Interpretation of the course listings

**IFST 445  Parent Resources  2**
Emphasis on techniques in working and communicating with parents, understanding parent-child relationships and effectively utilizing parent, teacher, home, and school community resources.
Prereq: IFST 101.
Coreq: IFST 459 or EDUC 400.

**IFST 449  Internship in Community Services  3-9 PF**
On-the-job experience in a community and family service agency.
Restrictions: Requires permission of instructor.

1. Subject area and course number.
2. Course title.
3. Credit hours.
   a. When only one number is printed it is a fixed credit hour course.
   b. When two numbers are printed it is a variable credit hour course.
   The lower number is the minimum number of credits that a student may take in a section of this course in a semester. The higher number is the maximum number of credits that a student may take in this course in a semester. A department may choose to offer a variable credit hour course as fixed in a particular semester, as long as the number of credit hours is within the range of the minimum and maximum for the course.
4. Grade types:
   a. When blank the course is a letter graded course.
   b. Course for which the grade is either pass or fail.
   c. R, RP - Not for baccalaureate credit.
   d. NR - No grade required.
5. Brief description of the course.
6. Prerequisites may be satisfied by the course or courses indicated or by equivalent preparation.
7. Corequisite course or courses should be taken in the same semester as the course.
8. Special requirements for the course. Some courses only offered during specific semesters have those semesters identified here. Questions about when a course will be offered should be directed to the department.

Interpretation of course numbers:

- **U**ndergraduate-level courses
- **P**rerequisite courses
- **R**equired courses
- **T**raditional courses
- **E**xperimental courses
- **V**ariable courses
- **N**ot for credit

### Courses numbered 500 to 599
- May not be taken for graduate credit in a student's major.
- With the approval of the graduate student's major department, 500-level courses taken outside the student's major may be counted toward graduate degree requirements.
- Courses numbered 600 to 699 are graduate-level courses also open to qualified advanced undergraduates with the consent of the instructor. There should be a standard of expectation and grading for all students registered at this level.
- In those few cases where the number of either undergraduate students or graduate students does not permit adequate offerings of both a 400-level and a 600-level course, a graduate 600-level course may be combined with a separately numbered 400-level undergraduate course in the same section. The graduate component must then be offered with a graduate standard of expectation and grading.
- The appropriateness of 600-numbered courses for undergraduate credit is subject to review by the Committee on Undergraduate Studies.
ACCT 160 INTRODUCTION TO BUSINESS INFORMATION SYSTEMS I 3
Introduction to computers: components and operations. Introduction to management information/decision support systems and the system development process. Emphasis on microcomputers and software packages used in business.

ACCT 200 SURVEY OF ACCOUNTING 4
Survey of financial and managerial accounting concepts for the non-business major. Students learn about financial statements for merchandising, manufacturing, and service companies. Topics include: accounting cycle, budgeting, standard costing, contribution margins, cost-volume-profit analysis, and decision making. RESTRICTIONS: No credit granted for majors within the accounting or business degree programs.

ACCT 207 ACCOUNTING I 3

ACCT 208 ACCOUNTING II 3

ACCT 261 INTRODUCTION TO BUSINESS INFORMATION SYSTEMS II 3

ACCT 302 ACCOUNTING INFORMATION SYSTEMS 3
Accounting information and its place within an organization’s overall management information system. Emphasis on information and document flow, internal control, data organization, and the analysis, design, development, and audit of computer-based accounting systems. Includes some computer work. PREREQ: ACCT208, ACCT160. RESTRICTIONS: Requires junior status.

ACCT 315 INTERMEDIATE ACCOUNTING I 3
In-depth coverage of financial accounting. Topics include: environment and conceptual framework of financial accounting; review of the accounting process; preparation of financial statements; recognition and measurement of current assets, property, plant and equipment and current liabilities. PREREQ: ACCT207, ACCT208. RESTRICTIONS: Requires junior status.

ACCT 316 INTERMEDIATE ACCOUNTING II 3
Continuation of ACCT315. Topics include: recognition and measurement of investments, long-term liabilities and stockholders’ equity; dilutive securities and earnings per share calculations; revenue recognition; accounting for income taxes, pensions and leases; accounting changes and error analysis; financial reporting and changing prices; preparation of the statement of cash flows; and disclosure requirements in financial reporting. PREREQ: ACCT315. RESTRICTIONS: Requires junior status and a grade of C or better in ACCT315.

ACCT 327 COST ACCOUNTING 3
Process, job order and standard costing; direct and absorption costing; budgeting, decentralization, and transfer pricing; and cost analysis for managerial applications. PREREQ: ACCT208. RESTRICTIONS: Requires junior status.

ACCT 350 BUSINESS LAW I 3
The formation, use and performance of contracts, including both Common Law and the Uniform Commercial Code (Article 2, Sales). Other topics covered include product liability, negotiable instruments and accountants’ liability.

ACCT 351 BUSINESS LAW II 3
Covers a variety of areas of the law, including agency, partnerships, corporations, unfair competition, debtor-creditor relationships, bankruptcy, secured transactions, real and personal property, wills and trusts. PREREQ: ACCT350.

ACCT 352 LAW AND SOCIAL ISSUES IN BUSINESS 3
Focuses on the legal environment of business, including objectives of the law, sources of the law, the regulatory and judicial process, and the effect of government and society on the formation and evolution of the law. RESTRICTIONS: Not open to accounting majors.

ACCT 366 INDEPENDENT STUDY 1-6

ACCT 395 SEMINAR: INTERNATIONAL ACCOUNTING 3
Seminar on selected topics in international accounting. Combines lectures and visits to local organizations. PREREQ: ACCT207. RESTRICTIONS: Taught abroad.

ACCT 410 THEORY OF EXTERNAL REPORTING 3
Covers the traditional model of accounting for information users external to the firm as well as modern descriptive research. Examines the institutional environment and the impact of the organization on the development of accounting theory and practice. PREREQ: ACCT316. RESTRICTIONS: Accounting junior or senior status.

ACCT 413 INCOME TAX ACCOUNTING 3
Analysis of recent revenue acts; use of federal law and regulations to determine tax liability. PREREQ: ACCT315. RESTRICTIONS: Requires junior status and a grade of C or better in ACCT315.

ACCT 414 FEDERAL INCOME TAXATION: RESEARCH AND PLANNING 3
Introduction to tax research and corporate and partnership tax laws. Introduces research tools useful for analyzing tax issues. Student uses acquired skills to explore corporate and partnership taxation concepts. PREREQ: ACCT413.

ACCT 415 ADVANCED ACCOUNTING 3
Introduction to branch accounting, consolidations, partnerships, fund accounting for state and local governments, and accounting for international transactions. Other relevant topics may also be covered. PREREQ: ACCT316. RESTRICTIONS: Requires senior status and a grade of C or better in ACCT316.

ACCT 417 AUDITING 3
An introduction to the standards and procedures underlying contemporary auditing. Topics include ethics, legal liability, internal control, audit evidence, audit reports, statistical sampling, the audit of computerized systems, operational auditing, other engagements and services. PREREQ: ACCT316. RESTRICTIONS: Requires senior status and a grade of C or better in ACCT316.

ACCT 425 STRATEGIC INFORMATION SYSTEMS AND ACCOUNTING 3
Explores the role of accounting and information systems in accomplishing the strategic goals of the corporation. Students will be exposed to accounting information from large data bases, enterprise-wide computing environments and cases and projects related to strategic problem solving across functional areas of business. PREREQ: ACCT302 and ACCT316. RESTRICTIONS: Accounting majors only.

ACCT 466 INDEPENDENT STUDY 1-6

ACCT 483 INTRODUCTION TO INTERNATIONAL ACCOUNTING 3
Describes the functions of international accounting; foreign currency transactions, financial statement translation, inflation, auditing and taxation. Current issues are covered as appropriate. PREREQ: ACCT207.

ACCT 614 FEDERAL TAX RESEARCH AND PLANNING 3
Analysis of recent revenue acts; use of federal law and regulations to determine tax liability. PREREQ: ACCT315. RESTRICTIONS: Requires junior status and a grade of C or better in ACCT315.

ACCT 640 INDEPENDENT STUDY 1-6

ACCT 800 FINANCIAL REPORTING AND ANALYSIS 3
Surveys concepts underlying financial accounting and external reporting. Provides an understanding of accounting methods, standards, and terminology so that students can interpret and evaluate financial statements. Students are encouraged to participate in class and group discussions involving contemporary investment issues and decisions. RESTRICTIONS: Not open to M.S. in Accounting students.

ACCT 801 MANAGEMENT CONTROL SYSTEMS AND INFORMATION TECHNOLOGY 3
Examines the use of management control systems to influence and direct managerial behavior in accomplishing strategic objectives. The impact of information technology on their design and implementation is considered as well as the strategic use of technology to transform the organization and maintain competitive advantage. PREREQ: ACCT800 or equivalent. RESTRICTIONS: Not open to M.S. in Accounting students.
### ACC 804 Database Design, Networks and Implementation 3
Covers the design and implementation of enterprise databases in a business environment. Special consideration will be placed on issues related to systems in a networked setting, including current topics related to the management and implementation of databases in such systems.

**Restrictions:** Open to business and accounting graduate students only.

### ACC 805 Current Issues in Management Information Systems 3
Addresses current information technology challenges facing today's corporate management. Although content will constantly change to reflect current technology and emerging issues, topics include: ethics, management of the impact of new information systems on corporate environments, implementation issues, and changing systems in a global environment.

**Restrictions:** Open to business and accounting graduate students only.

### ACC 806 Systems Analysis, Design and Implementation 3
Explores the management, organizational and technical challenges of developing systems. Analyzes business processes within a data-driven development methodology. Students will elicit requirements, weigh alternatives and design and implement solutions. Data, process and object modeling will be covered.

**Restrictions:** Open to MS: Information Systems & Technology Management, MS: Accounting, and MBA majors with a concentration in Information Technology.

### ACC 810 Theory of External Reporting 3
Study of contemporary models of accounting for information users external to the firm. Includes an examination of the institutional environment and the impact of the institutions on the development of accounting theory and practices.

**Prerequisite:** ACC 316.

### ACC 811 Advanced Management Accounting 3
Examination of concepts and rationale underlying managerial accounting methods. Advanced topics in decision analysis, standard costing and performance measurement.

**Prerequisite:** ACC 312.

### ACC 812 Corporate Tax Planning and Decision Making 3
Topics include gross income, business deductions and credits, taxable entities, special limitations on business and passive activity losses; compensation planning; tax facets in the use of the disposition of fixed assets; non-taxable transaction; and family tax planning.

**Restrictions:** Not open to students with prior tax courses.

### ACC 817 Information Technologies Audit 3
Analysis of current and prospective developments in professional auditing. Topics include auditing computerized systems and the use of statistical sampling by the auditor.

**Prerequisite:** ACC 417.

### ACC 820 Financial Statement Analysis 3
Examines contemporary aspects of financial statement analysis such as the supply and demand for accounting information, statistical properties of accounting numbers and the impact of information on securities prices.

**Prerequisite:** ACC 800.

### ACC 840 Contemporary Issues in Accounting 3
Selected problems of current interest to the accounting profession.

**Prerequisites:** ACC 316 and ACC 272.

**Restrictions:** Requires permission of instructor.

### ACC 868 Research 1-6

### ACC 883 International Accounting 3
Describes the functions of international accounting: foreign currency transactions, financial statement translation, inflation, auditing, and taxation. A comparative approach is stressed. Current issues are covered as appropriate.

**Prerequisite:** ACC 800 or equivalent.

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### AFSC 110 Foundations of the United States Air Force 3
Introduces the role in our society of the Department of Defense and Air Force. Emphasis is placed on Air Force doctrine, mission and organization, as well as U.S. strategic offensive forces. Introduces the concept of professionalism and assesses oral and written communication skills.

### AFSC 111 Foundations of the United States Air Force II 1
Continuation of AFSC 110. Emphasis on mission, organization and function of U.S. Air Force strategic, defensive, general purpose and aerospace support forces. Includes understanding the use of army, naval and reserve forces in achieving national security objectives. Assesses oral and written communication skills.

### AFSC 150 Initial Military Training I 0 PF
Provides instruction on the ROTC program and an overview to Air Force skills and life.

**Corequisite:** AFSC 110.

**Restrictions:** Open to freshmen and sophomores.

### AFSC 151 Initial Military Training II 0 PF
Continuation of AFSC 150. Provides instruction on the ROTC program and an overview to Air Force skills and life.

**Corequisite:** AFSC 111.

**Restrictions:** Open to freshmen and sophomores.

### AFSC 210 Evolution of United States Air and Space Power I 3
Focuses on development of air power from its beginning through two world wars; evaluates air power concepts, doctrine and role of technology in growth of air power; considers air power development in military and non-military operations in support of national objectives. Assesses oral and written communication skills.

### AFSC 211 Evolution of United States Air and Space Power II 1
Continuation of AFSC 210. Focuses on growth and development of air and space power since 1945 in response to Korea, the Cold War, Southeast Asia, the Persian Gulf and the Space Age. Also includes peaceful employment of air and space forces for relief and civic action programs. Assesses oral and written communication skills.

### AFSC 250 Field Training Preparation I 0 PF
Prepares cadets to attend the summer training program required for all those wishing to earn a commission through the ROTC program.

**Restrictions:** Open to sophomores and juniors. Required for all cadets planning to attend field training in the next year.

### AFSC 251 Field Training Preparation II 0 PF
Continuation of AFSC 250. Prepares cadets to attend the summer training program required for all those wishing to earn a commission through the Air Force ROTC program.

**Restrictions:** Open to sophomores and juniors. Required for all cadets planning to attend field training in the next year.

### AFSC 300 Leadership Studies I 3
Focuses on applying concepts in leadership and management by comprehending leadership styles and managerial functions, concepts of individual motivation and organizational/group dynamics, and decision-making processes. Emphasizes oral and written communication skills, leadership research and behavior.

### AFSC 310 Leadership Studies II 3
Continuation of AFSC 300. Emphasis on understanding and applying management concepts, principles and functions in relation to the organization and work environment. Continued emphasis on oral and written communication skills, leadership research and behavior.

### AFSC 350 Intermediate Cadet Leader Training I 0 PF
Allows cadets to practice leadership skills and Air Force specific skills.

**Corequisite:** AFSC 310.

**Restrictions:** Restricted to those cadets who have completed Field Training.

### AFSC 351 Intermediate Cadet Leader Training II 0 PF
Continuation of AFSC 350. Allows cadets to practice leadership skills and Air Force specific skills.

**Corequisite:** AFSC 311.

**Restrictions:** Restricted to those cadets who have completed Field Training.

### AFSC 410 National Security Affairs I 3
Focuses on political, economic and social constraints in the international environment and their effects on the formulation of U.S. defense policy. Also includes the impact of technology, doctrine, alliances, arms control and terrorism on national security policy. Emphasizes oral and written communication skills.

### AFSC 411 National Security Affairs II 3
Continuation of AFSC 410. Focuses on role and function of the professional officer in a democratic society; the socialization processes, prevailing public attitude and value orientations associated with military service; principal requisites for maintaining national security forces; and the military justice system. Continued emphasis on oral and written communication skills.

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**Air Force Science**

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AFSC 450 SENIOR CADET LEADER TRAINING I 0 PF
Allows cadets within one year of commissioning to polish their leadership skills while learning about aspects of the military which will directly impact them upon entrance to active duty.
COREQ: AFSC410.
RESTRICTIONS: Restricted to those cadets who have completed Field Training.

AFSC 451 SENIOR CADET LEADER TRAINING II 0 PF
Continuation of AFSC450. Allows cadets within one year of commissioning to polish their leadership skills while learning about aspects of the military which will directly impact them upon entrance to active duty.
COREQ: AFSC411.
RESTRICTIONS: Restricted to those cadets who have completed Field Training.

AGRICULTURAL EDUCATION

AGED 180 INTRODUCTION TO AGRICULTURAL EDUCATION 3
Provides the foundation for planning activities necessary for an agricultural education program. Historical foundations, purposes and roles of schools, contemporary issues and careers in agricultural education are discussed. An early field-based experience and portfolio development is included.
RESTRICTIONS: Freshman or sophomore classification or approval of instructor.

AGED 266 SPECIAL PROBLEM 1-3

AGED 280 FFA AND SUPERVISED AGRICULTURAL EXPERIENCE 3
A prepares students with the activities necessary for an agricultural education program, specifically the history and structure of a FFA chapter and the development of individual supervised agricultural experiences for high school students.
RESTRICTIONS: Freshman or sophomore classification or approval of instructor.

AGED 366 INDEPENDENT STUDY 1-6

AGED 425 AGRICULTURAL LEADERSHIP; TOOLS AND TECHNIQUES 3
Topics include leadership theories, team work, facilitation, internet research, problem solving and facilitating team activities focused on agricultural industries and professions.
RESTRICTIONS: Not open to freshmen.

AGED 448 STUDENT TEACHING PORTFOLIO 1 PF
Enables students to devote the appropriate amount of time needed to produce a finished product which can be used when seeking employment. Additionally, it teaches the basics of implementing the pedagogy learned in the classroom, and helps refine technology skills since the final portfolio is in a web-based format that can be accessed when needed. The professional portfolio is a requirement for NCATE and AGED480/680.

AGED 466 INDEPENDENT STUDY 1-6

AGED 480 CAREER AND TECHNICAL EDUCATION MATERIALS AND APPROACHES I 3
Teaching methods, treatment of aims, materials, unit organization, evaluation and teaching techniques. Participation in career and technical student organization activities required.
PREREQ: Students must show evidence of passing Praxis I.
RESTRICTIONS: School practicum of 12 hours required.

AGED 481 CAREER AND TECHNICAL EDUCATION MATERIALS AND APPROACHES II 3
Methods of teaching and organization in supervised career and technical programs, applied technical skills and adult education and community activities. Participation in career and technical student organization activities required.
PREREQ: Students must show evidence of passing Praxis I.
RESTRICTIONS: School practicum of 12 hours required.

AGED 600 INTERNSHIP IN TEACHING 3-6
Full-time 18-week teaching internship experience in 7-12th grade schools. Students are under the guidance and supervision of a cooperating teacher in the classroom and a University of Delaware supervisor.
PREREQ: Students must show evidence of passing Praxis I.
RESTRICTIONS: Must be repeated for a total of 9 credits.

AGED 625 AGRICULTURAL LEADERSHIP; TOOLS AND TECHNIQUES 3
Topics include leadership theories, team work, facilitation, internet research, problem solving and facilitating team activities focused on the agricultural industries and professions.

AGED 648 MASTER’S PORTFOLIO 1 PF
Use of multiple assessment indicators in formative evaluation of improvement of candidate’s teaching effectiveness.
PREREQ: Completion of at least 21 graduate credits toward master’s degree and evidence of passing Praxis II content area as specified by the State of Delaware.

AGED 666 SPECIAL PROBLEM 1-12

AGED 680 CAREER AND TECHNICAL EDUCATION MATERIALS AND APPROACHES I 3
Teaching methods, treatment of aims, materials, unit organization, evaluation and teaching techniques. Participation in career and technical student organization activities required.
PREREQ: Students must show evidence of passing Praxis I.
RESTRICTIONS: School practicum of 12 hours required.

AGED 681 CAREER AND TECHNICAL EDUCATION MATERIALS AND APPROACHES II 3
Methods of teaching and organization in supervised career and technical programs; applied technical skills and adult education and community activities. Participation in student career and technical activities required.
PREREQ: Students must show evidence of passing Praxis I.
RESTRICTIONS: School practicum of 12 hours required.

AGRICULTURE

AGRI 164 PRACTICAL TEAMWORK EXPERIENCE 1-3
Examines roles of leaders, strategies for working in teams, and principles of event planning. The final project is the planning and execution of Ag Day, a college-wide community event.
RESTRICTIONS: Limited to majors in the College of Agriculture and Natural Resources.

AGRI 165 MASTERING THE FRESHMEN YEAR 1 PF
Focuses on academic services, career exploration and preparation, campus resources, and practical skills that are helpful in mastering the freshman year.
RESTRICTIONS: Limited to freshmen in the College of Agriculture and Natural Resources.

AGRI 211 LITERATURE OF THE AGRICULTURAL AND LIFE SCIENCES 1
Promotes familiarity with arrangement of the card catalog, guides to literature, indexes to periodical literature, abstracting services, bibliographic form, and scientific papers and reports. Aids students in scientific writing and reporting.
RESTRICTIONS: Not open to freshmen.

AGRI 212 ORAL COMMUNICATION IN AGRICULTURE AND NATURAL RESOURCES 3
Introduces basic communication principles and provides a series of experiences designed to develop skills needed for oral presentations and other forms of public and interpersonal communication.
RESTRICTIONS: Open to majors only.

AGRI 399 TEACHING ASSISTANT 1-4 PF
Practical teaching experience. Students participate and assist in instruction of an undergraduate course.
PREREQ: Must have taken the course for which assisting, or have equivalent experience.
RESTRICTIONS: An overall GPA of 2.5 or better is required. Maximum of 4 credits may count toward graduation.

AMERICAN MATERIAL CULTURE STUDIES

AMCS 216 INTRODUCTION TO MATERIAL CULTURE STUDIES 3
See ARTH216 for course description.

AMCS 243 AMERICAN DECORATIVE ARTS,1700-1900 3
See ARTH243 for course description.

AMCS 402 AMERICAN MATERIAL CULTURE RESEARCH SEMINAR 3
Balanced emphasis on writing skills, research strategies and interpretation related to the study of American material culture. Students will develop research projects drawing on the collections of local and regional museums, libraries and historical agencies.
PREREQ: ANTH216.
RESTRICTIONS: Open to majors only.

AMCS 435 SEMINAR IN AMERICAN ART 3
See ARTH435 for course description.
RESTRICTIONS: May be repeated for credit when topics vary.
ANSC 270  BIOTECHNOLOGY: SCIENCE AND SOCIOECONOMIC ISSUES  3
Introduction to agricultural biotechnology and socio-economic issues. Introduces genetic engineering and the basic scientific theory and the applications of biotechnology in agriculture production and research. Presents issues surrounding biotechnology risk and technology assessment, animal rights, public and private research interface, media and environmental perspectives, consumer acceptance, regulation and economic development. May be cross-listed with FREC270 and/or PLSC270.

ANSC 300  PRINCIPLES OF ANIMAL AND PLANT GENETICS  3
Introduction to the theory and application of genetics as related to the improvement of plants and animals. May be cross-listed with ENWC300 and/or PLSC300. PREREQ: ANSC101 and ANSC140, or PLSC101.

ANSC 305  FOOD SCIENCE  3
See FOSC305 for course description.

ANSC 310  ANIMAL AND PLANT GENETICS LABORATORY  1
Laboratory exercises concerning genetic concepts, methods and applications using various plant and animal systems. May be cross-listed with ENWC310 and/or PLSC310. COREQ: ANSC300.

ANSC 315  FOOD SAFETY FROM FARM TO FORK  3
See FOSC315 for course description. PREREQ: BISC207 or equivalent. RESTRICTIONS: Offered in Spring semester.

ANSC 322  HORSEMANSHIP  3
Practical application of principles of equine husbandry, techniques of horsemanship and methods used in selection and evaluation.

ANSC 324  EQUINE DISEASE AND LAMENESS  3
A study of infectious and non-infectious diseases common to the horse. Principles of pathophysiology, manifestation, prevention, and control of disease are emphasized. Approximately one third of course content will include types, cause, prevention, and management of musculoskeletal disease (lameness) in the horse.

ANSC 328  FOOD CHEMISTRY  4
See FOSC328 for course description.

ANSC 329  FOOD ANALYSIS  4
See FOSC329 for course description. PREREQ: CHEM214 or CHEM527, and CHEM220.

ANSC 332  INTRODUCTION TO ANIMAL DISEASES  3
Nature and mechanisms of disease processes with emphasis on their prevention and control. PREREQ: ANSC140.

ANSC 366  INDEPENDENT STUDY  1-6
RESTRICTIONS: Contract must have department chair signature. Independent study to involve library or lab research.

ANSC 399  TEACHING ASSISTANT  1-2 PF
Practical teaching experience. Students participate and assist in instruction of an undergraduate course. RESTRICTIONS: A GPA of 2.75 (3.0 in major) is required. Students must have taken the course or have equivalent experience.

ANSC 404  DAIRY PRODUCTION  4
Principles of modern dairy production units emphasizing nutrition, reproduction, housing, health, management and lactation. PREREQ: ANSC101 and ANSC251. RESTRICTIONS: Offered in Spring of even-numbered years. Laboratory requires some out of class time for hands-on experience in animal production facilities.

ANSC 409  FOOD PROCESSING I  4
See FOSC409 for course description.

ANSC 415  VERTEBRATE DEVELOPMENTAL MORPHOLOGY  3
See BISC415 for course description. PREREQ: BISC207 and BISC208.

ANSC 417  BEEF CATTLE AND SHEEP PRODUCTION  4
Principles of modern beef cattle and sheep production; nutrition, reproduction, housing, health and management. PREREQ: ANSC101 and ANSC251. RESTRICTIONS: Offered in Spring of odd-numbered years. Laboratory requires some out of class time for hands-on experience in animal production.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSC 418</td>
<td>Swine Production</td>
<td>4</td>
<td>Principles of modern swine production: nutrition, reproduction, housing, health and management. PREREQ: ANSC101 and ANSC251. RESTRICTIONS: Offered in Spring of even-numbered years. Laboratory requires some out-of-class time for hands-on experience in animal production.</td>
</tr>
<tr>
<td>ANSC 419</td>
<td>Topics in International Animal Agriculture</td>
<td>3-4</td>
<td>Instruction in animal production taught as part of a study abroad course. Topics vary with program location and focus. PREREQ: ANSC 101.</td>
</tr>
<tr>
<td>ANSC 420</td>
<td>Equine Reproductive Management</td>
<td>4</td>
<td>Provides an in-depth study of the anatomy, endocrinology, physiology, behavior, and management of the mare, stallion, and foal. The laboratory provides an opportunity to care for a pregnant mare, to be present at foaling, and care for the newborn foal. PREREQ: ANSC101 and ANSC220 or permission of instructor.</td>
</tr>
<tr>
<td>ANSC 421</td>
<td>Poultry Production</td>
<td>4</td>
<td>Application of the fundamental principles of incubation, feeding, brooding, growing, disease control, processing and marketing as applied to broilers, heavy breeders and commercial egg producers. Additional hands-on experience outside of class is required. PREREQ: ANSC101 and ANSC140.</td>
</tr>
<tr>
<td>ANSC 422</td>
<td>Nonruminant Nutrition</td>
<td>3</td>
<td>Advanced comparative study of the digestion, absorption and metabolism of nutrients in terms of the needs of nonruminant animals. Application of principles to swine, poultry and equine nutrition. PREREQ: ANSC 251, CHEM 214. RESTRICTIONS: Offered in Spring of odd-numbered years.</td>
</tr>
<tr>
<td>ANSC 435</td>
<td>Virology</td>
<td>3</td>
<td>Lecture-based introduction to virus functional characterization including classification methods, replication strategies and pathogen-host interactions. Content stresses current methods in the diagnosis and analysis of viruses associated with important animal diseases. PREREQ: ANSC431 or BISC300.</td>
</tr>
<tr>
<td>ANSC 436</td>
<td>Immunology of Domestic Animals</td>
<td>3</td>
<td>Comparative study of the immune response of domestic animals including dog, cat, horse, pig, chicken and others. General topics include ontogeny of the immune system, reproductive immunity, neonatal immunity, immunodeficiencies and autoimmunity. PREREQ: ANSC332 and BISC207. RESTRICTIONS: Offered in Fall of even-numbered years.</td>
</tr>
<tr>
<td>ANSC 438</td>
<td>Immunological Techniques</td>
<td>1</td>
<td>Laboratory sessions demonstrating the various types of cellular and humoral immunity in animals and methods of evaluating the immune response. RESTRICTIONS: Offered in Fall of even-numbered years.</td>
</tr>
<tr>
<td>ANSC 441</td>
<td>Reproductive Physiology of Domestic Animals</td>
<td>3</td>
<td>Emphasis on physiology and endocrinology of reproductive function in males and females, comparative aspects of reproductive function and opportunity for enhancing production through newer management practices. Discussion and laboratory involve both classic and current state of knowledge in mammalian and avian reproduction. PREREQ: ANSC140, BISC306 strongly recommended.</td>
</tr>
<tr>
<td>ANSC 442</td>
<td>Lactational Physiology</td>
<td>3</td>
<td>Fundamentals of physiology and metabolism involved in initiation, maintenance and cessation of lactation. Neuroendocrine control of lactation, nutrient absorption and processing by the mammary gland and control of milk composition. Covers mammals of commercial dairy importance as well as rodents, horses and humans. PREREQ: ANSC140.</td>
</tr>
<tr>
<td>ANSC 445</td>
<td>Comparative Physiology of Domestic Animals</td>
<td>3</td>
<td>Comparative approach to the study of the physiology of domestic animals of economic importance in animal agriculture. Emphasis on cardiovascular physiology, the immune system, excretion, respiration, stress physiology and the control and coordination of body functions via the nervous and endocrine system. PREREQ: ANSC140. RESTRICTIONS: Offered in Fall only. Required for prevet concentration.</td>
</tr>
<tr>
<td>ANSC 454</td>
<td>Ruminant Nutrition</td>
<td>3</td>
<td>Practical and applied aspects of ruminant nutrition with an emphasis on dairy. Topics include basic nutrient requirements and nutrition management aspects for different age and production classes of dairy cattle. PREREQ: ANSC101, ANSC111 and ANSC251. ANSC404 or ANSC417 recommended.</td>
</tr>
<tr>
<td>ANSC 464</td>
<td>Animal Science Field Experience</td>
<td>1-12 PF</td>
<td>Opportunity to gain work experience in a field related to the animal sciences and to explore potential occupational areas. RESTRICTIONS: Over six credits by permission of chair only. A clear understanding of supervision and reporting is required.</td>
</tr>
<tr>
<td>ANSC 466</td>
<td>Independent Study</td>
<td>1-6</td>
<td>RESTRICTIONS: Contract must have department chair signature. Independent study to involve library or lab research.</td>
</tr>
<tr>
<td>ANSC 470</td>
<td>Principles of Molecular Genetics</td>
<td>3</td>
<td>Fundamentals of nucleic acid biochemistry (replication, repair and recombination) and bacterial genetics are studied to provide the background needed for detailed study of selected topics in animal and plant molecular biology. PREREQ: BISC401/411 and ANSC300.</td>
</tr>
<tr>
<td>ANSC 615</td>
<td>Vertebrate Developmental Biology</td>
<td>3</td>
<td>See BISC615 for course description. PREREQ: BISC401/411 and BISC403/413. RESTRICTIONS: Requires approval of instructor.</td>
</tr>
<tr>
<td>ANSC 462</td>
<td>Food Analysis</td>
<td>4</td>
<td>See FOSC629 for course description.</td>
</tr>
<tr>
<td>ANSC 630</td>
<td>Trace Minerals and Vitamins</td>
<td>3</td>
<td>See NTD630 for course description.</td>
</tr>
<tr>
<td>ANSC 632</td>
<td>Elements of Pathology</td>
<td>3</td>
<td>Microscopic and gross changes in cells, tissues and organs as a result of a disease process. PREREQ: ANSC332 or ANSC633.</td>
</tr>
<tr>
<td>ANSC 633</td>
<td>Poultry Pathology</td>
<td>3</td>
<td>Study of poultry diseases with emphasis on their causes, prevention, treatment and control. PREREQ: ANSC332, ANSC431 and ANSC635.</td>
</tr>
<tr>
<td>ANSC 635</td>
<td>Virology</td>
<td>3</td>
<td>Lecture-based introduction to virus functional characterization including classification methods, replication strategies and pathogen-host interactions. Content stresses current methods in the diagnosis and analysis of viruses associated with important animal diseases. PREREQ: ANSC431 or BISC300.</td>
</tr>
<tr>
<td>ANSC 636</td>
<td>Immunology of Domestic Animals</td>
<td>3</td>
<td>Comparative study of the immune response of domestic animals including dog, cat, horse, pig, chicken and others. General topics include ontogeny of the immune system, reproductive immunity, neonatal immunity, immunodeficiencies and autoimmunity. PREREQ: ANSC332 and BISC207. RESTRICTIONS: Offered in Fall of even-numbered years.</td>
</tr>
<tr>
<td>ANSC 637</td>
<td>Avian Immunology</td>
<td>3</td>
<td>Advanced study of the avian immune system covering cellular and humoral immune responses; autoimmunity; neuroendocrine-immune interactions; nutritional effects on the immune system; and immunogenetics. RESTRICTIONS: Offered in Spring of even-numbered years.</td>
</tr>
<tr>
<td>ANSC 638</td>
<td>Immunological Techniques</td>
<td>1</td>
<td>Laboratory sessions demonstrating the various types of cellular and humoral immunity in animals and methods of evaluating the immune response. RESTRICTIONS: Offered in Fall of even-numbered years.</td>
</tr>
<tr>
<td>ANSC 639</td>
<td>Food Microbiology</td>
<td>4</td>
<td>See FOSC639 for course description.</td>
</tr>
<tr>
<td>ANSC 644</td>
<td>Bioinformatics</td>
<td>3</td>
<td>Examines computer applications to biological sciences with emphasis placed upon genomics and proteomics applications. No computer programming experience required.</td>
</tr>
<tr>
<td>ANSC 654</td>
<td>Advanced Ruminant Nutrition</td>
<td>3</td>
<td>Emphasis of metabolic aspects of ruminant microbiology and intermediary metabolism. Discussions on methods to partition nutrients at the tissue level and methods to alter rumen fermentation. May be cross-listed with NTD6154. PREREQ: Undergraduate or graduate courses in nutrition, microbiology, biochemistry, ANSC454 or equivalents. ANSC404 or ANSC417 recommended.</td>
</tr>
<tr>
<td>ANSC 668</td>
<td>Research</td>
<td>1-6</td>
<td>RESTRICTIONS: Over six credits by permission of chair only. A clear understanding of supervision and reporting is required.</td>
</tr>
<tr>
<td>ANSC 670</td>
<td>Principles of Molecular Genetics</td>
<td>3</td>
<td>Fundamentals of nucleic acid biochemistry (replication, repair, recombination) and bacterial genetics provide the background needed for detailed study of selected topics in animal and plant molecular biology. PREREQ: BISC401/411 and ANSC300.</td>
</tr>
</tbody>
</table>
ANTH 336  **Women in Cross-Cultural Perspective**  3  
See WOMS363 for course description.

ANTH 366  **Independent Study**  1-6

ANTH 370  **Culture of Food Production and Economic Development**  3  
Social and cultural dynamics of food production, distribution and consumption throughout the developing world, examined in the context of concepts and policies of development.

ANTH 375  **Peoples and Cultures of Modern Latin America**  3  
Contemporary cultures and societies of Latin America, with emphasis on historical perspective. Rural and urban populations, the elite, the military, the church, students and workers.

ANTH 379  **Historical Archaeology of the Eastern United States**  3  
Surveys the substantive contributions of historical archaeology to the study of the cultural history of eastern North America beginning with the period of initial European contact. May be cross-listed with HIST379.

ANTH 380  **Peoples and Cultures of Mexico and Central America**  3  
Cultures, institutions and ethnic groups of contemporary Mexico and Central America: Description and analysis of major cultural traditions and social institutions of Indian and non-Indian groups.

ANTH 381  **Visions of Native Americans**  3  
Critically examines the visual images of Native Americans that have been created in films, photography, commercial art and media and analyzes how those images function in Euroamerican culture.

ANTH 382  **Anthropology and Business**  3  
How culture affects business and capitalism in societies worldwide and how modern capitalistic life affects culture. Looks at diverse work cultures from direct-sales organizations to dot-coms, street-vendor businesses to megacorporations, as well as working women and the working poor in different cultures.

ANTH 385  **Historical Archaeology of American Battlefields**  3  
Represents the material culture interpretation of selected historical conflicts with an emphasis on the American war sites. Topics vary and include a broad spectrum of social and ethnic groups in battle and the material evidence of armed struggle. Besides the Civil War, interpretation is given from a material culture perspective of the wars of the 20th century. The commonality of behavior by individuals subjected to war is emphasized.

ANTH 390  **Honors Colloquium**  3  
See ARSC390 for description. RESTRICTIONS: Requires a GPA of 3.0 or higher.

ANTH 401  **The Idea of Race**  3  
The idea of race from historical and anthropological perspectives. The interpretation of racial differences in 18th and 19th century Europe and America and an examination of modern approaches to the question of human variability. RESTRICTIONS: Requires permission of instructor.

ANTH 404  **Human Osteology**  4  
The identification of the human skeleton, including complex and fragmentary materials. Basic bone growth, bone pathology, paleopathology and forensic identification. RESTRICTIONS: Requires permission of instructor.

ANTH 424  **Introduction to Archaeological Field Methods**  6  
Excavation at selected sites; laboratory work and field trips to museum sites.

ANTH 444  **Technology of Cultural Materials: Ceramics and Glass**  3  
See MSST444 for course description.

ANTH 445  **Technology of Cultural Materials: Metals**  3  
See MSST445 for course description.

ANTH 451  **Myth and Culture**  3  
The relationships between world views, cosmology, mythology and social institutions, illustrating the analytic methods of structuralist and functional anthropology. RESTRICTIONS: Requires permission of instructor.

ANTH 457  **Survey of African Art**  3  
Major African art styles, their interrelationships, the context of usage and the meanings of African artworks. May be cross-listed with ARTH457.
ANTH 463 HISTORICAL ARCHAEOLOGY AND THE PUBLIC 3
Provides practical experience through involvement in a project at an agency, research center or museum which researches, interprets, administers and preserves historical archaeological resources for the public. For students planning careers in historical archaeology, public history, university teaching, the museum field and historic preservation. May be cross-listed with HIST463 and/or MSST463.

ANTH 466 INDEPENDENT STUDY 1-6

ANTH 475 THE TEACHING OF ANTHROPOLOGY 3
Emphasis on the structure and coherence of the discipline - identifying central questions and assembling relevant data - as seen from the perspective of an anthropologist offering an introductory-level survey course. PREREQ: 15 hours of anthropology. RESTRICTIONS: Requires permission of instructor teaching the introductory course. Tutorial and primarily for majors.

ANTH 486 TUTORIAL IN SOCIAL AND CULTURAL ANTHROPOLOGY 3
History, theory and method in the field of social and cultural anthropology. RESTRICTIONS: Open to majors only. Requires permission of instructor.

ANTH 487 TUTORIAL IN ARCHAEOLOGY 3
History, theory and method in the field of archaeology. RESTRICTIONS: Open to majors only. Requires permission of instructor.

ANTH 488 TUTORIAL IN PHYSICAL ANTHROPOLOGY 3
History, theory and method in the field of physical anthropology. RESTRICTIONS: Open to majors only. Requires permission of instructor.

ANTH 604 HUMAN OSTEOLOGY 4
The identification of the human skeleton, including complex and fragmentary materials. Basic bone growth, bone pathology, paleopathology and forensic identification. RESTRICTIONS: Requires permission of instructor.

ANTH 644 TECHNOLOGY OF CULTURAL MATERIALS: CERAMICS AND GLASS 3
See MSST644 for course description.

ANTH 645 TECHNOLOGY OF CULTURAL MATERIALS: METALS 3
See MSST645 for course description.

ANTH 657 SURVEY OF AFRICAN ART 3
Major African art styles, their interrelationships, the context of usage and the meanings of African artworks. May be cross-listed with ARTH657.

ANTH 663 HISTORICAL ARCHAEOLOGY AND THE PUBLIC 3
Provides practical experience through involvement in a project at an agency, research center or museum which researches, interprets, administers and preserves historical archaeological resources for the public. For students planning careers in historical archaeology, public history, university teaching, the museum field and historic preservation. May be cross-listed with HIST663 and/or MSST663.

ARABIC

ARAB 105 ARABIC I - ELEMENTARY 4
Introduction to the Arabic language and development of speaking, listening, reading and writing skills through the use of basic texts.

ARAB 106 ARABIC II - ELEMENTARY/INTERMEDIATE 4
Completion of basic Arabic. Increasing mastery of the basic skills of speaking, listening, reading and writing. PREREQ: ARAB105. RESTRICTIONS: Two to three years of high school Arabic acceptable in lieu of ARAB105.

ARAB 107 ARABIC III - INTERMEDIATE 4
Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty. PREREQ: ARAB106. RESTRICTIONS: Four years of high school Arabic acceptable in lieu of ARAB106. Satisfies Arts and Sciences foreign language requirement.

ARTS AND SCIENCES

ARSC 136 TOPICS: EAST ASIA IN FILM 1-3
Explores East Asian cinema and society via readings, discussion and viewing of films by and/or about East Asians. Topics vary. May be cross-listed with HIST136. RESTRICTIONS: May be repeated for credit when topics vary.

ARSC 293 HONORS FORUM 1
Topics vary. RESTRICTIONS: May be repeated for credit when topics vary.

ARSC 295 HONORS ARTS FORUM 1
Attendance at, and critical appreciation of, performing arts events and visual arts events. RESTRICTIONS: May be repeated for credit when topics vary.

ARSC 296 HONORS FORUM: MULTICULTURAL 1
Recent topics include Passing the Torch: An Interdisciplinary Look at a World Pooled for Change; Living in History; Representations of Race, Class and Gender in the Media; Sexual Identity in Contemporary Culture. RESTRICTIONS: May be repeated for credit when topics vary.

ARSC 316 PEER TUTORING/ADVANCED COMPOSITION 3
Trains a selected group of upper-division students in writing techniques by applying recent composition theories to students’ own writing. Explores and evaluates fundamental theories of teaching writing. May be cross-listed with ENGL316.

ARSC 366 INDEPENDENT STUDY 1-6

ARSC 390 HONORS COLLOQUIUM 3
First year interdisciplinary Honors seminar. May be team-taught, specific topics vary.

ARSC 392 HONORS COLLOQUIUM: MULTICULTURAL 3
First year interdisciplinary Honors seminar. May be team-taught, specific topics vary.

ARSC 466 INDEPENDENT STUDY 1-6

ARSC 869 MASTER’S THESIS 1-6

ART

ART 110 DRAWING I 3
What do we see versus what we think we see? Perceptual drawing as a language and means of communication for artists and designers. Projects in and development of technical skills through basic drawing media explore drawing in its various forms: process/investigation, proposal, document, and artifact. COREQ: ART111 and ART116. RESTRICTIONS: Open to majors only

ART 111 DESIGN I 3
Introduction to the dynamic shaping of surface and space for expressive communication. Concentration on visual and temporal vocabulary of the artist and designer with an emphasis on organizational principles relative to art elements. Students represent, rank and rethink originality of designs and ideas. COREQ: ART110 and ART116. RESTRICTIONS: Open to majors only

ART 112 DRAWING II 3
Emphasizes drawing as the expressive communication of experience and ideas with increasing attention on the conceptual rather than perceptual. Progressive understanding of materials and mixed media with a broader development of critical vocabulary. COREQ: ART110, ART113 and ART117. RESTRICTIONS: Open to majors only

ART 113 DESIGN II 3
Artists and designers apply the vocabulary of Design I to projects of increasing complexity. Communicating in representational, abstract and non-objective formats, students give multi-sensory form to original concepts using 2D and 3D media. COREQ: ART112 and ART117.

ART 114 FOUNDATION COLLOQUIUM 0 PF
A weekly forum for the discussion of issues common to beginning level art students concurrently enrolled in foundation art courses. Presentations include overviews of disciplines within the Art Department and examinations of professional art practices. COREQ: ART110, 111, 112 or 113.
ART 115 FOUNDATION COLLOQUIUM 0 PF
A weekly forum for the discussion of issues common to beginning level art students concurrently enrolled in foundation art courses. Presentations will include overviews of disciplines within the Art Department and examinations of professional art practices.
COREQ: ART110, 111, 112 or 113.

ART 116 INTRODUCTION TO DIGITAL MEDIA 3
Introduction to the Macintosh computer through pixel-based and object oriented image manipulation plus exposure to time-based media. Looks at digital media as an investigative and creative tool in art and design; emphasis on relevance of technology to contemporary creative practices.
COREQ: ART110 and ART111.
RESTRICTIONS: Open to majors only

ART 117 RESEARCH STUDIO: PRACTICE AND PRODUCT 3
Problem solving for the artist and designer through projects that are media independent. Discussion of creative strategies for idea generation, research, critical analysis, and communication. Exploration and discovery toward the establishment of productive studio practice. Projects include both individual and collaborative investigations.
COREQ: ART112 and ART113.
RESTRICTIONS: Open to majors only

ART 129 DESIGN IN VISUAL ARTS 3
Introduction to design through the physical application of various art media, including charcoal, pencil, ink wash and paint. Study of design criteria and artistic objectives as they relate to the environment.
RESTRICTIONS: Open to nonmajors and nonminors only.

ART 130 DRAWING II: TOOLS AND TECHNIQUES 3
Projects involving black and white and color studies in a variety of media, including pencil, charcoal, ink and pastels.
RESTRICTIONS: Open to nonmajors and nonminors only.

ART 132 ELEMENTARY DRAWING AND PAINTING I 3
Representational drawing and painting from still lifes, landscapes and the human head in a variety of media including charcoal, pastel and paint.
RESTRICTIONS: Open to nonmajors and nonminors only.

ART 180 INTRODUCTION TO PHOTOGRAPHY 3
Study of photographic imagery and processes. Photography as a fine art medium and its uses past and present. Considerable camera work with slide processing done by students, nondarkroom.
RESTRICTIONS: Open to nonmajors and nonminors only.

ART 200 VISUAL COMMUNICATIONS PROCESS I 3
An introduction to communicating visually through conceptual thinking in the visual design process with the use of typography, imagery and layout, and an introduction to computer page layout and imaging.
RESTRICTIONS: Requires permission of instructor.

ART 201 VISUAL COMMUNICATIONS PROCESS II 3
Continuation of the introduction to communicating visually through conceptual thinking in the visual design process and the use of typography, imagery and layout. Continuation of computer page layout and imaging.
PREREQ: ART200.
COREQ: ART211.
RESTRICTIONS: Requires permission of instructor.

ART 205 MACINTOSH TOPICS 1
Variety of specific offerings for hands-on instruction of Macintosh computer software applications, various levels of expertise and varying length of instruction. Preliminary exam may be necessary to determine advanced coursework.
RESTRICTIONS: May be repeated for up to nine credit hours.

ART 210 VISUAL COMMUNICATIONS IMAGEMAKING I 3
Introduction to imagemaking principles and techniques as applied to design, visual thinking and communication problem solving through both photographic and illustration techniques. Includes various films and light sources for color and b/w photography with basic use of illustration media and techniques.
COREQ: ART200.
RESTRICTIONS: Requires permission of instructor.

ART 211 VISUAL COMMUNICATIONS IMAGEMAKING II 3
Continuation of imagemaking principles and techniques as applied to design, visual thinking and communication problem solving through both photographic and illustration techniques.
COREQ: ART201.
RESTRICTIONS: Requires permission of instructor.
ART 306  TELEVISION COMMERCIALS TO MTV 3
An introduction multimedia course involving the conceptualizing, sequencing and editing of still and video images with sound. Utilizing computer programs such as Adobe Premiere, projects can include movie trailers, television commercials, film graphics, animation and rock videos.
RESTRICTIONS: Only offered during Winter Session.

ART 307  INTERACTIVE MEDIA DESIGN 3
Introduction to interactive design involving information architecture, interactivity, navigation, page sequencing, imagery and page design using still images, moving images and sound. Projects emphasize web site design and may also include games, training and educational applications.
RESTRICTIONS: Requires permission of instructor.

ART 309  BOOK ARTS 3
Exploration of book arts as a complete object that integrates content and form through narratives and/or sequential picture planes. Emphasis on elements of design and the principles of book planning and production.

ART 310  APPLIED PHOTOGRAPHY 3
The development of conceptual and technical skills emphasizing both studio and location assignments for graphic and advertising design projects including editorial, annual reports, print advertising, posters, collateral materials, books, book jackets and packaging.
PREREQ: ART211 or ART380, ART381.
RESTRICTIONS: Requires permission of instructor.

ART 311  APPLIED PHOTOGRAPHIC ILLUSTRATION 3
The development of conceptual and technical skills emphasizing photographic applications in an editorial context. Projects include a wide variety of subjects along with the manipulation of images through the use of computers.
PREREQ: ART211 and ART310, or ART380 and ART381.
RESTRICTIONS: Requires permission of instructor.

ART 312  ILLUSTRATION I 3
Introduction of color through watercolor, gouache, acrylic, oil painting and dry color media. Emphasis on approaches to illustrated visual imagery in editorial, book, institutional and advertising.
PREREQ: ART211.
RESTRICTIONS: Requires permission of instructor.

ART 313  ILLUSTRATION II 3
Application of creative illustration concepts to editorial, book, institutional and advertising projects.
PREREQ: ART312.
RESTRICTIONS: Requires permission of instructor.

ART 315  ISSUES IN CONTEMPORARY ART 3
Examination of current issues of content and form; developments in technology; and social, political and cultural issues affecting contemporary visual art and artists. 
RESTRICTIONS: Completion of 60 credit hours.

ART 318  APPLIED DESIGN VISITS 3
To gain a global awareness of the applied design field students will visit, discuss and review design-related organizations (i.e., advertising agencies, design studios, interactive / Web design studios, photographers, illustrators, commercial directors, magazines, and design museums) through a series of assigned projects.
COREQ: ART319.

ART 319  APPLIED DESIGN TOPICS 3
Students undertake assigned independent research projects relating to applied design topics and projects (e.g., advertising, graphic and design, typography, applied photography, etc.) resulting in visual and written presentations.
COREQ: ART318.
RESTRICTIONS: Requires permission of instructor

ART 330  ADVANCED FIGURE DRAWING 3
Continued studies in figure drawing. Emphasis on advanced media techniques, description and personal expression.
PREREQ: ART230.
RESTRICTIONS: May be repeated up to nine credit hours.

ART 331  INTERMEDIATE PAINTING I 3
Identifying and exploring ideas and abilities in painting by examining the context of modern and contemporary works. Emphasis on the role of professional quality studio practices in realizing student painting goals.
PREREQ: ART231.

ART 332  INTERMEDIATE PAINTING II 3
Continuation of the investigations established in ART331 with emphasis on the individual student's development of ideas and techniques through studio practice, field trips and the research of contemporary art.
PREREQ: ART331.

ART 333  FIGURE STUDIO 3
Advanced conceptual and technical issues in depicting the human figure. Topics include figurative descriptions through the exploration of a wide range of media with special emphasis on color and related concerns.
PREREQ: ART230 and ART231.

ART 334  INTERMEDIATE PAINTING: THE FIGURE 3
A technical and conceptual guide to interpreting the human figure in oils, with an emphasis on the use of the figure as a vehicle for expression in contemporary painting.
PREREQ: ART230 and ART231.
RESTRICTIONS: May be repeated up to six credit hours.

ART 340  WOODCUT 3
Introduction to basic woodcut and/or linoleum with relief printing processes. Black and white as well as multi-colored printing processes will be investigated.
PREREQ: ART110, ART111.

ART 341  ETCHING 3
Introduction to etching and intaglio printing processes including drypoint, line etching, soft ground, liftground, aquatint techniques and non-toxic photo etching.
PREREQ: ART110, ART111, ART112, ART113.

ART 342  INTRODUCTION TO MONOPRINTING AND PAPERMAKING PROCESSES 3
Introduction to western and eastern papermaking and cast paper processes. Introduction to monoprinting and collage processes to produce one-of-a-kind prints.

ART 344  DIGITAL PRINTMAKING 3
Investigates the computer as a tool for imagemaking by scanning, creating and manipulating digital images, both photographic and hand drawn. Exploration of contemporary and traditional printmaking techniques are used to produce printed editions of original digital images.

ART 350  INTERMEDIATE SCULPTURE I 3
Continues to emphasize all goals of ART250 and introduces more advanced techniques and information on sculpture. Students strongly encouraged to find and pursue individual goals and are guided in seeking choices of media and types of artistic expressions that best suit each individual. Researching modes of contemporary sculptural expression is required.
PREREQ: ART250.

ART 351  INTERMEDIATE SCULPTURE II 3
At this intermediate level, less emphasis is given to tools and techniques, and more attention is given to the student's search for personal artistic expression. Participation in student and local exhibitions is expected. For those interested in a concentration in sculpture, time will be given to portfolio preparation. Research into sculpture is intensified.
PREREQ: ART350.

ART 366  INDEPENDENT STUDY 1-6
Practicum credit for the student to pursue individual creative projects in the major. Emphasis on the development of independent work, culminating in a comprehensive body of work.

ART 380  INTERMEDIATE PHOTOGRAPHY: BLACK AND WHITE 3
Use of the medium for artistic communication. Advanced technical and aesthetic concepts as related to fine and applied art problems.
PREREQ: ART280.

ART 381  INTERMEDIATE PHOTOGRAPHY: COLOR 3
Shooting and processing of color slides and negatives, producing color prints from each. Examines color theory, color emulsions and contemporary ideas in color photography.
PREREQ: ART380.

ART 382  ALTERNATIVE PHOTOGRAPHIC PROCESSES 3
Non-silver photographic processes such as cyanotype, gum-bichromate, photo transfer, and van-dyke brown. Using existing negatives, students will create, alter and manipulate images.
PREREQ: ART280.

ART 383  PHOTOGRAPHIC FACILITIES MANAGEMENT 3
First-hand experience of operating and maintaining a photographic facility, including equipment operation for both black/white and color photography labs, course and auto-class scheduling, on-loan equipment and materials, ordering and mixing of chemicals and keeping associated faculty abreast of developments.
RESTRICTIONS: Art major or minor or permission of instructor.

ART 390  INTERMEDIATE CERAMICS I 3
Continuation of Beginning Ceramics.
PREREQ: ART290.

ART 391  INTERMEDIATE CERAMICS II 3
Continuation of Intermediate Ceramics I with emphasis on the technical properties of clay and glazes.
PREREQ: ART390.
ART 402 ▼ ADVANCED APPLIED DESIGN I 3
Mastering the advanced principles of effective conceptual design through solutions involving advertising design or graphic design problems as they would occur in advertising agencies, design studios or corporate design departments.
PREREQ: ART303 and ART305.
COREQ: ART403.
RESTRICTIONS: May be repeated up to six credit hours.

ART 403 ▼ PORTFOLIO PREPARATION I 3
Directed toward the production of a portfolio which accurately and effectively defines the student's conceptual and practical skills in advertising design or graphic design situations.
PREREQ: ART303 and ART305.
COREQ: ART402.
RESTRICTIONS: May be repeated up to six credit hours.

ART 404 ▼ ADVANCED APPLIED DESIGN II 3
Continuation of mastering the advanced principles of effective conceptual design through solutions involving advertising design or graphic design problems as they would occur in advertising agencies, design studios or corporate design departments.
PREREQ: ART402 and ART403.
COREQ: ART405.
RESTRICTIONS: May be repeated up to six credit hours.

ART 405 ▼ PORTFOLIO PREPARATION II 3
Continuation of the production of a portfolio which accurately and effectively defines the student's conceptual and practical skills in advertising design or graphic design situations.
PREREQ: ART402 and ART403.
COREQ: ART404.
RESTRICTIONS: May be repeated up to six credit hours.

ART 407 ▼ ADVANCED NEW MEDIA DESIGN 3
Continuation and more advanced focus on interactive design involving information architecture, interactivity, navigation, page sequencing, imagery and page design using still images, moving images and sound.
PREREQ: ART307.
RESTRICTIONS: Requires permission of instructor.

ART 408 ▼ VISUAL COMMUNICATIONS INTERNSHIP 3
Field experience in an advertising agency, design studio, illustration studio, or commercial photography studio in the student's concentration.
PREREQ: ART303 and ART305, or ART310 and ART311, or ART312 and ART313.
RESTRICTIONS: Requires permission of instructor. May be repeated up to six credit hours.

ART 412 ▼ ADVANCED IMAGEMAKING I 3
Advanced principles of effective communication through imagery applied to graphic and advertising design, including work with advanced graphic and advertising students in developing complete project solutions.
PREREQ: ART303, ART305, ART311, or ART312.
COREQ: ART413.
RESTRICTIONS: Requires permission of instructor.

ART 413 ▼ IMAGEMAKING PORTFOLIO I 3
Development toward production of a portfolio that accurately and effectively defines the student's conceptual and practical skills in applied photography or illustration.
PREREQ: ART303, ART305, ART311, or ART312.
COREQ: ART412.
RESTRICTIONS: Requires permission of instructor.

ART 414 ▼ ADVANCED IMAGEMAKING II 3
Continued work with advanced principles of effective communication through imagery applied to graphic and advertising design, including work with advanced graphic and advertising design students in developing complete project solutions.
PREREQ: ART412.
COREQ: ART415.
RESTRICTIONS: Requires permission of instructor.

ART 415 ▼ IMAGEMAKING PORTFOLIO II 3
Continued development toward production of a portfolio that accurately and effectively defines the student's conceptual and practical skills in applied photography or illustration.
PREREQ: ART413.
COREQ: ART414.
RESTRICTIONS: Requires permission of instructor.

ART 416 ▼ PROFESSIONAL PRACTICES 3
Students who plan to work and exhibit in a fine arts studio discipline will learn how to prepare for a professional career. Topics include making application to galleries, residencies and graduate school; grant writing; tax issues; taking slides; etc.
RESTRICTIONS: BFA seniors only.

ART 417 ▼ BFA EXHIBITION 0 PF
The concluding exhibition required of all Bachelor of Fine Arts candidates and usually held during the final semester of undergraduate study.
RESTRICTIONS: BFA seniors only.

ART 418 ▼ FINE ARTS INTERNSHIP 3
Field experience related to a current fine art discipline offered in the Art Department through a hands on involvement at an art studio, gallery, museum or related industry.
PREREQ: Junior or senior level in a concentration.
RESTRICTIONS: Requires permission of instructor. May be repeated up to six credit hours.

ART 424 ▼ STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST 3
See MSST480 for course description.

ART 425 ▼ SEMINAR IN MATERIALS AND TECHNIQUES OF THE CONTEMPORARY PAINTER AND DRAFTSMAN 3
See ARTC481 for course description.

ART 426 ▼ COLOR MIXING AND MATCHING 3
See MSST485 for course description.

ART 427 ▼ STUDIO MATERIALS AND TECHNIQUES OF PAINTING I 3
See MSST488 for course description.

ART 428 ▼ STUDIO MATERIALS AND TECHNIQUES OF PAINTING II 3
See MSST489 for course description.

ART 429 ▼ STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I 3
See MSST490 for course description.

ART 430 ▼ DRAWING STUDIO 3
Drawing as unique works on paper using traditional or non-traditional media. Works produced will be determined by each student as an extension of their studio concentration.
PREREQ: ART230.
COREQ: 400 level art course.
RESTRICTIONS: May be repeated up to six credit hours.

ART 432 ▼ ADVANCED PAINTING 3
Provides maturing process through experience. Emphasis on identifying and shedding undue influences in painting in favor of evolving a more personal artistic direction and vision.
PREREQ: ART331 and ART332, or ART331 and ART334.
RESTRICTIONS: May be repeated up to nine credit hours.

ART 433 ▼ PAINTING STUDIO 3
The execution of a mature body of work. Emphasis placed on distilling individual painting ideas down to their essence through a process of rigorous group and self criticism.
PREREQ: ART432.
RESTRICTIONS: May be repeated up to nine credit hours.

ART 440 ▼ PRINTMAKING STUDIO 3
Advanced studio work based on agreement between student and instructor as to content and quantity of work required.
PREREQ: ART241 or ART246, and ART341 or ART342.
RESTRICTIONS: May be repeated up to nine credit hours.

ART 441 ▼ ADVANCED PRINTMAKING 3
Advanced techniques in lithography and screenprinting or papermaking, monoprinting, etching and woodcut. Processes vary according to instructor.
PREREQ: ART241 or ART246, and ART341 or ART342.
RESTRICTIONS: May be repeated up to nine credit hours.

ART 450 ▼ SCULPTURE STUDIO 3
Designed to assist the student in finding the best materials and means of personal expression in sculpture and the relationship of differing fields of artistic expression. An increasing emphasis on involvement in the sculpture profession.
PREREQ: ART351.
RESTRICTIONS: May be repeated up to nine credit hours.
ART 451 ADVANCED SCULPTURE 3
At this level, students are expected to have put together a solid body of work with a clear direction. Advanced studio work is based on agreements between the student and the instructor regarding content and quality of work requirements. Each student receives personal instruction and attention in what is planned to become the student’s profession.
PREREQ: ART351.
RESTRICTIONS: May be repeated up to nine credit hours.

ART 466 INDEPENDENT STUDY 1-6

ART 481 PHOTOGRAPHY STUDIO 3
Advanced studio and conceptual work based on agreement between student and instructor as to content and quality of work required. Students taking the course for repeating credit will be engaged in the development of a professional photography portfolio along with the other course requirements.
PREREQ: ART380.
RESTRICTIONS: May be repeated up to nine credit hours.

ART 483 PORTFOLIO AND EXHIBITION TECHNIQUE 3
Emphasis on professional methods involved in presenting a portfolio for publication or exhibition. Organization, editing and sequencing, as well as attitudes and strategies form the basis of study.
PREREQ: ART380.
RESTRICTIONS: Previous photographic experience.

ART 486 PHOTOGRAPHIC ELECTRONIC IMAGING 3
Use of computer technology and techniques to create digital photography and imagery. Students use electronic technology to manipulate, retouch, adjust color, make multiple images and explore other creative techniques.
PREREQ: ART380.
RESTRICTIONS: Previous photographic experience. May be repeated up to nine credit hours.

ART 487 LOCATION PHOTOGRAPHY 3
A series of interrelated projects and assigned topics on location to develop the visual and technical skills of on site photography. The location and environment may vary. Winter and/or summer session offering.
PREREQ: ART280 or equivalent.
RESTRICTIONS: Requires permission of instructor.

ART 490 ADVANCED CERAMICS 3
Continuation of Intermediate Ceramics II with emphasis on individual development of design and form.
PREREQ: ART391.
RESTRICTIONS: May be repeated up to nine credit hours.

ART 491 CERAMICS STUDIO 3
Advanced studio work based on agreement between student and instructor as to content and quantity of work required.
PREREQ: ART391.
RESTRICTIONS: May be repeated up to nine credit hours.

ART 600 APPLIED DESIGN TUTORIAL 3
Studio experience for students whose principal mode of artistic expression and prior studies are in disciplines other than applied design, or where previous applied design work has been with a subject that is substantially different from what is now being studied.
RESTRICTIONS: May be repeated up to twelve credit hours.

ART 601 APPLIED PHOTOGRAPHY TUTORIAL 3
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than photography or where the work in photography has been with an aspect of the medium that is substantially different from what is now being studied.
RESTRICTIONS: May be repeated up to twelve credit hours.

ART 602 DRAWING TUTORIAL 3
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than drawing or where the work in drawing has been with an aspect of the medium that is substantially different from what is now being studied.
RESTRICTIONS: May be repeated up to twelve credit hours.

ART 603 PAINTING TUTORIAL 3
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than painting or where the work in painting has been with an aspect of the medium that is substantially different from what is now being studied.
RESTRICTIONS: May be repeated up to twelve credit hours.

ART 604 PRINTMAKING TUTORIAL 3
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than printmaking or where the work in printmaking has been with and aspect of the medium that is substantially different from what is now being studied.
RESTRICTIONS: May be repeated up to twelve credit hours.

ART 605 SCULPTURE TUTORIAL 3
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than sculpture or where the work in sculpture has been with an aspect of the medium that is substantially different from what is now being studied.
RESTRICTIONS: May be repeated up to twelve credit hours.

ART 608 PHOTOGRAPHY TUTORIAL 3
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than photography or where the work in photography has been with an aspect of the medium that is substantially different from what is now being studied.
RESTRICTIONS: May be repeated up to twelve credit hours.

ART 609 CERAMICS TUTORIAL 3
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than ceramics or where the work in ceramics has been with an aspect of the medium that is substantially different from what is now being studied.
RESTRICTIONS: May be repeated up to twelve credit hours.

ART 610 ADVANCED APPLIED PHOTOGRAPHY 3
Emphasis on the development of a portfolio and the understanding of the role of the applied photographer. Includes introduction to large format techniques and equipment and the professional studio.
PREREQ: ART411.
RESTRICTIONS: May be repeated up to twelve credit hours.

ART 611 ADVANCED APPLIED PHOTOGRAPHY 3
Continuation of ART610 directed toward the production of a portfolio which accurately and effectively defines the student’s conceptual and practical capabilities in applied photography situations.
PREREQ: ART411.
RESTRICTIONS: May be repeated up to twelve credit hours.

ART 630 DRAWING STUDIO 3
Works on paper using traditional and non-traditional media. The nature of work is an extension of student’s creative direction.
RESTRICTIONS: May be repeated up to six credit hours.

ART 632 PAINTING 3-6
Advanced problems in the media and aesthetics of painting.
RESTRICTIONS: May be repeated up to eighteen credit hours.

ART 633 PAINTING STUDIO 3-6
Advanced studio work based on agreement between student and instructor as to content and quality of work required.
RESTRICTIONS: May be repeated up to eighteen credit hours.

ART 640 PRINTMAKING STUDIO 3-6
Advanced studio work based on agreement between student and instructor as to content and quality of work required.
RESTRICTIONS: May be repeated up to eighteen credit hours.

ART 641 PRINTMAKING 3-6
Provides independent work in a chosen print area. Course requirements will be determined by agreement of the student and the teacher.
RESTRICTIONS: May be repeated up to eighteen credit hours.

ART 650 SCULPTURE STUDIO 3-6
Concentrates on professional studio practices and the creation of individual sculptural expressions. Advanced studio work is based on agreement with the instructor regarding content and quality of work.
RESTRICTIONS: May be repeated up to eighteen credit hours.

ART 651 SCULPTURE 3-6
Advanced level course focusing on becoming professionals. Beyond the studio and the creation of artistic expression, the student artist learns ways voices can be hard. Focuses on all the peripherals involved in the profession of sculpture.
RESTRICTIONS: May be repeated up to eighteen credit hours.

ART 677 SEMINAR: THE BUSINESS OF ART 3
Examination of some of the practical aspects of being a practicing studio artist, including promotion, copyrighting artwork, art related tax and business law, building a reputation, pricing of art works, and grant writing.
ART 678  Seminar: Studio Instruction Practicum  3
Planning, instruction and evaluation of art disciplines at the college or equivalent level.
RESTRICTIONS: Requires permission of instructor. May be repeated up to nine credit hours.

ART 679  Seminar: Issues in Contemporary Art  3
Examination of current issues of content and form; developments in technology; social, political and cultural issues affecting visual art and artists; studio visits.
RESTRICTIONS: Requires permission of instructor. May be repeated up to nine credit hours.

ART 681  Materials and Techniques of the Contemporary Painter and Draftsman  3
See MSST681 for course description.

ART 682  Studio in the Materials and Techniques of Drawing in the West  3
See MSST680 for course description.

ART 683  Photography  3-6
Individual problems in still photography applied to art education, fine arts, or applied design.
RESTRICTIONS: May be repeated up to eighteen credit hours.

ART 684  Photography Studio  3-6
Advanced studio work based on agreement between student and instructor as to content and quantity of work required.
RESTRICTIONS: May be repeated up to eighteen credit hours.

ART 685  Color Mixing and Matching  3
See MSST685 for course description.

ART 686  Electronic Imaging  3
Use of computer technology and techniques to create digital photography and imagery. Students use electronic technology to manipulate, retouch, adjust color, make multiple images and explore other creative techniques.
RESTRICTIONS: May be repeated up to six credit hours.

ART 688  Studio Materials and Techniques of Painting I  3
See MSST688 for course description.

ART 689  Studio Materials and Techniques of Painting II  3
See MSST689 for course description.

ART 690  Studio in the Materials and Techniques of Printmaking I  3
See MSST690 for course description.

ART 691  Ceramics  3-6
Problems in throwing, glazing and firing techniques.
RESTRICTIONS: May be repeated up to eighteen credit hours.

ART 692  Ceramics Studio  3-6
Advanced studio work based on agreement between student and instructor as to content and quantity of work required.
RESTRICTIONS: May be repeated up to eighteen credit hours.

ART 698  MFA Exhibition  3
Selection, presentation and installation of art work in an exhibition space culminating the studio component of graduate study.
RESTRICTIONS: Approval of the student's individual graduate committee.

ART 699  MFA Supporting Paper  3
Development of a written and photographic document in support of issues and concerns characterizing personal artistic development experienced during graduate study.
RESTRICTIONS: Approval of the student's individual graduate committee.

ART 868  Research  1-12

ART CONSERVATION

ARTC 101  Art Conservation Freshman Seminar  1 PF
Introduction to the field through exposure to Winterthur Museum, Library and Garden and current art conservation projects. Professional interaction fosters academic and social competencies while explaining education, research, and career opportunities.

ARTC 210  Science of Color Phenomena  4
Introduction to the basic physical and chemical principles which describe the nature of light and the phenomena of color. Targeted for non-science majors who seek a descriptive understanding of the scientific principles underlying the formation of color phenomena found in nature and works of art.
PREREQ: High school chemistry and algebra.

ARTC 301  Care and Preservation of Cultural Property I  3
Examines philosophy, ethics, practice of art conservation and the issues pertaining to collections management at cultural property. Typical deterioration characteristics and preservation alternatives for a variety of materials including photographs, works of art on paper, archival and library materials, and magnetic media will be presented and discussed.

ARTC 302  Care and Preservation of Cultural Property II  3
Examines the philosophy, ethics, approach and practice of art conservation with primary emphasis on easel paintings and a secondary emphasis on textiles, objects, furniture and conservation science. Deterioration mechanisms, care and conservation treatment issues are covered.
PREREQ: ARTC301.

ARTC 444  Technology of Cultural Materials: Ceramics and Glass  3
See MSST444 for course description.

ARTC 445  Technology of Cultural Materials: Metals  3
See MSST445 for course description.

ARTC 466  Conservation Internship  3

ARTC 468  Studio in the Materials and Techniques of Drawing in the West  3
See MSST480 for course description.

ARTC 481  Seminar in Materials and Techniques of the Contemporary Painter and Draftsman  3
Twentieth century artists' materials. Topics: acrylic emulsion, acrylic solution, alkyd resin, and PVA paints; collage-assemblage; solvent-photo transfer; synthetic fiber canvas, paper, panels, oil pastels, paint sticks, felt-tip markers, colored ink pencils; airbrush spray gun; and non-art materials. Potential health hazards. Conservation topics: pH, lightfastness, adhesion and storage environments. May be cross-listed with ART425 and/or ARTH481.
RESTRICTIONS: Requires permission of instructor.

ARTC 485  Color Mixing and Matching  3
See MSST485 for course description.

ARTC 488  Studio Materials and Techniques of Painting I  3
See MSST488 for course description.

ARTC 489  Studio Materials and Techniques of Painting II  3
See MSST489 for course description.

ARTC 490  Studio in the Materials and Techniques of Printmaking I  3
See MSST490 for course description.
RESTRICTIONS: Requires permission of instructor.

ARTC 615  Properties and Structure of Art Materials I  3
Relationship between structure of materials and their physical, mechanical and chemical behavior. Emphasis on art materials such as metals, ceramics, glasses, geological materials, polymeric materials, textiles, coatings, cellulose products, pigments, dyestuffs, etc. Also, mechanics of change due to heat, time, radiation and environment.
RESTRICTIONS: Full-time fellowship students only.

ARTC 616  Conservation Research Methods  3
Introduction to the principles and methodology of scientific research in conservation. Emphasis on topics such as experimental design, data analysis, preparation of research proposals, authenticity and technical studies, accelerated aging, and simple analytical methods.
PREREQ: ARTC615.
RESTRICTIONS: Full-time fellowship students only.

ARTC 617  Analysis of Painted Surfaces  3
Introduction to the analysis and technology of painted and varnished surfaces using reflected, visible and ultraviolet light microscopy techniques. Lectures and lab work include a review of traditional coating materials, color measurement and matching, and analysis and interpretation of cast cross-sections of paint and varnish stratigraphy.
ARTC 618 Conservation Cleaning Methods 3
Introduction to techniques for controlled removal of overpaints, varnishes, and grime from paintings and decorative and architectural objects. Cross-section microscopy techniques are used. Lectures and lab work include discussion of solvent and water-based cleaning systems, use of enzymes and chelating agents, and mixing and testing of customized cleaning materials.

ARTC 644 Technology of Cultural Materials: Ceramics and Glass 3
See MSST644 for course description.

ARTC 645 Technology of Cultural Materials: Metals 3
See MSST645 for course description.

ARTC 650 Seminar in Art Conservation 1
Discussion, demonstration, practice, and research relating to the examination, treatment and preservation of works of art on paper, library materials, photographs, textiles, paintings, joined wooden objects, decorative, ethnographic, and archaeological objects, under the supervision of conservation faculty.
RESTRICTIONS: Full-time fellowship students only.

ARTC 654 Examination and Treatment of Art Objects I 1-3
Application of scientific and art historical techniques to the examination, treatment and preservation of works of art on paper, library materials, photographs, textiles, paintings, joined wooden objects, decorative, ethnographic, and archaeological objects, under the supervision of conservation faculty.
RESTRICTIONS: Full-time fellowship students only.

ARTC 655 Examination and Treatment of Art Objects II 1-3
Application of scientific and art historical techniques to the examination, treatment and preservation of works of art on paper, library materials, photographs, textiles, paintings, joined wooden objects, decorative, ethnographic, and archaeological objects under the supervision of conservation faculty.
PREREQ: ARTC654.
RESTRICTIONS: Full-time fellowship students only.

ARTC 658 Topics in Advanced Apprenticeship and Research in Conservation I 6
Classroom discussion, demonstration, practice, and research relating to the examination, analysis, treatment, and collections care of cultural property including works of art on paper, library materials, photographs, textiles, paintings, joined wooden objects and works on the conservation faculty.
RESTRICTIONS: Full-time fellowship students only.

ARTC 659 Topics in Advanced Apprenticeship and Research in Conservation II 6
Classroom discussion, demonstration, practice, and research relating to the examination, analysis, treatment, and collections care of cultural property including works of art on paper, library materials, photographs, textiles, paintings, joined wooden objects, decorative, ethnographic, and archaeological materials. Course requirements may be fulfilled by work in institutions outside the Winterthur Museum.
PREREQ: ARTC654 and ARTC655.
RESTRICTIONS: Full-time fellowship students only.

ARTC 666 Independent Study 1-12
A third year of study at an accredited institution working with a master conservator under the supervision of conservation faculty.
PREREQ: ARTC655 and ARTC658.
RESTRICTIONS: Full-time fellowship students only.

ARTC 667 Chemical and Physical Techniques Used in the Examination of Art Materials I 3
Classroom discussion and laboratory application of chemical and physical techniques that art conservators perform to identify and characterize organic art materials.
RESTRICTIONS: Full-time fellowship students only.

ARTC 671 Chemical and Physical Techniques Used in the Examination of Art Materials II 3
Classroom discussion and laboratory application of chemical and physical techniques that art conservators perform to identify and characterize metals, glass, ceramics, and natural and synthetic polymers. Basic structure, composition and deterioration mechanics of such materials.
PREREQ: ARTC670.
RESTRICTIONS: Full-time fellowship students only.

ARTC 672 Chemical and Physical Techniques Used in the Examination of Art Materials III 3
Classroom discussion and laboratory application of more sophisticated analytical and physical techniques used by the scientist to characterize materials. Application of these techniques to art materials and treatment-related problems stressed.
PREREQ: ARTC670 and ARTC671.
RESTRICTIONS: Full-time fellowship students only.

ARTC 673 Chemical and Physical Techniques Used in the Examination of Art Materials IV 3
Independent research project focusing on the analytical and physical techniques used by the scientist to characterize art materials.
PREREQ: ARTC670, ARTC671 and ARTC672.
RESTRICTIONS: Full-time fellowship students only.

ARTC 680 Studio in the Materials and Techniques of Drawing in the West 3
See MSST680 for course description.

ARTC 681 Materials and Techniques of the Contemporary Painter and Draftsman 3
See MSST681 for course description.

ARTC 685 Color Mixing and Matching 3
See MSST681 for course description.

ARTC 688 Studio Materials and Techniques of Painting I 3
See MSST688 for course description.

ARTC 689 Studio Materials and Techniques of Painting II 3
See MSST689 for course description.

ARTC 690 Studio in the Materials and Techniques of Printmaking 3
See MSST690 for course description.

ARTC 694 Pre-Candidacy Study 3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.
RESTRICTIONS: Not open to students who have been admitted to candidacy.

ARTC 969 Doctoral Dissertation 1-12 PF

ART HISTORY

ARTH 101 Visual Culture 3
Explores the ways we make, perceive and experience images and artifacts. Students will hone their skills in seeing, analyzing historical models and critically engaging in discussions of visual art and material cultures in selected eras and civilizations around the world.

ARTH 150 Monuments and Methods in the History of Art 3
Painting, sculpture and architecture studied as artistic and cultural expressions of their times. Emphasis on selected major artists, monuments and methods of analysis.

ARTH 151 Myth, Religion and Art 3
An introduction to the study of mythical and religious images, types, attributes and symbols on a comparative basis from many ages throughout the world. Includes archetypal images, such as the Great Mother, the Great Father, the hero, images with supernatural powers and satirical images.

ARTH 152 Design and Expression in the Visual Arts 3
An introduction to visual analysis of painting, sculpture and architecture. Principles of two- and three-dimensional design, spatial composition, color and technical methods used by artists to create emotional and aesthetic effects. Examples chosen from a variety of periods and places.

ARTH 153 Introduction to Art History I 3
Painting, sculpture and architecture from Prehistoric times through ancient Egypt, Greece, Rome and the Middle Ages studied in historical and cultural context. RESTRICTIONS: Usually offered in Fall semester.

ARTH 154 Introduction to Art History II 3
Painting, sculpture and architecture of Western Europe from the Renaissance to the present studied in historical and cultural context. RESTRICTIONS: Usually offered in Spring semester.

ARTH 155 Asian Art 3
Introduction to the artistic traditions of China, Japan, India, Korea and Southeast Asia. Emphasis on historical, religious and social context. Focuses on the arts of Buddhism; also considers Hindu, Confucian, Taoist and other localized religious and cultural influences on the visual arts.
ART HISTORY

ARTH 156  ROMAN: FROM CAESAR TO TELLIN  3
Investigates Rome from antiquity to the twentieth century focusing on art and
architecture, archaeology, film, literature, urban planning, law, social history,
religion, and politics.

ARTH 161  ART IN EAST AND WEST  3
Similarities and differences between works of art typical of Asian and Western
traditions and examination of their points of contact, emphasizing such themes as
nature, humanity and the divine, world of the ruler, religious art and private art.

ARTH 162  HISTORY OF ARCHITECTURE  3
Major buildings and architects from the ancient world to the present. Elements of
architectural design and the influence of social, economic, political, religious and
technological factors on the art of building. Architecture as cultural expression.

ARTH 166  SPECIAL PROBLEM  1-3

ARTH 203  ART OF THE BLACK AND AFRICAN DIASPORA  3
Through the art and architecture of the Atlantic and Indian oceans, introduces the
art of African Heritage peoples after the early 15th century and indicates what
connects them (and what separates them) in terms of subject matter, style,
representational mode and critique.

ARTH 204  ART, POWER AND ARCHITECTURE IN AFRICA  3
Explores several African communities including Bamileke, Yoruba, Shona, Eda,
Fon, Kuba and Hausu-Fulani (located among others in Nigeria, Zimbabwe, Benin,
Congo). Reveals the relationships, sometimes spatial, between art and architecture
in their varied stances to, and as representations of, political, social and spiritual
power. May be cross-listed with BAMS203.

ARTH 205  SCIENCE AND THE DETECTION OF ART FORGERIES  3
See MSST205 for course description.

ARTH 206  INTRODUCTION TO ART AND ARCHITECTURE IN AFRICA  3
Explores all African selections from diverse art histories including modern Congo,
contemporary Nigeria and South Africa, 19th Century Mande, 17th century
Ethiopia, 15th century Edo, 19th Century Yoruba, Nubian Egypt and the pre-
pharaonic Northeast. Lectures thematize art against a backdrop of politics,
religions, sensuality and architecture.

ARTH 207  ART OF ANCIENT EGYPT AND THE NEAR EAST  3
Survey of the art and architecture of ancient Egypt and Near East. Emphasis on
the relationship of art to religion, politics and ritual. Topics include Egyptian
pyramids and the after-life, images of kings and the art of propaganda and art in
the service of religion.

ARTH 208  GREEK AND ROMAN ART  3
Development of Greek art and architecture from the Geometric period through the
Orientalizing, Archaic, Classical and Hellenistic eras. Roman art and architecture
from its Etruscan and Greek origins through the Republican period and the stages
of the Empire until the time of Constantine the Great.

ARTH 209  EARLY MEDIEVAL ART: 200-1000 AD  3
Painting, sculpture and architecture in Europe and the Near East. Surveys the
earliest Christian art as well as Byzantine, Early Islamic, Anglo-Saxon and
Carolingian art.

ARTH 210  LATER MEDIEVAL ART: 1000-1400 AD  3
Painting, sculpture and architecture of the Christian world, treating later Byzantine,
Romanesque and Gothic artistic traditions in their historical and cultural contexts.
Development of a distinctively European art and society.

ARTH 213  ART OF THE NORTHERN RENAISSANCE  3
Covers late medieval devotional images to the art of the early modern cities
(1400-1570), especially in the Netherlands and Germany. Special emphasis on
Jan van Eyck, Rogier van der Weyden, Albrecht Duerer and Pieter Bruegel.

ARTH 217  EARLY RENAISSANCE ART  3
Italian art of the 14th and 15th centuries. Special emphasis on the founders of the
Renaissance tradition in central Italy such as Giotto, Donatello, Masaccio, Fra
Angelico, Botticelli, Brunelleschi and Alberti.

ARTH 218  HIGH RENAISSANCE AND MANNERIST ART  3
Italian art in the 16th century. Emphasis on such artists as Leonardo da Vinci,
Raphael, Michelangelo, Bramante, Titian, Tintoretto and El Greco. Also treats the
spread of Italian style to France and Spain.

ARTH 220  ITALIAN RENAISSANCE ARCHITECTURE  3
Italian architecture and cities from the 14th to the 16th centuries. Emphasis on the
socio-economic, intellectual and cultural context of Renaissance architecture.
Focuses on architects such as Brunelleschi, Alberti, Michelangelo and Palladio and
cities such as Florence, Rome and Venice.

ARTH 222  BAROQUE ART  3
Seventeenth-century European painting, sculpture and architecture in its social-
historical context. Emphasis on such major artists as Caravaggio, Bernini, Rubens,
Rembrandt, Vermeer, Poussin and Velasquez. Discussion of the rise of genre, still-
life and landscape painting, as well as the role of patronage.

ARTH 223  BAROQUE AND ROCOCO ARCHITECTURE AND URBANISM  3
Architecture and urban design in Europe from 1580 to 1750 in its religious,
political and cultural context. Studies Italy, France, England and Germany. Architects
such as Bernini, Borromini, Le Vau, Mansart and Neumann.

ARTH 225  EIGHTEENTH CENTURY ART  3
Examines major trends and artists in 18th century European painting, sculpture
and architecture in the framework of the social, ideological and cultural currents of
the time. Artists such as Watteau, Hogarth, Blake, Chardin, Canova, David and
Goya.

ARTH 227  MODERN ART I  3
Important 19th century European movements in art such as Neo-Classicism,
Romanticism, Realism and Impressionism studied in their cultural and socio-political
context. Artists such as Daumier, Delacroix, Turner, Courbet and Monet.

ARTH 228  MODERN ART II  3
Art and theory of major movements from 1880 to the present. Post-Impressionism,
Fauvism, Cubism, Futurism, Constructivism, Dada, Surrealism, Abstract
Expressionism, Pop Art, Minimalism, Conceptualism, Neo-Expressionism and Post-
Modern developments. Painting, sculpture, photography, environments and
performance art.

ARTH 230  AMERICAN ART: 1607-1865  3
Architecture, painting, sculpture and the decorative arts of the United States from
the first Colonial settlements to the Civil War. American art examined in the light of
its political, social, economic and religious background and in relationship to
European art.

ARTH 231  AMERICAN ART: 1865-PRESENT  3
Architecture, painting, sculpture, photography and decorative arts in the United States
from the Civil War on. American art in a political, social, economic and cultural
framework. The rise of the United States to a position of global power and
emergence as an international artistic center.

ARTH 232  ART OF LATIN AMERICA  3
Survey of art and architecture in Latin America from pre-Hispanic times to the 21st
century. Emphasis on the interaction between native traditions and imported ideas,
particularly in relationship to religion, politics, and daily life.

ARTH 233  ART OF CHINA  3
Survey of the arts of China from neolithic times to the 20th century. Discussions
center on such phenomena as Confucian thought and political art, the importation
of Buddhist beliefs and their Chinese expressions, and the search for harmony with
the natural world.

ARTH 234  ART OF JAPAN  3
Survey of the art of Japan from neolithic times to the 20th century. Emphasis on the
interaction between imported ideas and native sensibilities, the development of
Buddhist imagery and the influence of literature, drama and political change on
the visual arts.

ARTH 235  ART OF INDIA  3
Survey of the art of Indian Asia from the prehistoric culture of the Indus Valley
through the development of Buddhist, Hindu and Islamic religious structures and
imagery. Emphasizes the interrelationships of philosophical, religious and aesthetic
concepts in shaping Indian art and the spread of Indian culture.

ARTH 236  ARTS OF THE ISLAMIC WORLD  3
Formation and diffusion of a distinctive artistic tradition from the eighth to the
sixteenth century. Considers architecture, painting, metalwork and other media,
especially in the Mediterranean world and western Asia.

ARTH 237  ART OF TIBET  3
Survey of Tibetan art including sculpture, paintings, textiles, jewelry, ritual objects,
architecture, and ephemeral art. Emphasis on relationship of art to religious and
philosophical tenets of Buddhist and Bon-po traditions; development of regional
styles in Tibet; and artistic connections to northern India, Nepal, and China.

ARTH 242  WOMAN AS IMAGE AND IMAGEMAKER  3
Analyzes the depiction of women in art from pre-history to the present in light of
recent feminist studies. Topics correspond with particular periods in history. Each
class includes a brief discussion of women artists and their works.
May be cross-listed with WOMS242.
ART 243 AMERICAN DECORATIVE ARTS, 1700-1900 3
An introduction to interior decoration and household arts during the 18th and 19th centuries, with an emphasis on furniture, metalwork, glass, ceramics, textiles, prints, and wallpaper. Field trips to Winterthur and the Delaware Art Museum are required. May be cross-listed with AMCS243.

ART 245 THE AMERICAN HOME 3
Explores the history and design of the most intimate and public of objects—the house. Our residences are powerful statements about how we see ourselves and how we perceive others. Includes a variety of cultural experiences and investigates the significance of those experiences.

ART 250 RULERS’ IMAGES FROM AUGUSTUS TO GEORGE WASHINGTON 3
Thirteen rulers from the ancient, medieval and early modern worlds as they were depicted in contemporary artistic and literary works. Rulers studied include Augustus, Justinian, Saint Louis, Napoleon and Washington. Focuses on rulers’ images in the modern world.

ART 301 RESEARCH AND METHODOLOGY IN ART HISTORY 3
Methods and major approaches to advanced art historical study, together with the practical aspects of research and work in art historical professions, such as education, historic preservation, museums and galleries. Experience with original works of art.

ART 302 PRINTS AND SOCIETY 3
A social history of prints and printmaking techniques, focusing on such major printmakers as Durer, Rembrandt, Piranesi, Goya, Daumier and Picasso. Topics include the role of woodcuts in popular culture, political and satirical prints, posters and advertising, and the connoisseurship of original prints.

ART 303 ART OF THE SPANISH RENAISSANCE 3
The art of Spain and its New World territories during the 15th and 16th centuries. Emphasis on the negotiation between different artistic and religious traditions in both the Iberian Peninsula (Christian, Muslim, and Jewish) and Spanish America (European and Native American).

ART 304 NORTHERN BAROQUE ART: THE AGE OF RUBENS, REMBRANDT AND VERMEER 3
Painting, printmaking and art theory in 17th-century Holland and Flanders in social and historical context. Examines the rise of landscape, genre and portraiture, the nature of Dutch realism, the social role of the artist, art and theater, and the impact of religion on art.

ART 305 ITALIAN BAROQUE ART: METAPHOR AND MARVEL 3
Painting, sculpture and architecture from the time of Caravaggio and the Carracci to Bernini and Cortona. Examines topics such as the Counter-Reformation and its impact on the arts, the rise of naturalism and illusionism, the design process and the function of drawings, theatricality and rhetoric.

ART 307 SEURAT TO MATISSE: ART IN FRANCE 3
Examines developments in French art, culture and society between 1880 and 1907. Topics include the avant-garde, women artists, public art, bohemianism, mass culture and early cinema. Artists include Manet, Monet, Pissarro, Degas, Cézanne, Morisot, Cassatt, Seurat, Van Gogh, Gauguin, Vuillard, Redon, Moreau, Puvis de Chavannes, Rodin, Gauguin, Matisse and Picasso.

ART 310 THE ROLE OF THE ARTIST IN SOCIETY 3
Explores changing ideas of the artist from medieval craftsman and Renaissance courtier to Romantic genius and modern revolutionary. Topics include self-portraiture, notions of artistic temperament and genius, women artists and artists’ changing relations with their clients.

ART 311 RENAISSANCE WOMEN, SOCIETY AND THE ARTS 3
Focuses on the role of women in Italian art and society from 1300-1650. Interdisciplinary and feminist readings emphasize a variety of approaches. Topics include gender and power; women as patrons; female eroticism and mysticism; the masculine vision of ideal beauty; women writers and their complaints; nuns, prostitutes and saints. May be cross-listed with WOMS311.

ART 318 HISTORY OF PHOTOGRAPHY 3
History and aesthetics of photography from its beginnings to the present. Emphasis on photography as artistic expression, the importance of technology and photography in relation to the other arts and social history. Photographers such as Negre, Emerson, Steiglitz, Cunningham, Weston and Arbus.
ARTH 415 Seminar in Italian Baroque Art 3
Painting, sculpture and architecture in Italy in the 17th century. Recent topics include Bernini and Roman Baroque Sculpture, Seicento Poetics and Imagery, Caravaggio. RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 417 Seminar in Northern Baroque Art 3
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 419 Spanish Art of the Golden Age 3
Art in Spain and its colonies from 1500-1700. Topics vary. Seminars may focus on particular artists, or on broader historical and/or methodological issues dealing with artistic production, reception, and circulation within the Spanish empire. RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 420 Seminar in African Art 3
Studies recent scholarship on art and/or architecture in Africa, focusing on specific subjects such as Modern and Contemporary art, sculpture before 1500, global views and uses of African art and art institutions in Africa. RESTRICTIONS: Not open to freshmen.

ARTH 421 Seminar in Nineteenth Century Art 3
Art from David to Impressionism. Recent topics include Gericault, Delacroix, Cezanne, Art and Politics, The Theory and Practice of Romanticism, Historicism from David to Gerome, and Orientalism. PREREQ: ARTH227. RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 422 Folk and Outsider Art 3
Focuses on the traditional and popular arts of the United States. Topics covered include colonial Pennsylvania-German decorative arts, Victorian Welsh gravestones, African American textile and basketry crafts, and contemporary blue print graphic arts. Discussions and research will focus on the relationship of folk arts to questions of ethnicity, class, popular culture, and community aesthetics.

ARTH 423 Seminar in Twentieth Century Art 3
Art in Europe, with some reference to American art, from Post-Impressionism to the present. Recent topics include Symbolism, Picasso, Dada and Surrealism, Cubism and its Influence, and Postmodernism. PREREQ: ARTH227 or ARTH228. RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 424 Seminar in Nineteenth Century Photography 3
Aspects of the history and aesthetics of 19th-century photography. Topics change with each time of offering. Recent topics include Photography and Art, Documentary Photography, and 'Art' Photography. PREREQ: ARTH227 or ARTH318.

ARTH 425 Silent Cinema 3
Examination of the invention, emergence, and development of silent cinema in Europe, the former USSR, and the United States. Includes study of significant films and filmmakers; social, cultural and artistic contexts; and the critical literature. PREREQ: Either ARTH227 or ARTH228.

ARTH 427 Seminar in Twentieth Century Photography 3
Aspects of the history and aesthetics of 20th-century photography. Topics change with each time of offering. Recent topics include Photography and Art, and Photography and Criticism. PREREQ: ARTH227 or ARTH228 or ARTH320 or ARTH311.

ARTH 429 Seminar in Modern Architecture 3
Architecture in Europe and/or America from 1750 to the present. Recent topics include the Architecture of Neoclassicism, and Sullivan, Wright and the Prairie School. RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 431 Seminar in American Architecture 3
American architecture from the Colonies to the present. Recent topics include Architecture of the Colonial and Federal Periods, Nineteenth Century American Architecture, and Philadelphia Architecture. RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 435 Seminar in American Art 3
American art from the Colonies to the present. Recent topics include Art and Revolution in Early America; Early American Modernism, and American Painting and Sculpture after World War II. May be cross-listed with AMCS435. RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 440 Seminar in Latin American Art 3
The arts of Latin America from pre-Hispanic times to the 21st century. Topics change with each time of offering. Recent topics include Art and Religion in Latin America, and Art and Conquest in the New World. RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 454 Vernacular Architecture 3
See HIST454 for course description.

ARTH 457 Survey of African Art 3
See ANTH457 for course description.

ARTH 466 Independent Study 1-6

ARTH 480 Studio in the Materials and Techniques of Drawing in the West 3
See MSST480 for course description.

ARTH 481 Seminar in Materials and Techniques of the Contemporary Painter and Draftsman 3
See ARTC481 for course description.

ARTH 488 Studio Materials and Techniques of Painting I 3
See MSST488 for course description.

ARTH 489 Studio Materials and Techniques of Painting II 3
See MSST489 for course description.

ARTH 490 Studio in the Materials and Techniques of Printmaking I 3
See MSST490 for course description.

ARTH 499 Topics in Art History 3
Detailed investigation in a lecture rather than a seminar format of varying topics, e.g., St. Denis and Problems of 12th Century Art.

ARTH 601 Theories and Practices of Art Historical Interpretation 3
Critical analysis of selected writings influential in art history and the humanities. Designed to help students hone their interpretive skills through close examination of assumptions, standards of argument and evidence, core concepts, procedures, boundaries, and objectives that have shaped art historical writings past and present.

ARTH 602 Theories and Methodologies in Architectural History 3
Introduction to issues and methodologies in architecture and urbanism history. Readings in philosophy and sociology and in recent works of architectural and urbanism history they have inspired. Organized thematically (capitalism, colonialism, print culture, etc.).

ARTH 603 Studies in Greek and Roman Art 3
The art of antiquity from the origins of Greek civilization to the fall of Rome. Recent topics include Roman Architecture, Religion, Religiosity and Ritual in the Lives of Romans; Visual Culture in Pompeii. RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 606 Studies in Medieval Art 3
The art of Europe from the fall of Rome to the late Gothic period. Recent topics include the Court of Charlemagne, Early Irish and Anglo-Saxon Art, and Medieval Ivories. RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 611 Studies in Italian Renaissance Art 3
Italian art from 1300 to 1600. RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 614 Studies in Italian Renaissance Architecture 3
Italian architecture from 1300 to 1600. Recent topics include Renaissance Villas and Gardens, Brunelleschi and Alberti, Roman Architecture in the Age of Michelangelo, and Palladio. RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 616 Studies in Italian Baroque Art 3
Italian art in the 17th century. Recent topics include Bernini and Roman Baroque Sculpture, Seicento Poetics and Imagery, Caravaggio. RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 617 Studies in Northern Baroque Art 3
Seventeenth-century art in northern Europe. Recent topics include Vermeer and Dutch Genre Painting; Art and Money; 17th Century Netherlands; and Prints in the Age of Rembrandt. RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 619 Spanish Art of the Golden Age 3
Art in Spain and its colonies from 1500-1700. Topics vary. Seminars may focus on particular artists, or on broader historical and/or methodological issues dealing with artistic production, reception and circulation within the Spanish culture. RESTRICTIONS: May be repeated for credit when topics vary.
ARTH 620 Seminar in African Art 
Topics vary from pre-Dagaman art (pre-European 'discovery') to 20th-century painting and contemporary African cinema and may include representations of Africa in Enlightenment art and philosophy, reviews of the literature on the arts of Fulani peoples and its related archive of documentary film.

ARTH 621 Studies in Nineteenth Century Art 
Art from David to Impressionism. Recent topics include Gericault; Delacroix; Cezanne, Art and Politics (1780-1880); The Theory and Practice of Romanticism, and Center and Periphery: the French Avant-Garde.

ARTH 622 Research Topics in Historic Preservation 
See UAPP636 for course description.

ARTH 623 Studies in Twentieth Century Art 
Art in Europe, with some reference to later American art, from 1900 to the present. Recent topics include Symbolism, Picasso, Dada and Surrealism, and Cubism and French Art.

ARTH 624 Folk and Outsider Art 
Focuses on the traditional and popular arts of North America. Topics include colonial Pennsylvania-German decorative arts, Victorian-Welsh gravestones, African-American textile and basketry crafts and contemporary tribal graphic arts. Discussions and research focus on the relationship of folk arts to questions of ethnicity, class, popular culture and community aesthetics.

ARTH 625 Silent Cinema 
Examination of the invention, emergence, and development of silent cinema in Europe, the former USSR, and the United States. Includes study of significant films and filmmakers; the social, cultural and artistic contexts; and the critical literature.

ARTH 626 Studies in Modern Art and Theory 
Studies in Modern Art, exploring diverse themes, media, theoretical and interdisciplinary perspectives. Possible topics include Art and Nationalism; Classicism and Modernity; Allegory; Regimes of Visibility; Modern Art and Literature; Modern Fontnaiture; Freud, Psychoanalysis, and Colonialism.

ARTH 627 Studies in the History of Photography 

ARTH 628 Theory and Practice of Historical Preservation Planning 
See UAPP629 for course description.

ARTH 629 Studies in Modern Architecture 
Architecture in Europe and/or America from 1750 to the present. Recent topics include the Architecture of Neoclassicism and Sullivan, Wright and the Prairie School.

ARTH 630 History of Theories in Material Culture 
See EAMC605 for course description.

Architecture in the American Colonies from the anonymous buildings of the 17th century to the designs of Thomas Jefferson and B.H.Latrobe in the early 19th century.

ARTH 632 Making the American City 
See UAPP632 for course description.

ARTH 633 Studies in Nineteenth Century American Architecture 
The Greek, Gothic, Egyptian and Oriental Revivals; High Victorian Style and its culmination in the Age of Elegance; and Late Nineteenth Century American Architecture.

ARTH 634 American Art to 1865 
Topics change with each offering. Recent topics include Visual Culture in Antebellum America, Common Ground: Dialectics of High and Low in 19th Century American Visual Arts.

ARTH 635 American Art: 1875-Present 
Painting, sculpture and related media from Eakins to the present. Recent topics include Eakins and American Modernism, and American Painting and Sculpture after World War II.

ARTH 637 Studies in English Art and Architecture 
The art of England, emphasizing the period from the 16th century through the end of the 19th century. Recent topics include the English Country House, British Painting, English Architecture, and Collecting in England.

ARTH 640 Seminar in Latin American Art 
The arts of Latin America from pre-Hispanic times to the 21st century. Recent topics include Art and Conquest in the New World, and Life and Afterlife of pre-Hispanic Artifacts.

ARTH 654 Vernacular Architecture 
See HIST654 for course description.

ARTH 657 Survey of African Art 
See ANTH657 for course description.

ARTH 680 Studio in the Materials and Techniques of Drawing in the West 
See MSST680 for course description.

ARTH 681 Materials and Techniques of the Contemporary Painter and Draftsman 
See MSST681 for course description.

ARTH 685 Cultural Theory and Criticism 
See ENGL685 for course description.

ARTH 688 Studio Materials and Techniques of Painting I 
See MSST688 for course description.

ARTH 689 Studio Materials and Techniques of Painting II 
See MSST689 for course description.

ARTH 690 Studio in the Materials and Techniques of Printmaking I 
See MSST690 for course description.

ARTH 801 Introduction to Decorative Arts in America to 1860 
See EAMC801 for course description.

ARTH 850 Resources in Art History 
An introduction to the art historical resources of the University of Delaware and to the techniques of scholarly research and bibliographical materials in the historical study of the visual arts.

ARTH 851 Seminar in Art Historical Pedagogy 
Discussion of all aspects of teaching in the field of art history (lectures, discussions, materials, examinations, grading) and special topics in the teaching of a large introductory survey course.

ARTH 860 Reading and Research 
Readings and conferences on an approved subject under faculty direction. Restrictions: Requires permission of Department Chair. Open to Art History Ph.D. students only.

ARTH 869 Master's Thesis 
1-6

ARTH 964 Pre-Candidacy Study 
3-12 PF

ARTH 969 Doctoral Dissertation 
1-12 PF

BAMS 107 History of Rock 
See MUSC107 for course description.

BAMS 110 Introduction to Black American Studies 
Assesses the status of Black America in the modern technological order through an examination of the major spheres of institutional life, including employment, education politics, criminal justice and the military.

BAMS 134 History of Africa 
See HIST134 for course description.
BAMS 203  ART, POWER AND ARCHITECTURE IN AFRICA  3
See ARTH204 for course description.

BAMS 204  URBAN COMMUNITIES  3
See SOCI204 for course description.

BAMS 205  CONTEMPORARY AFRO-AMERICAN ISSUES  3
The impact of important issues involving Black American people in contemporary American society. Critical theoretical analyses of trends that affect programs of the Black community.

BAMS 206  SURVEY OF AFRO-AMERICAN CULTURE  3
Historic and contemporary aspects of Black American culture. A multi-faceted approach utilizing resources from history, folklore, religion and sociology.

BAMS 207  HISTORY OF JAZZ  3
See MUSC207 for course description. PREREQ: MUSC105.

BAMS 215  RACE IN SOCIETY  3
See SOCI125 for course description.

BAMS 220  AMERICAN CIVIL RIGHTS MOVEMENT  3-4
See Hist220 for course description.

BAMS 293  HONORS SHORT COURSE  1
See ARSC293 for course description.

BAMS 296  HONORS FORUM  1
See ARSC296 for course description.

BAMS 298  RESEARCH ON RACE, ETHNICITY AND CULTURE  1 PF
See WOMS298 for course description.

BAMS 304  HISTORY OF BLACK AMERICA TO THE CIVIL WAR  3
Black historical impact on American life and culture to the Civil War. May be cross-listed with HIST25. PREREQ: BAMS110.

BAMS 305  IMAGES OF RACE AND ETHNICITY IN AMERICAN CULTURE  3
See HIST305 for course description.

BAMS 306  HISTORY OF BLACK AMERICA SINCE THE CIVIL WAR  3
Survey of the broad social, political and economic developments that shaped the Black experience during this period: the rise of segregation in the South, the migration from plantation to ghetto and the struggle for civil rights. May be cross-listed with HIST326.

BAMS 307  BLACK THOUGHT AND PHILOSOPHY  3
Readings and discussions of Black philosophies, ideologies and concepts as reflected in the thought of significant Black figures. May be cross-listed with PHIL307.

BAMS 308  DELAWARE BLACK HISTORY  3
A survey course in Delaware Black history. The Black American in Delaware from colonial times to recent developments. PREREQ: HIST205.

BAMS 313  AFRICAN AMERICAN LITERATURE I  3
See ENGL344 for course description.

BAMS 322  RACE AND POLITICS  3
See POSC322 for course description.

BAMS 327  RACE, GENDER, SCIENCE  3
See PHIL327 for course description.

BAMS 330  RHETORIC OF BLACK AMERICA  3
Rhetoric of Black Americans from early orators to contemporary figures. Oral interpretation and analysis of methods and techniques. PREREQ: Introductory class in Communication.

BAMS 331  HISTORY OF CARIBBEAN I  3
See HIST331 for course description.

BAMS 332  HISTORY OF CARIBBEAN II  3
See HIST332 for course description.

BAMS 333  PEOPLES OF AFRICA  3
See ANTH333 for course description.

BAMS 334  AFRICAN AMERICAN WOMEN'S HISTORY  3
See HIST334 for course description.

BAMS 345  AFRICAN AMERICAN LITERATURE II  3
See ENGL345 for course description. PREREQ: ENGL110.

BAMS 347  STUDIES IN AMERICAN LITERATURE  3
See ENGL347 for course description. RESTRICTIONS: May be repeated once for credit when topics vary.

BAMS 351  RACE AND ETHNICITY IN LATIN AMERICA  3
See ANTH351 for course description.

BAMS 355  RACE, CLASS AND CRIME  3
See CRJU355 for course description.

BAMS 356  STUDIES IN MODERN/CONTEMPORARY LITERATURE  3
See ENGL356 for course description. RESTRICTIONS: May be repeated once for credit when topics vary.

BAMS 361  RACIAL INEQUALITY  3
See SOCI361 for course description.

BAMS 382  STUDIES IN MULTICULTURAL LITERATURE IN ENGLISH  3
See ENGL382 for course description. RESTRICTIONS: May be repeated once for credit when topics vary.

BAMS 395  PAN AFRICANISM  3
See HIST395 for course description.

BAMS 411  SEMINAR IN AMERICAN HISTORY  3
See HIST411 for course description.

BAMS 415  RACE, CLASS AND GENDER  3
See SOCI415 for course description.

BAMS 418  RACE, GENDER AND POVERTY  3
See SOCI418 for course description. PREREQ: SOCI201.

BAMS 432  PSYCHOLOGICAL PERSPECTIVES ON THE BLACK AMERICAN  3
See PSYC146 for course description.

BAMS 439  PROBLEMS IN AFRICAN POLITICS  3
See POSC439 for course description.

BAMS 440  THEMES IN BLACK AMERICAN STUDIES  3
Analysis of important themes in the study of Afro-American life and history. Themes may vary each time the course is offered. RESTRICTIONS: Open to juniors and seniors only.

BAMS 649  CIVIL RIGHTS LAW AND POLICY  3
See UAPP649 for course description.

BAMS 650  BLACK COMMUNITY STUDIES  3
Investigation and analysis of various topics and developments of interest and significance to the Black community. RESTRICTIONS: May be repeated for credit when topics vary.

BAMS 660  RESEARCH AND BLACK AMERICAN STUDIES  1-6

BIological Sciences

BISC 100  FRESHMAN SEMINAR  1 PF
Provides a forum for the discussion of topics in biology that relate to material being covered in BISC207. Papers from the scientific literature and/or world wide web may be discussed. RESTRICTIONS: Open to freshman majors by faculty invitation only.

BISC 103  PRINCIPLES OF BIOLOGY  3
The study of biological principles at multiple levels of organization. Fosters biological literacy through the exploration of concepts, theories, practices, and new developments and their impact on individuals and society. RESTRICTIONS: Open to non-majors only. Students may not receive credit for both BISC103 and BISC104.

BISC 104  PRINCIPLES OF BIOLOGY WITH LABORATORY  4
The study of biological principles at multiple levels of organization. Fosters biological literacy through the exploration of concepts, theories, practices, and new developments and their impact on individuals and society. The laboratory component provides concrete examples of some of the principles discussed in the lecture component. RESTRICTIONS: Open to non-majors only. Students cannot receive credit for both BISC103 and BISC104.
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<th>Course Code</th>
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<td><strong>Human Heredity and Development</strong></td>
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<td>BISC 106</td>
<td><strong>Elementary Human Physiology</strong></td>
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<td>BISC 107</td>
<td><strong>Elementary Evolutionary Ecology</strong></td>
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<td>BISC 110</td>
<td><strong>Viruses, Genes and Cancer</strong></td>
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<td>BISC 113</td>
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<td>BISC 115</td>
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<td>BISC 116</td>
<td><strong>Elementary Human Physiology Laboratory</strong></td>
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<td>BISC 127</td>
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<td>BISC 207</td>
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<td>BISC 244</td>
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<td>BISC 276</td>
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<td>BISC 302</td>
<td><strong>General Ecology</strong></td>
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<td>BISC 305</td>
<td><strong>Cell Physiology</strong></td>
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<td>BISC 306</td>
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<td>BISC 312</td>
<td><strong>General Ecology Laboratory</strong></td>
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<td>BISC 316</td>
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<tr>
<td>BISC 317</td>
<td><strong>Tropical Ecology</strong></td>
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**Notes:**
- **RESTRICTIONS:** Open to non-majors only.
- **RESTRICTIONS:** Taught in Costa Rica.
- **RESTRICTIONS:** Offered on Associate in Arts Program campuses.
- **RESTRICTIONS:** Non-majors may take only one of BISC103, BISC104 or BISC207 to fulfill the group D requirement in the College of Arts and Sciences.
- **RESTRICTIONS:** Open to non-majors only.
- **RESTRICTIONS:** Open to non-majors only.
BISC 318 TROPICAL AMPHIBIANS AND REPTILES 3
Topics in worldwide herpetology with a major focus on Costa Rica. Topics include evolution, extinct groups and the orders Gymnophiona, Caudata, Anina, Tertudines, Crocodylia and others. Field trips included.
PREREQ: BISC107 or BISC207.
RESTRICTIONS: Taught in Costa Rica.

BISC 321 ENVIRONMENTAL BIOLOGY 3
Basic ecological and physical principles with major emphasis on the effect of human-caused environmental changes on populations, communities and ecosystems.
PREREQ: BISC208 or permission of instructor.

BISC 326 GENERAL PHYSIOLOGY DISCUSSION 1
Discussion of selected topics in physiology with emphasis on experimental evidence.
COREQ: BISC306.

BISC 366 INDEPENDENT STUDY 1-6

BISC 401 MOLECULAR BIOLOGY OF THE CELL 3
Introduction to the molecular biology of eukaryotes and procaryotes. Topics include structure and function of proteins and nucleic acids; replication and repair of DNA; biosynthesis of RNA and proteins; membranes, transport, composition and function of the eukaryotic cell, chromosomes, viruses, the immune system and recombinant DNA.
PREREQ: BISC207 and one semester of organic chemistry.

BISC 403 GENETIC AND EVOLUTIONARY BIOLOGY 3
The physical and chemical basis of heredity, the nature and mechanisms of gene action, genes in populations, speciation. PREREQ: BISC207 and one semester of organic chemistry.

BISC 405 ADVANCED MAMMALIAN PHYSIOLOGY 3
Systemic mammalian physiology: cellular mechanisms, muscle, cardiovascular, respiratory, renal, digestive and endocrine systems. Emphasizes human physiology and includes presentations of primary literature in the field of physiology research. PREREQ: BISC306.
RESTRICTIONS: Priority given to students in the Medical Scholars Program.

BISC 408 MAMMALIAN HISTOLOGY 4
Microscopic organization, identification and functional anatomy of mammalian organ systems and tissues. PREREQ: BISC208.

BISC 411 EXPERIMENTAL MOLECULAR BIOLOGY 2
Introduction to the process of scientific inquiry as it relates to cellular molecular biology. Students perform a series of exercises emphasizing experimental design and data analysis. Students then pose related scientific questions, design experiments and present results in written, poster or oral format.
PREREQ: BISC208, BISC401, CHEM321 or CHEM213.

BISC 413 ADVANCED GENETICS LABORATORY 2
Areas to be covered include Mendelian genetics and eukaryotic gene mapping; bioinformatics and protein structure; karyotype analysis; population and evolutionary genetics. Computer simulations will illustrate each area. Problems will be posed for student groups to solve after a basic understanding of the phenomena has been acquired.
PREREQ: BISC208, BISC403.

BISC 415 VERTEBRATE DEVELOPMENTAL MORPHOLOGY 3
Introduces the basic principles of vertebrate development including the formation of the basic body plan and the molecular control of tissue morphogenesis. The importance of each developmental milestone will be illustrated by discussing the underlying causes of birth defects. May be cross-listed with ANSC415.
PREREQ: BISC207 and BISC208.

BISC 422 TEACHING EXPERIENCE 1-2
Teaching experience in an undergraduate laboratory. Evaluation based on teaching performance and preparation of required material for laboratory. RESTRICTIONS: Prior completion of core requirements necessary. Requires permission of instructor.

BISC 439 DEVELOPMENTAL NEUROBIOLOGY 3
Developmental biology of the nervous system, including cellular components, neural induction, neurogenesis and neuronal migration, cellular determination, axon outgrowth and pathfinding, synapse formation, programmed cell death, neurotrophic factors, neurodevelopmental disorders, and early critical periods.

BISC 440 CONSERVATION OF TROPICAL BIODIVERSITY 3
See ENWC444 for course description.
RESTRICTIONS: Winter or Summer Session only. Taught in Costa Rica or Peru.

BISC 442 VERTEBRATE MORPHOLOGY 4
The vocabulary describing vertebrate anatomy is introduced and discussed by tracing the evolutionary and developmental histories of major vertebrate organ systems. Laboratory involves detailed dissections of representative vertebrates. PREREQ: BISC208.

BISC 446 PLANT CELL BIOLOGY 3
Examines the cell as an integrated system of localized protein-protein reactions. Strongly comparative, including examples from yeast and mammals. Focuses on underlying principles/methods. Topics include protein structure, folding, targeting, modification and interactions, membranes, cell walls, cytoskeleton, molecular motors, cell cycle, signal transduction, apoptosis and pathogenesis. May be cross-listed with PLSC446.
PREREQ: Introductory organic chemistry.

BISC 451 UNDERGRADUATE THESIS I 3
Independent research under direction of faculty member. PREREQ: Admission to B.S. in Biology in either CMG or EOB concentration. RESTRICTIONS: Not for students pursuing degree with distinction.

BISC 452 UNDERGRADUATE THESIS II 3
Continuation of BISC451. PREREQ: BISC451 and admission to B.S. in Biology in either CMG or EOB concentration. RESTRICTIONS: Not for students pursuing degree with distinction.

BISC 466 INDEPENDENT STUDY 1-6

BISC 471 INTRODUCTORY IMMUNOLOGY 3
The biological basis of adaptive immunity including participating cells, cellular interactions, counted mechanisms and immunopathologies.
PREREQ: BISC208, BISC401/411 or BISC305, BISC300.

BISC 480 VERTEBRATE NATURAL HISTORY 4
Biology of vertebrate organisms dealing specifically with adaptations to the environment, morphology, physiology and taxonomy.
PREREQ: BISC208.

BISC 492 HUMAN AND MAMMALIAN CYTOGENETICS 3
Introduction to the structure, function and behavior of eukaryotic chromosomes with special emphasis on those from human and mammalian species. Covers methods of chromosome study, gene mapping and medical cytogenetics.
PREREQ: BISC208.
RESTRICTIONS: BISC403 recommended in addition to prerequisite. Offered in spring of odd-numbered years.

BISC 495 EVOLUTION 3
Present status of the theory of biological evolution and its implications in the different areas of biology.
PREREQ: BISC208.

BISC 498 TOPICS IN BIOLOGY 3
Topics may vary from section to section. Information about each section is available in the Biology Office prior to registration. PREREQ: BISC208 (or two BISC100-level courses).
RESTRICTIONS: Requires junior or senior status. May be taken more than once but only three credits can count towards the major.

BISC 510 TOPICS IN MIDDLE SCHOOL BIOLOGY EDUCATION: GENETICS 3
Strengthens the content understanding of the developmentally appropriate genetic concepts for middle school students. Instructors model effective inquiry-based classroom pedagogy and teachers engage in reflective discussions of how to enhance student appreciation of genetics.
RESTRICTIONS: Enrollment limited to in-service high school science educators.

BISC 530 TOPICS IN BIOLOGY EDUCATION: NATURE OF SCIENCE AND EVOLUTION 3
Strengthens understanding in key areas of evolutionary biology and the nature of science, using methods that model inquiry-based classroom practices. Discussions focus on best ways to enhance student understanding, and on dealing with controversies in the teaching of evolution in high school.
RESTRICTIONS: Enrollment limited to in-service high school science educators.
BISC 600  BIOTECHNOLOGY AND MOLECULAR MEDICINE  3
Application of molecular and cellular biology techniques and principles to the field of biotechnology. Stresses the applied side of science and focuses on the practical side of molecular biology and how scientists and companies reduce the basic knowledge to practice. Emphasis on product formation and the skills required to meet such goals. Covers tangential issues of biotechnology and the ethical choices made in developing clinical trial protocols.
PREREQ: Undergraduate course in biology or chemistry or permission of the instructor.

BISC 601  IMMUNOCHEMISTRY  4
Methods as basic as immunization and as complex as developing monoclonal antibodies. Methods used to investigate the genetics and protein structure of β-galactosidase.
PREREQ: BISC401 or biochemistry.
RESTRICTIONS: Requires permission of instructor.

BISC 602  MOLECULAR BIOLOGY OF ANIMAL CELLS  3
Examination of eukaryotic genes, synthesis and processing of messenger RNA and control of protein synthesis with emphasis on regulation of normal cellular growth and differentiation and the process of cancer cell transformation. Emphasis on recombinant DNA technology, monoclonal antibody production and tissue culture.
PREREQ: BISC401 and BISC403.

BISC 604  NUCLEIC ACIDS LABORATORY  4
Introduces techniques of gene cloning, amplification, manipulation and expression.
PREREQ: BISC401.
RESTRICTIONS: Biochemistry recommended. Senior or graduate status required.

BISC 605  ADVANCED MAMMALIAN PHYSIOLOGY  4
Systemic mammalian physiology: cellular mechanisms, muscle, cardiovascular, respiratory, renal, digestive and endocrine systems. Emphasizes human physiology and includes discussions of primary literature in the field of physiology research.
PREREQ: BISC306 or instructor’s approval.
RESTRICTIONS: Priority given to graduate students and seniors seeking research-related careers.

BISC 612  ADVANCED CELL BIOLOGY  3
Three major sections: (1) cell structure/function; (2) signaling mechanisms; and (3) integrative cell physiology. Students required to interpret and evaluate data from primary scientific literature.
RESTRICTIONS: Instructor approval required.

BISC 615  VERTEBRATE DEVELOPMENTAL BIOLOGY  3
Introduces the basic principles of vertebrate development including formation of the basic body plan and the molecular control of tissue morphogenesis. The importance of each developmental milestone will be illustrated by discussing the underlying causes of birth defects.
May be cross-listed with ANSC615.
PREREQ: BISC401 and BISC403.
RESTRICTIONS: Requires instructor approval.

BISC 617  LABORATORY TECHNIQUES FOR MODERN MICROSCOPY  4
Techniques of electron and confocal microscopic study of tissues. Includes fixation, embedding, ultrathin sectioning, staining, observation and interpretation.
RESTRICTIONS: Requires permission of instructor.

BISC 618  COMPUTER IMAGING IN BIOLOGY  3
Principles and methods of computer image processing as they apply to biological images. Laboratory provides hands-on experience prompted by prepared tutorials. Students develop their own projects and present them as posters or other formats.
PREREQ: Requires permission of instructor.
RESTRICTIONS: Limited by number of computer workstations in laboratory.

BISC 619  GENE EXPRESSION LABORATORY  4
Laboratory in techniques of molecular biology. Student generates recombinant viruses which can express large amounts of foreign protein. The protein will be purified and characterized functionally and biochemically using such methods as in vitro DNA replication, DNA footprinting, DNA melting and/or unwinding and gel retardation.
PREREQ: BISC401.
RESTRICTIONS: Limited to ten students. Preference given to bachelor of science degree students with a concentration in biotechnology.

BISC 625  CANCER BIOLOGY  3
Provides an integrated lecture series summarizing current knowledge in cancer biology. Topics include: statistics of incidence/survival, pathology, the process of chemical carcinogenesis and sources of carcinogens, genetic and epigenetic mechanisms and consequences, viral and hormonal carcinogenesis as well as current treatment options.
PREREQ: BISC207, BISC401, CHEM103, CHEM104, CHEM321.
RESTRICTIONS: Instructor approval required.
BISC 671 Cellular and Molecular Immunology
Introduces the basic concepts of immunology and describes how different immune responses can either protect the body from infection or lead to immunological based diseases. Focuses on cellular interactions and the resultant molecular responses that lead to immune protection.
PREREQ: BISC401 or BISC305 or BISC300.
RESTRICTIONS: Requires permission of instructor

BISC 675 Cardiovascular Physiology
The physiology and biophysics of the mammalian heart and circulation.
PREREQ: A physiology course at or above the 300-level.

BISC 679 Virology
Molecular biology of animal viruses. Virus structure and organization; mechanisms of penetration, replication, maturation and transformation.
PREREQ: BISC401 or biochemistry.

BISC 693 Human Genetics
Emphasis on the medical and social implications of our knowledge of human genetics. Discusses theoretical and practical principles of genetics useful in studying heredity and the discussion of genetic counseling.
PREREQ: BISC401 or BISC305.

BISC 801 Seminar in Ecology
Critical examination of selected topics in ecology, through evaluation of relevant literature. Students prepare seminars on topics provided each semester.
RESTRICTIONS: Requires permission of instructor.

BISC 806 Advances in Cell and Organ Systems
Literature-based current topics in cell and organ systems.
RESTRICTIONS: May be repeated up to nine credits when topics vary. Offered only in Spring.

BISC 827 Graduate Research Seminar
Seminar allowing graduate students in the Department of Biology to report on the progress of their research projects. Both students and faculty attend presentations.

BISC 833 Special Topics in Biology
Various topics in biology.

BISC 864 Research Tutorial
First year doctoral students will complete six weeks of research training in the laboratory of a Biological Sciences faculty member. Students may enroll in either one or two sections of BISC864 in a single semester. Students gain breadth of research training and are better able to identify appropriate dissertation advisors.
RESTRICTIONS: Requires approval of instructor.

BISC 868 Research
Independent research leading to the Master’s Thesis.

BISC 869 Master’s Thesis
Independent research prior to completion of the Ph.D. Candidacy Examination.

BISC 964 Pre-Candidacy Study
Independent doctoral dissertation research prior to completion of the Ph.D. Candidacy Examination.

BISC 969 Doctoral Dissertation
Independent dissertation research after completion of the Candidacy Examination.

BMSC 866 Special Problem
RESTRICTIONS: Open only to freshmen in the Alfred Lerner College of Business and Economics.

BMSC 868 Research

BMSC 869 Master’s Thesis

BMSC 964 Pre-Candidacy Study
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.
RESTRICTIONS: Not open to students who have been admitted to candidacy.

BMSC 969 Doctoral Dissertation

BIORESOURCES ENGINEERING

BREG 603 Soil Physics
See PLS603 for course description.
PREREQ: PLS204.

BREG 628 Natural Wastewater Treatment Systems
Land treatment systems for wastewater, biosolids and septic tank application, constructed wetlands and aquatic treatment systems, lagoons and decentralized wastewater management.
PREREQ: EGTE328 or CIEG233.

BREG 666 Special Problem

BUSINESS ADMINISTRATION

BUAD 030 Cooperative Education Program
Assists students to integrate classroom theory with on-the-job experience through analysis of their cooperative work assignments. Business administration, accounting, and economics co-op students must enroll for one credit hour of BUAD030 during their co-op work term.

BUAD 100 Introduction to Business
A survey of basic business concepts designed for the non-business major. Topics include business organization, management, marketing, operations research and finance.
RESTRICTIONS: No majors within the business administration or accounting degree programs may receive credit for this course.

BUAD 110 Basics of Business
An introduction to business to inform about each of the functional areas of business through lectures, readings, discussions, guest speakers, cases and projects. Includes topics relating to operations, marketing, finance, management, accounting and MIS, as well as business ethics, and critical thinking and decision making.
COREQ: ENGL110.
RESTRICTIONS: Open only to freshmen in the Alfred Lerner College of Business and Economics.

BUAD 301 Introduction to Marketing
Management of the marketing functions, marketing research, product planning, distribution channels, pricing, personal selling and advertising. Emphasis on consumer and industrial markets.
PREREQ: ECON100 or ECON152.

BUAD 302 Marketing Research
Focus on the marketing research process as an aid in marketing decision making. Defining marketing problems, identifying marketing information needs, developing methods to gather information, and applying research results to marketing problems.
PREREQ: MATH202, BUAD301 and ACCT160.

BUAD 306 Operations Management
Analysis of major problems faced by operations managers at different levels of management. Topics include scheduling, forecasting, process design, inventory management and quality management.
PREREQ: MATH202 and ACCT160.

BUAD 309 Management and Organizational Behavior
The processes and procedures used to manage performance effectively, including behavioral implications and an awareness of the individual’s impact on others.
BUAD 341  ENVIRONMENT OF MULTINATIONAL CORPORATIONS  3
Interdisciplinary approach explores the multinational corporation: its political and economic environment; current attitude of policy makers; and techniques used to earn profits. Material supplemented by practicing economists, financial experts, business executives and political analysts. May be cross-listed with ECON341 and/or POSC341.
PREREQ: ECON152.
RESTRICTIONS: Counts as a BUAD elective for BS candidates. Credit for BUAD/ECON/POSC341 given only once.
BUAD 346  ANALYSIS OF OPERATIONS PROBLEMS  3
Intensive treatment of topics covered in BUAD306 to include the investigation and development of the decision making process in an operations environment. Emphasis on practical applications.
PREREQ: BUAD306.
BUAD 366  INDEPENDENT STUDY  1-6
BUAD 382  INTERNATIONAL BUSINESS MANAGEMENT  3
BUAD 383  SEMINAR ON INTERNATIONAL BUSINESS  3
Surveys the economic, political, and institutional context of international business as well as the strategic operations of the international company. Special attention is given to cross-discipline topics, both in the form of interdisciplinary materials and lectures and institutional and company visits.
RESTRICTIONS: Taught abroad.
BUAD 391  SEMINAR ON INTERNATIONAL MANAGEMENT  3
Seminar on selected topics in international management. Combines lectures and visits to local organizations. Research paper typically required.
PREREQ: BUAD309.
RESTRICTIONS: Taught abroad. Counts as BUAD elective for BS candidates.
BUAD 393  SEMINAR ON INTERNATIONAL MARKETING MANAGEMENT  3
Seminar on selected topics in international marketing management. Combines lectures and visits to local organizations. Research paper typically required.
PREREQ: BUAD301.
RESTRICTIONS: Taught abroad. Counts as BUAD elective for BS candidates.
BUAD 394  SEMINAR ON INTERNATIONAL OPERATIONS MANAGEMENT  3
Seminar on selected topics in international operations management. Combines lectures and visits to local organizations. Research paper typically required.
PREREQ: BUAD306.
RESTRICTIONS: Taught abroad. Counts as BUAD elective for BS candidates.
BUAD 420  LABOR RELATIONS  3
Treatment of labor-management relationships, with an emphasis on collective bargaining behavior and the settlement of disputes. The various environmental factors (history, philosophy, law and structure) which have greatly affected union-management affairs are first inspected, as a vital background to understanding.
PREREQ: BUAD309.
BUAD 421  HUMAN RESOURCE MANAGEMENT  3
Emphasizes key human resource management requirements: acquisition of personnel (planning, selecting, recruiting and training) and maintenance of personnel (evaluation, compensation, working conditions and labor relations).
PREREQ: BUAD309.
BUAD 422  DESIGNING EFFECTIVE ORGANIZATIONS  3
Concepts of administration at the individual, group and organizational level of analysis. Emphasis on organizational level of analysis with topics including job design, organization structure and design, and inter- and intra-organizational processes.
PREREQ: BUAD309.
BUAD 423  NEGOTIATION  3
Improves negotiation and conflict resolution skills by introducing principles for effective negotiation and providing with opportunities to develop their skills through the use of simulation exercises. Topics include preparing for negotiation, strategies and tactics of negotiation, dealing with interpersonal conflict, and avoiding common mistakes when negotiating.
PREREQ: BUAD309.
BUAD 425  CURRENT ISSUES IN GLOBAL BUSINESS  3
Current topics and emerging issues in the changing global marketplace. May focus on regional issues, global business sectors, current issues in the globalization of business, or a combination of these.
PREREQ: Senior standing, and at least one of ACCT382, BUAD382, ECON340, or FINC415.
BUAD 428  MANAGEMENT SYSTEMS  3
Concepts of general systems theory, with applications to analysis of management systems, work flows and information flows. Design and analysis of sociotechnical systems, project and program management.
PREREQ: BUAD309.
BUAD 429  SELECTED TOPICS IN MANAGEMENT  3
Topical seminar on such management issues as organizational socialization, work motivation, and organization-environment relations. Development of an individual research project is stressed.
PREREQ: Twelve credit hours of management courses.
BUAD 441  STRATEGIC MANAGEMENT  3
Case studies and concepts in the determination of top-level company policy and the solution of problems that cross major functional areas in business.
PREREQ: BUAD301, BUAD306, BUAD309 and FINC311.
RESTRICTIONS: Requires senior standing in business administration or accounting.
BUAD 444  ENTREPRENEURSHIP AND SMALL BUSINESS MANAGEMENT  3
Principles of managing a small business and differences in approach between large and small companies. Characteristics of the entrepreneur. Interpersonal and skill relationships in partnerships. The functions of accounting, finance, marketing, personnel and production forecasting for the small business.
PREREQ: BUAD309.
BUAD 446  OPERATIONS PLANNING AND CONTROL  3
Management of operations and inventories in a variety of organizations including banks, hospitals, government and manufacturing firms. Topics include forecasting, operations planning and scheduling, material requirements planning and purchasing.
PREREQ: BUAD306.
COREQ: BUAD447.
BUAD 447  QUALITY MANAGEMENT  3
The new technology for quality and productivity. Emphasis on actual implementation of total quality management in general and statistical process control in particular.
PREREQ: BUAD306.
COREQ: BUAD446.
BUAD 448  DECISION SUPPORT SYSTEMS FOR OPERATIONS  3
Effective design and implementation of decision support for operations. Selection of appropriate models for decision support. Emphasis on project work in which an actual decision support system is designed and implemented.
PREREQ: BUAD306, ACCT160.
RESTRICTIONS: Open to senior operations management majors only.
BUAD 449  PROBLEM STRUCTURING FOR OPERATIONS DECISION MAKING  3
Focuses on how unstructured problems in various areas of operations management can be structured and solved using a variety of tools and techniques. Emphasis placed on logistics problems and other unstructured problems related to forecasting, inventory management, scheduling, and supply chain management.
PREREQ: BUAD306, BUAD446 and BUAD447.
RESTRICTIONS: Not open to students who have taken or are taking BUEC432.
Senior operations management majors only.
BUAD 466  INDEPENDENT STUDY  1-6
BUAD 468  UNDERGRADUATE RESEARCH  1-6
Directed research for Undergraduate Honors students and Summer Scholars. The research must be scholarly research of thesis level potentially leading to an undergraduate thesis.
PREREQ: Upper class standing.
RESTRICTIONS: Permission of instructor and Department Chairperson.
BUAD 470  SALES MANAGEMENT AND SELLING  3
Selling as the process of commercial persuasion and as a service to the customer. Major operating responsibilities of the sales manager, recruitment, training, motivation, compensation, territory management and manpower planning and control.
PREREQ: BUAD301.
BUAD 471  ADVERTISING MANAGEMENT  3
Planning, implementing, and evaluating advertising and sales promotion activities. Determining advertising objectives, selection of campaign themes and media, evaluating advertisements and campaigns, controlling advertising and promotion expenditures, the client-agency relationship, regulation, and the social and economic effects of advertising.
PREREQ: BUAD301.
BUAD 472  MARKETING, SOCIETY AND THE ENVIRONMENT  3
Focusses on the interface between marketing management and the societal-environmental dynamics of the surrounding society. Students critically analyze concepts and practices relating to socially responsible marketing management to gain an understanding of emerging social and environmental issues relevant to marketing decision making.
PREREQ: BUAD301.

BUAD 473  BUYER BEHAVIOR  3
The decision processes associated with buying and consumption. Social, cultural and psychological influences on consumer decisions and consumption patterns. The relationship between buyer behavior and marketing decision making.
PREREQ: BUAD301.

BUAD 474  MARKETING CHANNELS AND RETAILING  3
Focus on decision processes involved in establishing the paths for the movement of products, title, payment, and information between producers and users. Emphasis on the decisions necessary for successful retail operations.
PREREQ: BUAD301.

BUAD 475  INTERNATIONAL MARKETING  3
Analysis of the concepts and practices relating to the marketing of products and services internationally. Focus on the uncontrollable environmental forces facing an international marketer, issues relating to the standardization of marketing strategies across countries and the unique problems of specific international markets.
PREREQ: BUAD301.

BUAD 477  INFORMATION TECHNOLOGY APPLICATIONS IN MARKETING  3
How changes in information technology affect the marketplace and how it should be used to support marketing decision-making. Emerging opportunities that could drastically alter the way organizations market their products and provide service to their customers are presented and discussed.
PREREQ: BUAD301.
RESTRICTIONS: Open to marketing majors only.

BUAD 478  FIELD PROJECTS IN MARKETING  3
Student teams apply their knowledge of marketing and business in a "real world" setting with local, regional, and national profit and nonprofit businesses on marketing projects funded by the companies. Projects involve: defining objectives, collecting relevant data, analyzing, interpreting, and reporting results/recommendations to management.
PREREQ: At least nine credits in marketing including BUAD302 and honors status or permission of the instructor.

BUAD 479  MARKETING STRATEGY FOR THE FIRM  3
The application of management decision processes and strategies to the integration of the firm's total marketing mix. Multifaceted problems are studied in large, medium and small firms. Students analyze cases and other real marketing problems.
PREREQ: Twelve credit hours of marketing courses including BUAD302.

BUAD 800  STRATEGIC THINKING FOR THE EXECUTIVE LEADER  3
A broad introduction to the MBA program and the nature of management thought. Topics include strategy, decision-making and organizational behavior. Emphasizes understanding underlying assumptions/limitations of different business perspectives. Provides a foundation for the MBA program and gives students practical skills.

BUAD 807  OPERATIONS PLANNING AND CONTROL  3
Focuses on the development of business strategies and management practices for managing the multinational business organization. Discusses technical and behavioral issues related to the design and implementation of effective DSS and ES. Discusses the development of information systems. Emphasizes quality management primarily via statistical process control. Focuses on data analysis for the purpose of measurement, inference, quality and productivity improvement. Descriptive statistics, graphical analysis, exploratory data analysis, applications of common distributions and models such as regression are covered.
PREREQ: BUAD831.

BUAD 842  SPECIAL TOPICS IN MANAGEMENT OF TECHNOLOGY  1-3
Examines techniques and issues in project management, with special emphasis on new product development projects. Topics include models for cost estimation, process selection, competitive benchmarking, concurrent engineering, and successful project management. Focuses on using decision support systems (DSS) and expert systems (ES) to enhance decision making in business. Critically examines the literature on the development of information systems. Examines selected topics in the management of technology. Individual inquiry stressed.
PREREQ: BUAD831.

BUAD 843  SPECIAL TOPICS IN OPERATION MANAGEMENT  3
Focuses on the interface between marketing management and the social-environmental dynamics of the surrounding society. Students critically analyze concepts and practices relating to socially responsible marketing management to gain an understanding of emerging social and environmental issues relevant to marketing decision making.
PREREQ: BUAD301.

BUAD 844  SPECIAL TOPICS IN GLOBAL BUSINESS  3
Examines selected topics in global business that may focus on one or more areas of the world (e.g., the European Union, Latin America, Pacific Basin, etc.). May be offered overseas.
PREREQ: Requires 24 MBA credits.
BUAD 851 CREATIVITY AND INNOVATION FOR NEW VENTURES 1
New Venture Creation module explores the creative and innovative process and the linkages between creativity and innovation both within a corporate environment as well as in an entrepreneurial venture. Students gain an understanding of the creative and innovative process, know how to stimulate creativity and break down barriers to innovation.
PREREQ: BUAD870.

BUAD 852 MARKET RESEARCH FOR NEW VENTURES 1
New Venture Creation module focuses on marketing issues related to new product development. Addresses how to use research to design products that meet customer needs, assess market potential, and segment heterogeneous markets. Strategic issues related to achieving a desirable market position, overcoming obstacles to successful product diffusion, and building equity in new brands are also considered. Depending on student interests, varying emphasis will be given to business-to-business and business-to-consumer markets.
PREREQ: BUAD880.

BUAD 853 PROJECT PLANNING AND MANAGEMENT 1
Focuses on the innovation process. Various approaches to project planning and management are explored and specific project management techniques such as PACE and Stage Gate process are covered. The objective is to be able to plan an innovation process, know the various tools that are available and to appropriately apply the tools to an innovation project. Learning assessed through written exam involving a case application.
PREREQ: BUAD880.

BUAD 854 STRATEGIC, TECHNICAL AND INDUSTRY ANALYSIS 1
New Venture module develops the principle that effective strategies follow from the founder and firm’s fundamental goals. Key course outcomes include (1) develop skills in analyzing environment in which they or their firm compete; (2) understand how to define a strategy and design a business; (3) interpret the management processes used to analyze, formulate and implement effective strategies.
PREREQ: BUAD890.

BUAD 855 ETHICAL AND REGULATORY ISSUES FOR NEW VENTURES 1
Extension of the legal and regulatory module in the MBA core as it applies to technological innovation and new venture creation. Content may vary depending on students’ interests.
PREREQ: BUAD840.

BUAD 856 SPECIAL TOPICS IN NEW VENTURE CREATION I 3
Specialized modules designed for students pursuing a concentration in New Venture Creation. Topics include: strategic, technical and industry analysis; project planning and management; ethical and regulatory issues for new ventures.
PREREQ: Complete tier 1 of MBA program.
RESTRICTIONS: Cannot be counted in program along with BUAD853, BUAD854 or BUAD855.

BUAD 857 SPECIAL TOPICS IN NEW VENTURE CREATION II 3
Specialized modules designed for students pursuing a concentration in New Venture Creation. Topics include: creativity and innovation for new ventures; market research for new ventures; financing new ventures.
PREREQ: Complete tier 1 of MBA program.
RESTRICTIONS: Cannot be counted in program along with BUAD851, BUAD852 or FINC860.

BUAD 864 INTERNSHIP 1-6 PF
Fieldwork designed to allow a student to apply acquired knowledge in a corporate setting. Requires a corporate sponsorship, a performance evaluation to be completed by that sponsor, and a written paper to be submitted to the administrator of internships.

BUAD 868 PROFESSIONAL PROJECT 3-6 PF
OECD. Project demonstrating ability to apply Organizational Development and Change in field setting. Requires written and oral presentation of the professional project following UD Thesis guidelines.

BUAD 869 MASTER’S THESIS 3-6
Can be taken for up to 6 credits in the MS program.

BUAD 870 UNDERSTANDING PEOPLE IN ORGANIZATIONS 3
Develops a knowledge base and requisite skills for managing individual, group and organizational processes through the use of diagnostic models, cases and/or experimental experiences.

BUAD 871 MANAGING FOR CREATIVITY AND INNOVATION 3
Focuses on individual characteristics and group and organizational factors that influence the ability of organizations to generate new products and/or processes, and to implement new products/processes. Students practice skills to diagnose barriers and develop creative organizations.
PREREQ: BUAD870.

BUAD 872 ORGANIZATIONAL DEVELOPMENT AND CHANGE 3
Provides knowledge and skills to function as effective change agents in organizations. Particularly appropriate for students seeking potential employment in positions requiring skills in facilitating change. Classic OD concepts are studied along with contemporary concepts, approaches and techniques for planned organizational change.
PREREQ: BUAD870.

BUAD 874 SPECIAL TOPICS IN ADMINISTRATION 1-3
Examines selected current organizational topics: e.g., new compensation and benefits initiatives, employee involvement, teamwork designs and reengineering. Individual inquiry is stressed.
PREREQ: BUAD870.

BUAD 875 STRATEGIC HUMAN RESOURCES 3
Examines the personnel/human resources function focusing on five key areas: 1) procurement, 2) training and development, 3) compensation, 4) security, and 5) labor-management relations. Throughout, attention is paid to international practices and an effort is made to integrate business functions both strategically and operationally.
PREREQ: BUAD870.

BUAD 876 LABOR MANAGEMENT RELATIONS 3
Labor-management relationships. Primary focus on contract negotiations and administration as well as inspection of the various environmental factors (history, philosophy, law and structure) that underpin collective bargaining.

BUAD 878 LEADERSHIP IN INTERNATIONAL BUSINESS CULTURES 3
Focuses on cultural similarities and differences worldwide and how they affect managers’ effectiveness. Attention is given to general cultural dimensions as well as specific cultural practices with a special emphasis on cross-cultural communications.
PREREQ: BUAD870.

BUAD 879 NEGOTIATION AND CONFLICT RESOLUTION 3
Acquaints students with theory and research on negotiation and conflict resolution and involves students in active negotiation exercises with discussions, including feedback on students’ negotiation skills. Negotiation is broadly defined to include many varieties of bargaining, third party dispute intervention and organizational justice.
PREREQ: BUAD870.

BUAD 880 MARKETING MANAGEMENT 3
Management of marketing functions in modern profit and non-profit enterprises. Introduction to the marketing management process.
PREREQ: ACCT800 and ECON503.

BUAD 881 RESEARCH METHODS FOR MARKETING DECISIONS 3
Focuses on the techniques of research design, data collection, and data analysis for making marketing decisions. Helps students develop an appreciation for the potential contributions and limitations of marketing research data, enabling them to evaluate marketing research activities. Emphasizes interpretation, not computation, from statistical analyses.
PREREQ: BUAD820 and BUAD880.

BUAD 882 INTERNATIONAL MARKETING MANAGEMENT 3
Develops managerial decision-making skills in several areas related to international/global marketing such as environmental analysis, planning/organization, marketing research, segmentation, targeting and positioning/competitive analysis, and method of entry.
PREREQ: BUAD880.

BUAD 883 PRODUCT AND PRICE MANAGEMENT 3
Integrates topics in product management and pricing strategy. Special emphasis is given to the use of conceptual frameworks and analytical methods that may be used to improve product and price decisions. The concepts and methods are applied to real-world case studies.
PREREQ: BUAD880.

BUAD 884 SPECIAL TOPICS IN MARKETING 1-3
Examines selected current marketing topics: e.g., strategy development, opportunity assessment, modeling and marketing programming. Individual inquiry is stressed.
PREREQ: BUAD880.

BUAD 885 MARKETING CHANNELS 3
Analyzes marketing channels as social, economic and political systems. Strong emphasis placed on understanding the behavioral dimension of the channel relationship after focusing on the economic and structural aspects of retailing, wholesaling, and physical distribution. Governmental and other constraints on channel activities are also studied.
PREREQ: BUAD880.
BUAD 888 **Advanced Marketing Management and Strategy Seminar** 3
Focuses on the issues faced by senior and middle level marketing executives in an organization. Emphasizes developing a comprehensive marketing strategy that is consistent with corporate plans. Issues explored include: opportunity assessment and competitive analysis, segmentation and positioning, and the development of integrated marketing mix programs.
PREREQ: BUAD880.

BUAD 899 **Business Consulting Project** 3
Designed to assist students gain an integrative, practical and applied industry experience by solving a real life industry problem in a group setting. Projects may be set up in different functional areas and/or concentrations, e.g., New Venture Creation, Marketing, Interdisciplinary Projects, etc.
RESTRICTIONS: MBA advanced elective to be taken after completing the core and required courses.

BUAD 810 **Telecommunications and Networks I** 3
See CPEG810 for course description.
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management program.

BUAD 811 **Telecommunications and Networks II** 3
See CPEG811 for course description.
COREQ: CPEG810. May also be taken as prerequisite.
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management Program.

BUAD 827 **Information Technology Applications in Management** 3
Explores practical applications of information technology in all aspects of management including organizational behavior, human resource management, international management and strategic decision making. Issues of managing emerging technologies, integrating technologies with people, organizational culture and structure and strategic decision making will be discussed.
PREREQ: BUAD309.
RESTRICTIONS: Open to management majors only.

BUAD 830 **Decision Support and Analysis** 3
Considers how to structure and define complex business decision problems; the analytical framework and techniques required to understand the problem; where the data needed for the analysis resides in the organization and the tools and techniques needed to obtain it.
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management Program.

BUAD 840 **Project Management and Costing** 3
Provides the technical knowledge and skills needed to successfully plan, execute and evaluate IT projects. Strong emphasis on the costing of IT projects.
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management Program.

BUAD 850 **Security and Control** 3
Considers state-of-the-art technological and organizational approaches to enhancing the security and integrity of corporate information resources in a cost-effective manner.
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management program.

BUAD 860 **High Technology Entrepreneurship** 3
Focuses on the critical financial, legal, scientific and engineering issues that must be confronted during the initial planning stages of a start-up enterprise. Students work in teams to develop a business plan for a real world business product offering.

BUAD 865 **Seminar** 1-12
Taught from an IT perspective and provides a background for understanding the information needs of an organization’s business processes. Topics include: accounting for an IT environment; business processes and operations management; finance; marketing; management; and programming.
RESTRICTIONS: Open only to students in the M.S. in Information Systems and Technology Management program.
CGSC 660 ELEMENTS OF COGNITIVE SCIENCE 3
An introduction to the interdisciplinary study of the mind. Concentrates on interdisciplinary (linguistic, psychological, anthropological, philosophical, and computational) approaches to the domains of language and visual perception and other areas of cognition, as well as the role of representation and algorithm in theories of processing and development.

CGSC 681 ARTIFICIAL INTELLIGENCE 3
See CISC681 for course description.

CGSC 683 SEMINAR IN COGNITIVE SCIENCE 3
Intensive study of topics in cognitive science, such as mental representation, vision, computational modeling, disorders.
RESTRICTIONS: May be repeated for credit as topics change.

CGSC 696 PSYCHOLUMINOSTICUS 3
Study of linguistic approaches to cognition. Issues in the relation of language to thought: universals, language acquisition and theories of syntactic and semantic processing.
PREREQ: LING101.

CGSC 866 INDEPENDENT STUDY 1-12
Varying topics in cognitive science, such as mental models, philosophical problems in the study of mind, computational modeling, and development.
RESTRICTIONS: May be repeated for credit as topics change.

CHEMICAL ENGINEERING

CHEG 009 FRESHMAN SEMINAR 0 PF
Defines chemical engineering and presents predictions of the future of the profession in research and development.

CHEG 112 INTRODUCTION TO CHEMICAL ENGINEERING 3
Development of quantitative models for physical systems using a combination of conservation principles and carefully focused experimental data. Stresses the conservation of matter and energy.
PREREQ: A minimum grade of C- in MATH242.
COREQ: MATH243.

CHEG 166 SPECIAL PROBLEM 1-3
RESTRICTIONS: Cannot count toward graduation in chemical engineering.

CHEG 231 CHEMICAL ENGINEERING THERMODYNAMICS 3
The first law energy balance; the entropy balance; thermodynamic constitutive equations for gases and liquids; thermodynamic cycles and energy conversion; and stability. Kinetic Theory and Partition functions.
PREREQ: A minimum grade of C- in CHEG112 or, for environmental engineering majors, in CIEG233. A minimum grade of C- in MATH243.

CHEG 266 SPECIAL PROBLEM 1-3
RESTRICTIONS: Cannot count toward graduation in chemical engineering.

CHEG 305 APPLIED MATHEMATICS FOR CHEMICAL ENGINEERING 3
See MATH305 for course description.
PREREQ: A minimum grade of C- in MATH243 and CHEG112.

CHEG 320 ENGINEERING ECONOMICS AND RISK ANALYSIS 3
Introduction to chemical process simulation, process safety, and the principles of chemical engineering economics, uncertainty and risk assessment within the context of chemical engineering analysis and design.
PREREQ: A minimum grade of C- in MATH305 and CHEG325.

CHEG 325 CHEMICAL ENGINEERING THERMODYNAMICS 3
A continuation of CHEG231. The thermodynamics of mixtures; phase and chemical equilibrium. Application to staged separation processes, particularly distillation.
PREREQ: A minimum grade of C- in CHEG231.

CHEG 332 CHEMICAL ENGINEERING KINETICS 3
Systematic description of rates of homogeneous and heterogeneous chemical reactions of industrial importance. Application of these principles to analysis and design of chemical reactors.
PREREQ: A minimum grade of C- in MATH305, CHEG325 and CHEM444.

CHEG 341 FLUID MECHANICS 3
Theory of flow of incompressible viscous and nonviscous fluids; flow of non-Newtonian fluids; empirical correlations for laminar and turbulent flow; and applications in chemical processing.
PREREQ: A minimum grade of C- in CHEG231 and MATH305.
CHEG 342  HEAT AND MASS TRANSFER  3
Theory of heat transfer in flow and nonflow systems. Fundamentals of mass transfer. Empirical correlations for transfer in free and forced convection; and application to process engineering problems.
PREREQ: A minimum grade of C- in CHEG341, or for environmental engineering majors, in CIEG305.

CHEG 345  CHEMICAL ENGINEERING LABORATORY I  3
Laboratory studies demonstrating the principles of fluid mechanics, reaction engineering, heat transfer, mass transfer and thermodynamics. Emphasis on correlation of experimental results and on written and oral presentation.
PREREQ: A minimum grade of C- in CHEG325, CHEG332 and CHEG341.
COREQ: CHEG342.

CHEG 366  INDEPENDENT STUDY  1-6

CHEG 401  CHEMICAL PROCESS DYNAMICS AND CONTROL  3
Analysis of transient behavior of chemical processing equipment and chemical reactors. Modeling and identification of process systems. Design of linear control systems. Introduction to model-based, multivariable and statistical process control.
PREREQ: A minimum grade of C- in MATH303, CHEG332 and CHEG342.
COREQ: CHEG443.

CHEG 432  CHEMICAL PROCESS ANALYSIS  3
A study of the economic/energy utilization/environmental principles of conceptual process design. The optimization of a design along with the safety and ethics issues are taught by several case process synthesis studies.
PREREQ: A minimum grade of C- in CHEG320, CHEG332, CHEG401 and CHEG443.

CHEG 442  MASS TRANSFER OPERATIONS  3
Application of chemical engineering fundamentals to the analysis and design of mass transfer processes for separation and purification. Applications of computer-aided design for distillation-based separations. Examples involving absorption, extraction, membrane separations etc. with special emphasis on bioseparations.
PREREQ: A minimum grade of C- in CHEG325 and CHEG443.

CHEG 445  CHEMICAL ENGINEERING LABORATORY II  3
Intensive laboratory experiments illustrate the application of chemical and physical principles to industrial processes. Expands upon CHEG332 and CHEG443. Technical report writing emphasized.
PREREQ: A minimum grade of C- in CHEG332, CHEG442 and CHEG435.
COREQ: CHEG443.

CHEG 466  INDEPENDENT STUDY  1-6

CHEG 468  RESEARCH  1-9

CHEG 473  CHEMICAL ENGINEERING PROJECTS  3
Experimental, theoretical and literature studies of chemical engineering problems.
PREREQ: A minimum grade of B in CHEG345.

CHEG 474  CHEMICAL ENGINEERING PROJECTS  3
A continuation of CHEG473.

CHEG 595  INTELLECTUAL PROPERTY FOR ENGINEERS AND SCIENTISTS  3
Methods of protecting intellectual property. Patents, trademarks, copyrights, trade secrets and unfair methods of competition, including analyses of significant court decisions in each area. Directed to innovators in all fields interested in legal protection of their ideas.

CHEG 600  INTRODUCTION TO POLYMER SCIENCE AND ENGINEERING I  3
Introduction to polymer physics with emphasis on structure-property models for bulk polymers, viscoelasticity, polymer morphology, crystallization and crystallization kinetics, effects of processing on bulk polymers and structure-property correlations for bulk polymers.

CHEG 601  STRUCTURE AND PROPERTIES OF POLYMER MATERIALS  3
See MSEG601 for course description.

CHEG 602  POLYMER PROCESS ANALYSIS AND DESIGN  3
Development of the tools of continuum mechanics necessary for the quantitative description of viscoelastic media. Use of principles of chemical kinetics, fluid and continuum mechanics, and heat and mass transfer to describe the production and processing of polymeric materials.
PREREQ: CHEG342; CHEG600 suggested.

CHEG 604  PROBABILITY AND STATISTICS FOR ENGINEERING PROBLEM SOLVING  3
Presents a fundamental approach to modeling, characterization and analysis of random phenomena with the objective of providing students with the basic principles, methods and tools for solving engineering problems involving randomly varying phenomena. Application areas explored include experimental design, manufacturing, system reliability, and cellular biology.
PREREQ: MATH302 or equivalent with permission of instructor.

CHEG 605  MULTIPHASE FLUID MECHANICS  3
Presents topics in fluid dynamics of practical importance in the chemical process industries, emphasizing two-phase flow and other advanced topics. Covers two-phase gas-liquid and solid-liquid flow, compressible flow, turbulence, non-Newtonian flow and prime movers.
PREREQ: CHEG341 or other introductory course in fluid mechanics.

CHEG 606  INTRODUCTION TO CATALYSIS  3
Introduction to modern principles of catalysis with emphasis on industrial catalytic reactions, mechanisms and kinetics. Principles of homogeneous organometallic catalysis, supported-metal and solid acid heterogeneous catalysis.
PREREQ: CHEM331 and CHEM444.

CHEG 608  PARTICLE DESIGN AND PROCESSING  3
Examines the production of new particles with specific attributes and prepares students to work in the pharmaceutical industry, nanotechnology and biotechnology. Population balances are developed and integrated with particle science to model a variety of particle design processes, such as crystallization, granulation and comminution.
PREREQ: CHEG325 and CHEG341.

CHEG 610  INDUSTRIAL AND ENGINEERING CHEMISTRY  3
Investigation of the role of chemistry and engineering in important industrial processes. Emphasis on innovations in chemical processing routes based on the interplay between chemistry and engineering. Flowsheeting of specific routes.
RESTRICTIONS: Requires permission of instructor.

CHEG 612  APPLIED PROCESS HEAT TRANSFER  3
Principles of heat transfer by conduction, convection and radiation illustrated through the case study approach. Emphasis on analyzing heat balance and heat transfer equations with their proper boundary conditions.
PREREQ: CHEG342.

CHEG 615  SPECIAL TOPICS IN MIXING  3
Introduces basic principles of fluid dynamics, rheology and turbulence that dictate the mixing behavior required to implement a desired process result. Agitation in vessels and pipeline and viscous mixing discussed. Emphasis on recent research on the effects of mixing on chemical reactions.
PREREQ: CHEG341.

CHEG 616  CHEMISTRY AND PHYSICS OF SURFACES AND INTERFACES  3
Fundamental and engineering aspects of metal, semiconductor, and oxide surfaces; their structure and defects, characterization, electronic properties, adsorption and reaction kinetics and thermodynamics.
Applications to catalysis, microelectronics, and environmental sensitive behavior.
May be cross-listed with MSEG616.
PREREQ: CHEG325 and CHEM444.

CHEG 617  COLLOID SCIENCE AND ENGINEERING  3
Surface thermodynamics and intermolecular forces are related to the properties of colloidal dispersions and micellar and surfactant structures. Applications to biological systems, nanotechnology, powder dispersions and supramolecular structures.
PREREQ: CHEG325 and CHEM444.

CHEG 620  BIOCHEMICAL ENGINEERING  3
Application of chemical engineering principles to analyze different molecular engineering approaches, evaluate bioreactors and product recovery processes, analyze cellular engineering approaches and critically evaluate primary bioengineering data from literature and laboratory experiments.
PREREQ: MATH424, and CHEM527 or CHEM641/642.

CHEG 621  METABOLIC ENGINEERING  3
Focuses on design and control of cellular metabolism and includes analysis of metabolic function using systems engineering and molecular biology tools. Goals are to learn computational approaches for analyzing metabolic behavior, and experimental techniques to measure cellular components, metabolites, proteins and nucleic acids.
PREREQ: CHEM527 or CHEM641; MATH305.
RESTRICTIONS: Open only to graduate students, seniors and juniors.

CHEG 622  CHEMICALS, RISK AND THE ENVIRONMENT  3
Develops the foundation for understanding the transport and fate of chemical materials in the environment, and how these materials may possibly affect human health and ecology. The principles of heat, mass and momentum transfer, and chemical reaction kinetics are used to develop a quantitative understanding of transport and fate. These are used in conjunction with risk assessment and risk assessment practices to understand how environmental policy evolves.
PREREQ: CHEG325 and CHEG344.
COREQ: CHEG342.

CHEG 623  RESEARCH TUTORIAL  1-3
First year doctoral students complete research training in the laboratory of a faculty member and report on the progress of their research training experience.
RESTRICTIONS: May enroll in one or two sections in a single semester.
CHEG 649  Molecular Biophysics  3
Biophysical principles and methods: thermodynamic and kinetic analysis of
folding, protein-nucleic acid interactions; ligand binding; spectroscopy; structural
methods; modeling; calorimetry; ultraacentrifugation; SPR. Problem solving in
macromolecular interactions: protein refolding; altering ligand affinity; increasing
protein stability; drug design and HTS; protein expression and solubility; protein
engineering.
May be cross-listed with CHEM649.
PREREQ: Introductory-level courses in chemistry, physics, biochemistry.

CHEG 650  Biomedical Engineering I  3
Application of engineering concepts and techniques to problems in biomedicine.
Mass transfer and chemical reactions in the body, drug distribution, kidney and
other organ physiology, and artificial organs.
PREREQ: Upper division or graduate standing in engineering or equivalent.
COREQ: CHEG443.

CHEG 801  Process Control and Dynamics  3
Advanced concepts on MIMO system modeling, identification, analysis and
control appropriate to the chemical and allied industries. Model Predictive Control;
robust control and Nonlinear control; statistical methods. Introduction to control
systems in physiological processes.
PREREQ: Undergraduate control course.

CHEG 823  Transmission Electron Microscopy in Materials Science  3
See MSEG823 for course description.

CHEG 825  Chemical Engineering Thermodynamics  3
Applications of classical and molecular thermodynamics to industrial problems
in chemical and phase equilibrium. Topics include nonideal solutions, high pressure
systems, complex reaction equilibria, generalized correlations and equations of
state.
PREREQ: CHEG325 and CHEM444.

CHEG 827  Chemical Engineering Problems  2-3
The application of numerical methods for the solution of chemical engineering
problems. Linear and nonlinear analysis. Numerical methods applied to the
solution of ODE's, PDE's and optimization problems with applications to fluid flow,
heat and mass transfer reaction engineering. Monte-Carlo and molecular
dynamics.
PREREQ: Undergraduate linear algebra and differential equations.

CHEG 828  Statistical Thermodynamics  2-3
A discussion of the concepts of classical statistical mechanics, with special
emphasis on applications, thermodynamic modeling and physical properties
correlations.
PREREQ: CHEG825 or equivalent.

CHEG 830  Fluid Mechanics  3
Use of field equations of motion and a variety of constitutive assumptions to solve
problems involving both laminar and turbulent flows. Emphasizes polymer
processing, fluids transport and boundary layer theory.
PREREQ: Undergraduate study in fluid mechanics or transport phenomena.

CHEG 832  Transport and Relaxation Phenomena in Polymers  3
Modeling and key experimental findings of transport and relaxation phenomena
in polymer melts and solutions. Macroscopic descriptions are connected to
microstructure with emphasis on structure property relations. Polymer rheology and
linear viscoelasticity. Nonisothermal flows, heat transfer and diffusion in polymers
stress induced migration, phase transitions and crystallization.
PREREQ: Graduate courses on fluid mechanics, thermodynamics and diffusional
operations.

CHEG 835  Applied Chemical Kinetics  3
Principles of collision theory and transition-state theory. Development of reaction
rate expressions based on networks of elementary reaction steps. Analysis of non-
isothermal and non-steady state reactors.
PREREQ: Requires undergraduate reaction engineering and physical chemistry.

CHEG 836  Advanced Chemical Kinetics  3
Examination of the physical interpretation of kinetic rate expressions via
elementary reaction steps, transition state theory, estimation of enthalpies and
entropies of activation. Development of reaction networks from elementary kinetic
steps using concepts of the steady-state approximation, rate determining step and
most abundant reaction intermediate. Application to thermal cracking, pyrolysis,
polymerization, combustion and heterogeneous catalysis.

CHEG 845  Advanced Transport Phenomena  4
Principles and applications of momentum, mass and energy transfer. Topics include
molecular analysis of transport, continuum and macroscopic conservation and
covative equations, scaling and dimensional analysis, and exact and
approximate solutions for problems of practical importance.
PREREQ: Undergraduate studies in transport phenomena.

CHEG 863  Diffusional Operations  3
Advanced coverage of the latest theoretical and experimental studies in several
fields involving mass transfer. These fields include humidification, absorption,
extraction, distillation, ion exchange and adsorption.
PREREQ: CHEM444.

CHEG 868  Research  1-9
CHEG 869  Master's Thesis  1-6
CHEG 964  Pre-Candidacy Study  3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying
examinations for doctoral students before admission to candidacy but after
completion of all required course work.
RESTRICTIONS: Not open to students who have been admitted to candidacy.

CHEG 969  Doctoral Dissertation  1-12 PF
CHEM 106  E LEMENTARY BIOORGANIC CHEMISTRY  5
Survey of organic chemistry and biochemistry, with emphasis on the latter. Includes one three-hour laboratory per week that deals with selected concepts in biochemistry and biorganic chemistry.  
PREREQ: CHEM105. 
RESTRICTIONS: For nursing majors.

CHEM 111  G ENEERAL CHEMISTRY  3
Fundamental laws of chemical action with emphasis on atomic structure, chemical bonding and the important classes of substances.  
PREREQ: One year of high school chemistry, two years strongly preferred.  
COREQ: CHEM119, and MATH115 or higher math course. 
RESTRICTIONS: For biochemistry, chemical engineering and environmental engineering majors. Only one course among CHEM101, CHEM103, CHEM105 and CHEM111 can count toward graduation.

CHEM 112  G ENERAL CHEMISTRY  3
Introduction to most of the major sub-fields of chemistry: descriptive inorganic chemistry, coordination chemistry, organic chemistry, nuclear chemistry, thermodynamics, kinetics and electrochemistry. 
PREREQ: CHEM103 or CHEM111.  
COREQ: CHEM120. 
RESTRICTIONS: For biochemistry, chemistry, chemical engineering and environmental engineering majors. Only one course among CHEM102, CHEM104 and CHEM112 can count toward graduation.

CHEM 119  Q UANTITATIVE CHEMISTRY I  3
Chemical equilibrium theory applied to basic gravimetric and volumetric analyses. Includes one three-hour laboratory per week.  
PREREQ: One year of high school chemistry, two years strongly preferred.  
COREQ: CHEM111 and MATH115. 
RESTRICTIONS: For biochemistry, chemistry, chemical engineering and environmental engineering majors.

CHEM 120  Q UANTITATIVE CHEMISTRY II  3
The theory of analytical chemistry with introductory practice in UV-visible spectroscopy, electrochemistry and separation science. Includes two three-hour laboratories per week.  
PREREQ: CHEM104, or CHEM111 and CHEM119.  
COREQ: CHEM112. 
RESTRICTIONS: For biochemistry and chemistry majors.

CHEM 165  F reshman Majors Seminar  0 PF
Introduction to the CHEM/BIOC Department, as well as to the CHEM/BIOC professions. Discussion topics include courses and curricula, sub-disciplines in the field, communication tools, and career and research opportunities. Social activities help integrate new students into the Department community.  
RESTRICTIONS: Freshmen majoring in CHEM, BIOC, or XCE only.

CHEM 166  S pecial Problem  1-3 PF

CHEM 213  E LEMENTARY ORGANIC CHEMISTRY  4
Fundamentals of organic chemistry. Includes one three-hour laboratory per week that introduces basic laboratory techniques of organic chemistry.  
PREREQ: CHEM102 or CHEM104 or CHEM105. 
RESTRICTIONS: Designed for students of agriculture, human resources and medical technology.

CHEM 214  E LEMENTARY BIOCHEMISTRY  3
Principal classes of biomolecules and their structural and metabolic interrelationships.  
PREREQ: CHEM213.

CHEM 216  E LEMENTARY BIOCHEMISTRY LABORATORY  1
Basic manipulations and techniques for the characterization of biomolecules.  
PREREQ: CHEM212.  
COREQ: CHEM214.

CHEM 220  Q UANTITATIVE ANALYSIS  3
Chemical equilibria in aqueous solutions; volumetric and gravimetric analysis; and introduction to chromatography and spectrometry. 
PREREQ: CHEM102, CHEM104 or CHEM105. 
COREQ: CHEM221.

CHEM 221  Q UANTITATIVE ANALYSIS LABORATORY  1
The practice and application of volumetric and gravimetric analysis, as well as basic chromatographic and spectrometric measurements. 
PREREQ: CHEM102, CHEM104 or CHEM105. 
COREQ: CHEM220.

CHEM 311  S URVEY OF ORGANIC CHEMISTRY I  3
First half of a two-semester survey of the structure, synthesis, and reactions of organic compounds.  
PREREQ: CHEM104. 
RESTRICTIONS: Not for credit for CHEM BS majors. Neither CHEM311 and CHEM321 nor CHEM311 and CHEM331 can both count toward graduation.

CHEM 312  S URVEY OF ORGANIC CHEMISTRY II  3
Second half of a two semester survey of the structure, synthesis and reactions of organic compounds.  
PREREQ: CHEM311. 
RESTRICTIONS: Not for credit for CHEM BS majors. Neither CHEM312 and CHEM322 nor CHEM312 and CHEM332 can both be counted toward graduation.

CHEM 321  O RGANIC CHEMISTRY  4
First half of a two-semester survey of the structure, synthesis, and reactions of organic compounds. Includes one three-hour laboratory per week that introduces the basic laboratory techniques of organic chemistry.  
PREREQ: CHEM104. 
RESTRICTIONS: Not for CHEM BS majors. CHEM321 and CHEM331 cannot both be counted toward graduation.

CHEM 322  O RGANIC CHEMISTRY  4
Second half of a two-semester survey of the structure, synthesis and reactions of organic compounds. Includes one three-hour laboratory per week that introduces the basic laboratory techniques of organic chemistry.  
PREREQ: CHEM321. 
RESTRICTIONS: Not for B.S. credit in chemistry. CHEM322 and CHEM332 cannot both be counted toward graduation.

CHEM 331  O RGANIC CHEMISTRY  3
Major classes and reactions of organic compounds, emphasizing stereochemistry, reaction mechanisms and synthetic methods. 
PREREQ: CHEM104, CHEM112 or CHEM120. 
COREQ: CHEM333. 
RESTRICTIONS: For chemistry, biochemistry, chemical engineering and other majors desiring fuller treatment than in CHEM321. Neither CHEM311 and CHEM321, nor CHEM321 and CHEM331 can both count toward graduation.

CHEM 332  O RGANIC CHEMISTRY  3
Major classes and reactions of organic compounds, emphasizing stereochemistry, reaction mechanisms and synthetic methods. 
PREREQ: CHEM331, CHEM333. 
COREQ: CHEM334. 
RESTRICTIONS: For chemistry, biochemistry, chemical engineering and other majors desiring fuller treatment than in CHEM322. Neither CHEM312 and CHEM322, nor CHEM322 and CHEM332 can both be counted toward graduation.

CHEM 333  O RGANIC CHEMISTRY MAJORS LABORATORY I  1-2
The theory and practice of basic techniques of laboratory work with organic compounds, including separation methods and instrumental methods of analysis and identification.  
PREREQ: CHEM104, or preferably CHEM112, or CHEM120. 
COREQ: CHEM331. 
RESTRICTIONS: Registration for two credits involves both a lecture period and a laboratory period each week. Registration for one credit involves only the weekly lecture.

CHEM 334  O RGANIC CHEMISTRY MAJORS LABORATORY II  2
Continuation of CHEM333: Two lab periods each week. 
PREREQ: CHEM333. 
COREQ: CHEM332.

CHEM 342  I NTRODUCTION TO BIOCHEMISTRY  3
Discussion of the nature of scientific research, ethics of science, impact of science on society, role of scientific publication and use of the library. Reading of a series of research papers to gain an understanding of what a biochemist does. Perspectives on the history of biochemistry. 
PREREQ: CHEM331.

CHEM 366  I NDependent Study  1-3 PF

CHEM 401  T UTORIAL METHODS OF INSTRUCTION  1-2
For group tutor-facilitators in courses where problem-based learning (PBL) is used as a mode of instruction.  
COREQ: Being a Tutor-Facilitator in a PBL course. 
RESTRICTIONS: Open to juniors and seniors only.

CHEM 410  H ISTORY OF CHEMISTRY  3
A survey of the development of chemistry's fields of study emphasizing the nature of individual contributions to the subfields of chemistry.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 418</td>
<td>Introductory Physical Chemistry I</td>
<td>3</td>
<td>Introduction to the principles of physical chemistry with a focus on thermodynamics, using minimal calculus, for B.A. chemistry and B.S. biochemistry majors. PREREQ: General chemistry; MATH241; PHYS202 or PHYS208. RESTRICTIONS: Not acceptable for B.S. degree in chemistry. CHEM419 and CHEM443 cannot both be counted toward graduation.</td>
</tr>
<tr>
<td>CHEM 419</td>
<td>Introductory Physical Chemistry</td>
<td>3</td>
<td>Introduction to the principles of physical chemistry with a focus on kinetics and spectroscopy, using minimal calculus, for B.A. chemistry and B.S. biochemistry majors. PREREQ: CHEM418. RESTRICTIONS: Not acceptable for B.S. degree in chemistry. CHEM419 and CHEM443 cannot both be counted toward graduation.</td>
</tr>
<tr>
<td>CHEM 424</td>
<td>Quantum Mechanics</td>
<td>3</td>
<td>Study of the principles of design and application of spectroscopic, chromatographic and electroanalytical instrumentation in chemical analysis. PREREQ: CHEM322 or CHEM332. COREQ: CHEM418 or CHEM443.</td>
</tr>
<tr>
<td>CHEM 437</td>
<td>Instrumental Methods</td>
<td>3</td>
<td>Study of the principles of design and application of spectroscopic, chromatographic and electroanalytical instrumentation in chemical analysis. PREREQ: CHEM322 or CHEM334. COREQ: CHEM445.</td>
</tr>
<tr>
<td>CHEM 438</td>
<td>Instrumental Methods Laboratory</td>
<td>1</td>
<td>Application of spectroscopic, chromatographic and electroanalytical techniques to the solution of chemical problems. PREREQ: CHEM322 or CHEM334. COREQ: CHEM444.</td>
</tr>
<tr>
<td>CHEM 443</td>
<td>Physical Chemistry I</td>
<td>3</td>
<td>Application of the principles and methods of mathematics and physics to the quantitative study of chemistry, focusing on thermodynamics. PREREQ: CHEM119, or CHEM220 and CHEM221; MATH242 (MATH243 recommended); PHYS202 (recommended) or PHYS202. RESTRICTIONS: CHEM418 and CHEM443 cannot both be counted toward graduation.</td>
</tr>
<tr>
<td>CHEM 444</td>
<td>Physical Chemistry II</td>
<td>3</td>
<td>Application of the principles and methods of physics and mathematics to the quantitative study of chemistry, focusing on kinetics and quantum mechanics. PREREQ: CHEM119, or CHEM220 and CHEM221; MATH242 (MATH243 recommended); PHYS202 (recommended) or PHYS202. RESTRICTIONS: CHEM419 and CHEM444 cannot both be counted toward graduation.</td>
</tr>
<tr>
<td>CHEM 445</td>
<td>Physical Chemistry Laboratory I</td>
<td>1</td>
<td>Physical methods for studying properties of matter. PREREQ: CHEM119, or CHEM220 and CHEM221. COREQ: CHEM443 or CHEM444.</td>
</tr>
<tr>
<td>CHEM 446</td>
<td>Physical Chemistry Laboratory II</td>
<td>1</td>
<td>Physical methods for studying properties of matter. PREREQ: CHEM120, or CHEM220 and CHEM221. RESTRICTIONS: To be taken concurrently with or subsequent to CHEM418 or CHEM443.</td>
</tr>
<tr>
<td>CHEM 457</td>
<td>Inorganic Chemistry</td>
<td>3</td>
<td>Basic theoretical concepts of inorganic chemistry with emphasis on structure, bonding and reactions. PREREQ: CHEM418 or CHEM443, and CHEM112.</td>
</tr>
<tr>
<td>CHEM 458</td>
<td>Inorganic Chemistry Laboratory</td>
<td>1</td>
<td>Laboratory synthesis and characterization of inorganic and organometallic compounds and independent study. COREQ: CHEM457.</td>
</tr>
<tr>
<td>CHEM 465</td>
<td>Senior Seminar</td>
<td>1 PF</td>
<td>RESTRICTIONS: Requires senior status.</td>
</tr>
<tr>
<td>CHEM 466</td>
<td>Independent Study</td>
<td>1-3 PF</td>
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</tr>
<tr>
<td>CHEM 468</td>
<td>Undergraduate Research</td>
<td>1-6 PF</td>
<td>Chemistry research on an assigned subject under the supervision of a member of the faculty. RESTRICTIONS: Requires permission of instructor. (Letter grade upon completion of written report).</td>
</tr>
<tr>
<td>CHEM 527</td>
<td>Introductory Biochemistry</td>
<td>3</td>
<td>A one-semester survey of the fundamentals of biochemistry. PREREQ: CHEM321 or CHEM331; CHEM322 or CHEM332 recommended. RESTRICTIONS: For undergraduate majors in biochemistry and chemistry, graduate students in agriculture, biology, nutrition, marine sciences and engineering not using biochemistry professionally. BISC104 or BISC207 strongly recommended.</td>
</tr>
<tr>
<td>CHEM 601</td>
<td>Introduction to Laboratory Instruction</td>
<td>1 PF</td>
<td>Inservice required of first-year graduate teaching assistants. Prepares teaching assistants to become effective instructors. Topics relate to the theory and practice of teaching in a laboratory setting. COREQ: Having a chemistry (or another science) teaching assistantship.</td>
</tr>
<tr>
<td>CHEM 603</td>
<td>Practical NMR Spectroscopy</td>
<td>1</td>
<td>Elements of NMR spectroscopic techniques, the practical operation of NMR spectrometers, spectral acquisition and special analysis techniques. COREQ: CHEM444 recommended. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>CHEM 604</td>
<td>Practical Mass Spectrometry</td>
<td>1</td>
<td>Laboratory experimentation with mass spectrometry. COREQ: CHEM624 recommended as corequisite or prerequisite. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>CHEM 605</td>
<td>Spectroscopy of Organic Compounds</td>
<td>1</td>
<td>Introductory organic structure determination by modern spectroscopic methods. PREREQ: One year of general chemistry. RESTRICTIONS: Restricted to graduate students.</td>
</tr>
<tr>
<td>CHEM 606</td>
<td>Introduction to Research at the Chemistry/Biology Interface</td>
<td>3</td>
<td>Research experiences in biochemistry, molecular biology, bioanalytical chemistry, bioorganic chemistry, biochemical engineering, materials science, protein crystallography, agricultural biochemistry, virology, and cell biology. Attendance at the weekly Chemistry-Biology Interface Seminar is required. RESTRICTIONS: Restricted to graduate students admitted to the Chemistry/Biology Interface Program.</td>
</tr>
<tr>
<td>CHEM 608</td>
<td>Environmental Soil Chemistry</td>
<td>3</td>
<td>See PLSC608 for course description.</td>
</tr>
<tr>
<td>CHEM 620</td>
<td>Analytical Spectroscopy</td>
<td>3</td>
<td>Experimental aspects of electronic and vibrational spectroscopy. Linear and nonlinear optics; photon counting; Fourier transformation; and topics from the current literature. PREREQ: CHEM437 and CHEM438.</td>
</tr>
<tr>
<td>CHEM 621</td>
<td>Chemical Separations</td>
<td>3</td>
<td>Fundamental description of chemical separations. Zone broadening and separation efficiency; and chemistry of separations. Application of fundamental principles to chromatography, electrophoresis, field-flow fractionation and newly emerging techniques. PREREQ: CHEM437 and CHEM438.</td>
</tr>
<tr>
<td>CHEM 622</td>
<td>Electroanalytical Chemistry</td>
<td>3</td>
<td>Analytical applications of electrochemistry: dynamic and steady-state methods of potentiometry, coulometry, voltammetry, and ancillary techniques. RESTRICTIONS: Requires senior or graduate status in chemistry. Offered in Fall of even-numbered years.</td>
</tr>
<tr>
<td>CHEM 624</td>
<td>Principles of Mass Spectrometry</td>
<td>3</td>
<td>Principles of mass spectral measurements for the elucidation of molecular structure; applications to biomolecular materials and topics from the current literature. PREREQ: CHEM437.</td>
</tr>
<tr>
<td>CHEM 625</td>
<td>Chemical Ionization Mass Spectrometry</td>
<td>1</td>
<td>Analytical applications of ion/molecule reactions. Mechanisms and thermochemical kinetics of gaseous ionic reactions. Correlations of spectra with molecular structure. RESTRICTIONS: Requires junior, senior or graduate status in chemistry/biochemistry.</td>
</tr>
<tr>
<td>CHEM 626</td>
<td>Instrumental Methods in Mass Spectrometry</td>
<td>1</td>
<td>Experimental techniques in analytical mass spectrometry: ionization methods, mass analyzers, tandem mass spectrometry, coupled chromatographic methods and applications. COREQ: CHEM624 recommended as corequisite or prerequisite.</td>
</tr>
<tr>
<td>Course Code</td>
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<td>Credit Hours</td>
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<tr>
<td>CHEM 652</td>
<td>ORGANOMETALLIC CHEMISTRY</td>
<td>3</td>
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<td>PREREQ: CHEM 444 and CHEM 457.</td>
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<td>Examples from compounds of both the representative elements and the transition elements.</td>
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<td>CHEM 633</td>
<td>ADVANCED ORGANIC CHEMISTRY: PHYSICAL</td>
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<td>PREREQ: CHEM 444 and CHEM 457.</td>
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<td></td>
<td>Stereochemistry and reactivity of organic compounds, and reaction mechanisms, structure and bonding.</td>
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<td>CHEM 634</td>
<td>ADVANCED ORGANIC CHEMISTRY: SYNTHESIS AND REACTIVITY</td>
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<td>PREREQ: CHEM 444 and CHEM 457.</td>
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<td></td>
<td>Reactions of organic compounds with emphasis on synthetic methods.</td>
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<td>CHEM 635</td>
<td>ORGANIC REACTIVITY AND TOTAL SYNTHESIS</td>
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<td>PREREQ: CHEM 444 and CHEM 457.</td>
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<td></td>
<td>Focuses on the development of new organic reactivity, as exemplified by current accomplishments in the total synthesis of natural products. Additional focus on the strategies of total synthesis.</td>
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<td>CHEM 641</td>
<td>BIOCHEMISTRY</td>
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<td>PREREQ: CHEM 322 or CHEM 332.</td>
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<td>Structure and function of proteins, enzymes and coenzymes; kinetics and mechanisms; carbohydrate metabolism and its regulation; and citric acid cycle.</td>
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<td>CHEM 642</td>
<td>BIOCHEMISTRY</td>
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<td>PREREQ: CHEM 641.</td>
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<td>CHEM 643</td>
<td>INTERMEDIARY METABOLISM</td>
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<td>PREREQ: CHEM 641.</td>
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<td>General principles of intermediary metabolism with emphasis on biosynthetic pathways of amino acids, nucleotides, coenzymes, antibiotics and toxic secondary metabolites.</td>
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<td>CHEM 644</td>
<td>MECHANISMS OF ENZYME CATALYSIS</td>
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<td>PREREQ: CHEM 641 or CHEM 645.</td>
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<td>Detailed chemical mechanisms of enzyme catalysis for several representatives. Emphasis on kinetic and physical organic methods.</td>
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<td>CHEM 645</td>
<td>PROTEIN STRUCTURE AND FUNCTION</td>
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<td>PREREQ: CHEM 641.</td>
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<td>Overview of structural biology, including how x-ray crystallography, NMR spectroscopy, homology modeling and other techniques are used to solve or model structures of macromolecules. Representative proteins discussed in terms of how a protein's structure relates to its function.</td>
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<td>CHEM 646</td>
<td>DNA-PROTEIN INTERACTIONS</td>
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<td>PREREQ: CHEM 642.</td>
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<td>Current topics of DNA-protein interactions which focus on DNA replication, DNA recombination, DNA damage repair, transcription and translation processes.</td>
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<td>CHEM 647</td>
<td>BIOCHEMICAL EVOLUTION</td>
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<td>PREREQ: CHEM 642 or CHEM 645.</td>
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<td>The origins and evolution of life as reconstructed from geochemical, biochemical and genetic evidence.</td>
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<td>CHEM 648</td>
<td>MEMBRANE BIOCHEMISTRY</td>
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<td>PREREQ: CHEM 645 or CHEM 647.</td>
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<td>Recent advances in the structure and function of biomembranes and related model systems, with particular reference to molecular and physiochemical mechanisms.</td>
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<td>CHEM 649</td>
<td>MOLECULAR BIOPHYSICS</td>
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<td>See CHEG 649 for course description.</td>
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<td>CHEM 651</td>
<td>ADVANCED INORGANIC CHEMISTRY I</td>
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<td>PREREQ: CHEM 444 and CHEM 457.</td>
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<td>Inorganic chemistry: application of the principles of structure and reactivity, examples from compounds of both the representative elements and the transition metals.</td>
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<td>CHEM 652</td>
<td>ORGANOMETALLIC CHEMISTRY</td>
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<td>PREREQ: CHEM 444 and CHEM 457.</td>
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<td>Chemistry of carbon to transition-metal bonds beginning with rules governing structure and stability; effects of metal and ancillary ligand environment; general mechanistic steps; NMR and IR spectroscopy; fluxional processes. Followed by applications in homogeneous catalysis and stoichiometric organic synthesis.</td>
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<td>CHEM 661</td>
<td>BIOINORGANIC CHEMISTRY</td>
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<td>PREREQ: CHEM 457.</td>
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<td>Overview of our current understanding of the role of metal ions in the structure and function of proteins, enzymes and nucleic acids including applications in medicine. Emphasis is placed on the synergism between biochemical and synthetic model studies with examples provided by the current literature.</td>
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<td>CHEM 665</td>
<td>ADVANCED INORGANIC CHEMISTRY II</td>
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<td>PREREQ: CHEM 444 and CHEM 457.</td>
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<td>A group theoretical approach to structure and bonding in inorganic compounds.</td>
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<td>CHEM 671</td>
<td>QUANTUM CHEMISTRY</td>
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<td>PREREQ: CHEM 444.</td>
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<td>Basic principles and methods of quantum theory including wave mechanics of simple systems, angular momentum and the hydrogen atom, and approximate methods applied to atomic and molecular structure.</td>
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<td>CHEM 672</td>
<td>ADVANCED QUANTUM CHEMISTRY</td>
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<td>PREREQ: CHEM 457.</td>
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<td>Applications of quantum theory to predictions of molecular structure, energetics, spectra and reactivity; principles of spectroscopy and the interaction of light with molecules; other topics at the instructor's discretion.</td>
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<td>CHEM 674</td>
<td>CHEMICAL DYNAMICS</td>
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<td>PREREQ: CHEM 444.</td>
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<td>Experimental methods in chemical kinetics, rate laws and mechanisms, statistical and dynamical theories of reaction rates, and applications of the principles and techniques of kinetics to a variety of systems.</td>
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<td>CHEM 677</td>
<td>CHEMICAL THERMODYNAMICS</td>
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<td>PREREQ: CHEM 443.</td>
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<td>The elements of classical and statistical thermodynamics and their application to chemical problems.</td>
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<td>CHEM 680</td>
<td>INTRODUCTORY POLYMER SCIENCE</td>
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<td>PREREQ: CHEM 443.</td>
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<td>Provides a broad foundation in the basic concepts of polymer science, including synthesis, physical structures and phase transitions, structure/property relationships, material properties, characterization methods and current trends in polymer technology.</td>
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<td>CHEM 681</td>
<td>GREEN CHEMISTRY</td>
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<td>PREREQ: CHEM 641.</td>
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<td>Pollution prevention - how to eliminate toxic chemicals and hazardous wastes while using less energy and, preferably, starting with renewable materials.</td>
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<td>CHEM 682</td>
<td>KINETICS AND SURFACE CHEMISTRY OF SOILS</td>
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<td>PREREQ: CHEM 641.</td>
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<td></td>
<td>See PLSC 810 for course description.</td>
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<td>CHEM 685</td>
<td>SEMINAR</td>
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<tr>
<td>CHEM 686</td>
<td>RESEARCH</td>
<td>1-9</td>
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<tr>
<td>CHEM 689</td>
<td>MASTER'S THESIS</td>
<td>1-6</td>
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</table>
CHEM 974 SPECIAL TOPICS IN PHYSICAL CHEMISTRY 1-3
RESTRICTIONS: Requires permission of instructor. May be repeated for credit when topics vary.

CHEM 964 PRE-CANDIDACY STUDY 3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work. RESTRICTIONS: Not open to students who have been admitted to candidacy.

CHEM 969 DOCTORAL DISSERTATION 1-12 PF

CHINESE

CHIN 105 CHINESE I - ELEMENTARY 4
Introduction to the contemporary Mandarin Chinese language through developing listening comprehension, speaking, reading, and writing skills, including mastery of the pinyin pronunciation system and introduction to Chinese characters.

CHIN 106 CHINESE II - ELEMENTARY/INTERMEDIATE 4
Continued practice in the aural, oral, reading and writing skills of Mandarin Chinese including the identification and reproduction of basic Chinese characters. Introduction to formality levels and to reading and writing texts in Chinese characters. PREREQ: CHIN105.

CHIN 107 CHINESE III - INTERMEDIATE 4
Development of aural, oral, reading and writing skills at the intermediate Chinese level, including continued practice in identifying and reproducing Chinese characters, handling a greater variety of formality levels, and further comprehension of spoken (Koutouyu) and written (Shumianyu) language differences. PREREQ: CHIN106. RESTRICTIONS: Satisfies College of Arts and Sciences language requirement.

CHIN 200 CHINESE GRAMMAR AND COMPOSITION 3
Further study of Mandarin Chinese grammar, and further development of all four language skills for communication. Emphasis on grammar and essay writing. PREREQ: CHIN107 or instructor’s permission.

CHIN 205 CHINESE CONVERSATION 3
Practical use of Mandarin Chinese by means of oral reports on a variety of topics including family, school, and work life. Emphasis on improvement of conversational skills for social situations which require grammatical and written competence. PREREQ: CHIN107 or instructor’s permission.

CHIN 206 CULTURE THROUGH CONVERSATION 3
Discussion of topics drawn from contemporary Chinese life. Designed for students who wish to broaden their knowledge of Chinese culture while improving their oral and aural language skills. PREREQ: CHIN107. RESTRICTIONS: Taught abroad only.

CHIN 208 CONTEMPORARY CHINESE SOCIETY 3
Introduction to contemporary China, its culture, people, way of life and issues confronting them. RESTRICTIONS: Taught abroad only, in both English and Chinese. Not for major credit. Does not satisfy College of Arts and Sciences language requirement.

CHIN 266 SPECIAL PROBLEM 1-4

CHIN 305 CHINESE CONVERSATION AND COMPOSITION 3
Discussion of current cultural, social and political topics in Mandarin Chinese. Vocabulary building, grammar exercises and frequent compositions. PREREQ: Two courses at the 200 level, one of which must be CHIN200 or CHIN205 or instructor’s permission.

CHIN 355 SPECIAL TOPICS 3
Explores an area of special interest in Chinese literature or culture studies. Topics vary and will be announced in the registration booklet. PREREQ: Two courses at the 200 level, one of which must be CHIN200 or CHIN205 or instructor’s permission. RESTRICTIONS: May be repeated for credit when topics vary.

CHIN 366 INDEPENDENT STUDY 1-3
Discussion of subject matters of students’ special interest related to Chinese language, literature, and/or culture. PREREQ: Two courses at the 200 level, one of which must be CHIN200 or CHIN205, or permission of instructor.

CHIN 466 INDEPENDENT STUDY 1-3
Discussion of subject matters of students’ special interest related to Chinese language, literature, and/or culture. PREREQ: Two courses at the 300 level, one of which must be CHIN305 or CHIN355, or instructor’s permission.

CIVIL AND ENVIRONMENTAL ENGINEERING

CIEG 125 INTRODUCTION TO CIVIL ENGINEERING 2 PF
An overview of civil engineering disciplines, including structural, environmental, geotechnical and transportation engineering. Addresses physical principles, numerical analysis and elementary design problems in each area. Emphasis on computer use, (text processing, spreadsheet, graphics), team design project.

CIEG 126 INTRODUCTION TO SURVEYING AND COMPUTER AIDED DRAFTING 3
Introduction to computer aided drafting with applications from land surveying. Fundamental principals of land surveying and use of surveying instruments. Use of CAD software for drafting, design layout, two dimensional and isometric drafting, creation and modification of entities and attributes. Computer lab and field work.

CIEG 135 INTRODUCTION TO ENVIRONMENTAL ENGINEERING 1
Overview of environmental engineering discipline. Physical, chemical, biological interactions within the environment and associated engineering problems. Introduction to common processes for pollution control. Use of computer software for problem solving. Environmental engineering practice and ethics, and an introduction to proper design approach.

CIEG 211 STATICS 3

CIEG 212 SOLID MECHANICS 3
Stresses and displacements in axially loaded beams and in bars subjected to torsion. Analysis of stresses and deflections of laterally loaded beams. Study of stresses and strains in a plane. Mohr’s circle for stresses. Failure theories. Design of structural members using strength criteria. PREREQ: CIEG211. COREQ: MATH302 or MATH351.

CIEG 213 CIVIL ENGINEERING MATERIALS LABORATORY 1
Experiments in the mechanics of materials and the strength of materials to complement the content of CIEG212. Emphasis on the behavior of civil engineering materials including steel, aluminum, concrete and timber. COREQ: CIEG212.

CIEG 223 SURVEYING
See EGTE223 for course description. PREREQ: EGTE104 or CIEG126.

CIEG 233 ENVIRONMENTAL ENGINEERING PROCESSES 3
Quantified descriptions of physical, chemical and biological processes of environmental importance. Introductory level analysis of pollution transport, treatment, containment, remediation. Process engineering approach to contaminant removal methods, including use of appropriate computer software. PREREQ: CHEM104 or CHEM120; MATH242. RESTRICTIONS: Open to majors only.

CIEG 301 STRUCTURAL ANALYSIS 4

CIEG 302 STRUCTURAL DESIGN 3-4
Basic concepts of structural design including methodologies, applicable limit states and design codes. Structural members and systems, fabrication issues, loads and load paths. Design of steel and concrete members subjected to tension, compression and bending. Additional topics including connections and combined axial compression and bending. PREREQ: CIEG301.
CIEG 305 Fluid Mechanics 3
Incompressible fluid mechanics: fluid statics, control volume analysis of fluid flows, differential analysis of inviscid and viscous fluid flows and dimensional analysis. PREREQ: MATH302 or MATH351, and CIEG311 or MEEG211.

CIEG 306 Fluid Mechanics Laboratory 1
Experiments in fluid mechanics. COREQ: CIEG305.

CIEG 311 Dynamics 3

CIEG 315 Probability and Statistics for Engineers 3
The role of chance and variability in engineering activities. Topics include set operations, probability, Bayes' theorem, random variables, common probability distributions, data reduction, statistical estimation and inference, probability model selection, regression analyses and introduction to probability-based design and Monte-Carlo simulation. PREREQ: MATH242 and MATH243 or equivalents.

CIEG 320 Soil Mechanics 3
Soil properties, soil-water interaction, soil stresses, two-dimensional flow, soil compressibility, shear strength and lateral earth pressures. PREREQ: CIEG212 and CIEG305. COREQ: CIEG323.

CIEG 321 Geotechnical Engineering 3
Introduction to geotechnical engineering. Topics include shallow foundation analysis and design, deep foundation analysis and design, earth retaining structure analysis and design and introduction to slope stability analysis. PREREQ: CIEG320 and CIEG323.

CIEG 322 Soil Mechanics Laboratory 1
Demonstrates soil properties, soil-water interaction, soil stresses, two-dimensional flow, soil compressibility, shear strength and lateral earth pressures. PREREQ: CIEG212 and CIEG305. COREQ: CIEG320.

CIEG 331 Introduction to Environmental Engineering 3
Introduction to important environmental engineering topics faced by consulting engineers and public works and regulatory agencies, including water treatment, water quality management, wastewater treatment, air pollution control, solid waste management and hazardous waste management. PREREQ: CIEG305.

CIEG 337 Environmental Engineering Laboratory 3
Unit operations and unit processes in environmental engineering, with an emphasis on biological processes. Introduction to contaminant transport processes in the subsurface. Utilizes collaborative, problem-based learning within a laboratory context. PREREQ: CIEG438.

CIEG 351 Transportation Engineering 3
Five components of transportation: vehicle, way, terminal and control; design and dynamic characteristics of vehicles; geometric design of highways and railroad tracks; operation and design of stations, airports and bus terminals; highway traffic flow analysis. RESTRICTIONS: Requires junior status in civil engineering.

CIEG 366 Independent Study 1-6
The study and application of automatic digital computation; the calculus of finite differences; matrices; iterative, numerical and relaxation procedures; and special applications to civil engineering problems. PREREQ: MATH302.

CIEG 381 Civil Engineering Analysis 3
Study and application of automatic digital computation; the calculus of finite differences; matrices; iterative, numerical and relaxation procedures; and special applications to civil engineering problems. PREREQ: MATH302.

CIEG 401 Introduction to the Finite Element Method 3
Discussion of approximate solution procedures: finite difference method, weighted residual methods and variational methods. Development of approximate solutions using the finite element method. Application to one- and two-dimensional problems in applied mechanics. Discussion of numerical methods and computer programming techniques applicable to finite element analyses. PREREQ: CIEG381.

CIEG 404 Prestressed Concrete Design 3
Behavior, analysis and design of prestressed concrete structures. Covers flexure, shear, axial load, bond anchorage design and construction considerations for pretensioned and post-tensioned concrete.

CIEG 405 Matrix Structural Analysis 3
Computer analysis of two- and three-dimensional frameworks using matrix methods. Straight, tapered, curved and beam on elastic foundation members; flexible supports, element and temperature loads, partially rigid connections and finite sized joints; material and geometric nonlinearities; stability analyses; and determination of ultimate load capacities. PREREQ: CIEG301.

CIEG 407 Building Design 3
Design of building structural systems and elements. Topics include dead and live loading, earthquake and wind forces; load paths; and gravity and lateral load resisting systems. Approximate analysis of building frames and details regarding design elements for steel and concrete buildings. PREREQ: CIEG301 and CIEG302.

CIEG 408 Introduction to Bridge Design 3
Provides practical insight into the art and science of bridge design. Various design methodologies in use today in the field of bridge design and evaluation are investigated. Bridges of steel, reinforced concrete, prestressed concrete, wood and composite materials are included. PREREQ: CIEG302.

CIEG 409 Forensic Engineering 3
Provides practical insight into structural engineering by examining failures. Examples include bridge and building failures; infamous catastrophic collapses to little known examples of design criteria being violated to the structures detriment. The main objective is to learn sound engineering practices through the study of failures. PREREQ: CIEG301 and CIEG302.

CIEG 410 Experimental Mechanics of Composite Materials 3
See MSEG410 for course description.

CIEG 411 Structural Dynamics Design 3
Design of structures (buildings, bridges, dams, foundation piles and offshore platforms) for dynamic loadings (severe wind force, ocean wave force, strong earthquake excitations, machine vibrations, and general impulse and time dependent forces and motions). Determination of realistic dynamic loadings and application of design concepts. PREREQ: CIEG311 and MATH302.

CIEG 415 Probability-based Design 3
Examines decision making in the presence of uncertainties and application of probabilistic methods in the design and maintenance of engineering systems. Topics include: randomness modeling, failure representation, Monte-Carlo simulation, computation of failure probabilities, concept of risk, and probability-based acceptance criteria. PREREQ: Introductory course in probability such as CIEG315, MATH450 or equivalent.

CIEG 417 Advanced Structural Analyses 3

CIEG 418 Continuously Supported Structures 3

CIEG 421 Foundations and Substructures 3

CIEG 422 Earth Structures Engineering 3
Properties of soils and methods to determine them: water flow through inhomogeneous and anisotropic earth mass; predictions of pore-water pressures; stresses and settlement predictions; slope stability: type and causes of slope failures, effective and total stability analyses, design strength parameters and safety factors, construction considerations; design of earth dams; and predictions vs. field performance. Computer software used in problem solving. PREREQ: CIEG320/323.
CIEG 425 GEOENVIRONMENTAL ENGINEERING 3
RESTRICTIONS: Engineering or science background required.

CIEG 430 WATER QUALITY MODELING 3
Water quality modeling and criteria. Application to lakes, streams, and estuaries. Dissolved oxygen, BOD, nitrification. Eutrophication: carbon, nitrogen, phosphorus and silica mass balances; chlorophyll, primary production and dissolved oxygen; Toxic chemicals: PCBs, PAHs, toxic metals; partitioning theory, organic carbon normalization; coupled water column-sediment models.
PREREQ: MATH302.

CIEG 431 WATER SUPPLY ENGINEERING 3
Water quality criteria and monitoring, development of water resources, design of water collection and distribution systems, design of water treatment works, economics of water supply engineering, treatment of water works sludge and advanced water purification technology.
PREREQ: CIEG233 and MECH305.

CIEG 432 WASTEWATER ENGINEERING 3
Source and character of wastes; design and operation of wastewater treatment facilities; ultimate disposal of wastewater residues and considerations of discharge criteria, and economic and regulatory aspects.
PREREQ: CIEG233.

CIEG 433 HAZARDOUS WASTE MANAGEMENT 3
Toxicological, risk assessment and regulatory aspects of hazardous waste management; characterization of hazardous wastes and materials; waste reduction strategies; storage and transportation methods; engineering processes for the chemical, physical and biological treatment of toxic and hazardous wastes; remediation of contaminated soil and groundwater at existing disposal sites.
PREREQ: CIEG233.

CIEG 434 AIR POLLUTION CONTROL 3
Introduces the origins, characteristics and environmental and health effects of priority air pollutants and the equipment commonly used to control emissions of these pollutants from stationary sources. Emphasis placed on understanding the principles, operation and design of different control devices.
PREREQ: CIEG233, CIEG305, and CHEG231 or equivalent.

CIEG 436 SOLID WASTE MANAGEMENT 3
PREREQ: CIEG233 and CHEG325.

CIEG 437 WATER AND WASTEWATER QUALITY 3
Principles and applications of analysis of solids, organic load, dissolved oxygen, disinfectants, nutrients, trace metals, trace organic compounds and microorganisms. Lecture and laboratory.
PREREQ: CIEG233.

CIEG 438 WATER AND WASTEWATER ENGINEERING 3
Sources and characteristics of water and wastewater; water quality criteria and monitoring; principles and application of physical, chemical, and biological processes for water purification and wastewater treatment. Design and operation of treatment systems to meet water quality and effluent standards.
PREREQ: CIEG233.

CIEG 440 WATER RESOURCES ENGINEERING 3
Basics of water resources systems and analysis and introduction to hydraulics. Covers water resources systems, rainfall analysis and flood routing, pipe flow and hydraulic machinery, open channel flow and computer models.
PREREQ: CIEG305 and CIEG306.

CIEG 441 HYDROLOGY 3
The fundamentals of climatology, meteorology and hydrologic cycle; their relation to surface water and groundwater; rainfall runoff characteristics; frequency analysis; flood routing; flood plain hydraulics; and groundwater flow.
COREQ: CIEG305.

CIEG 442 HYDRAULIC ENGINEERING 3
Application of the principles of fluid mechanics to flow in pipelines, open channels, sediment transport, drainage, hydraulic structure and hydraulic models.
PREREQ: CIEG305.

CIEG 451 TRANSPORTATION ENGINEERING LABORATORY 1
Exercises related to transportation: design, control, measurement, calculation/simulation, reasoning, and communication. Topics may include geometric roadway design, traffic signal control, design of transportation terminals, traffic simulation and pedestrian flow, pavement design and maintenance, design justification, and contemporary issues involving transportation policies and technologies.
PREREQ: CIEG351.

CIEG 452 TRANSPORTATION FACILITIES DESIGN 3
Theoretical concepts of general transportation demand, supply and flow analysis. Planning and design of multi-modal transportation facilities including streets and highways, railways and guideways, airports, and harbors and ports. Engineering, social and economic evaluation of alternative design schemes for simple case studies and existing transportation facilities.
PREREQ: CIEG351.

CIEG 454 URBAN TRANSPORTATION PLANNING 3
Characteristics of urban travel demand, travel demand forecasting models, urban transportation modes and their characteristics, urban transportation planning processes and issues, evaluation of plans, economic analysis, transportation financing, transportation policy and regulations, and urban transportation systems management.
PREREQ: CIEG351.

CIEG 459 RAILROAD ENGINEERING 3
Evolution and analysis of railroad track design and components, ballast and subgrade, rail axial forces, expansion joints, anchors, and track buckling and preventive measures. Response of tracks to moving loads, track transition problems and track tests. Review of track standards. Movies on maintenance and construction.
PREREQ: CIEG212.

CIEG 461 SENIOR DESIGN PROJECT 1-4
Work with advisors from engineering firms and faculty on design projects requiring knowledge and skills acquired in previous courses.
RESTRICTIONS: Requires senior status in engineering.

CIEG 466 INDEPENDENT STUDY 1-6

CIEG 468 PRINCIPLES OF WATER QUALITY CRITERIA 3
Toxicological and chemical background and technical basis necessary for understanding the models of water and sediment quality criteria for individual and mixtures of organic chemicals and metals that focus on bioavailability: narcosis models of toxicity, complexation models applied to both the water column and sediments.
PREREQ: CHEM104 (or 103) or permission of instructor.

CIEG 471 INTRODUCTION TO COASTAL ENGINEERING 3
Problems of design in the ocean and coastal environment. Mechanics of wave motion, tides and storm surge, littoral processes, wave forces on structures and design of coastal structures. Includes observations of hydraulic model tests in the Ocean Engineering Laboratory.
PREREQ: CIEG305.

CIEG 482 SYSTEMS DESIGN AND OPERATION 3
Methodology and technique for the evaluation and design of civil engineering systems. Modern probabilistic and optimization techniques applied to problems in mechanics, structures, transportation, water resources, environmental and ocean systems.

CIEG 486 CONSTRUCTION METHODS AND MANAGEMENT 3
Different methods, management and techniques of construction including earthmoving, heavy construction, building construction and construction management including planning and scheduling, contract administration and construction safety.

CIEG 498 GROUNDWATER FLOW AND CONTAMINANT TRANSPORT 3
Development and application of models for fluid flow and contaminant transport in porous media. Derivation of governing equations, analytical and numerical solutions, and application to the movement of groundwater and transport of contaminants at an actual field site.
PREREQ: CIEG305 and MATH302, or permission of instructor.

CIEG 601 INTRODUCTION TO THE FINITE ELEMENT METHOD 3
Discussion of approximate solution procedures: finite difference method, weighted residual methods and variational methods. Development of approximate solutions using the finite element method. Application to one- and two-dimensional problems in applied mechanics. Discussion of numerical methods and computer programming techniques applicable to finite element analyses.
PREREQ: CIEG381.
CIEG 639  OCEAN FLUID DYNAMICS  4
Kinematics and dynamics of incompressible fluids with emphasis on coastal and
ocean processes: governing equations, examples of solutions for viscous flows,
potential flows, vorticity, flows on a rotating planet, density vary flows, boundary
layers, turbulence.  May be cross-listed with MAST691.  PREREQ: CIEG305.

CIEG 640  URBAN TRANSPORTATION SYSTEMS  3
Design and operation of urban transportation systems, characteristics of public
transportation modes, vehicle design, right-of-way types and terminal facilities.
Application of operations research techniques to analysis of scheduling, network
optimization, capacity and evaluation of alternatives.  May be cross-listed with ORES650.
RESTRICTIONS: Requires permission of instructor.

CIEG 652  TRANSPORTATION FACILITIES DESIGN  3
Theoretical concepts of general transportation demand, supply and flow analysis.
Planning and design of multi-modal transportation facilities including streets and
highways, railroads and guideways, airports, and harbors and ports. Engineering,
social and economic evaluation of alternative design schemes for case studies and
existing transportation facilities.
RESTRICTIONS: Requires permission of instructor.

CIEG 654  URBAN TRANSPORTATION PLANNING  3
Characteristics of urban travel demand, travel demand forecasting models, urban
transportation modes and their characteristics, urban transportation planning
processes and issues, evaluation of plans, economic analysis, transportation
financing, transportation policy and regulations, and urban transportation systems
management.
RESTRICTIONS: Requires permission of instructor.

CIEG 659  RAILROAD ENGINEERING  3
Evolution and analysis of railroad track design and components, ballast and
subgrade, rail axial forces, expansion joints, anchors, and track buckling and
preventive measures. Response of tracks to moving loads, track transition problems
PREREQ: CIEG212.

CIEG 660  PRINCIPLES OF WATER QUALITY CRITERIA  3
Toxicological and chemical background and technical basis necessary for
understanding the models of water and sediment quality criteria for individual and
mixtures of organic chemicals and metals that focus on bioavailability: narcosis
models of toxicity, complexation models applied to both the water column and
sediments.  PREREQ: CHEM104 (or 103) or permission of instructor.

CIEG 662  WATER WAVE MECHANICS  3
Primary emphasis on linear water wave theory and its applications. Shoaling,
refraction and diffraction of waves. Basic aspects of wave-structure and wave-
bottom interaction. Introduction to basic wave propagation models.
May be cross-listed with MAST648.
PREREQ: CIEG305.

CIEG 667  TRANSPORT AND MIXING PROCESSES  3
Application of hydrodynamics to mixing and transport processes in the water
environment.
PREREQ: CIEG672.

CIEG 679  SEDIMENT TRANSPORT MECHANICS  3
Mechanics and mathematical modeling of sediment transport in unidirectional and
oscillatory flow; sediment properties, initiation of sediment movement, bedload
and suspended load transport rates, formation of bed forms and flow resistance,
erosion and deposition in the vicinity of structures, and practical applications.
PREREQ: CIEG305.

CIEG 680  LITTORAL PROCESSES  3
Coastal morphology, equilibrium beach profiles, onshore-offshore response,
sediment transport relationships, sand budgets around inlets and along open
coasts, modeling of shoreline response, analyses of beach problems and
recommendations of remedial measures.

CIEG 681  WATER WAVE SPECTRA  3
Concepts of amplitude and energy spectra, covariances and cross-spectra; linear
response functions; use of the Fast Fourier Transform for ocean engineering
applications including analysis of one-dimensional and directional spectra,
probability of ocean waves and wave forces.
RESTRICTIONS: Requires permission of instructor.

CIEG 682  NEARSHORE HYDRODYNAMICS  3
The mechanics of waves and currents in the nearshore zone: wave breaking, surf
zone dynamics, cross- and long-shore currents, turbulence and bottom boundary
layers, infra-gravity and edge waves and nearshore modeling.
PREREQ: CIEG672 and CIEG639.

CIEG 683  PROBABILISTIC ENGINEERING ANALYSIS  3
Operational techniques, derived distributions and expectations are used to
develop random models to analyze and design in a random environment.
Applications may span topics in mechanics, stream and reservoir flows and
technologic decision making and management.

CIEG 693  WAVES IN THE MARINE ENVIRONMENT  3
See MAST693 for course description.

CIEG 698  GROUNDWATER FLOW AND CONTAMINANT TRANSPORT  3
Development and application of models for fluid flow and contaminant transport in
porous media. Derivation of governing equations, analytical and numerical
solutions, and application to the movement of groundwater and transport of
contaminants at an actual field site.
PREREQ: CIEG305 and MATH302, or permission of instructor.

CIEG 801  ADVANCED TOPICS IN FRACTAL AND FRACTAL ANALYSIS  3
Review of elementary aspects of the finite element method. Application of the
method to linear and nonlinear one-, two- and three-dimensional problems in
applied mechanics. Basic and advanced numerical methods and computer
programming techniques appropriate to finite element analyses (includes two to
three computational laboratory classes).
PREREQ: CIEG401.

CIEG 802  ADVANCED STEEL DESIGN  3
Application of ultimate and elastic design procedures to continuous beams and
frames, composite members, statically indeterminate trusses and arches. Projects
and special topics focus attention to the basis and limitations of codes and
specifications for steel structures.
PREREQ: CIEG302.

CIEG 803  ADVANCED CONCRETE DESIGN  3
Application of ultimate strength design procedures to continuous beams and
frames, composite members, slabs and arches. Projects and special topics focus
attention to the basis and limitations of codes and specifications for concrete
structures.
PREREQ: CIEG302.

CIEG 811  ADVANCED STRUCTURAL DYNAMICS DESIGN  3
Linear and nonlinear dynamic analysis of multiple degree of freedom systems
subjected to earthquake, wind and impact loadings; the use of analysis results in
design. Computer analysis of complex structural systems; distributed, consistent
and lumped mass models; wave propagation; random excitations; and structural
control.
PREREQ: CIEG411.

CIEG 815  RELIABILITY OF ENGINEERING SYSTEMS  3
Examination of the performance of systems with multiple modes of failure and
whose input, properties, evolution etc. are stochastic in nature. Topics include:
stochastic processes, system representation and system failure, component and
system reliability, time-dependent reliability, Monte-Carlo simulation, probability-
based optimization and design code development.
PREREQ: Strong background in probability and statistics, and proficiency in
C/Fortran/Maple or equivalent.

CIEG 817  STABILITY OF STRUCTURES  3
Structural instability phenomena caused by static and dynamic loads. Stability
analyses of structures by equilibrium, energy and dynamic methods. Conservative
and non-conservative problems: Elastic and non-elastic buckling of beams, frames
and arches caused by mechanical and thermal loads. Buckling of continuously
supported beams, plates, and shells. Delamination buckling in composites.
PREREQ: CIEG212 and MATH302.

CIEG 820  INELASTIC BEHAVIOR OF GEOMATERIALS  3
Introduces constitutive laws and numerical methods used to characterize the stress-
strain-time behavior of geomaterials. Correlation between laboratory experiments
and numerical predictions. Finite element analyses of coupled stress-flow problems
(e.g., consolidation), reinforced earth structures and slopes. Discussion of
anisotropy, time effects and frictional interfaces.
PREREQ: CIEG420, CIEG601.
RESTRICTIONS: CIEG620 is highly recommended as a prerequisite.

CIEG 831  THEORY OF WATER TREATMENT  3
Composition of wastes; physical, chemical and biological methods of wastewater
treatment; treatment and disposal of sludges produced at wastewater treatment
plants.
PREREQ: CIEG636.
CIEG 833 FATE OF ORGANIC POLLUTANTS IN THE ENVIRONMENT 3
PREREQ: CIEG632, CIEG634, CIEG636.

CIEG 865 CIVIL ENGINEERING SEMINAR 1

CIEG 868 RESEARCH 1-6

CIEG 869 MASTER'S THESIS 1-6
An independent investigation undertaken by a master's degree candidate under the direction of a faculty advisor. Selection of topic and approval of proposal are prerequisite.

CIEG 870 OFFSHORE DESIGN 3
Naval hydrodynamics, behavior of submerged and floating bodies, and ship waves. Tsunami and harbor response.
PREREQ: CIEG672 and CIEG639.

CIEG 871 COASTAL STRUCTURES 3
Advanced design procedures of coastal structures. Includes statistics and spectra of random sea waves, random sea transformation in the nearshore, design of vertical and rubble mound breakwaters, harbor oscillations and tranquility, and hydraulic model tests.

CIEG 872 ADVANCED WATER WAVE MECHANICS 3
Development of finite amplitude wave theories such as solitary, cnoidal stokes and stream function. Application to coastal and ocean engineering problems.
PREREQ: CIEG639, CIEG672.

CIEG 964 PRE-CANDIDACY STUDY 3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.
RESTRICTIONS: Not open to students who have been admitted to candidacy.

CIEG 969 DOCTORAL DISSERTATION 1-12 PF

COMPUTER AND INFORMATION SCIENCE

CISC 101 COMPUTERS AND INFORMATION SYSTEMS 3
Introduces general concepts of computer organization, terminology, usage and discusses the impact of computers on society. Introduces word processing, spreadsheets, databases, electronic mail, bulletin boards, windowing systems, networks and the internet, and very simple programming.
RESTRICTIONS: Does not count toward graduation if taken after CISC105 or any other CISC course. Not open to students with credit for ACCT160 or 260, or FREC135.

CISC 103 INTRODUCTION TO COMPUTER SCIENCE WITH WEB APPLICATIONS 3
Principles of computer science illustrated through programming in scripting languages such as JavaScript and VBScript. Topics include control structures, arrays, functions, and procedures. Programming projects illustrate web-based applications.
RESTRICTIONS: Open to non-majors. Students may not get credit for both CISC103 and CISC105.

CISC 105 GENERAL COMPUTER SCIENCE 3
Principles of computer science illustrated and applied through programming in the high level language C. Programming projects illustrate applications in all areas: business, humanities, social sciences, physical sciences, mathematics.
RESTRICTIONS: Does not count toward graduation if taken after CISC181.

CISC 106 GENERAL COMPUTER SCIENCE FOR ENGINEERS 3
Principles of computer science illustrated and applied through programming in Matlab and C. Programming projects illustrate computational problems, styles, and issues that arise in engineering computation.

CISC 181 INTRODUCTION TO COMPUTER SCIENCE 3
Principles of computer science illustrated and applied through programming in the object oriented language C++. Programming projects illustrate computational problems, styles and issues that arise in computer systems development and in all application areas of computation.
PREREQ: Grade of C- or better in CISC105 or CISC106 or equivalent programming experience in a high level language.
COREQ: MATH115, MATH117, MATH171, MATH221, or MATH241.

CISC 220 DATA STRUCTURES 3
Review of data type abstraction, recursion, arrays, stacks, queues, multiple stacks and linked lists. Emphasis on dynamic storage management, garbage collection, trees, graphs, tables, sorting and searching.
PREREQ: A minimum grade of C- in CISC181.
COREQ: MATH210 or MATH241.

CISC 250 BUSINESS TELECOMMUNICATION NETWORKS 3
Examines the technologies of information transmission currently utilized in the business environment and the implications of these technologies upon the development and implementation of information systems. Provides a basic background in the convergence of voice, data and video services into a common digital network. Security issues also considered.
PREREQ: CISC181.
RESTRICTIONS: Degree credit will not be given for both CISC250 and CISC450.

CISC 260 MACHINE ORGANIZATION AND ASSEMBLY LANGUAGE 3
Introduction to the basics of machine organization. Programming tools and techniques at the machine and assembly levels. Assembly language programming and computer arithmetic techniques.
PREREQ: A minimum grade of C- in CISC181.
RESTRICTIONS: CISC220 recommended as a prerequisite.

CISC 280 PROGRAM DEVELOPMENT TECHNIQUES 3
Structure and interpretation of computer programs. Different paradigms (mind sets) that programmers use: procedural, functional, logic and object oriented programming. Top down design, stepwise refinement, procedural abstraction and information hiding concepts as applied to the program development process.
PREREQ: A minimum grade of C- in CISC220.
COREQ: MATH221 or MATH241.

CISC 303 AUTOMATA THEORY 3
Automata and formal language theory. Background for advanced applications in compilers, computer networks, operating systems, and natural language processing. Finite automata and regular languages. Push down automata and context free grammars. Turing machines.
PREREQ: A minimum grade of C- in both MATH210 and CISC220.

CISC 304 LOGIC AND PROGRAMMING 3
Propositional and predicate logic for general reasoning and advanced applications in knowledge representation in artificial intelligence and database, program correctness and programming semantics. Models, resolution, logic programming, and natural deduction.
PREREQ: CISC220, MATH210 (with minimum C- grade).

CISC 320 INTRODUCTION TO ALGORITHMS 3
PREREQ: MATH210 and a minimum grade of C- in CISC220.

CISC 360 COMPUTER ARCHITECTURE 3
Principles and techniques used in the architecture of digital computers. Machine elements and their interrelation. Instruction sets, risc vs cisc, registers, busses and switches.
PREREQ: CPEG210 and CPEG211, or CPEG202, and a minimum grade of C- in CISC220 and CISC260 (or equivalent courses).

CISC 361 OPERATING SYSTEMS 3
Principles and techniques employed in the development of operating systems and their control programs. Includes management of memory, processors, I/O devices.
PREREQ: A minimum grade of C- in both CISC220 and CISC260. CPEG222 may be substituted for CISC260.
RESTRICTIONS: CISC360 recommended as a prerequisite.

CISC 366 INDEPENDENT STUDY 1-6

CISC 370 OBJECT ORIENTED PROGRAMMING USING JAVA 3
Object oriented programming through use of the Java programming language. Use of Java’s extensive library of APIs (application programming interfaces). Study of the design issues of large program systems.
PREREQ: CISC220.

CISC 372 PARALLEL PROGRAMMING 3
Introduction to parallel programming concepts, methodologies, and tools. Programming techniques for programs that contain code segments which will run simultaneously on multiple processors. Topics include: concurrency, program decomposition, data distribution, communication, load balancing, scalability, locality, granularity, debugging, performance evaluation.
PREREQ: CISC220.
CISC 401 ELEMENTS OF THE THEORY OF COMPUTATION 3
General models of computation, formal languages and automata theory and algorithmic unsolvability.
PREREQ: CISC303.
RESTRICTIONS: Credit cannot be received for both CISC401 and CISC601.
CISC 403 PROGRAM VALIDATION 3
Specification and verification of programs. Testing through the use of formal and informal verification techniques, program design is made more effective and product quality (meeting specifications) is enhanced.
PREREQ: CISC304.
RESTRICTIONS: Credit cannot be received for both CISC403 and CISC603.
CISC 409 TOPICS IN THEORETICAL COMPUTER SCIENCE 3
Contents vary to coincide with the interests of students and current faculty.
PREREQ: CISC401.
RESTRICTIONS: Credit cannot be received for both CISC409 and CISC609.
CISC 410 INTRODUCTION TO NUMERICAL ANALYSIS AND ALGORITHMIC COMPUTATION 3
See MATH426 for course description.
CISC 411 ALGORITHMIC AND NUMERICAL SOLUTION OF DIFFERENTIAL EQUATIONS 3
See MATH428 for course description.
CISC 429 TOPICS IN ALGORITHMS AND COMPLEXITY THEORY 3
Contents vary to coincide with the interests of students and current faculty.
RESTRICTIONS: Credit cannot be received for both CISC429 and CISC629.
CISC 437 DATABASE SYSTEMS 3
Physical and logical organization of databases. Data retrieval languages, relational database languages, security and integrity, concurrency, distributed databases.
PREREQ: A minimum grade of C- in CISC220.
RESTRICTIONS: Credit cannot be received for both CISC437 and CISC637.
CISC 440 COMPUTER GRAPHICS 3
Computer graphics technology, two- and three-dimensional systems, graphics software systems, modeling and object hierarchy, and animation.
PREREQ: CISC220 and MATH241.
RESTRICTIONS: Credit cannot be received for both CISC440 and CISC640.
CISC 449 TOPICS IN COMPUTER APPLICATIONS 3
Contents will vary to coincide with the interests of students and current faculty.
RESTRICTIONS: Credit cannot be received for both CISC449 and CISC649.
CISC 450 COMPUTER NETWORKS 3
Foundation principles, architectures and techniques employed in computer and communication networks. Focuses on mechanisms used in TCP/IP protocol suite. Topics include connection management, end-to-end reliable data transfer, sliding window protocols, quality of service, flow control, congestion control, routing, LANs, framing, error control, analog versus digital transmission, packet versus circuit switching, multiplexing.
PREREQ: CISC303, CISC360 and MATH205.
COREQ: CISC361.
RESTRICTIONS: Knowledge of probability recommended. Credit cannot be received for both CISC450 and CISC650. Credit cannot be received for both CISC250 and CISC450.
CISC 451 DATA COMPRESSION IN MULTIMEDIA 3
PREREQ: CISC220, MATH210, MATH241, MATH205.
CISC 452 TELECOMMUNICATIONS SYSTEMS 3
Presents basic concepts in telecommunications, emphasizing topics such as SONET, Cell and Frame Relay and multimedia switching. Concepts of the operation and maintenance of large communications networks are discussed.
PREREQ: CISC250, or CISC450, or CPEG419.
RESTRICTIONS: Restricted to CS and ELEG/CPEG majors and minors.
CISC 458 APPLIED COMPUTER NETWORKS 3
Principles of communications as they apply to computer networks. Includes advanced concepts of network design, construction and management.
PREREQ: CISC430 or CPEG419.
CISC 459 TOPICS IN COMMUNICATIONS, DISTRIBUTED COMPUTING AND NETWORKS 3
Contents vary to coincide with the interests of students and current faculty.
PREREQ: CISC450.
RESTRICTIONS: Credit cannot be received for both CISC459 and CISC659.
CISC 462 COMPUTER SYSTEMS: ARCHITECTURE 3
Recent advances in computer architecture and their impact on architectural design. Multicomputer and multiprocessor architectures. Parallel machines.
PREREQ: CISC360 and MATH205.
RESTRICTIONS: Credit cannot be received for both CISC462 and CISC662.
CISC 466 INDEPENDENT STUDY 1-6
CISC 470 PROGRAMMING LANGUAGES 3
Selection, use and implementation of appropriate language(s) for given problems. Syntax, semantics, pragmatics, parameter passing, abstract data types and comparisons between languages.
PREREQ: CISC280.
RESTRICTIONS: Credit cannot be received for both CISC470 and CISC670.
CISC 471 COMPILER DESIGN 3
Introduction to the design and implementation of compilers, with a focus on lexical analysis, parsing and syntax directed translation.
PREREQ: CISC260 and CISC303.
CISC 473 COMPUTER SCIENCE PROJECTS 3
Experimental, theoretical and literature studies of computer science problems.
RESTRICTIONS: Open to majors only. Requires permission of instructor. May be taken twice for credit when topics vary.
CISC 474 ADVANCED WEB TECHNOLOGIES 3
Programming and architecture of web servers and the technologies for implementing high performance, sophisticated web sites for applications like e-commerce. Students learn how to install and set-up a web server, how to write and install programs for a web server, and how to design and implement multi-tier client/server applications with database backends.
PREREQ: CISC220 and CISC370.
COREQ: CISC437.
CISC 475 OBJECT ORIENTED SOFTWARE ENGINEERING 3
Introduction to object oriented software engineering concepts, methodologies and tools. Requirement analysis, specification, design and implementation of object oriented software development process using UML. Real-life examples and homework projects to cover all aspects of object oriented lifecycle, from the requirements to coding in C++ and/or Java. Students learn how to install and set-up a web server, how to write and implement high performance, sophisticated web sites for applications like e-commerce. Students learn how to install and set-up a web server, how to write and implement high performance, sophisticated web sites for applications like e-commerce.
PREREQ: CISC280, and CISC361.
RESTRICTIONS: Credit cannot be received for both CISC475 and CISC675.
CISC 477 SYSTEMS ADMINISTRATION 3
Introduces students to the internals of UNIX, trouble-shooting system and network problems, hardware and software configuration and installation, and security aspects of hosts on the internet. Multi-operating system integration will also be discussed.
PREREQ: CISC361.
CISC 479 TOPICS IN ARCHITECTURE AND SOFTWARE 3
Contents will vary to coincide with the interests of students and faculty.
PREREQ: CISC361 and CISC462.
RESTRICTIONS: Credit cannot be received for both CISC479 and CISC679.
CISC 481 ARTIFICIAL INTELLIGENCE 3
Programming techniques for problems not amenable to algorithmic solutions. Problem formulation, search strategies, state spaces, applications of logic, knowledge representation, planning and application areas. May be cross-listed with CGSC481.
PREREQ: CISC280, and CISC304.
RESTRICTIONS: Credit cannot be received for both CISC481 and CISC681.
CISC 485 MECHATRONICS 3
Mechatronics is the intersection set of computers, electronics and mechanical engineering. Covers practical and theoretical aspects of mechatronic design, including human/machine interfacing, haptic systems, procedures in mechatronic design, reverse engineering, machine behaviors, and mechatronic control systems.
RESTRICTIONS: Credit cannot be received for both CISC485 and CISC685.
CISC 489 TOPICS: ARTIFICIAL INTELLIGENCE 3
Contents vary to coincide with the interests of students and current faculty.
PREREQ: CISC481/681.
RESTRICTIONS: Credit cannot be received for both CISC489 and CISC689.
CISC 601  **ELEMENTS OF THE THEORY OF COMPUTATION**  3
General models of computation, formal languages and automata theory, and algorithmic unsolvability.
PREREQ: A course in which the student was required to prove theorems.
RESTRICTIONS: Credit cannot be received for both CISC401 and CISC601.

CISC 603  **PROGRAM VALIDATION**  3
Specification and verification of programs. Testing through the use of formal and informal verification techniques. Program design is made more effective and product quality (meeting specifications) is enhanced.
PREREQ: CISC304 or equivalent.
RESTRICTIONS: Credit cannot be received for both CISC603 and CISC403.

CISC 604  **LOGIC IN COMPUTER SCIENCE**  3
Formal introduction to first-order logic with emphasis on its relevance to computer science. Syntax, semantics, models, formal proofs and results on soundness, consistency, completeness, compactness and undecidability. Automated theorem proving also covered.
PREREQ: CISC304 or equivalent.
RESTRICTIONS: Credit cannot be received for both CISC604 and CISC404.

CISC 609  **TOPICS IN THEORETICAL COMPUTER SCIENCE**  3
Contents vary to coincide with the interests of students and current faculty.
PREREQ: CISC609.
RESTRICTIONS: Credit cannot be received for both CISC609 and CISC409.

CISC 611  **ALGORITHM DESIGN AND ANALYSIS**  3
Emphasis on developing expertise in the design and analysis of algorithms. Equal importance given to techniques and specific algorithms. Particular topics include advanced data structures, graph algorithms, disjoint set manipulation, sorting and selection, amortized analysis, NP-completeness, and matrix and polynomial multiplication.
PREREQ: Undergraduate algorithms and discrete math courses.

CISC 637  **DATABASE SYSTEMS**  3
Physical and logical organization of databases. Data retrieval languages, relational database languages, security and integrity, concurrency, distributed databases.
PREREQ: CISC220, and CISC304, or equivalent.
RESTRICTIONS: Credit cannot be received for both CISC637 and CISC437.

CISC 640  **COMPUTER GRAPHICS**  3
Computer graphics technology, two- and three-dimensional systems, graphics software systems, modeling and object hierarchy, and animation.
PREREQ: CISC220 or equivalent.
COREQ: CISC320 recommended.
RESTRICTIONS: Credit cannot be received for both CISC640 and CISC440.

CISC 649  **TOPICS IN COMPUTER APPLICATIONS**  3
Contents vary to coincide with the interests of students and current faculty.
RESTRICTIONS: Credit cannot be received for both CISC649 and CISC449.

CISC 650  **COMPUTER NETWORKS**  3
Foundation principles, architectures, and techniques employed in computer and communication networks. Focuses on mechanisms used in TCP/IP protocol suite. Topics include connection management, end-to-end reliable data transfer, sliding window protocols, quality of service, flow control, congestion control, routing, LANs, framing, error control, analog versus digital transmission, packet versus circuit switching, multiplexing.
PREREQ: CISC360, CISC361 or CISC663.
RESTRICTIONS: Credit cannot be received for both CISC650 and CISC450.

CISC 651  **DATA COMPRESSION IN MULTIMEDIA**  3
PREREQ: CISC220, MATH210, MATH241 or MATH205, or equivalent.

CISC 652  **TELECOMMUNICATIONS SYSTEMS**  3
Presents basic concepts in telecommunications emphasizing topics such as SONET, Cell and Frame Relay and multimedia switching. Concepts of the operation and maintenance of large communications networks are discussed.
PREREQ: CISC450 or CPEG419 or ELEG651 or equivalent.
RESTRICTIONS: Open to CS, ELEG, and CPEG majors and minors only.

CISC 659  **TOPICS IN COMMUNICATIONS, DISTRIBUTED COMPUTING AND NETWORKS**  3
Contents vary to coincide with the interests of students and faculty.
PREREQ: CISC650.
RESTRICTIONS: Credit cannot be received for both CISC659 and CISC459.

CISC 662  **COMPUTER SYSTEMS: ARCHITECTURE**  3
Recent advances in computer architecture and their impact on architectural design. Multicomputer and multiprocessor architectures. Parallel machines.
PREREQ: CISC360 or equivalent.
RESTRICTIONS: Credit cannot be received for both CISC662 and CISC462.

CISC 663  **OPERATING SYSTEMS**  3
Comparison and analysis of strategies for the management of memory, processors, I/O devices and file systems.
PREREQ: CISC260 or equivalent.

CISC 664  **INTRODUCTION TO NETWORK SECURITY**  3
Detailed, in-depth overview of pressing network security problems and discusses potential solutions. Covers a broad variety of security topics, such as cryptography, authentication, denial-of-service attacks, worms, viruses, etc. Lecture and optional reading provide background information on the key network security concepts, and course projects create opportunity to exercise concepts learned in class.
PREREQ: CISC450 or CISC650 or ELEG651.

CISC 670  **PROGRAMMING LANGUAGES**  3
Selection, use and implementation of appropriate language(s) for given problems. Syntax, semantics, pragmatics, parameter passing and abstract data types.
PREREQ: CISC303 or equivalent.
RESTRICTIONS: Credit cannot be received for both CISC670 and CISC470.

CISC 672  **ADVANCED COMPILER CONSTRUCTION**  3
Advanced design and implementation of programming language translators. Emphasis on parsing methods, run-time, storage management techniques, code generation and optimization.
PREREQ: CISC320 or equivalent, and CISC601 recommended.
RESTRICTIONS: Undergraduates must obtain instructor’s permission.

CISC 675  **OBJECT ORIENTED SOFTWARE ENGINEERING**  3
Introduction to software engineering concepts, methodologies and tools. Requirement analysis, specification, design and implementation of object oriented software development process. Students will be presented with several real life examples and homework projects to cover all aspects of object oriented lifecycle, from the requirements to coding in C++.
RESTRICTIONS: Requires C/C++ and permission of instructor. Credit cannot be received for both CISC675 and CISC475.

CISC 681  **ARTIFICIAL INTELLIGENCE**  3
Programming techniques for problems not amenable to algorithmic solutions. Problem formulation, search strategies, state spaces, applications of logic, knowledge representation, planning and application areas. May be cross-listed with CGSC681.
PREREQ: CISC220, and CISC304, or equivalent.
RESTRICTIONS: Credit cannot be received for both CISC681 and CISC481.

CISC 685  **MECHATRONICS**  3
Mechatronics is the intersection set of computers, electronics and mechanical engineering. Covers practical and theoretical aspects of mechatronic design, including human/machine interfacing, haptic systems, procedures in mechatronic design, reverse engineering, machine behaviors, and mechatronic control systems.
RESTRICTIONS: Credit cannot be received for both CISC685 and CISC485.

CISC 689  **TOPICS: ARTIFICIAL INTELLIGENCE**  3
Contents vary to coincide with the interests of students and faculty.
PREREQ: CISC681.
RESTRICTIONS: Credit cannot be received for both CISC689 and CISC489.

CISC 699  **GRADUATE INTERNSHIP**  1 PF
On-the-job experience performing technical computer science related work.
RESTRICTIONS: Requires permission of the instructor.

CISC 801  **ADVANCED COMPUTABILITY THEORY**  3
Advanced abstract computability (or recursive function theory) theory with emphasis on the tools underpinning research in the area. Topics include universal programming systems, complexity results, oracular computations and quantifier hierarchies, classification of algorithmically enumerable sets, machine self-reference and priority arguments.
PREREQ: CISC601.

CISC 805  **COMPUTABILITY THEORETIC LEARNING**  3
Mathematically circumscribes the absolute boundaries of what algorithms can do about learning grammars for languages and programs for functions. Proves results in the recursion-theoretic theory of machine learning. Provides interpretations of results regarding human language learning and philosophy of science.
PREREQ: CISC601.
CISC 809  **ADVANCED TOPICS IN THEORETICAL COMPUTER SCIENCE**  3
Contents vary to coincide with the interests of students and faculty.
PREREQ: CISC601.

CISC 822  **ALGEBRAIC ALGORITHMS**  3
PREREQ: CISC621 and/or an abstract algebra course or permission of instructor.
RESTRICTIONS: Offered in alternate years.

CISC 829  **ADVANCED TOPICS IN ALGORITHMS AND COMPLEXITY THEORY**  3
Contents vary to coincide with the interests of students and faculty.

CISC 841  **BIOMINFORMATICS**  3
Algorithms and models for analyzing biological sequences of DNA, protein, and RNA to infer functions, predict structures, and understand evolutionary relationships. Pairwise and multiple alignment, phylogenetic trees, pattern discovery and recognition, hidden Markov models, stochastic context-free grammars and dynamic programming.
PREREQ: CISC220 or consent of instructor.

CISC 849  **ADVANCED TOPICS IN COMPUTER APPLICATIONS**  3
Contents vary to coincide with the interests of students and faculty.
RESTRICTIONS: Requires permission of instructor.

CISC 852  **COMPUTER NETWORK PERFORMANCE**  3
PREREQ: CISC650 or ELEG651 or equivalent.

CISC 853  **NETWORK MANAGEMENT**  3
Introduction to network management concepts. Network management architectures and protocols: the Internet and OSI frameworks, management functionalities, management domains and objects, protocols and services (SNMP, CMS/IF), Design of management agents and clients. Concepts of performance management, fault management, configuration management and other management applications.
PREREQ: CISC650 or ELEG651.

CISC 856  **TCP/IP AND UPPER LAYER PROTOCOLS**  3
Advanced principles and techniques of the TCP/IP protocol suite. Emphasis on network, transport and application layers, and recent new protocols as proposed by the IETF. Examples: FTP, SMTP, telnet, NTP, HTTP, DNS, Multicast, DHCP, ECN, IMAP, CNDN, ICPM, SCTP.
PREREQ: CISC650 or ELEG651.

CISC 858  **INTERNET PROTOCOLS AND TECHNOLOGY**  3
State-of-the-art issues related to Internet protocols, routers, and middleware. Topics include: router architectures, algorithms for packet lookup and flow classification, QoS and differentiated services, TCP congestion control and active queue management, intradomain and interdomain routing, network measurements and traffic characterization, streaming and real-time applications, web middleware.
PREREQ: CISC450/650, CISC360, CISC361, ELEG651, or equivalent.

CISC 859  **ADVANCED TOPICS IN COMMUNICATIONS, DISTRIBUTED COMPUTING NETWORKS**  3
Contents vary to coincide with the interests of students and faculty.
PREREQ: CISC650 or ELEG651.

CISC 861  **WIRELESS NETWORKS AND MOBILE COMPUTING**  3
Provides an in-depth study of networking protocol and system software in wireless networks and mobile computing. Topics include MAC layer and 802.11, ad hoc networks, sensor networks, GloMoSim simulation package, Mobile IP, Cellular IP, wireless TCP, middleware for mobile computing and 3G wireless networks.
PREREQ: CISC650 or ELEG651.

CISC 862  **ADVANCED SOFTWARE DESIGN**  3
Review of basic object oriented software development; software design and architecture patterns; component-based software engineering; mobile software agents; protocols and architectures for complex software management; project developing large scale E-trade software application.
PREREQ: Good Java programming skills; CISC650 is recommended.
RESTRICTIONS: Preference given to CS, EE and CPEG graduate students.

CISC 864  **RESEARCH TOPICS IN NETWORK SECURITY**  3
Focuses on research and emphasizes reading and writing of technical papers, and project work. Covers a variety of network security topics, such as denial-of-service, worm and virus attacks, privacy, anonymization techniques, IP spoofing, social engineering, etc.
PREREQ: CISC450 or CISC650 or ELEG651.

CISC 868  **RESEARCH**  1-9
Upper-level graduate research oriented toward a student's potential master's thesis or Ph.D. dissertation.

CISC 869  **MASTER'S THESIS**  1-6

CISC 872  **ADVANCED PROGRAM ANALYSIS AND TRANSFORMATIONS**  3
Static program analysis and machine-independent code transformations. Topics include control flow analysis, intraprocedural data flow analysis, alias analysis, advanced program representations including SSA and PDG and local, global and interprocedural analysis for classic code-improving transformations.
PREREQ: CISC672.

CISC 873  **COMPILED FOR ADVANCED ARCHITECTURES**  3
Techniques for generating code for advanced uniprocessor and multiprocessor architectures. Topics include register allocation, code generation for pipelined, superscalar, VLIW architecture. Dependence analysis, locality transformations, compiling for shared memory, message passing, distributed shared memory and multithreaded architectures.
PREREQ: CISC662 or previous course in compilers, and CISC662 or previous course in computer architecture.
RESTRICTIONS: CISC872 is recommended.

CISC 875  **IMPLEMENTING OBJECT ORIENTED LANGUAGES**  3
Program analysis and code generation for object oriented languages. Program analysis in the presence of polymorphism, threads, exceptions, templates and multiple inheritance. Compiling high-level languages to virtual machines (like JVM) and compiling virtual machine codes to register instruction sets. Garbage collection and memory management.
PREREQ: CISC672 or previous compiler course and exposure to object oriented programming.
RESTRICTIONS: CISC872 is recommended.

CISC 879  **ADVANCED TOPICS IN ARCHITECTURE AND SOFTWARE SYSTEMS**  3
Contents vary to coincide with the interests of students and faculty.
PREREQ: CISC662 or CISC663.

CISC 882  **NATURAL LANGUAGE PROCESSING**  3
Introduction to computational models of syntax, semantics and pragmatics for natural language understanding. Emphasis on design of English interfaces to data bases and ill-formed input.
PREREQ: CISC681.

CISC 883  **NATURAL LANGUAGE GENERATION**  3
Current research directions in generation, models of generation, differences between generation and understanding, text structure and coherence, grammars for generation.
PREREQ: CISC681 and CISC682.

CISC 885  **DISCOURSE AND DIALOGUE**  3
Pragmatic issues involved in developing intelligent discourse and dialogue systems. Topics: speech acts, characteristics of a coherent dialogue, explicit versus implicit communication, discourse models, planning and plan recognition, ill-formed input, cooperative responses, user models and default reasoning.
PREREQ: CISC681.

CISC 886  **MULTI-AGENT SYSTEMS**  3
Introduction to the field of Multi-Agent Systems, examining issues that arise when groups of self-interested or cooperating autonomous agents interact to solve shared problems. Issues include reasoning about the knowledge and beliefs of other agents, communication and negotiation, computational organization, coordination and control.
PREREQ: CISC681 or equivalent.

CISC 887  **INTERNET INFORMATION GATHERING**  3
Approaches to information gathering, filtering, and integration including work in the heterogeneous database, information retrieval and agent-oriented communities. Text indexing, vector-based and probabilistic retrieval, semantic web technologies, wrappers and mediators, query planning and optimization, collaborative filtering, information agents, applications.
PREREQ: CISC681 or equivalent.

CISC 888  **ADVANCED TOPICS IN ARTIFICIAL INTELLIGENCE**  3
Contents vary to coincide with the interests of students and faculty.
PREREQ: CISC681.
CMLT 207  GREAT WRITERS OF THE WESTERN WORLD I: 1100-1700  3
Studies writers such as Dante, Chaucer, Rabelais and Cervantes, in translation.
PREREQ: ENGL110.
May be cross-listed with ENGL211.
CMLT 208  GREAT WRITERS OF THE WESTERN WORLD II: 1650-1950  3
Studies writers such as Moliere, Voltaire, Goethe, Dostoevski, Thomas Mann and Herman Hesse, in translation.
May be cross-listed with ENGL212.
PREREQ: ENGL110.
CMLT 219  INTRODUCTION TO THE NOVEL  3
See ENGL209 for course description.
CMLT 220  BIBLICAL AND CLASSICAL LITERATURE  3
See ENGL202 for course description.
CMLT 221  INTRODUCTION TO DRAMA  3
See ENGL208 for course description.
CMLT 222  TOPICS: CLASSICAL LITERATURE IN TRANSLATION  3
See FLIT322 for course description.
CMLT 223  MEDIEVAL LITERATURE AND CULTURE  3
See ENGL321 for course description.
CMLT 224  THEATRE/DRAMA: CLASSIC/庫MEVAL  3
See THEA341 for course description.
CMLT 225  THEATRE/DRAMA: RENAISSANCE TO 1700  3
See THEA342 for course description.
CMLT 226  THEATRE/DRAMA: 1700 TO 1900  3
See THEA343 for course description.
CMLT 227  THEATRE/DRAMA: 1900 TO PRESENT  3
See THEA344 for course description.
CMLT 228  MEDIA AND COMMERCE  3
See ARSC360 for course description.
CMLT 229  LITERARY CRITICISM AND THEORY  3
See ENGL361 for course description.
CMLT 320  VARYING AUTHORS AND GENRES  3
See FLIT320 for course description.
CMLT 321  MEDIEVAL LITERATURE AND CULTURE  3
See ENGL321 for course description.
CMLT 322  TOPICS: CLASSICAL LITERATURE IN TRANSLATION  3
See FLIT322 for course description.
CMLT 323  VARYING AUTHORS, THEMES AND MOVEMENTS  3
See FLIT330 for course description.
CMLT 324  THEATRE/DRAMA: CLASSIC/库MEVAL  3
See THEA341 for course description.
CMLT 325  THEATRE/DRAMA: RENAISSANCE TO 1700  3
See THEA342 for course description.
CMLT 326  THEATRE/DRAMA: 1700 TO 1900  3
See THEA343 for course description.
CMLT 327  THEATRE/DRAMA: 1900 TO PRESENT  3
See THEA344 for course description.
CMLT 328  MEDIA AND COMMERCE  3
See ARSC360 for course description.
CMLT 329  LITERARY CRITICISM AND THEORY  3
See ENGL361 for course description.
CMLT 330  VARYING AUTHORS, THEMES AND MOVEMENTS  3
See FLIT330 for course description.
CMLT 331  THEATRE/DRAMA: CLASSIC/库MEVAL  3
See THEA341 for course description.
CMLT 332  THEATRE/DRAMA: RENAISSANCE TO 1700  3
See THEA342 for course description.
CMLT 333  THEATRE/DRAMA: 1700 TO 1900  3
See THEA343 for course description.
CMLT 334  THEATRE/DRAMA: 1900 TO PRESENT  3
See THEA344 for course description.
CMLT 335  MEDIA AND COMMERCE  3
See ARSC360 for course description.
CMLT 336  LITERARY CRITICISM AND THEORY  3
See ENGL361 for course description.
CMLT 340  HUMANITIES COLLOQUIUM  3
See ARSC360 for course description.
CMLT 341  THEATRE/DRAMA: CLASSIC/库MEVAL  3
See THEA341 for course description.
CMLT 342  THEATRE/DRAMA: RENAISSANCE TO 1700  3
See THEA342 for course description.
CMLT 343  THEATRE/DRAMA: 1700 TO 1900  3
See THEA343 for course description.
CMLT 344  THEATRE/DRAMA: 1900 TO PRESENT  3
See THEA344 for course description.
CMLT 345  MEDIA AND COMMERCE  3
See ARSC360 for course description.
CMLT 346  LITERARY CRITICISM AND THEORY  3
See ENGL361 for course description.
COMM 310 Topics: Mass Communication Honors Pro-Seminar 1-4
Focus on areas of study in mass communication. Will enhance and expand on other communication courses offered as a co-requisite.
COREQ: A list of co-requisites will be available to students each semester.
RESTRICTIONS: Students with a 3.0 GPA or higher. May be repeated up to three times for credit when topics vary.

COMM 311 Public Relations Writing 3
Development of writing skills with emphasis on clarity, conciseness, color, organization and flow. Application of skills in various public relations formats (news releases, features, profiles, brochures, etc.) geared to specific audiences and appropriate channels.
PREREQ: COMM309 and ENGL307.

COMM 313 Communication Principles in Advertising 3
Provides a comprehensive overview of the marketing function, emphasizing integrated marketing communication. Includes historical perspective and current advertising and promotion principles and practices. Combines both individual and small team projects, such as developing an integrated marketing communication campaign.

COMM 318 Topics in Mass Communication 3
Focus on introductory areas of study in mass communication.
RESTRICTIONS: May be repeated three times for credit when topics vary.

COMM 319 Topics in Politics and Broadcast Journalism 3
Topics vary and may include the influence of the media on foreign policy, the responsibility of the media on foreign policy or for policy failures or successes. May be cross-listed with POSC319.
RESTRICTIONS: For majors only. May be repeated up to three times for credit when topics vary.

COMM 320 Topics: Interpersonal Communication Honors Pro-Seminar 1-4
Focus on areas of study in interpersonal communication. Will enhance and expand on other communication courses offered as a co-requisite.
COREQ: Vary from semester to semester. Students will be supplied with a list of co-requisites each semester.
RESTRICTIONS: Students with a 3.0 GPA or higher. May be repeated up to three times for credit when topics vary.

COMM 325 Studio Television Production 3
Television as a mass communication media. Background, programming, production and studio procedures in educational television, broadcasting and closed circuit. Laboratory observation and practices.

COMM 326 Field Television Production 3
Analysis and synthesis of the production, planning and videotaping of TV programs, news and public affairs, drama, variety and instructional programming.

COMM 327 Television Production Laboratory I 1 PF
Practice of TV production techniques.
RESTRICTIONS: Permission required from department.

COMM 328 Television Production Laboratory II 1 PF
Further practice of TV production techniques.
RESTRICTIONS: Permission required from department.

COMM 329 Broadcast Newswriting 3
Emphasizes broadcast newswriting fundamentals and comparisons to other forms of writing. Includes news judgment, news gathering, and news editing, as well as integration of current events.

COMM 330 Communication and Interpersonal Behavior 3
Introduces key principles of interpersonal communication and discusses their application across diverse contexts.

COMM 340 Politics and the Media 3
See POSC340 for course description.
RESTRICTIONS: For majors only.

COMM 341 Theories of Interpersonal Communication 3
Survey of concepts and theories in interpersonal communication. Focuses on dyadic interaction and relationships as created, maintained, and modified through verbal and nonverbal behavior.

COMM 342 Topics in Organizational Communication 3
Focuses on introductory areas of study in organizational communication.
RESTRICTIONS: May be repeated three times for credit when topics vary.

COMM 343 Topics in Interpersonal Communication 3
Focuses on introductory areas of study in interpersonal communication.
RESTRICTIONS: May be repeated three times for credit when topics vary.

COMM 345 Legal Issues of the Mass Media 3
Survey of legal issues affecting the development and performance of the mass media. The foundation of American communications law outlined through the study of First Amendment theory, its origin and development. Legal issues concerning libel, obscenity, copyright and broadcast regulation discussed. May be cross-listed with LEST345.

COMM 350 Public Speaking 3
Analyzes and applies theory and research in public speaking. Develops skills in preparation, presentation and evaluation of speeches. Includes classroom performances.

COMM 351 Oral Communication Fellows 3
Oral Communication Fellows training.
PREREQ: COMM350.
RESTRICTIONS: Enrollment by department invitation only.

COMM 356 Small Group Communication 3
Examines basic group processes, structures and functions. Emphasizes both theory and practical applications.
RESTRICTIONS: Requires permission of instructor.

COMM 364 Internship 1-3 PF
Practical, on-the-job training in the student's field of interest: i.e., interpersonal, mass media, public relations or organizational communication.
RESTRICTIONS: Offered in spring and fall semesters only. Open to junior and senior communication majors only.

COMM 366 Independent Study 1-3

COMM 370 Theories of Mass Communication 3
An examination of the foundations and development of theories of mass communication. Specific areas of study include media, society and the individual, media violence, cultivation theory, personal influence, social learning theory, diffusion theory and general media effects.

COMM 388 Television Production Practicum 3
A special topics video/audio course that acts as the production arm of an interdisciplinary project. Intensive work on specific projects such as producing promotional or sales campaigns, video documentaries and radio drama.
PREREQ: COMM325.
RESTRICTIONS: Offered in winter session only.

COMM 401 Careers in Communication 1 PF
Offers insights into the many careers open to those with communication degrees and includes guest lectures from successful alumni. Provides strategies for career development.
RESTRICTIONS: Open to junior and senior communication majors only.

COMM 408 New Media Project Development 3
Application of communication research processes to designing new media (e.g., web sites, streaming video, electronic communication, interactive media) for a client. Involves conducting research for planning, developing strategies, designing prototypes, and making recommendations for implementation and evaluation.

COMM 409 Public Relations Campaign Planning 3
Comprehensive recap of the Integrated Marketing Communication function, with an emphasis on public relations research, objectives, strategies, integrated tactics, and campaign evaluation. Utilizes a small team "service learning" setup, wherein the teams adopt a community non-profit organization and work closely with Board and staff members to produce and present a comprehensive public relations campaign plan.
PREREQ: COMM309.

COMM 413 Public Relations Management 3
Examination of the effects of management systems on the public relations function and the managerial role of the public relations practitioner. Includes in-depth analysis of complex cases, preparation of a crisis communications plan for a non-profit client and several writing projects geared to specific audiences.
PREREQ: COMM309.

COMM 417 Communication and the Management of Conflict 3
An overview of communication and the conflict process in face-to-face interaction. Emphasis on theories concerning the structure, analysis, and management of conflict situations.

COMM 418 Topics in Mass Communication 3
Current directions in mass communication theory and practice including new technologies, politics, broadcast programming and research, advertising and audience responses to media content.
RESTRICTIONS: May be repeated three times for credit when topics vary.
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<tr>
<th>Course Code</th>
<th>Course Name</th>
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<td>Intercultural Communication</td>
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<td>COMM 422</td>
<td>Media Message Analysis</td>
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<td>COMM 425</td>
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<td>COMM 427</td>
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<td>COMM 452</td>
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<td>COMM 454</td>
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<td>COMM 456</td>
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<td>COMM 485</td>
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<td>COMM 603</td>
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<td>Public Relations Management</td>
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<td>COMM 618</td>
<td>Topics in Mass Communication</td>
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<td>COMM 621</td>
<td>Intercultural Communication: Applications in International Contexts</td>
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<td>Media Message Analysis</td>
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<td>COMM 640</td>
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<tr>
<td>COMM 642</td>
<td>Topics in Organizational Communication</td>
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</tbody>
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COMM 652 COMMUNICATION AND PERSUASION 3
An examination of how influence is created and resisted through communication in various settings, including personal relationships, public relations, advertising and political campaigns. Emphasis on contemporary theories of persuasion and attitude change, with applications to the various content areas studied.

COMM 654 CHILDREN AND THE MASS MEDIA 3
Mass media research and theory as they relate to children. Substantive areas include children's use and comprehension of media, content of children's television programming, television and the family, children and advertising, and the media's contribution to social values and roles.

RESTRICTIONS: Open to graduate students only.

COMM 656 COMMUNICATION IN ORGANIZATIONS 3
An introduction to concepts and research related to communication processes in organizational settings. Both traditional and interpretive approaches are emphasized.

COMM 657 CHILDREN, TELEVISION AND EDUCATION 3
Issues relating to education, academic achievement, and the development of critical viewing skills; media and comprehension; content of children's television programming and advertising directed toward children; and the media's contribution to social values and roles; development of critical viewing skills curriculum. May be cross-listed with EDUC657.

COMM 664 INTERNSHIP 1-6
Provides the student with practical, on-the-job training in the field of his or her interest, i.e., interpersonal, mass media, public relations or organizational communication.

RESTRICTIONS: Open to graduate students only.

COMM 670 MASS COMMUNICATION THEORY 3
Examination of theories of mass communication focusing upon media, society and the individual; sociocultural influences; the social context of the broadcast media; theories relating to effects of media violence; personal influence; social learning theory; diffusion theory; and media effects.

RESTRICTIONS: Open to graduate students only.

COMM 685 ANALYSIS OF FACE-TO-FACE COMMUNICATION 3
An examination of methods for analyzing face-to-face interaction, message construction, and message interpretation.

COMM 686 MULTIMEDIA LITERACY 3
See EDUC685 for course description.

COMM 868 RESEARCH 1-12
See EDUC685 for course description.

COMM 869 MASTER'S THESIS 1-6

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Computer Engineering

CPEG 202 INTRODUCTION TO DIGITAL SYSTEMS 4
Analysis and design of logic circuits. Topics include: Boolean algebra and its application to switching circuits, simplification of switching functions, design of logic circuits at the gate level and with MSI and LSI components. Analysis and design of synchronous and asynchronous sequential state machines.

CPEG 210 INTRODUCTION TO COMBINATIONAL LOGIC 2
Boolean algebra and its application to logic circuits. Simplification of switching functions. Gate level design of circuits to implement logic functions and design with MSI and LSI components.

CPEG 211 INTRODUCTION TO SEQUENTIAL CIRCUITS 2
Analysis and design of asynchronous sequential logic circuits, synchronous sequential machines and algorithmic state machines.


CPEG 220 MICROPROCESSOR BASED SYSTEMS I 2
Introduction to small computing machines including the architecture, organization and programming of microprocessors. Emphasizes basic machines language and assembly language coding.

PREREQ: CPEG211 and CISC181.

CPEG 221 MICROPROCESSOR BASED SYSTEMS II 2
Extension of CPEG220 with emphasis on Input/Output, interrupt systems and the interfacing of microprocessor systems. A project is required that includes the design and implementation of a microprocessor based system with external interfacing.

PREREQ: CPEG220.

CPEG 222 MICROPROCESSOR SYSTEMS 4
Introduction to microprocessors as embedded devices. Emphasizes Input/Output techniques, interrupts, real-time operation, high-level code debugging and interfacing to various types of sensors and actuators. Projects that address various embedded applications are a major part of the course.

PREREQ: CPEG202.

CPEG 323 INTRODUCTION TO COMPUTER SYSTEMS ENGINEERING 3
General purpose, special purpose and embedded computer architecture are studied. Principles of digital system design are introduced including an introduction to tools for automated design and the use of programmable logic devices. 

PREREQ: ELEG309 and CPEG221 or CPEG222.

CPEG 324 COMPUTER SYSTEMS DESIGN I 3
Principles of computer system design are studied emphasizing tradeoffs involving cost, performance, testability, reliability and manufacturability. Topics include timing analysis, component and subsystem interconnect, noise effects debugging techniques, boundary scan testing and printed circuit layout. Laboratory work involves design and implementation of a computer subsystem.

PREREQ: CPEG323.

CPEG 409 SIGNALS AND COMMUNICATION DESIGN I 4
See ELEG409

PREREQ: ELEG305 and knowledge of C/C++.

CPEG 410 SIGNALS AND COMMUNICATIONS DESIGN II 4
See ELEG410 for course description.

PREREQ: ELEG306 or ELEG403 or ELEG413.

CPEG 419 COMPUTER COMMUNICATION NETWORKS 3
Introduction to computer communication networks based on circuit switching and packet switching. Layered architectures and layer protocols are described and models are developed to analyze network performance. Other topics include multiple access, local area networks and integrated networks.

PREREQ: ELEG310.

CPEG 421 COMPILER DESIGN 3
Introduction to compiler design, syntax and semantics, code generation and optimization. Design of high performance computers together with high performance optimizing compilers as an integral unit. Software/hardware tradeoffs in pipelined computers, superscaler computers and computers embedded in other systems.

PREREQ: CPEG323 and CISC361.

CPEG 422 COMPUTER SYSTEMS DESIGN II 4
Examines modern digital computer design methods using industry standard electronic CAD synthesis tools. Topics include hardware design using VHDL, logic synthesis tools, simulation methods for synthesis and efficient coding techniques for synthesis. Includes experimental laboratory work to design and evaluate FPGA-based digital computer hardware.

PREREQ: CPEG324 and CISC361.

CPEG 460 INTRODUCTION TO VLSI SYSTEMS 4
Study of CMOS VLSI devices, circuits and systems implemented in VLSI CAD tools for the design and simulation of VLSI. Topics include the performance and limitations of VLSI systems, low level circuit design and system design with an emphasis on digital systems. Major chip design project required.

PREREQ: ELEG312.

CPEG 490 CAREER SKILLS FOR ENGINEERS 1
Covers a variety of skills engineers need in their careers, including ethics, the need for life-long learning, societal and global impact of engineering solutions, teaming and team dynamics, resume writing, interviewing and communications. May be cross-listed with ELEG490.

RESTRICTIONS: Open to engineering seniors, or by permission of instructor.

CPEG 621 COMPILER DESIGN 3
Introduction to compiler design, syntax and semantics, code generation and optimization. Design of high performance computers together with high performance optimizing compilers as an integral unit. Software/hardware tradeoffs in pipelined computers, superscaler computers and computers embedded in other systems.

PREREQ: CPEG323 and CISC361.

CPEG 622 COMPUTER SYSTEM DESIGN II 3
Examines modern digital computer design methods using industry standard electronic CAD synthesis tools. Topics include hardware design using VHDL, logic synthesis tools, simulation methods for synthesis, and efficient coding techniques for synthesis. Includes experimental laboratory work to design and evaluate FPGA-based digital computer hardware.

PREREQ: CPEG324 and CISC361.
CRJU 110 INTRODUCTION TO CRIMINAL JUSTICE 3

Responses in American society to the problems of crime. Examines criminal behavior, criminal law, the police, the courts and corrections, as well as selected issues in criminal justice.

CRJU 120 ILICIT DRUG USE IN AMERICA 3

The nature and extent of illicit drug use in the United States and the sociocultural context. The history and effects of the major drugs of abuse and the social issues since the 1990s that contributed to the increased use of illicit drugs.

CRJU 134 GREAT CRIMES 3

Examines the realities of securing justice in light of crimes that have generated intense interest and critical analysis (Lindbergh kidnapping, Rosenberg spy case, etc.) Using the case study method, contrasts made and comparisons drawn among changing legal norms, investigative techniques and public attitudes toward crime.

CRJU 201 PROBLEMS OF LAW ENFORCEMENT 3

Introduction to a range of historical, political, philosophical and sociological problems in institutions vested with the responsibility to enforce laws and/or preserve order.

CRJU 202 PROBLEMS OF CRIMINAL JUDICIARY 3

Focuses on problems and issues found in the American criminal court system. Includes judicial procedure, organization, judicial personnel and basic criminal law.

CRJU 203 PROBLEMS OF CORRECTIONS 3

General overview of the American corrections system and a survey of the most pressing correctional problems of the twenty-first century. Philosophy of punishment extensively discussed. Major emphasis on the nature of the prison experience, alternatives to incarceration, judicial intervention in correctional affairs and the controversy over the efficacy of rehabilitation programs.

CRJU 301 INTRODUCTION TO LEGAL STUDIES 3

See LEST301 for course description.

CRJU 302 SOCIAL DEVIANC 3

See SOCI302 for course description.

CRJU 303 JUVENILE DELINQUENCY 3

See SOCI303 for course description.

CRJU 304 CRIMINOLOGY 3

See SOCI304 for course description.

CRJU 311 CAPITAL PUNISHMENT AND THE LAW 3

Overview of the law of capital punishment. Emphasizes the U. S. Supreme Court’s major death-penalty decisions and the effects of these decisions. PREREQ: CRJU110 or CRJU203.

CRJU 312 CRIME AND PUNISHMENT IN AMERICAN HISTORY 3

Examines changes in the criminalization of deviant behavior and the social, institutional, and legal development of criminal justice administration in the United States from colonial times to the present. May be cross-listed with HIST312.

CRJU 313 THE STUDY OF MURDER 3

An historical and contemporary analysis of criminal homicide, examining the nature and extent of murder, including those related to assassination and war.

CRJU 320 INTRODUCTION TO CRIMINAL LAW 3

An analysis of the evolution of criminal law within the larger societal context, and an overview of the basic structure and administration of criminal law in the United States. PREREQ: CRJU110.

CRJU 322 CROWDS, CULTS AND REVOLUTIONS 3

See SOCI322 for course description. PREREQ: SOCI201.

CRJU 324 AMERICAN CONSTITUTIONAL HISTORY 3

A survey of the development of judicial review since Reconstruction, emphasizing the Supreme Court’s response to urbanization and industrialization, the growth of executive authority, and the extension of civil rights and civil liberties in the twentieth century. May be cross-listed with HIST324.

CRJU 332 CRIMINAL VIOLENCE IN AMERICA 3

Examines the issues and ideologies found in noteworthy American and international films and writings that emphasize themes of justice, punishment, and social control. Contrasts cinematic and literary depictions of these themes with empirical research on criminality, violence, victimization, and the practices of criminal justice institutions.

CRJU 335 CRIME AND JUSTICE IN FILM AND LITERATURE 3

Examines contemporary patterns of violence in America, including crimes such as homicide, rape, assault, and domestic abuse and collective violence such as terrorism. Examines social control of violence, including adjudication within the criminal justice system. Places trends of violence in cross-national perspective.

CRJU 336 THE DETECTIVE IN FILM AND FICTION 3

Study of detective fiction and film has applications to a liberal arts approach to crime and justice. Blends literary analysis with the insights of social science research on the work of private and police detectives. May be cross-listed with ENGL330 and/or SOCI336. PREREQ: CRJU201.

CRJU 340 THE JUVENILE JUSTICE SYSTEM 3

An in-depth view of the juvenile justice system in the United States focusing on crime patterns, police-juvenile relations, juvenile courts and correctional practices.

CRJU 345 SOCIOLOGY OF LAW 3

See SOCI345 for course description.

CRJU 346 PSYCHOLOGY AND THE LAW 3

Seminar exploring the rapidly expanding field of psychology and the law. Review and discussion of psychological research on such topics as the adversary system, jury selection, eyewitness testimony, the insanity defense, perceptions of crime and the death penalty. May be cross-listed with PSYC346.

CRJU 350 GENDER AND CRIMINAL JUSTICE 3

Reviews historical and contemporary explanations for women’s participation in crime and evaluates these explanations in light of current research on gender. Other topics include treatment of women offenders by judicial and correctional systems, women as victims of crime and women as criminal justice personnel. May be cross-listed with WOMS350.

CRJU 355 RACE, CLASS AND CRIME 3

Examines contemporary patterns of race, class and crime through historical interconnections of social, political and economic processes. Addresses the impact of race and class on the arrest, conviction and sentencing of offenders. May be cross-listed with BAM355 and/or SOCI356.

CRJU 357 SEMINAR ON THE POLICE 3

Teaches students to criticize and analyze research and theory in the scholarly literature on policing.

CRJU 366 INDEPENDENT STUDY 1-6
CRJU 368 INDEPENDENT RESEARCH 1-6
Independent research under the supervision of a faculty member. Requirements include preparation of a research report consistent with the professional literature in the field. Student and faculty member will file a learning contract describing the research and a report with the department chair.
RESTRICTIONS: Requires permission of instructor.

CRJU 369 ALCOHOL, DRUGS AND CRIME 3
Examines the relationship between alcohol, drugs and crime, including societal response to offenders who commit alcohol/drug related offenses and offenders who engage in crime over drug markets. May be cross-listed with SOCI369.
PREREQ: CRJU110 or SOCI210.

CRJU 370 PRISON AND PRISON SUBCULTURES 3
Provides an intensive examination of the culture and lifestyles of prisoners. Special emphasis on how gender and race contribute to differential patterns of adjustment to incarceration. Mainly examines how the prisoner subculture contributes to racial conflict, violence and mental health crises among prisoners.

CRJU 375 CRIMINAL PROCEDURE 3
Intensive analysis of criminal court procedures that occur once a case is actually brought against an accused. Emphasis on trial tactics and procedures.

CRJU 409 DOMESTIC VIOLENCE SERVICES 3
See IFST409 for course description.
PREREQ: IFST235 or SOCI210 or WOMS210.
RESTRICTIONS: Open to juniors and seniors only.

CRJU 414 DATA ANALYSIS 3
See SOCI414 for course description.

CRJU 420 CRIMINAL JUSTICE ADMINISTRATION 3
Aids those planning a career as an administrator in the criminal justice system. Topics typically include basic administrative policy and budgetary matters.
PREREQ: CRJU110.

CRJU 425 CRIMINAL LAW AND SOCIAL POLICY 3
Analyzes the role of the American judiciary in making social policy and examines the manner in which the courts have adjudicated controversial socio-legal issues. Topics typically include capital punishment, abortion, the right to privacy, search and seizure, the Miranda rule, and freedom of speech and press.

CRJU 428 CORPORATE CRIME 3
See SOCI428 for course description.

CRJU 435 PUNISHING SPEECH 3
Examines the use of the criminal law and other regulatory sanctions to punish certain types of speech and the efforts of courts to determine which speech is deserving of constitutional protection and therefore beyond governmental control.

CRJU 437 SEMINAR ON CORRECTIONS 3
An in-depth examination of central topics in corrections including philosophy of punishment, history of punishment; structure and change of correctional settings and programs; and prison reform.

CRJU 446 JUDGING THE JURY 3
Examines and evaluates the institution of the jury. Explores contemporary controversies over the jury by review and analysis of research studies on jury decision making.

CRJU 448 COMMUNITY-BASED TREATMENT 3
See SOCI448 for course description.

CRJU 450 PRISONERS AND THE LAW 3
An examination of the legal rights available to prisoners seeking to challenge their convictions or their conditions of confinement. Emphasis on analyzing the capacity of courts to spur prison reform and the impact of court decisions on American penal practices.

CRJU 452 DRUGS AND THE CRIMINAL JUSTICE SYSTEM 3
Covers both drug and criminal justice issues, focusing on the drugs-crime nexus and the criminal justice system response. Examines issues of race, gender, victimization, international policy, and new policy responses including drug treatment, harm reduction, and restorative justice. May be cross-listed with SOCI452.
RESTRICTIONS: Requires permission of the instructor.

CRJU 456 LAWYERS AND SOCIETY 3
See SOCI456 for course description.

CRJU 457 CRIMINAL EVIDENCE 3
The study of the laws of evidence, how they are used in the criminal courts, and their effect on the administration of justice.

CRJU 460 CRIMINAL JUSTICE POLICY 3
A critical examination of criminal justice policy in the United States over the past thirty years, with emphasis on the major theoretical positions that have dominated criminal justice policy making during that period.

CRJU 466 INDEPENDENT STUDY 1-6

CRJU 475 SOCIAL SCIENCE AND THE LAW 3
Examines the relationship of social science to law and the legal process, how social science has contributed to our understanding of law, and how social science has been employed in litigation. May be cross-listed with LEST475.

CRJU 480 CIVIL LIABILITY IN CRIMINAL JUSTICE 3
Examines the circumstances under which the law provides remedies for individuals harmed by agents of the government. May also include discussion of the use of civil remedies, such as asset forfeiture, to complement criminal prosecutions.

CRJU 489 CRIME VICTIMS AND VICTIMS' RIGHTS 3
Examines victim-offender relationships, interactions between victims and the criminal justice system, and the connections between victims and other social groups and institutions (such as the media, social movements, advocacy groups, legislatures and the state). Explores victims' rights and compensation, fear of crime, measurement of victimization and the impact of victimization on the individual.

CRJU 490 DRUG ABUSE RESEARCH SEMINAR 3
A concentrated examination of contemporary efforts in the areas of drug abuse legislation, enforcement and research, and how these combine to influence prevention, treatment and control strategies.
PREREQ: SOCI301.

CRJU 495 FIELD EXPERIENCE IN CRIMINAL JUSTICE 4 PF
Practicum involving actual field experience in a criminal justice agency, e.g., law enforcement, courts or correctional agencies. Emphasis on relating the field experience to academic work. May be cross-listed with SOCI495.
RESTRICTIONS: Requires permission of instructor. Not for major credit.

CRJU 496 PRACTICUM IN TEACHING 1-3 PF
Practical exposure to undergraduate education gained by assisting a member of the faculty in carefully supervised experiences such as discussion leader, crafting questions, consulting with students. Students may not be involved in the grading of student work or the assignment of grades. May be repeated for up to three credit hours.
RESTRICTIONS: Requires permission of instructor. Not for major credit.

CSCC 355 COMPUTERS, ETHICS AND SOCIETY 3
Explains relationships among information technology, society and ethics by examining issues raised by increasingly widespread use of computers. Topics include ethics for computer professionals, computer impact on factory work, office work, personal privacy and social power distribution.

CSCC 480 ISSUES IN HEALTHCARE FOR CHILDREN AND FAMILIES 1-3
Direct contact with children, families, physicians, and other health professionals. Learn about particular cases, and use those cases to explore issues of health, disease, physician-patient relationships, interactions among members of the healthcare teams, etc.
RESTRICTIONS: BALS and MSP majors only; at least junior standing.

CSCC 481 ISSUES IN PUBLIC HEALTH 1-3
Direct contact with children, families, physicians, and other health professionals. Learn about particular cases, and use those cases to explore issues of health, disease, physician-patient relationships, interactions among members of the healthcare team.
RESTRICTIONS: BALS and MSP majors only and junior status or above.

CSCC 482 ISSUES IN PUBLIC HEALTH · ECONOMICS 1-3
Direct contact with children, families, physicians, and other health professionals. Learn about particular cases, and use those cases to explore issues of health, disease, physician-patient relationships, interactions among members of the healthcare team.
RESTRICTIONS: BALS and MSP majors only and junior status or above.
### Early American Culture

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EAMC 602</td>
<td>Material Life in Early America</td>
<td>3</td>
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<tr>
<td></td>
<td>American domestic environments and decorative arts within social and economic contexts of 17th and 18th centuries. Critically assesses how objects contribute to the study of everyday life in colonial America. RESTRICTIONS: Requires permission of instructor.</td>
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<tr>
<td>EAMC 604</td>
<td>History of Nineteenth Century American Interiors</td>
<td>3</td>
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<tr>
<td></td>
<td>Introduction to domestic interiors with emphasis on household technology, interior design, decorative arts and furnishings. Touches on some of the social, political, economic and technological forces that shaped the built environment. RESTRICTIONS: Requires permission of instructor.</td>
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<tr>
<td>EAMC 605</td>
<td>History of Theories in Material Culture</td>
<td>3</td>
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<td></td>
<td>Landmark works and recent theoretical approaches to the understanding and interpretation of the man-made environment. Readings draw from a variety of disciplinary frameworks including art history, anthropology, historical archeology, cultural geography, sociology and history. May be cross-listed with ARTH630 and/or HIST605. RESTRICTIONS: Requires permission of instructor.</td>
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<tr>
<td>EAMC 606</td>
<td>Issues in American Material Culture</td>
<td>3</td>
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<td></td>
<td>Studies major themes in American material culture of the 17th, 18th or 19th centuries. Topics vary. May be cross-listed with HIST606 and/or MSS606. RESTRICTIONS: Requires permission of instructor.</td>
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<tr>
<td>EAMC 671</td>
<td>Connoisseurship of the Decorative Arts in America I</td>
<td>1-3</td>
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<td>Furniture with one additional subject within the decorative arts to be presented by a specialist on the Winterthur Museum staff. Emphasis on close analytical examination of objects stressing identification and evaluation. RESTRICTIONS: Requires permission of instructor.</td>
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<tr>
<td>EAMC 672</td>
<td>Connoisseurship of the Decorative Arts in America II</td>
<td>1-3</td>
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<td>Three subject areas within the decorative arts, each presented by a specialist on the Winterthur Museum staff. Emphasis on close analytical examination of objects stressing identification and evaluation. RESTRICTIONS: Requires permission of instructor.</td>
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<tr>
<td>EAMC 673</td>
<td>Connoisseurship of the Decorative Arts in America III</td>
<td>1-3</td>
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<td></td>
<td>One or two subject areas within the decorative arts in which students work closely with a specialist on the Winterthur faculty. Emphasis on close analytical examination of objects stressing identification and evaluation. RESTRICTIONS: Requires permission of instructor.</td>
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<tr>
<td>EAMC 801</td>
<td>Introduction to Decorative Arts in America to 1860</td>
<td>3</td>
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<td></td>
<td>Development of decorative arts, painting and architecture in America. Principles of connoisseurship and studies of American and imported objects of art. Collections of the Winterthur Museum. May be cross-listed with ARTH801. RESTRICTIONS: Requires permission of instructor.</td>
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<tr>
<td>EAMC 869</td>
<td>Master's Thesis</td>
<td>3</td>
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### Economics

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ECON 100</td>
<td>Economic Issues and Policies</td>
<td>3</td>
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<tr>
<td></td>
<td>Takes a nontechnical approach to basic economics. Applies economic concepts to contemporary issues, problems and policies. Covers both macro and micro topics. RESTRICTIONS: Not for major credit. May not be substituted for ECON151 or ECON152.</td>
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<tr>
<td>ECON 102</td>
<td>Civics and Economics for Teachers</td>
<td>3</td>
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<td></td>
<td>See HEP102 for course description. RESTRICTIONS: Elementary Teacher Education majors only. Cannot be taken for major or minor credit in economics.</td>
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<tr>
<td>ECON 141</td>
<td>Swedish Economics: A Survey</td>
<td>2</td>
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<td></td>
<td>Introduction to the Swedish economy focusing on its unique features. The role of Sweden in Euroland is examined. RESTRICTIONS: Offered only in Sweden.</td>
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<tr>
<td>ECON 151</td>
<td>Introduction to Microeconomics: Prices and Markets</td>
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<td></td>
<td>Introduces supply and demand concepts with basic economic graphs. Examines models of perfect and imperfect competition and the determination of product price and quantities. Covers current microeconomic issues such as the effect of government regulation and environmental problems. COREQ: MATH114 or MATH115.</td>
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<tr>
<td>ECON 152</td>
<td>Introduction to Macroeconomics: The National Economy</td>
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<td></td>
<td>Analyzes the determinants of unemployment, inflation, national income, and policy issues relating to how the government alters unemployment and inflation through control of government spending, taxes and the money supply. PREREQ: ECON151.</td>
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<tr>
<td>ECON 251</td>
<td>Managerial Economics</td>
<td>3</td>
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<td>Applies economic theory to business and managerial decision making. Includes analysis of consumer demand, theory of production and supply and the effects of different market structures and pricing strategies. PREREQ: ECON151 and MATH201. RESTRICTIONS: Credit can be earned for only one among ECON251, ECON300 or ECON301.</td>
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<tr>
<td>ECON 300</td>
<td>Intermediate Microeconomic Theory</td>
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<td></td>
<td>Price determination and income distribution in a market economy; the behavior of firms and industry under conditions of pure and imperfect competition. PREREQ: ECON151. RESTRICTIONS: Credit can be earned for only one among ECON251, ECON300 and ECON301. ECON300 cannot be used to satisfy Economics BS major requirements.</td>
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<tr>
<td>ECON 301</td>
<td>Quantitative Microeconomic Theory</td>
<td>3</td>
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<td>Uses calculus to study price determination and income distribution in a market economy; and the behavior of firms and industry under conditions of pure and imperfect competition. PREREQ: ECON151 and MATH221. RESTRICTIONS: Credit can be earned for only one among ECON251, ECON300 or ECON301.</td>
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<tr>
<td>ECON 302</td>
<td>Banking and Monetary Policy</td>
<td>3</td>
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<td>Nature and economic significance of money, credit and the banking system; the origin and management of the money supply; and effects of monetary changes on price levels, output and employment. PREREQ: ECON152.</td>
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<tr>
<td>ECON 303</td>
<td>Intermediate Macroeconomic Theory</td>
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<td></td>
<td>Determinants of national income and employment and inflation; theoretical problem of short-run fluctuations and secular growth; relative merits of monetary and fiscal policy. PREREQ: ECON302 or permission of instructor.</td>
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<tr>
<td>ECON 305</td>
<td>Comparative Economic Systems</td>
<td>3</td>
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<td>Theoretical and empirical comparison of economic systems' use of the market mechanism to allocate resources. Emphasis on the consequences of industrial democracy and governmental efforts to improve the decisions of corporations in Western and Eastern Europe, Russia and Japan. PREREQ: ECON151.</td>
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<tr>
<td>ECON 306</td>
<td>Economic Theory of Politics</td>
<td>3</td>
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<td>Uses rational choice principles of maximization and competition to analyze political behavior. Covers candidates' competition for votes, the <em>public good</em> problem, paradoxes of voting, the political business cycle, legislative decision making and vote trading and theories of bureaucracy. May be cross-listed with POSC306. PREREQ: ECON151 and POSC150.</td>
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<tr>
<td>ECON 311</td>
<td>Economics of Developing Countries</td>
<td>3</td>
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<td>Surveys policy issues related to economic growth and development. Special emphasis on problems facing contemporary developing countries. PREREQ: ECON151 and ECON152. RESTRICTIONS: ECON311 and ECON411 cannot both count for degree credit.</td>
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<tr>
<td>ECON 315</td>
<td>Economic History of Colonial America</td>
<td>3</td>
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<td></td>
<td>Simple economic models and quantitative evidence used to explain colonial American history. Includes migration, servant and slave markets, government financing and the creation of paper money, causes of the Revolution, colonial growth, foreign trade, education and witchcraft. PREREQ: ECON151 and ECON152.</td>
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<tr>
<td>ECON 316</td>
<td>Economic History of the United States</td>
<td>3</td>
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<td></td>
<td>Examines the record of economic change in the United States from the colonial period to the present. Emphasis on using economic theory and measurement for interpreting the past. PREREQ: ECON151 and ECON152.</td>
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<tr>
<td>ECON 332</td>
<td>Economics of Government Spending and Taxation</td>
<td>3</td>
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<tr>
<td></td>
<td>Microeconomic and macroeconomic analysis of public expenditure, borrowing and taxation. Introduction to stabilization, efficiency and distributional features of public finance. PREREQ: ECON151. RESTRICTIONS: ECON332 and ECON433 cannot both count for degree credit.</td>
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</tbody>
</table>
ECON 333 CURRENT READINGS IN ECONOMICS 3
Books on controversial economic topics such as the Asian financial crisis, income distribution in America, environmental regulation, economic aid to developing countries, healthcare reform, privatizing Social Security and education vouchers are studied. Student papers and discussion form the essence of class sessions.
PREREQ: ECON151.

ECON 340 INTERNATIONAL ECONOMICS 3
Theory, problems and policy in international trade and finance with emphasis on developments since World War II.
PREREQ: ECON151 and ECON152.
RESTRICTIONS: ECON340 cannot be taken for credit after ECON444 and/or ECON445.

ECON 341 ENVIRONMENT OF MULTINATIONAL CORPORATIONS 3
See BUAD341 for course description.

ECON 344 THE MAKING OF THE EUROPEAN ECONOMY 3
Theory and policy of trade integration, resource mobility, exchange mechanisms, policy coordination, and progress toward monetary union. Visits may be made to business and government agencies where course material is supplemented by presentations of business executives, practicing economists, and financial experts.
PREREQ: ECON151 and ECON152.
RESTRICTIONS: Credit toward degree may not be earned in both ECON344 and ECON444.

ECON 345 ECONOMIES IN TRANSITION 3
Analyzes the economic transition taking place in twenty eight countries in Europe and Asia. Provides a general picture of the historical development of these economies under central planning and analyzes the successes and failures of the transition programs in these countries.
PREREQ: ECON151.

ECON 360 GOVERNMENT REGULATION OF BUSINESS 3
Normative, economic and legal foundations of government intervention in business, particularly antitrust and regulation; and the process and the effects of government policies.
PREREQ: ECON151.

ECON 366 INDEPENDENT STUDY 1-6

ECON 381 ECONOMICS OF HUMAN RESOURCES 3
Analysis of labor markets and of the family. Topics include labor supply and demand, human capital, labor market discrimination, the distribution of income and theories of fertility and family structure. Public policy applications stressed.
PREREQ: ECON151.
RESTRICTIONS: ECON381 and ECON483 cannot both count for degree credit.

ECON 385 WOMEN AND THE ECONOMY 3
Examines a wide range of economic issues relating to women's lives, with special emphasis on family, work and income. Public policy applications and international comparisons are stressed. May be cross-listed with WOMS385.
PREREQ: ECON151.

ECON 390 ECONOMICS OF HEALTHCARE 3
Introduction to the United States healthcare system. Analysis of existing policies and proposals. Examines the roles of markets and government. Topics include costs, quantity and quality of healthcare systems, managed care and alternative delivery systems.
PREREQ: ECON151.
RESTRICTIONS: ECON390 and ECON490 cannot both count for degree credit.

ECON 393 URBAN ECONOMICS 3
Uses simple microeconomic analysis to explain why cities exist, how they develop, how they grow, and how different activities are arranged within cities. Explores the economics of urban problems and policies related to local governments, land rent and land use patterns, poverty, housing, transportation, education, and crime.
PREREQ: ECON151.

ECON 405 THE PLANNED ECONOMIES 3
Theoretical and empirical comparison of market and centrally planned economic systems. The United States and the Soviet Union are studied.
PREREQ: ECON300 or ECON301, and MATH230.

ECON 406 MARKETS: INFORMATION AND UNCERTAINTY 3
Investigates impact of costly information on the behavior of individuals and markets. Topics include decision making under risk and uncertainty, insurance, consumer-employer search behavior, product liability, industrial safety, futures markets and problems of contract enforcement.
PREREQ: ECON300 or ECON301, and MATH221 and MATH202.

ECON 408 ECONOMICS OF LAW 3
Effect of legal rules on resource allocation both in and between the public and private sectors. Considers common law, regulation and constitutional rules. May be cross-listed with LEST408.
PREREQ: ECON300 or ECON301.

ECON 411 ECONOMIC THEORY OF DEVELOPING COUNTRIES 3
Theoretical and empirical analysis of models of growth and development. Emphasizes the use of economic analysis to evaluate public policies in developing countries.
PREREQ: ECON300 or ECON301, and ECON303.
RESTRICTIONS: ECON311 and ECON411 cannot both count for degree credit.

ECON 415 ECONOMIC FORECASTING 3
A practically oriented introduction to the art of managerial forecasting. Includes an integration of microeconomic and macroeconomic theory with statistical and econometric techniques to provide meaningful forecasts of the future values of series such as prices, sales, inventory levels and costs.
PREREQ: ECON151, ECON152 and MATH202.

ECON 418 ECONOMIC HISTORY OF AMERICAN LABOR MARKETS 3
Economic models will be used to explain the evolution of various American labor markets, including: immigrant labor, female labor markets, slavery, labor unions, internal labor migration, southern labor institutions, and the impact of human capital on industrial expansion and productivity.
PREREQ: ECON300 or 301.

ECON 419 ECONOMICS OF THE GREAT DEPRESSION 3
Analysis of modern theoretical explanations of the economic downturn of 1929-1933, with implications for understanding current economic problems. Theories considered include those based on monetary contractions, consumption and investment instability and international disturbances.
PREREQ: ECON303.

ECON 422 ECONOMETRIC METHODS AND MODELS I 3
Uses statistical methods, especially multiple regression, to quantify economic models, including situations when the assumptions of classical statistics do not hold.
PREREQ: MATH221, MATH202 and ECON152.

ECON 423 ECONOMETRIC METHODS AND MODELS II 3
Class discussion and research in advanced economic statistics and applied econometrics.
PREREQ: ECON422.

ECON 426 MATHEMATICAL ECONOMIC ANALYSIS 3
Uses mathematical tools to formulate and analyze economic propositions. Topics include the use of calculus to analyze comparative statics, optimization and constrained optimization, interest and growth and dynamic models.
PREREQ: ECON300 or ECON301, and MATH221.

ECON 430 ADVANCED MACROECONOMIC THEORY 3
Continuation of intermediate macroeconomic theory. Recent developments in macroeconomic theory explored in the context of the ongoing debate between the classical equilibrium and Keynesian disequilibrium theorists.
PREREQ: ECON302.

ECON 433 ECONOMICS OF THE PUBLIC SECTOR 3
Role of government in the economy. Effects of taxation, spending and borrowing on resource allocation and income distribution. Special emphasis on cost-benefit analysis and current issues such as energy, environmental problems, the negative income tax, urban finances and the national debt.
PREREQ: ECON300 or ECON301.
RESTRICTIONS: ECON332 and ECON433 cannot both count for degree credit.

ECON 435 CONTEMPORARY MACROECONOMIC POLICY 3
Unfolding events in the economy and the actions of policymakers are studied. Special emphasis on current policy actions of the Federal Reserve. Macroeconomic models studied in earlier courses are used to analyze current events.
PREREQ: ECON303.

ECON 441 INTERNATIONAL TRADE 3
Focuses on international trade theory and policy, and exchange rates. Topics include trade based on competitive advantage and economies of scale and imperfect competition, international factor movements, tariffs, quotas, export subsidies, customs unions, current account deficits, purchasing power parity, and fixed versus flexible exchange rates.
PREREQ: ECON300 or ECON301.

ECON 443 INTERNATIONAL MONETARY ECONOMICS 3
Applies macroeconomic theory in an international context. Uses historical cases to analyze policy making under fixed and flexible exchange rates. Develops alternative models of exchange rate dynamics. Discusses problems and proposed reforms of the international monetary system.
PREREQ: ECON300 or ECON301, and ECON302.
ECON 444  ANALYSIS OF EUROPEAN ECONOMIC PERFORMANCE  3  
Theory and policy of trade integration, resource mobility, exchange mechanisms, policy coordination, and progress toward monetary union. Visits may be made to business and government agencies where course material is supplemented by presentations of business executives, practicing economists, and financial experts. Project required.  
PREREQ: ECON303 and one of ECON251, ECON300, ECON301.  
RESTRICTIONS: Credit toward degree may not be earned in both ECON344 and ECON444.

ECON 461  INDUSTRIAL ORGANIZATION AND ANTITRUST POLICY  3  
Describes and analyzes markets in terms of structure, methods of competition and social performance, particularly oligopolistic and differential competition. Stresses entrepreneurship, innovation and government competition policy, particularly antitrust.  
PREREQ: ECON300 or ECON301, and MATH202 and MATH221.

ECON 463  THE ECONOMICS OF REGULATION  3  
Analyzes government regulation of industry and its economic rationale, pricing issues, firm incentives and multiproduct natural monopolies. Discusses the positive theory of regulation and industry studies, with emphasis on efficiency and regulatory reform.  
PREREQ: ECON300 or ECON301, and MATH221.  
RESTRICTIONS: ECON360 and ECON463 cannot both count for degree credit.

ECON 466  INDEPENDENT STUDY  1-6
See FREC471 for course description.

ECON 471  FUTURES AND OPTION MARKETS  4  
See FREC471 for course description.

ECON 483  ECONOMICS OF LABOR MARKETS  3  
Analyzes economic models of labor market topics - sex and race discrimination, determination of wages and fringe benefits, labor unions, individual and firm investments in education and training, geographical mobility, labor supply, and professional sports.  
PREREQ: ECON300 or ECON301.

ECON 490  ECONOMICS OF HEALTH POLICY  3  
Theoretical analysis of healthcare issues and policies. Examination of changing relationships between patients, providers, hospitals, insurers, employers, communities and government. Analysis of spending policies, cost containment, hospital competition, care of the elderly, Medicare, Medicaid, managed care regulation, medical malpractice and provider (physician) manpower planning.  
PREREQ: ECON251, ECON300 or ECON301.  
RESTRICTIONS: ECON390 and ECON490 cannot both count for degree credit.

ECON 503  ECONOMIC ANALYSIS FOR BUSINESS POLICY  3  
Business-oriented overview of microeconomic and macroeconomic theory. Approximately two-thirds of the course will focus on microeconomics and one-third on macroeconomics.  
RESTRICTIONS: Can not be taken for credit by economics graduate students.

ECON 530  OPTIMIZATION AND GAME THEORY  3  
See MATH330 for course description.  
PREREQ: MATH302, MATH349, ECON301 and ECON303.

ECON 540  INTERNATIONAL ECONOMICS FOR MANAGERS  3  
Survey of international economic issues relevant to managers operating in a global context.  
PREREQ: ECON303 or instructor permission required.

ECON 551  MANAGERIAL ECONOMICS  3  
Employs microeconomic theory and analysis to enhance managerial decision-making. Emphasizes the development and analysis of economic models to understand the different market environments in which firms operate. Special attention is paid to the effects of antitrust policy, government regulation, and international trade policy.  
PREREQ: MATH221.

ECON 552  MACROECONOMIC ENVIRONMENT OF THE FIRM  3  
Focuses on formal modeling of macroeconomic activity. Special attention is given to the short-run and long-run effects of monetary and fiscal policies on national output, economic growth, inflation, interest rates, business capital expenditures, exchange rates, and foreign trade.

ECON 668  RESEARCH  1-3
See MAST672 for course description.

ECON 670  APPLIED POLICY ANALYSIS  3  
See MAST672 for course description.

ECON 671  MICROECONOMICS FOR ECONOMIC EDUCATORS  3  
Studies supply and demand, theory of price determination in perfectly and imperfectly competitive markets and role of government in the economy. Emphasizes applications such as industrial regulation antitrust policy, the environment and taxation.  
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.

ECON 672  MACROECONOMICS FOR ECONOMIC EDUCATORS  3  
Includes national income accounting, theory of income determination, monetary and fiscal policies, budget deficits and surpluses, and national debt.  
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.

ECON 673  CURRICULUM STRATEGIES FOR ELEMENTARY ECONOMIC EDUCATORS  3  
Curriculum applications incorporating proper treatment of economic concepts at elementary level. Strategies include techniques of motivation, training and reinforcement.  
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.

ECON 674  CURRICULUM STRATEGIES FOR SECONDARY ECONOMIC EDUCATORS  3  
Curriculum applications incorporating proper treatment of economic concepts at secondary level. Strategies include techniques of motivation, training and reinforcement.  
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.

ECON 675  ECONOMICS OF NATURAL RESOURCES  3  
See MAST675 for course description.

ECON 676  ENVIRONMENTAL ECONOMICS  3  
See MAST676 for course description.

ECON 677  PRACTICUM IN ECONOMIC EDUCATION  1-6  
Research and analysis of public policy issues. Projects must demonstrate applicability to economic education.  
RESTRICTIONS: Requires enrollment in Master of Arts in Economics Education.

ECON 678  MONETARY AND INTERNATIONAL TRADE THEORIES FOR ECONOMIC EDUCATORS  3  
Studies international trade, free trade vs. protectionism, cartels, balance of trade and payments, role of the financial sector, and monetary policy.  
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.

ECON 679  CONTEMPORARY ISSUES FOR ECONOMIC EDUCATORS  3  
Emphasizes contemporary economic issues, problems and controversies.  
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.

ECON 801  MICROECONOMIC THEORY  3  
Analyzes consumer behavior and market demand, production, costs and the theory of the firm, market structures and competition in open and closed markets, general equilibrium theory and welfare economics.

ECON 802  MACROECONOMIC THEORY  3  
Studies the determination of output, employment, and the price level within classical, neoclassical, and contemporary frameworks; analyzes the effects of fiscal and monetary policy within these alternative frameworks, and examines the determinants of economic growth.

ECON 805  GAME THEORY FOR ECONOMISTS  3  
Study of the theory of games with complete and incomplete information in both static and dynamic contexts with applications to economic problems, primarily in the areas of labor economics, economics of information and uncertainty, international trade and macroeconomics.  
PREREQ: ECON801 or equivalent.

ECON 808  UNITED STATES ECONOMIC HISTORY  3  
Topics where economic analysis has revolutionized the interpretation of U.S. History will be explored. Topics vary by semester, but may include: the market for immigrant servants; the economics of slavery; the impact of railroads; gender discrimination; the post-bellum Southern economic failure.  
PREREQ: MATH202 or equivalent.  
COREQ: ECON801.

ECON 810  MATHEMATICS FOR ECONOMISTS  3  
Introduces fundamental mathematical tools utilized in theoretical economic analysis. Topics include basic set theory and real analysis, optimization in both static and dynamic environments, linear algebra, difference and differential equations and probability theory. The use of these tools in constructing and analyzing economic models is emphasized.

ECON 811  ADVANCED MICROECONOMIC ANALYSIS  3  
Prepares doctoral students with microeconomic and mathematical tools needed to read the literature and perform original research. Focuses on producer and consumer theory, general equilibrium, welfare economics, and game theory. Additional topics include: uncertainty, time, stability, social choice, core theory, information, public goods, and externalities.  
PREREQ: ECON801.
**ECON 812 ADVANCED MACROECONOMIC ANALYSIS** 3
Examines recent research and literature in macroeconomics. Topics include capital accumulation and economic growth, unemployment, inflation, financial markets, the open economy and international monetary economics, economic fluctuations, stabilization policy, fiscal policy, monetary and banking policy. Intended for doctoral students.
PREREQ: ECON802.

**ECON 815 MANAGERIAL FORECASTING** 3
Reviews quantitative methods commonly used in forecasting within a business and economics environment, including causal and time series techniques. Emphasizes use and evaluation of techniques rather than their mathematical derivation. Economic theory integrates with statistical techniques providing forecasts of series such as prices, sales, inventories and costs.
PREREQ: MATH202.

**ECON 819 ECONOMICS OF INFORMATION** 3
Extends basic economic paradigms to incorporate and assess the impact of imperfect information. Topics include analysis of principal-agent relationships with applications to insurance markets and signalling product quality, auctions, consumer search behavior, and an introduction to game theoretic models of economic behavior.
PREREQ: ECON551 or ECON801 or equivalent.

**ECON 822 ECONOMETRIC THEORY** 3
Applies and modifies statistical techniques to economic data; presents the essentials of econometric theory.
PREREQ: MATH202 or STAT371.

**ECON 823 SEMINAR IN ECONOMETRICS** 3
Class discussion and research in advanced economic statistics and applied econometrics.
PREREQ: ECON822.

**ECON 824 TOPICS IN ADVANCED ECONOMETRICS** 3
Econometric techniques used in applied microeconomic analysis. Cross-section techniques, limited dependent variables, panel data analysis. Additional topics may also be covered. Intended for doctoral students.
PREREQ: ECON822 and ECON823 or equivalent.

**ECON 825 TIME-SERIES ECONOMETRICS** 3
Introduction to time-series methods, including modeling multivariate systems. Development of methods to test and insure goodness-of-fit of time-series models. Additional topics may also be covered. Intended for doctoral students.
PREREQ: ECON822 and ECON823 or equivalent.

**ECON 827 ADVANCED PRODUCTIVE ECONOMICS** 3
See FREC827 for course description.

**ECON 832 PUBLIC FINANCE** 3
Examines recent research and literature in public finance. Topics include public goods, public choice, externalities and environmental policy, expenditure programs for the poor, social insurance, social security, health insurance, unemployment insurance, cost-benefit analysis, tax incidence, optimal taxation. COREQ: ECON801.

**ECON 841 INTERNATIONAL TRADE AND DEVELOPMENT** 3
Covers the basis of exchange, trade policy, international factor movements and integration. Applies to both historical and current economic development.
PREREQ: ECON551 or ECON801 or equivalent.

**ECON 842 INTERNATIONAL FINANCE AND DEVELOPMENT** 3
Continues ECON841. Covers foreign exchange markets, balance of payments, exchange rate systems and international economic policy.
PREREQ: ECON552 or ECON802 or equivalent.

**ECON 846 TOPICS IN ECONOMIC DEVELOPMENT** 3
Topics of current interest to economists, such as labor markets, populations, human capital and income distribution in less developed countries. Additional or substitute topics may also be covered.
COREQ: ECON801 (ECON822 is recommended).

**ECON 852 MONETARY ECONOMICS** 3
Compares the role of money in various macroeconomic models: transactions demand for money, long term effects of inflation and government deficit finance decisions in intertemporal models, capital theory and the pricing of financial securities as well as theories of the term structure of interest rates.
PREREQ: ECON552 or ECON802 or equivalent.

**ECON 861 INDUSTRIAL ORGANIZATION AND ANTITRUST POLICIES** 3
Analyzes industrial markets in terms of structure, competition and performance, with concentration on oligopolistic and differentiated competition, statistical relationships between profits and concentration, entrepreneurship and hierarchy, and innovation. Also discusses government antitrust policies to promote competition.
PREREQ: ECON551 or ECON801 or equivalent.

**ECON 862 ECONOMICS OF REGULATION** 3
Economic rationale for government regulation of industries. Regulatory mechanisms to induce optimal behavior. Case studies of transportation, telecommunications and electric utility industries with empirical applications.
COREQ: ECON801, ECON822 or equivalent.

**ECON 868 RESEARCH** 1-9

**ECON 869 MASTER'S THESIS** 1-6

**ECON 875 ADVANCED FISHERY ECONOMICS** 3
See FREC827 for course description.

**ECON 877 ADVANCED BENEFIT-COST ANALYSIS** 3
Concentrates on the identification and measurement of the benefits and costs of both market and non-market activities. Applies benefit-cost principles to realistic problems.
PREREQ: ECON551.
COREQ: ECON801.

**ECON 880 LABOR ECONOMICS** 3
Covers topics in labor economics, including labor demand, labor supply, investment in human capital, wage determination, and labor market discrimination. Applications to public policy issues will be stressed throughout.
COREQ: ECON801, ECON822 or equivalent.

**ECON 890 COLLOQUIUM: ECONOMICS SEMINAR SERIES** 0 PF
Regularly-scheduled lectures by faculty and visiting researchers providing exposure to current research in economics.

**ECON 894 APPLIED REGIONAL MODELING** 3
Uses quantitative methods to forecast regional economic phenomena. Methods include regional export base, shift-share, input-output and econometric models. Emphasizes policy simulations.
PREREQ: ECON822.

**ECON 964 PRE-CANDIDACY STUDY** 3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required coursework.
RESTRICTIONS: Not open to students who have been admitted to candidacy.

**ECON 965 DOCTORAL DISSERTATION** 1-12 PF

**EDLM 621 REFERENCE SERVICES AND RESOURCES** 3
Explores and evaluates the role of information in our society and the range of reference materials supporting the school library media program. Includes the use of print and electronic systems, reference procedures, and instructional role of information in the school curriculum.

**EDLM 622 INTRODUCTION TO CATALOGING AND CLASSIFICATION** 3
Explores and evaluates standardized cataloging and classification systems with special emphasis on the organization of the school library media center. Topics include: Anglo-American Cataloging Rules; Library of Congress Subject Headings; and Dewey Decimal Classification.

**EDLM 623 ADVANCED CATALOGING AND CLASSIFICATION** 3
Continues study of concepts introduced in EDLM622 but focuses on organizing non-book materials and cataloging in the on-line environment. Special emphasis is given to the organization of the school library media center. Topics include: Library Automation; USMARC Format; Electronic Bibliographic Databases.

**EDLM 624 LIBRARY COLLECTION DEVELOPMENT** 3
Explores and evaluates the theory and practice of building and managing library collections with a special emphasis on collections in school library media centers. Topics include: Intellectual Freedom; Selection Criteria; Collection Analysis; Budgets; and Producing Teacher Resources.

**EDLM 625 SCHOOL LIBRARY MEDIA PROGRAM ADMINISTRATION** 3
Explores and evaluates the administration and management of the school library media center. Topics include: Planning and Evaluation; Policy Making; Personnel; Budget; Facilities; Standards; Trends in research in this area.
EDLM 626  DEVELOPMENT OF LIBRARIES IN SOCIETY  3
Explores and evaluates the foundations, concepts, research and issues of
librarianship pertaining to the goals and functions of American and world cultures
with particular emphasis on the relationship between school library media centers
and society.

EDLM 628  SCHOOL LIBRARY MEDIA PROGRAM CURRICULUM  3
Explores the role of the school library media program in meeting information
literacy and other education standards. Topics include information literacy, state
education standards, advocacy, instructional technology and collaboration.
PREREQ: EDLM626.
RESTRICTIONS: Permission of instructor.

EDUC 101  INTRODUCTION TO ELEMENTARY AND MIDDLE SCHOOL
EDUCATION  1 PF
First year seminar covers issues in K-8 learning and instruction. Topics include
overviews of discipline options within the ETE major and examinations of K-8
education practices.
RESTRICTIONS: ETE majors.

EDUC 166  SPECIAL PROBLEM  1-3
Introduces the major theories of human development and issues in the area of
language development. Students will also tutor in the schools to gain clinical
experience.

EDUC 203  HUMAN DEVELOPMENT II: GRADES 5-8  3
The development of adolescents, including topics of language development and
physical, cognitive and social-emotional changes in the middle school years. A
field experience consisting of interviewing students in area middle schools is
required.
RESTRICTIONS: Limited to ETE majors and minors requiring this course.

EDUC 205  HUMAN DEVELOPMENT: GRADES K-8  3
Explores theories of child and early adolescent development as they pertain to
teaching and learning. Topics include biological, cognitive, linguistic, and social-emotional
development and are taught through lecture, large- and small-group discussion,
and case studies. There is a required field placement in the schools.
RESTRICTIONS: Limited to ETE majors and minors requiring this course.

EDUC 210  BEGINNING LITERACY INSTRUCTION  3
Introduces research-based perspectives on literacy acquisition during the
kindergarten and first-grade years and emphasizes the integration of basic literacy
skills, reading, writing, oral language and language during instruction. Takes a
cognitive orientation and highlights the influence of vocabulary development,
phonemic awareness, and establishment of the alphabetic principle on literacy
learning. Includes field experience.
RESTRICTIONS: Open to ETE and ECE majors and minors only.

EDUC 230  INTRODUCTION TO EXCEPTIONAL CHILDREN  3
Historical and philosophical basis for special education; physical and
psychological characteristics of exceptional children; study and discussion of past
and emerging educational practices for exceptional children with emphasis on
pedagogical commonalities. Systematic observation of a cross section of special
education classes required. Emphasis on the school-age child.
RESTRICTIONS: Open to ETE and ECE majors and minors only.

EDUC 240  PROFESSIONAL ISSUES: PHILOSOPHICAL AND
LEGAL PERSPECTIVES  3
Explores ethical dilemmas and legal controversies encountered in school
discipline, intellectual freedom, equal treatment of students, planning for moral or
character education and other professional concerns.

EDUC 247  PROFESSIONAL ISSUES: HISTORICAL PERSPECTIVES  3
Interpretation of the history of American education as it has developed from the
colonial era into current time, with particular attention to issues of equity,
discipline, intellectual freedom and professionalism. Includes all levels of schooling
in a social, multicultural context.

EDUC 258  CULTURAL DIVERSITY, SCHOOLING AND THE TEACHER  3
Examines roles and responsibilities of the classroom teacher vis-a-vis the
demographic changes occurring in United States society and the public school
student population. Topics include race, ethnicity, gender, sexual orientation, social
class, poverty and language.

EDUC 259  CULTURAL DIVERSITY IN COMMUNITY CONTEXTS  3
Examines roles and responsibilities of the classroom teacher through critical
examinations of field placement experiences in diverse community contexts. Topics
include race, ethnicity, gender, sexual orientation, social class, poverty and language.
RESTRICTIONS: Open only to elementary education majors.

EDUC 266  SPECIAL PROBLEM  1-6
EDUC 286  EDUCATIONAL TECHNOLOGY: PROFESSIONAL TOOLS  1
Topics include educational resources and communication on the internet, word
processing, authoring for the web, electronic grade books, statistics, presentation
technology and assessment tools.
RESTRICTIONS: Open to education majors only or with permission of instructor.

EDUC 302  HUMAN DEVELOPMENT I: GRADES K-4  3
Introduces the major theories of human development and issues in the area of
language development. Students will also tutor in the schools to gain clinical
experience.

EDUC 303  CHILDREN'S LITERATURE IN WORDS AND IMAGES  3
Engages students in analysis of a range of children's texts in different modes
including books, films, oral performance, computer programs and television. The
nature of children's responses to these texts and the implications for educational
practice are addressed.

EDUC 306  EMERGING LITERACY: YOUNG CHILDREN  3
The nature, acquisition and development of literacy in children to age six. Explores
appropriate instructional strategies and resources for use with young children.
Field experience in kindergarten.
PREREQ: EDUC210, IFST222 and IFST224.

EDUC 308  CURRICULUM DEVELOPMENT IN THE PRIMARY AND MIDDLE
GRADES  2 PF
Theories and practices of designing and implementing thematic, interdisciplinary,
intradisciplinary and integrated curriculum in grades K-8 are explored. Stresses the
need to address local and state curriculum guidelines and consider the attributes of
the age group for whom the curriculum is provided.
COREQ: EDUC400 and EDUC433.

EDUC 310  READING AND WRITING IN ELEMENTARY SCHOOL  3
Focuses on literacy development of second through sixth grade children. Explores
relevant research and developmentally appropriate practices. Includes a field
experience in a second through sixth grade classroom.

EDUC 320  READING AND WRITING IN THE MIDDLE GRADES  3
Focuses on methods and materials for developing literacy from grades four
through eight. Explores practices suited to adolescent development. Includes a
practicum in a fourth through eighth grade classroom.
PREREQ: EDUC310.

EDUC 335  ELEMENTARY CURRICULUM: MATHEMATICS  3
Selection and use of appropriate methods and curriculum for teaching arithmetic in
grades K-6. Focuses on curriculum materials, teaching strategies, lesson planning
and implementation and the appraisal of pupil achievement. Practicum included.
PREREQ: MATH253.

EDUC 336  MIDDLE SCHOOL MATHEMATICS CURRICULUM AND METHODS  3
Investigates curriculum and teaching methods for presenting mathematical
concepts to middle school students (grades 5 through 8). Activities include
reviewing materials, examining topics and preparing lessons appropriate for this
level. Clinical experience included.
PREREQ: MATH253, MATH221 and MATH230.
RESTRICTIONS: Requires permission of advisor.

EDUC 341  ELEMENTARY CURRICULUM: SCIENCE  3
Introduction to teaching science in the elementary school. Includes the study of
current elementary school programs, instructional materials, teaching strategies,
lesson planning and implementation and the appraisal of pupil achievement.
Practicum included.

EDUC 346  ELEMENTARY CURRICULUM: SOCIAL STUDIES  3
Introduction to teaching social studies in the elementary school. Includes the study
of current elementary school programs, instructional materials, teaching strategies,
lesson planning and implementation and the appraisal of pupil achievement.
Practicum included.

EDUC 348  INVESTIGATING SOCIAL STUDIES IN MIDDLE SCHOOL
COMMUNITIES  3
Encourages and supports professional development as a social studies teacher.
Students investigate teaching, learning and assessing at the middle school level
and consider their roles as educators in diverse classrooms and communities. Field
experience is required.
PREREQ: EDUC346.
EDUC 358 LINGUISTICS AND LANGUAGE ARTS 3
Explores linguistic and cultural assumptions that motivate and guide current language arts curriculum and pedagogy. Encourages future teachers to reflect on their role in the classroom and on how they can empower their students to think critically about language and cultural meanings. May be cross-listed with ENGL358 and/or LING358.
PREREQ: ENGL390 or LING101.

EDUC 360 LEARNING IN COMMUNITY CONTEXTS 3
Study of the educational process in institutions and organizations with a focus on non-profit groups oriented toward community service. Emphasis upon the relation of these groups’ educational practices to their overall public service mission. May be cross-listed with IS1360.

EDUC 366 INDEPENDENT STUDY 1-6

EDUC 376 EDUCATION PRACTICUM 1-3 PF
Field-based internship in a school working as an assistant with a professional teacher, including tutoring, small group instruction, grading of instructional materials and limited whole group instruction.

EDUC 386 EDUCATIONAL TECHNOLOGY III: LITERACY AND LANGUAGE ARTS LABORATORY 1
Introduces prospective teachers to technology available for use in the literacy and language arts curriculum. Enables students to evaluate this technology by applying the approaches studied in their literacy and language arts methods courses. Concludes with a teaching project incorporating the use of technology. PREREQ: EDUC286.
COREQ: EDUC310.

EDUC 387 INTEGRATING TECHNOLOGY IN EDUCATION 2
Introduces prospective teachers to technology available for use in classroom content areas. Enables students to evaluate technology use and identify and create classroom lessons that demonstrate effective use of technology integration. Concludes with development of a teaching project incorporating the use of technology.
PREREQ: EDUC286.
RESTRICTIONS: Open to ETE majors only.

EDUC 390 BUILDING COMMUNITIES OF LEARNERS 3
Designing teaching and learning communal environments sensitive to diverse needs of all elementary school children: academic, emotional, moral, and relational. Holistic integration of instruction, classroom management, and students’ whole person growth guided by mutual respect, caring, self-reflection, problem solving, community of learners’ educational philosophy, and professional collaboration.
RESTRICTIONS: Open to ETE majors only.

EDUC 391 HONORS COLLOQUIUM 3
See ARSC390 for course description.

EDUC 400 STUDENT TEACHING 3-12 PF
Full-time extended student teaching experience in pre-kindergarten through 12th grade schools. Students are under the guidance and supervision of a cooperating teacher in the classroom and a University of Delaware supervisor. PREREQ: Students must show evidence of passing Praxis I and must present evidence (copy of test scores) of taking a state-designated certification test in their academic content field. See student teaching program coordinator/course instructor for portfolio requirements.

EDUC 403 LITERATURE FOR ADOLESCENTS 3
Evaluation of classic and contemporary reading materials and their application to the middle school curriculum. Study of criteria, methods and tools for selection of books. Techniques for developing and promoting reading. May be cross-listed with ENGL403.

EDUC 410 ASSISTIVE TECHNOLOGY 1
Students identify, evaluate, and use technology to support the education of individuals with disabilities, including assistive technology to promote academic learning and to compensate for cognitive, physical and sensory disabilities. COREQ: EDUC431, EDUC432 and EDUC435.

EDUC 413 ADOLESCENT DEVELOPMENT AND EDUCATIONAL PSYCHOLOGY 4
Examines social, emotional, moral, and cognitive development of adolescent learners; psychological processes underlying learning, motivation, and classroom behaviors; and teacher-student and group processes. Looks at the implications of these psychological processes for instruction; motivational strategies; classroom management; and assessment, with an emphasis on creating a learning environment that encourages positive social interaction, active engagement in learning, and self-motivation.
RESTRICTIONS: Open only to sophomore, junior, and senior secondary education majors. High school practicum of 18 hours is required. Students must keep a 4-5 hour block of time free between 7am-2pm once a week or keep a 3-4 hour block of time free between 7am-2pm twice a week.

EDUC 414 TEACHING EXCEPTIONAL ADOLESCENTS 3
Examines characteristics of exceptional adolescents and the historical, legal and philosophical bases for special education. Focuses on teaching students with special needs within general education settings using research-based instructional strategies, classroom management, and related services.
RESTRICTIONS: Open only to secondary education majors and students in the disabilities minor.

EDUC 419 DIVERSITY IN SECONDARY EDUCATION 3
Examines aspects of diversity (e.g., gender, class, language) in secondary schools and classrooms. Reviews the foundations of multicultural education and considers implications for curriculum, instruction and classroom management.
RESTRICTIONS: Open only to secondary education majors. Eighteen hour field placement required.

EDUC 420 READING IN THE CONTENT AREAS 1
Overview of reading comprehension issues at the middle and high school levels based primarily upon task analyses of content-area materials (math, social studies and science). Students will apply current theories of reading comprehension to texts in their areas of interest.

EDUC 429 METHODS OF TEACHING LANGUAGES IN ELEMENTARY SCHOOL 3
See FLLT429 for course description.

EDUC 430 CLASSROOM MANAGEMENT IN SECONDARY SCHOOLS 1 PF
Examines various aspects of discipline in high school classrooms: the causes of misbehavior, procedures and rules to establish and maintain order, responding to misbehavior and legal issues.
COREQ: EDUC400.

EDUC 431 APPLIED BEHAVIOR ANALYSIS 3
Covers the principles of behavior analysis and a variety of strategies based on these principles that teachers can employ to eliminate inappropriate behaviors and to teach academic skills. Includes explanation of classroom management techniques and systems for children and youth with and without disabilities. Students participate in a behavior analytic field experience in a public elementary school.
PREREQ: EDUC230.
COREQ: EDUC410, EDUC432 and EDUC435.

EDUC 432 CURRICULUM FOR SCHOOL-AGE EXCEPTIONAL CHILDREN 3
Focuses on understanding the special instructional needs of students with mild to moderate educational disabilities and on planning and monitoring instruction. Emphasis is placed on diagnostic assessment of learning problems, design and implementation of instructional interventions, and monitoring of progress. Methods for preventing early reading problems are included.
PREREQ: EDUC230.
COREQ: EDUC410, EDUC431 and EDUC435.
RESTRICTIONS: Requires field placement.

EDUC 433 NON-SCHOOL FACTORS AFFECTING LEARNING IN THE CLASSROOM 2
Emphasis on research findings describing extent to which academic success is affected by non-curricular factors including the role of families as partners and collaborators, peer relations, child abuse and classroom social climate. Counseling and mentoring skills will be taught and the role of other school and community based referrals will be examined.
COREQ: EDUC308 and EDUC400.

EDUC 435 EDUCATIONAL EVALUATION FOR EXCEPTIONAL CHILDREN 3
An examination of formal and informal assessment techniques for teacher use in identifying learning problems. Hands-on experience with test instruments used by school psychologists to improve student teacher’s understanding of reports in school records. Proper techniques for construction and evaluation of teacher-made tests.
PREREQ: EDUC230.
COREQ: EDUC410, EDUC431 and EDUC432.
RESTRICTIONS: Requires field placement.

EDUC 436 LITERACY PROBLEMS: ASSESSMENT AND INSTRUCTION 3
Introduces general and special education teachers to the needs of students whose literacy attainments are below expectations. Prepares teachers to use diagnostic assessment as a basis for planning preventive and remedial instruction.

EDUC 437 DIAGNOSIS AND INSTRUCTION: LITERACY PROBLEMS 3
Prepares special education teachers to meet the needs of students with significant problems in reading and writing. Emphasis is placed on understanding and analysis of learning problems and the design and implementation of instructional interventions in reading and language arts. A field experience is required.
PREREQ: EDUC431, EDUC432, EDUC435, EDUC310.
RESTRICTIONS: Open to students in the Elementary Teacher Education program who are seeking dual certification in elementary education and special education.
EDUC 443  Teaching Science in Middle School  3
Introduction to curriculum and appropriate methods for teaching science concepts to middle school students (grades 4-8). Activities include review and evaluation of current middle school programs, research on student thinking, instructional materials, teaching strategies and appraisal of student learning. Clinical experience required.
PREREQ: EDUC341.

EDUC 451  Educational Assessment for Classroom Teachers  3
Explores principles and methods for construction and evaluation of student learning assessments, including knowledge, understanding and skills. Presents methods to enhance teacher inquiry into student learning. Considers strengths and limitations of each method in regard to informing teachers’ judgments. Discusses implications of assessment policy.

EDUC 462  Language Acquisition  4
The factors which distinguish human language from animal communication, as well as the development of many facets of language (semantics, syntax and phonology). To supplement reading and discussion, students gain research experience by working approximately eight hours per week on the ongoing language acquisition projects. May be cross-listed with LING462 and/or PSYC462.

EDUC 466  Independent Study  1-6
EDUC 469  Research Internship Experience  3
Research apprenticeship with faculty mentor.

EDUC 473  Transitions from Secondary Special Education  3
Examines legislation, research and practices relating to school-to-adult life transition for youth with mild/moderate/severe disabilities. Emphasis on model secondary programs and instructional practices, family involvement, inter-agency collaboration and adult service systems.
RESTRICTIONS: Requires permission of instructor.

EDUC 474  Instructional Methods in Secondary Special Education  3
Reviews current issues and practices in curriculum and instruction for secondary students with mild/moderate disabilities. Within a school-to-adult life transition framework, examines general principles of effective instruction and their application to teaching academic, vocational and life skills at middle and high school levels.
RESTRICTIONS: Requires permission of instructor.

EDUC 475  Senior Thesis  3
Substantial research paper directed by faculty mentor.

EDUC 476  Second Language Acquisition and Bilingualism  3
See LING476 for course description.
PREREQ: LING101.

EDUC 477  The Structure of English  3
See LING477 for course description.
PREREQ: LING101.

EDUC 485  Multimedia Literacy  3
Defines multimedia and discusses its impact on society. Surveys applications across the curriculum and reflects on the effects of multimedia on current teaching practice. Provides a multimedia toolbox and shows how to use it to create and publish multimedia applications on the Internet. Discusses multimedia frontiers, emerging technology and societal issues including human impact, regulation, copyright, fair use, equity, cost and universal access.
May be cross-listed with CMAM486.

EDUC 486  Educational Technology IV: Science, Social Studies and Mathematics Lab  1
Introduces prospective teachers to technology available for use in mathematics, science, and social studies curricula. Enables students to evaluate this technology by applying the approaches studied in their mathematics, science, and social studies methods courses. Concludes with a teaching project incorporating the use of technology.
PREREQ: EDUC386, COREQ: EDUC320, EDUC335, EDUC341, EDUC346 and EDUC436.

EDUC 498  Teaching English as a Second Language  3
See LING498 for course description.

EDUC 500  Topics: In-Service Education  1-6 PF
Review and analysis of research and/or practices of a specific topic. Topics and format will vary depending on the needs of the participants.
RESTRICTIONS: Not intended for students enrolled in a degree program.

EDUC 524  Intensive Literacy Instruction  3
Training in the methods of teaching reading, writing and spelling developed in the Reading Study Center, School of Education. The program is called Intensive Literacy and is useful for beginners, remedials and students learning English as a second language.

EDUC 541  Environmental Resources  3
Focuses on air and water quality, proper waste disposal and soil conservation using government and private resources. Provides teachers with background information and activities. Creates opportunities for teachers to become active participants in programs from different disciplines, age levels and locations.
RESTRICTIONS: Includes presentations of outdoor teaching units and field trips suitable for class visits.

EDUC 566  Special Problem  1-12

EDUC 588  Geometry and Measurement for Middle School Teachers  3
See MATH588 for course description.

EDUC 600  Teacher as Researcher  3
Helps develop strategies to be used by teachers and administrators to bridge the gap between theory and practice. Assists teachers and administrators in initiating research on classroom problems related to teacher and student behavior and assessment.

EDUC 601  Language Development in the Classroom  3
Focuses on applying knowledge about language development in school-age children to the development of language processes and the assessment of language performance. Explores language processes that provide a foundation for reading, speaking and listening.

EDUC 602  Childhood Literature  3
Survey of literature of children and its application to the curriculum. A study of literary genres, elements and devices found in children’s books, aids for selection, criteria for evaluation and techniques for promoting reading.

EDUC 603  Literature for Adolescents  3
Evaluation of classic and contemporary reading materials and their application to the junior/senior high school curriculum. Study of criteria, methods and tools for selection of books. Techniques for developing and promoting reading.

EDUC 604  Teaching Writing in the Elementary and Middle School  3
Focuses on the development of appropriate instructional programs for elementary and middle school children. Provides information on the writing process, the beginnings of writing, exemplary programs, evaluation of children’s writing and functions/forms of writing.

EDUC 605  Measurement Applications in Education  3
Focuses on educational measurement strategies and processes that teachers use to assess student learning. Emphasis is on assessment skills and knowledge that can enhance professional practice and promote student learning.
RESTRICTIONS: Open to persons teaching in the public schools.

EDUC 606  Methods of Teaching Foreign/Second Languages in Elementary Schools  3
See FLIT629 for course description.

EDUC 607  Educational Research Procedures  3
An introduction to quantitative methods and procedures in education through the study of the logic and procedures of educational and social research. Provides information about the various stages of the research process with attention on measurement, sampling, design, data analysis and application.

EDUC 608  Foundations of Reading Instruction  3
Explores the relationships between reading theory, research, and practice. Sociological, psychological, and linguistic foundations of reading and writing processes and seminal reading research studies are examined.
PREREQ: EDUC620.
RESTRICTIONS: Permission of instructor.

EDUC 609  Assessment and Instruction for Reading  3
Focuses on assessment and instruction in reading and writing for K-12 students with learning problems.
PREREQ: EDUC608.
RESTRICTIONS: Permission of instructor.

EDUC 610  Assessment in Secondary Special Education  3
Examines assessment principles and practices that support instruction and school-to-adult life transition planning for secondary special education students. Teachers use of standardized and informal instruments including aptitude and interest inventories, curriculum-based assessments and job analyses.

EDUC 612  Ethnic Studies and Multicultural Education  3
Content, strategies, concepts and resources for teaching comparative ethnic studies and integrating these studies into the regular curriculum. Techniques for evaluating multicultural education outcomes. Surveys the culture and history of major American ethnic groups; emphasizes the major ethnic groups in our geographic area.
EDUC 613 ADOLESCENT DEVELOPMENT AND EDUCATIONAL PSYCHOLOGY 3
Examines (a) social, emotional, moral, and cognitive development of adolescent learners, (b) psychological processes underlying learning, motivation, and classroom behaviors, and (c) teacher-student and group processes. Also looks at the implications of these psychological processes for (a) instruction, (b) motivational strategies, (c) classroom management, and (d) assessment, with an emphasis on creating a learning environment that encourages positive social interaction, active engagement in learning, and self-motivation.
RESTRICTIONS: Open only to secondary education majors. 18-hour field placement required. Students must keep a 4.5-hour block of time free between 7am-2pm once a week or keep a 3.4-hour block of time free between 7am-2pm twice a week.
EDUC 614 TEACHING EXCEPTIONAL ADOLESCENTS 3
Examines characteristics of exceptional adolescents and the historical, legal and philosophical bases for special education. Focuses on teaching students with special needs within general education settings using research-based instructional strategies, classroom management, and related services.
RESTRICTIONS: Open to secondary education majors/certification candidates only.
EDUC 615 PREVENTING READING PROBLEMS THROUGH EARLY INTERVENTION 5
Focuses on instructional and assessment procedures designed to prevent reading problems in kindergarten through third grade. Working with individual and small group instruction and assessment procedures in a summer early intervention program that is site based in a local public school.
PREREQ: EDUC607, EDUC608.
RESTRICTIONS: Requires permission of instructor.
EDUC 616 PREVENTING READING PROBLEMS THROUGH EARLY INTERVENTION 1
Required follow-up to EDUC615. Students use videotapes and other evidence to show how they are applying instructional strategies and models developed in EDUC615 to instructional settings in which they work.
PREREQ: EDUC615.
EDUC 617 DELAWARE READING PROJECT SUMMER INSTITUTE 6
The Delaware Reading Project (DRP) focuses on research, theory, and practice in literacy instruction for grades K-12. DRP’s central purpose is for students to become familiar with and evaluate best practices in literacy instruction in order to develop a workshop for other teachers.
PREREQ: EDUC608, EDUC622 or equivalent.
RESTRICTIONS: Approval of instructor.
EDUC 618 INTRODUCTION TO SCHOOL PSYCHOLOGY 3
Explores roles and functions of school psychologists and current issues pertaining to assessment, education, and prevention/intervention for children with disabilities. Professional standards in school psychology, the history of school psychology, special services in the schools, and legal and ethical issues pertaining to school psychology and special education are also examined.
EDUC 619 DIVERSITY IN SECONDARY EDUCATION 3
Examines aspects of diversity (e.g., ethnicity, gender, class, language) in secondary schools and classrooms. Reviews the foundations of multicultural education and considers implications for curriculum, instruction, and classroom management.
RESTRICTIONS: Field placement of 18 hours is required. Open to secondary education majors/certification candidates only.
EDUC 620 FOUNDATIONS OF READING INSTRUCTION 3
Psychology and pedagogy of reading instruction. Lectures and demonstrations covering the following areas: psychology of the reading process, recent trends in reading instruction, initial reading procedures, directing reading activities, developing word recognition competence, developing efficient comprehension and differentiating instruction.
EDUC 621 DEVELOPMENTAL READING AND THE ROLE OF THE READING CONSULTANT 3
Laboratory course to prepare students as reading consultants. Teaching experience in the Reading Center is required along with visitations to different schools. Provides opportunity to study and compare remedial and developmental reading programs.
PREREQ: EDUC620.
EDUC 622 THE ROLE OF LITERACY IN CONTENT AREAS 3
Explores the contributions of literacy research for content learning (e.g., math, science, social studies). Underscores the benefits of linking reading, writing, listening, speaking and viewing acquisition of domain knowledge and suggests various frameworks for supporting this linkage.
PREREQ: EDUC608.
COREQ: EDUC520.
EDUC 623 APPLIED HUMAN DEVELOPMENT IN THE SCHOOLS 3
Research and theory in child adolescent development are studied with an emphasis on applications in the schools. Designed primarily for school psychologists, school counselors and other educators. Examines the social, moral, affective, cognitive and biological bases of behavior within the school setting.
May be cross-listed with JSTD623.
PREREQ: EDUC202 or EDUC413.
EDUC 624 INTRODUCTION TO AUTISM AND SEVERE DISABILITIES 3
An introduction to issues related to the identification and assessment of students with autism or severe disabilities. Presents identification instruments, assessment systems and their relation to theoretical models about these disabilities. Reviews the relationship between assessment and educational planning.
PREREQ: EDUC681.
RESTRICTIONS: Requires at least two other special education courses in addition to prerequisite.
EDUC 625 METHODS AND CURRICULUM FOR INDIVIDUALS WITH AUTISM AND SEVERE DISABILITIES 3
Reviews behaviorally-based educational models for students with autism and other severe disabilities. Presents methods aimed at enhancing functional skill development in the major life domains, with emphasis on community-based training.
PREREQ: EDUC681.
RESTRICTIONS: Requires at least two other special education courses in addition to prerequisite.
EDUC 626 FUNCTIONAL COMMUNICATION FOR INDIVIDUALS WITH AUTISM AND SEVERE DISABILITIES 3
Reviews appropriate functionally relevant communication objectives for students with autism and severe disabilities. Highlights the impact of functional communication upon social skills and behavior management. Presents a variety of alternative communication methods and modalities.
PREREQ: EDUC624, EDUC681.
RESTRICTIONS: Requires at least two other special education courses in addition to prerequisites.
EDUC 627 MODELS OF INSTRUCTION 3
Study of alternative models of instruction as applied to differing instructional objectives, content and settings.
EDUC 628 INSTRUCTION IN READING AND WRITING WITH LEARNING DISABILITY STUDENT 3
Focuses on the cognitive processes involved in reading and writing and instructional methods for helping students, especially those with learning problems, develop strategies for meaningful reading and writing activities.
PREREQ: EDUC620.
EDUC 629 PSYCHOLOGY OF TEACHING 3
A study of the research on teacher characteristics, teaching style and method, and teaching.
EDUC 630 SUPERVISED READING CLINIC 6
Supervised practice and lecture in assessing and instructing students who struggle with reading and writing. Participants will have opportunities to implement and discuss a wide range of instructional approaches, methods, and materials as they work closely with school-age students.
PREREQ: EDUC608 and EDUC609 or permission of instructor.
EDUC 631 ORGANIZATION AND SUPERVISION OF LITERACY PROGRAMS 3
Contextualizes assessment and instruction for reading in the whole-school context. Designed to introduce the leadership roles currently held by Reading Specialists and Literacy Coaches and includes an extensive school-level case study.
PREREQ: EDUC609 required; EDUC608, EDUC630, and EDUC668 recommended.
RESTRICTIONS: Requires permission of instructor.
EDUC 632 INTERNET CURRICULUM APPLICATIONS 3
Explore uses of the Internet to support, enhance, and deliver curriculum in grades K-12. Participants will use a variety of tools including the World Wide Web, File Transfer Protocol (FTP), listservs, newsgroups, and email to access and utilize Internet resources in education and related disciplines. Individuals or small groups will create units of instruction appropriate to their teaching level which utilize Internet tools and resources.
RESTRICTIONS: Familiarity with the World Wide Web and e-mail and an active e-mail account.
EDUC 633 INTRODUCTION TO COMPUTER INSTRUCTION 3
Introduction to the field of computer-based instruction, including instructional theory and design, hardware and software systems, artificial intelligence techniques, author languages and the politics and sociology of educational technology.
EDUC 634  TOPICS IN MATHEMATICS CURRICULUM: GRADES K-8 3
Examines in-depth topics usually included in a K-8 mathematics program. Provides not only an overview of the topics, but increased understanding as well.

EDUC 635  TEACHING MATHEMATICS IN THE ELEMENTARY SCHOOL 3
Acquaints students with historic and recent information from theory and research on teaching and learning mathematics in grades 1-4, and will engage students in methods and materials for instruction that such information suggests.
PREREQ: EDUC634 or MATH252.
RESTRICTIONS: Grade of C or better in EDUC634 or MATH252.

EDUC 636  TEACHING MATHEMATICS IN THE MIDDLE SCHOOL 3
Acquaints students with historic and recent information from theory and research on teaching and learning mathematics in grades 5-8, and engages students in methods and materials for instruction that such information suggests.
PREREQ: EDUC634 or MATH252.
RESTRICTIONS: Grade of C or better in EDUC634 or MATH252.

EDUC 639  EDUCATIONAL TECHNOLOGY TOPICS 3
In-depth study of a major problem in educational technology. Problems to be studied will vary with each offering.
RESTRICTIONS: May be repeated for credit when topics vary.

EDUC 640  INTRODUCTION TO CURRICULUM 3
Focuses on the curriculum that actually makes a difference - the curriculum that finds its way into the classroom. The three main topics are: a) major goals of education and their influence on curriculum policy and teacher planning; b) operational curriculum (what happens in the classroom); and c) strategies suitable for evaluating the operational curriculum.

EDUC 641  SCIENCE CURRICULUM AND INSTRUCTION 3
Examination of the goals of science education and their relation to science curricula. Examination of theories of learning and motivation as they relate to how individuals develop scientific concepts. Discussion and development of science instructional materials and strategies that are consistent with current learning theories.

EDUC 642  TOPICS IN SCIENCE EDUCATION 3
In-depth study of a major problem in science education.
RESTRICTIONS: May be repeated for credit when topics vary.

EDUC 643  ENVIRONMENTAL EDUCATION 3
Survey of and practice with existing environmental education materials and programs, the development of lessons in environmental education, and practical experiences with curriculum development and teaching procedures.

EDUC 644  SOCIAL STUDIES CURRICULUM AND INSTRUCTION 3
Compares the goals of the social studies curriculum with research on how teaching and learning typically occur in social studies classrooms. Consideration of traditional and innovative approaches to instruction, curriculum materials development and evaluation for the social studies.

EDUC 645  TOPICS: SOCIAL EDUCATION ISSUES 3
Analyzes selected topics and practices in social education. Reviews research findings, theoretical bases, sources and instructional strategies. Conceptual frameworks and/or curriculum modules designed with appropriate provisions for implementation and evaluation of student achievement.
RESTRICTIONS: May be repeated for credit when topics vary.

EDUC 646  ASSISTIVE TECHNOLOGY FOR SECONDARY SCHOOLS AND WORK 3
Emphasizes strategies for assessing and augmenting performance of persons with disabilities in secondary schools and work settings. Includes discussion of principles of environmental modification, vocational preparation and rehabilitation, use of electronic networks and funding for technology resources.

EDUC 647  ADVANCED METHODS IN TEACHING ENGLISH AS A SECOND LANGUAGE 3
Examines the application of current methods, techniques and procedures in EFL and ESL instructional settings. Although theoretical concerns are included, emphasis is on their practical use in listening, speaking, pronunciation, reading, writing and grammar.
PREREQ: EDUC698.

EDUC 648  MASTER'S PORTFOLIO 1 PF
Use of multiple assessment indicators in formative evaluation of improvement of candidate's teaching effectiveness.
PREREQ: Requires completion of at least 27 graduate credits toward master's degree.

EDUC 649  DELAWARE WRITING PROJECT SUMMER INSTITUTE 6
Provides teachers opportunities to read and write professionally and create workshops on the teaching of writing. Develops knowledge of best teaching of writing practices.
PREREQ: At least three years in the classroom. Must be nominated and invited.

EDUC 650  ADVANCE GROUP COUNSELING FOR CHILDREN AND ADOLESCENTS 3
Focuses on the specialized skills and knowledge necessary in counseling groups of children and adolescents, integrating developmental considerations, leadership skills and fundamentals of group counseling practice. Students are supervised practicing skills in class and at practicum site.
PREREQ: EDUC694.
COREQ: EDUC669.
RESTRICTIONS: Requires permission of instructor.

EDUC 651  SCHOOL-BASED FAMILY ISSUES AND INTERVENTION 3
Provides an ecological view of children in families and the relationships between families and the school system. Topics for study will be the family as a system, differing family shapes in contemporary society, special families in special circumstances and models of intervention.

EDUC 652  INTRODUCTION TO TECHNOLOGY IN SPECIAL EDUCATION AND REHABILITATION 3
Introduction to concepts and skills in special education technology including instructional software, augmentative communication systems, assistive devices, interactive video, robotics, artificial intelligence, electronic networks and productivity aids.
PREREQ: EDUC230 or EDUC697.

EDUC 653  COMPUTER-ASSISTED INSTRUCTION IN REMEDIAL/SPECIAL EDUCATION 3
Focuses on the design and evaluation of instructional technology applications for elementary and secondary school students with disabilities. Topics include instructional design principles and their application to the development, modification and evaluation of computer-assisted and multimedia instruction.
PREREQ: EDUC652, EDUC679.

EDUC 654  AUGMENTATIVE AND ALTERNATIVE COMMUNICATION 3
Focuses on augmentative and alternative communication systems for persons with disabilities, especially in the elementary, secondary and post-secondary school setting. Topics include assessment of functional communication needs, matching those needs to communication strategies and devices, and evaluation and generalization of communication skills.
PREREQ: EDUC652.

EDUC 655  ASSISTIVE TECHNOLOGY 3
Focuses on the use of computer-based aids and other assistive devices to reduce barriers to the education and rehabilitation of children and adults with mild, moderate, and severe physical and cognitive disabilities. Topics include strategies to facilitate the learning of cause-and-effect, alternate control interfaces to access computers and other aids, human factors principles in the design and configuration of assistive devices and strategies and devices to improve the interactivity of learning and living environments. Federal policies regarding assistive technology.
PREREQ: EDUC652.

EDUC 657  CHILDREN, TELEVISION AND EDUCATION 3
See COMM657 for course description.

EDUC 658  DISCIPLINE AND CLASSROOM MANAGEMENT 3
A review of discipline procedures, sources of assistance, legal implications, parental roles, management techniques and strategies for developing school discipline policies.

EDUC 660  EDUCATIONAL STATISTICS AND MEASUREMENT 3
Basic statistics necessary for research studies and educational and psychological measurement. Addresses measurement issues including norm-referenced vs. criterion-referenced assessment, interpretation of various derived scores, types of norms, reliability, validity and how statistics can be applied to research studies.

EDUC 661  SCHOOL BUSINESS MANAGEMENT 3
A study of the financial and business aspects of school administration.

EDUC 662  ADULT LEARNER 3
A study of values, interests and social roles through the life span. Emphasis on social and psychological development of adult learners; practical implications of aging on the learner studied from the perspective of teachers of adults.

EDUC 663  COUNSELING SKILLS LAB FOR COUNSELORS AND PSYCHOLOGISTS 3
Provides students the opportunity to develop skills necessary for facilitating counseling relationships. Students observe, participate in and critique a variety of role playing exercises and actual counseling sessions as a means of mastering particular skills.

EDUC 664  LEGAL ISSUES FOR SCHOOL MANAGERS 3
Legal problems affecting school management including tort and contractual liability, pupil personnel law, employee negotiations, Delaware school law and recent court decisions.
EDUC 665  **Elementary Statistics**  3
Provides a conceptual understanding of some useful statistical techniques along with practical computer and statistical skills which will enable the student to answer realistic research questions. Topics include descriptive statistics, regression, exploratory data analysis and hypothesis testing.

EDUC 666  **Special Problem**  1-12

EDUC 668  **Assessment and Instruction for Reading: Intermediate Grades**  3
Second in a three-course sequence on assessment and instruction of reading and writing for students with learning problems. Focuses on assessment of reading and writing problems in the intermediate grades (4-6) and appropriate instruction. PREREQ: EDUC608 or EDUC620; EDUC659.

EDUC 670  **Program Design for Adults**  3
Program planning, development and evaluation for adult and continuing education programs. Including diagnosis of client needs; effective system of planning, development and evaluation for adult education programs; program scheduling; and budget and resource planning.

EDUC 671  **Practicum in School Psychology**  3-6
Closely supervised experiences in various school and clinical settings. Students have the opportunity to develop and practice skills that must be mastered prior to starting the internship in school psychology. RESTRICTIONS: Requires permission of instructor.

EDUC 673  **Transitions From Secondary Special Education**  3
Examines legislation, research and practices relating to school-to-adult life transition for youth with mild/moderate/severe disabilities. Emphasis on model secondary programs and instructional practices, family involvement, inter-agency collaboration and adult service systems.

EDUC 674  **Instructional Methods in Secondary Special Education**  3
Reviews current issues and practices in curriculum and instruction for secondary students with mild/moderate disabilities. Within a school-to-adult life transition framework, examines general principles of effective instruction and their application to teaching academic, vocational and life skills at middle and high school levels. PREREQ: EDUC230 or EDUC697 and EDUC435 or EDUC680; or permission of instructor.

EDUC 675  **Language Acquisition**  4
Examines the factors which distinguish human language from animal communication as well as the development of many facets of language (semantics, syntax and phonology). Main emphasis on how children in the first three years acquire language. May be cross-listed with LING675 and/or PSYC675.

EDUC 676  **Second Language Acquisition and Bilingualism**  3
See LING676 for course description.

EDUC 677  **The Structure of English**  3
See LING677 for course description.

EDUC 678  **Human Resource Management**  3
Considers the ways in which organizations accommodate and utilize their human resources. Focuses on personnel management functions such as selection, maintenance and development.

EDUC 679  **Instructing Elementary/Middle Schoolers with Mild Disabilities**  3
Presents principles, techniques and materials associated with effective instruction for elementary and middle school students with mild disabilities and evaluation of their efficacy. PREREQ: EDUC230 or EDUC697 and EDUC435 or EDUC680.

EDUC 680  **Educational Diagnosis**  3
Informal and standardized measures are discussed and administered. Students are trained to be effective participants on a child study team and to administer a diagnostic-prescriptive protocol. Students are expected to interpret results from a placement protocol and to make recommendations for appropriate educational placement.

EDUC 681  **Techniques for Behavior Change**  3
Focuses on behavioral principles and procedures for promoting the acquisition of new skills, motivating the performance of previously acquired skills and reducing the occurrence of inappropriate behaviors. Includes strategies for analyzing the effectiveness of these interventions. Participants design and conduct a behavior-change project in an educational setting. PREREQ: EDUC230 or EDUC697.

EDUC 682  **Research in Special Education**  3
Review of methods and procedures for analyzing and interpreting empirical research studies in special education and applying this information to questions of importance in classroom practice. Assists students to become informed consumers of findings in the special education literature to design and interpret action research projects in classroom settings. PREREQ: EDUC607 and EDUC681.

EDUC 683  **Curriculum and Methods for Teaching the Gifted Child**  3
Focuses on the development of appropriate activities for gifted children. Acquaints students with theoretical models to guide the development and selection of curriculum for use with gifted and talented children. Practicum experiences included. PREREQ: EDUC679.

EDUC 684  **Vocational Training and Assessment: Severe Disabilities**  3
Focuses on designing and implementing vocational assessments and task modifications for students with multiple and severe disabilities. Participants learn hands-on training techniques.

EDUC 685  **Multimedia Literacy**  3
Defines multimedia and discusses the impact it has on society. Surveys applications across the curriculum and reflects on the effects of multimedia on current teaching practice. Provides a multimedia toolbox and shows how to use it to create and publish multimedia applications on the Internet. Discusses multimedia frontiers, emerging technology, and societal issues including human impact, regulation, copyright, fair use, equity, cost and universal access. May be cross-listed with COMM686.

EDUC 686  **Programming for Gifted Children**  3
Focuses on the identification of gifted and talented children and the development of programs to meet their needs.

EDUC 687  **Interpretation and Testing of the Exceptional Child**  3
Testing procedures including the more esoteric tests that are administered in educational settings. Tests from areas such as the gifted and learning disabilities will be discussed and administered. Emphasis on interpretation and test protocol for placement and programming purposes. PREREQ: EDUC680.

EDUC 688  **Internship in School Psychology**  3-6
Supervised experience in school psychology. Provides experience in a variety of areas, including consultation, psychological and educational assessment, counseling and intervention. RESTRICTIONS: Requires completion of all courses in the school psychology program. Requires permission of instructor.

EDUC 689  **Administration of Elementary and Middle Schools**  3
Study of administrative practices and procedures in the elementary schools with emphasis on the role of the elementary school principal.

EDUC 690  **Administration of Secondary Schools**  3
A study of administrative practices and procedures in secondary school with emphasis on the senior high school administrator.

EDUC 691  **Applied Statistics and Research Design**  3
Designed to develop students’ skills in statistics and research for use in educational practice, and designing and implementing program evaluation projects in educational settings. PREREQ: EDUC660.

EDUC 692  **Social Skills Training for Children**  3
Presents a critical examination of methods to teach social skills to children and youth in both classroom and clinical settings. Presents a model for understanding social competence and a rationale for including social skill training in school curricula. May be cross-listed with PSYC692.

EDUC 693  **Supervision: Purposes and Effects**  3
Investigates research in the purposes and effects of supervision and evaluation in school settings. Particular attention given to the Delaware appraisal process.

EDUC 694  **Organizational Management**  3
An introduction to the function and structure of educational organizations. Emphasis on the sociopsychological foundations of management principles dealing with organizational theory and development, decision making, planned change, group process and leadership styles.

EDUC 695  **Introduction to Leadership Theory**  3
Studies current applications of leadership research to educational administration. Includes some history of leadership studies. Focuses on instructional leadership, leadership style and the development of leadership skills.
EDUC 696  METHODS OF TEACHING SECONDARY SCIENCE  3-4
Teaching science, science standards, design of curriculum, instructional strategies and assessment of student learning. Includes classroom-based practicum in middle or high school.

EDUC 697  EDUCATION OF EXCEPTIONAL CHILDREN  3
Historical and philosophical basis for special education; legislative mandates and litigation that establish the right to a free, appropriate, public education; physical, psychological and educational characteristics of exceptional children; study of past and emerging education practices for exceptional children with emphasis on pedagogical commonalities.

EDUC 698  INSTRUCTIONAL STRATEGIES FOR ADULTS  3
Topics include characteristics of the adult learner; motivation; socioeconomic, cultural and psychological factors complicating the educational process; meeting students' needs through outside-class resources; counseling strategies; integrating adults' interests and needs into the curriculum.

EDUC 699  FOUNDATIONS OF ADULT AND POSTSECONDARY EDUCATION  3
Overview of the historical and philosophical foundations of postsecondary education with particular reference to the United States. Key people, issues, institutions, movements, public policy and programs. Examines the influence of postsecondary education's historical evolution and philosophical roots on contemporary theory and practice.

EDUC 700  ARTC SEMINAR  1-2
Explores issues related to creating a positive classroom learning and teaching environment within a strong collegial support system. Content varies with participant needs and interests. RESTRICTIONS: Limited to ARTC candidates.

EDUC 701  EFFECTIVE TEACHING STRATEGIES  2-4
Develops skills in effectively designing, implementing, and assessing instruction. Topics include cognitive theories, goals and objectives, instructional models and strategies, materials, technology, tests, performance assessments, rubrics and other scoring instruments. RESTRICTIONS: Limited to ARTC candidates.

EDUC 702  ADOLESCENT DEVELOPMENT AND CLASSROOM MANAGEMENT  2-4
Develops skills in effective classroom management and creating a classroom climate conducive to learning and growth with a focus on developmentally appropriate practice to adolescents. RESTRICTIONS: Limited to ARTC candidates.

EDUC 710  READING IN THE SECONDARY CONTENT AREAS  1-3
Explores the teacher-learner-text interaction and strategies for using text to develop independent learners actively engaged in the learning process. Emphasis is on selecting, adapting, implementing and evaluating text-based strategies appropriate to different content areas and learning objectives. RESTRICTIONS: Limited to ARTC candidates.

EDUC 711  INTRODUCTION TO SECONDARY SPECIAL EDUCATION  1-2
Introduces current issues and best practices for serving secondary students with special education needs. Topics include legal bases, transition models, school-to-work and classroom adaptations. Emphasizes familiarity with both model and local programs. RESTRICTIONS: Limited to ARTC candidates.

EDUC 712  MULTICULTURAL EDUCATION IN SECONDARY SCHOOLS  1-2
Examines research and practice pertaining to the education of culturally and racially diverse students and implications for classroom instruction, school climate and curriculum development. Reviews effective strategies for identifying and addressing behaviors and practices affecting the academic achievement of underrepresented populations. RESTRICTIONS: Limited to ARTC candidates.

EDUC 719  STUDENT DIVERSITY IN THE SECONDARY CLASSROOM  3
Examines the implications of student diversity for secondary content-area teachers. Explores best practice in multicultural education and inclusion of students with special learning needs in regular classrooms. RESTRICTIONS: Restricted to teachers enrolled in the Alternative Routes to Certification program. May not be used as a program requirement in a School of Education graduate program.

EDUC 730  IMPLEMENTING MIDDLE SCHOOL MATHEMATICS USING TECHNOLOGY  3
Explores how to use technology in the context of current middle school mathematics classroom materials and lessons. Features the use of graphing calculators, TI-Interactive, Geometer's Sketchpad, and Fathom. Examines the use of these tools in the learning of algebra, geometry, statistics, and probability.

EDUC 732  COMMUNITY BASED PRACTICUM  1-3 PF
Provides graduate students with a community based field experience working with children and adolescents in a variety of non-school settings such as after-school programs, community centers, and residential facilities. Sociocultural approaches to conducting research in these settings is examined. RESTRICTIONS: Requires permission of department.

EDUC 740  LITERACY INSTRUCTION FOR ENGLISH LANGUAGE LEARNERS  3
Focuses on effective literacy instruction for English language learners in the elementary and middle school levels in the following areas: language development, vocabulary instruction, decoding, reading fluency, comprehension strategy instruction, and motivation and engagement. RESTRICTIONS: Requires permission of instructor.

EDUC 742  PRACTICUM IN TEACHING ENGLISH AS A SECOND LANGUAGE  3-6
Closely supervised experiences in various school and community settings. Provides the opportunity to develop and practices skills in teaching English as a Second Language to non-native English speakers. PREREQ: EDUC647 and EDUC698. RESTRICTIONS: Requires permission of instructor.

EDUC 745  COLLABORATIVE TEAMING IN SPECIAL EDUCATION  3
Examines key components of successful teams serving students with special education needs. Skills to be developed include setting common goals, identifying and solving problems creatively, communicating effectively, and implementing and evaluating education plans that address student, family, and system needs. PREREQ: EDUC697 or equivalent...

EDUC 750  GRADUATE TEACHING INTERNSHIP  3-9 PF
Full-time extended teaching internship in a classroom setting. Students are under the guidance and supervision of a mentor teacher in the classroom and a University of Delaware supervisor. PREREQ: Must show evidence of passing Praxis I and complete all other pre-requisite coursework specified in the student's program requirements. Evidence of passing Praxis II for content area may be required in some programs. RESTRICTIONS: Requires permission of department. Students must apply for this internship during the academic year prior to their enrollment in the internship. May be repeated for up to a total of 9 credits.

EDUC 801  SEMINAR: CHILD DISCOURSE AND EDUCATION  3
Examination of child discourse, such as children's narrative and conversational skills, from the earliest period of language development through the middle school years. Investigation of the literature on oral language development among children from different sociocultural backgrounds. Focus on the relationship between discourse development and children's abilities to engage in oral language and literacy activities in the classroom. RESTRICTIONS: Open only to Ph. D. and advanced master's students.

EDUC 802  SEMINAR: READING  3
Studies significant research in reading to train students in the methodology of reading research and to plan needed research in reading. PREREQ: EDUC620. RESTRICTIONS: May be repeated for credit when topics vary. Open only to Ph.D. and advanced master's students.

EDUC 803  INTERNSHIP IN SCHOOL, AGENCY AND COUNSELING PSYCHOLOGY  1-6
Students in school, agency and counseling psychology gain on-site experience in individual, group and family counseling as well as consulting, assessing and conducting research in a variety of school and community agency settings.

EDUC 805  PROSEMINAR IN EDUCATION I  4
Required first-year seminar presents PhD students with the key domains of education research and the dominant quantitative research designs and statistical procedures used to investigate these domains. COREQ: EDUC656.

EDUC 806  PROSEMINAR IN EDUCATION II  4
Required first-year seminar introduces PhD students to the key domains of education research examined from the perspective of qualitative analyses. COREQ: EDUC650.

EDUC 807  WRITING PROCESSES IN EDUCATIONAL SETTINGS  3
Focuses on the nature of the writing system, how it is acquired and developed and the functions and discourse forms in writing. Provides information on writing process, structure, evaluation and instruction in elementary and middle grades. RESTRICTIONS: Open only to Ph.D. in the following areas: master's students.

EDUC 808  INTERNSHIP IN EDUCATION  3-9
RESTRICTIONS: Requires permission of department. Credit during any semester varies according to the percentage of time spent in internship. May be repeated up to nine credits.
EDUC 809  MANAGING PK-12 STUDENT/PARENT/COMMUNITY RELATIONS  
Intended for PK-12 educators in leadership positions, including teachers in leadership roles. Focuses on issues of managing discipline, positive school climate, and communications and relationships with parents and community constituencies. 
RESTRICTIONS: Ed.D. majors only.

EDUC 810  MODELS AND PRACTICES OF INSTRUCTIONAL LEADERSHIP: PK-12 
Intended for PK-12 educators in leadership positions, including teachers in leadership roles. Develops knowledge and skills for planning, managing, improving and evaluating PK-12 instructional programs. 
RESTRICTIONS: Ed.D. majors only.

EDUC 811  TOPICS IN EDUCATIONAL POLICY 
In depth examination of select topics that reflect the expertise of the instructor.

EDUC 812  REGRESSION AND MULTIVARIATE MODELS IN EDUCATION 
Introduces the theory and application of regression and multivariate statistical models in education and the social sciences. Focuses on practical understanding, with numerous opportunities to apply newly acquired understandings to substantive topics. Topics include: matrix algebra, linear regression, multiple regression, path analysis, multivariate analysis [MANOVA and discriminant analysis]. PREREQ: EDUC856 or equivalent.

EDUC 813  CHILDHOOD PSYCHOPATHOLOGY 
Survey of various developmental and behavioral disorders in childhood. Seminar will examine the issues of diagnosis and treatment theoretical perspectives. Special emphasis on current major psychological research. May be cross-listed with PSYC845. RESTRICTIONS: Requires permission of instructor.

EDUC 814  PSYCHOLOGICAL ASSESSMENT OF CHILDREN 
Assessment techniques used to evaluate the social, emotional and behavioral well-being of children and adolescents. Provides instruction and experience in selecting, administering and interpreting psychological tests; the use of classification systems for defining learning, behavioral, and emotional problems in public schools; training in report writing and the development of educational recommendations. RESTRICTIONS: Requires permission of instructor and program area.

EDUC 816  SEMINAR: LITERACY PROBLEMS 
Addresses the complex process of literacy development and explores the range of problems that can occur. Special attention devoted to how literacy development is affected by instructional methods, biological factors, and demographic factors such as poverty, ethnicity, and school location. PREREQ: EDUC609 or equivalent. RESTRICTIONS: Open only to doctoral level and advanced master's students.

EDUC 817  INDIVIDUAL INTELLIGENCE TESTING 
Administration and interpretation of major individually administered intelligence tests used in school and child clinical psychology. Five tests will be highlighted: the Stanford Binet, EISCO-R, WPPSI, WAIS-R and K-ABC. May be cross-listed with PSYC817. RESTRICTIONS: Requires permission of instructor.

EDUC 818  EDUCATIONAL TECHNOLOGY FOUNDATIONS 
Overview of the following topics related to planning and using educational technology: instructional technology models; internet resources; web design; networking and database fundamentals; educational technology standards; technology integration strategies; assessment and evaluation; societal, legal and ethical issues; and collaborative planning of technology programs. RESTRICTIONS: Open only to Ed.D. majors with specializations in curriculum, higher education, and education technology; otherwise requires permission of instructor.

EDUC 820  CONTEXTS FOR LEARNING 
Current approaches to cognitive analysis of school subjects. Topics include theory and research in perception, memory and information processing and the analysis of models and tasks for school subject matters. RESTRICTIONS: Open only to Ph.D. students in education. Requires permission of instructor.

EDUC 821  COGNITION AND INSTRUCTION 
Current approaches to the analysis of instruction and schooling. Topics include teacher decision making and effectiveness, classroom processes, instructional methods and design, models for schooling and theories of school-based learning. RESTRICTIONS: Open only to Ph.D. students in education. Requires permission of instructor.

EDUC 822  LITERACY AND EDUCATIONAL POLICY 
Doctoral seminar using federal educational policy to frame an examination of literacy research, advocacy, and policy. Readings include research targeted in the legislation as well as critiques of that research. RESTRICTIONS: Open only to Ph.D. and Ed.D. majors.

EDUC 823  LEARNING AND DEVELOPMENT 
The study of contemporary theory and research in human development, with an emphasis on issues of educational significance, and mechanisms that affect development. May be cross-listed with PSYC823.

EDUC 824  EFFECTIVE COMMUNICATION FOR LEADERSHIP IN EDUCATION 
Focuses on improving communication skills in the exercise of leadership in administrative and policy settings in education. RESTRICTIONS: Open only to Ed.D majors.

EDUC 825  PROSEMINAR: SOCIAL AND URBAN POLICY 
See UAPP823 for course description.

EDUC 827  DATA ANALYSIS FOR PK-12 SCHOOL IMPROVEMENT 
Intended for PK-12 educators in leadership roles, including teachers in leadership roles. Covers the management and statistical analysis of PK-12 student achievement data and related student, staff, program, and community data for purposes of instructional planning and school improvement. RESTRICTIONS: Open only to Ed.D majors in PK-12 system.

EDUC 828  PERFORMANCE ASSESSMENT AND ACCOUNTABILITY IN SCHOOLS 
Concepts, practices, and data requirements of performance measurement in schools at different levels (student, staff, program, school) and the uses of measurement results for purposes of professional and organizational improvement and accountability. PREREQ: EDUC827.

EDUC 829  RESEARCH ON TEACHING 
A survey of classical studies of classroom teaching. Teacher characteristics, teaching methods, learning environments, models of teaching, research methods and results of recent research.

EDUC 830  CONSULTATION AND INTERVENTION 
Surveys the major theoretical approaches and research related to consultation and intervention involving the school-age child. Provides skills in consultation and intervention techniques employed by school psychologists, counselors and other professionals working with teachers, parents and administrators. PREREQ: EDUC8681.

EDUC 831  ADVANCED COUNSELING TECHNIQUES WITH CHILDREN AND ADOLESCENTS 
The application of brief therapy techniques with children and adolescents from diverse backgrounds. Attention is given to a solution-focused perspective and specific intervention strategies for frequently encountered school problems. PREREQ: EDUC6653, COREQ: EDUC671 or EDUC669. RESTRICTIONS: Requires permission of instructor.

EDUC 832  ADVANCED PRACTICUM IN SCHOOL PSYCHOLOGY 3-12 
Students will work in school, clinic or community settings under supervision to further develop their applied skills. RESTRICTIONS: Permission of instructor; enrollment limited to PhD students in school psychology or closely related field of study.

EDUC 833  RESEARCH/THESIS OF MATH LEARNING 
Examines research and theories of mathematics learning. Traces development of psychological thinking from grades K to 12. Examines factors that influence the nature of what and how mathematics is learned.

EDUC 834  RESEARCH/THESIS OF MATH TEACHING 
Examines research and theories of mathematics teaching in grades K-12. Explores components of classroom teaching, relationships between methods of teaching and students’ learning, and the factors that influence the selection of teaching methods. PREREQ: EDUC833 or permission of instructor.

EDUC 835  RESEARCH/THESIS OF MATH CURRICULUM 
Examines research and theories of mathematics curricula, grades K-12. Analyzes features of traditional and reform curricula, and issues of curriculum design and implementation.

EDUC 836  RESEARCH/THESIS OF MATH TEACHER EDUCATION AND SCHOOL IMPROVEMENT 
Examines research and theories of mathematics teacher education and school improvement, grades K-12. Studies factors that influence the effectiveness of mathematics teacher education programs and factors that support teacher learning in schools. PREREQ: EDUC835 or permission of instructor.

EDUC 838  RESEARCH ISSUES IN MATH EDUCATION 1 PF 
Examines current issues in mathematics education from methodological and conceptual perspectives. Design and critique local research projects. PREREQ: Admission to doctoral program.
EDUC 839  PK-12 EDUCATION, GOVERNANCES, POLICY AND LAW  3
Intended for PK-12 educators in leadership roles. Covers federal/state/local systems of governance in public education and different district governance/management models; evolution of federal/state education reform policy and implications for school leadership; organizational planning, change, and leadership issues associated with current federal and state education improvement legislation and department of education initiatives; legal framework and legal issues shaping education policy and practice.
RESTRICTIONS: Open only to Ed.D majors with A&P concentration; otherwise instructor permission required.

EDUC 840  RESEARCH COLLOQUIUM IN EDUCATION  1-3 PF
A detailed analysis of the research currently under way at the University of Delaware and other institutions, including doctoral dissertations, that has application to human learning in an educational environment.
RESTRICTIONS: Open to Ph.D. and advanced master’s students.

EDUC 843  PROSEMINAR IN SCIENCE EDUCATION  3
Covers critical issues in curriculum, research on learning and teaching.
RESTRICTIONS: Topics vary. May be repeated for credit.

EDUC 845  SEMINAR IN SOCIAL STUDIES EDUCATION  3
The role of school programs in citizenship education. Selected topics may include analysis of the citizenship mission of American education, examination of how American culture is transmitted and evaluated in school programs and changing conceptions of civic education in an increasingly diverse nation.
RESTRICTIONS: May be repeated for credit when topics vary.

EDUC 847  POSTSECONDARY STUDENT AFFAIRS ISSUES AND MANAGEMENT  3
Intended for higher education professionals in leadership positions. Covers student affairs issues, co-curricular programming, and related public relations.
RESTRICTIONS: Open only to Ed.D. majors.

EDUC 848  SEMINAR IN LANGUAGE DEVELOPMENT  3
Covers aspects of semantic, syntactic and phonological development through an examination of current research and theory in the field. Treats the educational implications of language development.
May be cross-listed with LING848.

EDUC 849  GOVERNANCE, PLANNING, AND FINANCE IN HIGHER EDUCATION  3
Program development, planning, budgeting, and management in higher education settings; resource acquisition; alumni/trustee relations.
RESTRICTIONS: Open only to Ed.D. majors.

EDUC 850  QUALITATIVE RESEARCH IN EDUCATIONAL SETTINGS  3
Theory and practice are combined as students critique exemplary qualitative studies, explore theoretical frameworks and conduct shorter field research activities designed to develop students’ capacity to collect and analyze qualitative data. First part of a two-semester introduction to qualitative research.

EDUC 851  PRACTICUM: QUALITATIVE RESEARCH  3
Provides practical experience in qualitative data collection, analysis and writing. Topics include research design, formal and informal interviewing, community and classroom observations, life history, the case study, analytic induction, ethics and style in qualitative research reporting.
PREREQ: EDUC850.

EDUC 852  CRITICAL AND INTERPRETIVE METHODS IN EDUCATION RESEARCH  3
Introduction to non-social science approaches to educational inquiry such as philosophy, history, legal studies and others. Stresses epistemological and normative assumptions underlying education research programs. Selected relevant controversies are examined.

EDUC 853  TOPICS: CULTURALLY RELEVANT PEDAGOGIES  3
Focuses on diverse pedagogical theories, practices, and research discussing how to provide culturally relevant guidance to diverse students. Involves investigation of the role of the local community, popular culture, dialogue, and collaboration in establishing culturally relevant pedagogies.

EDUC 854  TOPICS: EQUITY IN EDUCATION  3
Focuses on diverse theories, practices, and research discussing issues of equity in education. Involves discussion of race, ethnicity, gender, sexual orientation, policy, economy, and structural and dynamic forces of power that promote or inhibit educational equity.

EDUC 855  TOPICS: SOCIOCULTURAL THEORIES OF EDUCATION  3
Focuses on sociocultural approaches to education focusing on how cultures, institutions, and practices shape participants’ learning. Involves situated cognition, dialogic pedagogy, activity theory, cultural-historical approach, ecological approach, and neo-Vygotskian approaches.

EDUC 856  INTRODUCTION TO STATISTICAL INFERENCE  3
Quantitative analysis topics include describing univariate and bivariate data distributions, calculating and interpreting summary statistics, the logic of least squares estimation, the rudiments of probability theory, selected probability models and their interrelationships, the logic of null hypothesis testing, interval estimation and selected inferential techniques.
PREREQ: EDUC665 or equivalent.
RESTRICTIONS: Requires admission to doctoral program.

EDUC 860  CURRICULUM THEORY  3
Introduces curriculum theory and the history of curriculum as a field of study. Topics include societal forces influencing curriculum, assumptions underlying curriculum decisions and conflicting views of curriculum.

EDUC 861  CURRICULUM DEVELOPMENT AND EVALUATION  3
Major curriculum theories and their relationships to planning, improvement and evaluation of school programs. Consideration of strategies for affecting curriculum change.

EDUC 862  DESIGN AND ANALYSIS OF EXPERIMENTS  3
Intermediate topics in the design of experiments and quasi-experiments, including analysis of variance, factorial designs, analysis of covariance, repeated measures, non-parametric statistics and selected multivariate techniques. Organized by the Campbell-Stanley framework for planning and critiquing experimental efforts.
PREREQ: EDUC665 or equivalent.
RESTRICTIONS: Requires admission to doctoral program. Offered once every two years.

EDUC 863  PROGRAM EVALUATION IN EDUCATION  3
Focuses on models, theories and practice of program evaluation and applied research in education. Topics include experimental and quasi-experimental designs, validity, political and ethical issues of evaluation and the implementation and practice of process and outcome program evaluation.
RESTRICTIONS: Ed.D. majors or permission of instructor.

EDUC 865  EDUCATIONAL MEASUREMENT THEORY  3
Focuses on both classical and modern test theory including scaling, scoring, reliability, validity, generalizability theory, bias, item analysis, item response theory and equating with applications to norm-referenced and criterion-referenced assessment frameworks.
PREREQ: EDUC665 or equivalent.

EDUC 866  MASTERS’ THESIS  1-6

EDUC 867  CHILD NEUROPSYCHOLOGY  3
Examines approaches to neuropsychological assessment and application to childhood learning and neurodevelopmental disorders.
RESTRICTIONS: Requires permission of instructor.

EDUC 868  ADVANCED EDUCATIONAL MEASUREMENT  3
Focuses on theories of measurement with special emphasis on item response theory. The first two classes will be devoted to classical test theory and remaining class sessions will emphasize item response theory.
PREREQ: EDUC856 and EDUC856.

EDUC 869  MULTILEVEL MODELS IN EDUCATION  3
Introduction to multilevel modeling. Considers the analysis of growth and change as a special case of multilevel modeling.
PREREQ: EDUC810 and EDUC856, or equivalent.

EDUC 870  MULTIVARIATE DATA ANALYSIS IN EDUCATION  3
Introduces models for the analysis of categorical data with specific applications to education and social science research. Topics include logistic regression, polytomous logit regression, log-linear modeling, event history analysis, manifest Markov chain modeling.
PREREQ: EDUC810 or equivalent.

EDUC 871  LATENT VARIABLES FOR EDUCATIONAL RESEARCH  3
Introduces models for latent variables with applications to educational and social science research. Topics divided into models for continuous and categorical latent variables. Continuous latent variables include confirmatory factor analysis, structural equation modeling, and growth curve modeling. Models for categorical latent variables include latent class analysis and latent Markov chain modeling. Advanced methods such as latent transition analysis and general growth mixture modeling are also covered.
PREREQ: EDUC810 or equivalent.

EDUC 877  PRACTICUM IN SPECIAL EDUCATION  3-6
Demonstration, directed observation and practice teaching with consultation and accompanying seminar to discuss experiences and problems under faculty supervision.
PREREQ: EDUC679, EDUC680 and EDUC681.
EDUC 879 INTERNSHIP IN EDUCATION 3-9
Supervised, on-the-job experience in one specific area of education (i.e., administration, guidance, etc.), in which such internships are required as a part of graduate degree programs.
RESTRICTIONS: Credit during any semester varies according to the time spent in internship.

EDUC 883 ADMINISTRATION OF ADULT AND CONTINUING EDUCATION PROGRAMS 3
Considers the administration, design and implementation, and evaluation of programs for postsecondary students in formal and informal training, degree or nondegree programs. Will consider factors influencing the administration and design of programs such as institutional demands.

EDUC 885 EDUCATIONAL TECHNOLOGY TOPICS 3
In-depth study of a major problem in educational technology.
RESTRICTIONS: May be repeated for credit when topics vary.

EDUC 890 LEADERSHIP: THEORY AND RESEARCH 3
Theories and research relating to leadership and management style. Fundamental principles of leadership as viewed from the fields of philosophy, sociology, psychology and applied behavioral science are discussed. Emphasis on analysis of personal style.
RESTRICTIONS: Open only to students in the Ed.D. program in educational leadership.

EDUC 891 ORGANIZATIONAL PROBLEM ANALYSIS/PLANNING IN EDUCATION 3
Focuses on conceptualizing, designing, and reporting decision-oriented studies for education administrators and policymakers.
RESTRICTIONS: Core requirement for all Ed.D. majors in SOE educational leadership program.

EDUC 894 ADVANCED ORGANIZATIONAL THEORY 3
Survey of historical and contemporary macro-organizational theory with a focus on the school as an organization. Topics include power in organizations, Weberian and neo-Weberian theory, coordination and control, decision-making and organizational culture.
RESTRICTIONS: Open only to students in the Ed.D. program in educational leadership.

EDUC 895 IMPROVEMENT STRATEGIES 3
Focuses on philosophies of change, assessing the need for change in an educational setting, the educational leader as an agent of change and an analysis of numerous approaches that have been successful in improving instructional programs.
RESTRICTIONS: Open only to students in the Ed.D. program in educational leadership.

EDUC 896 EDUCATION REFORM: TOPICS AND STRATEGIES 3
Intended for PK-12 educators in leadership roles, including teachers in leadership roles. Covers different perspectives on and issues in education reform and impacts at the school and district level. Flexible in content to enable study of current and response to these initiatives.
RESTRICTIONS: Open to Ed.D majors with PK-12 concentration: otherwise by permission of instructor.

EDUC 897 CURRICULUM INQUIRY 3
A study of the emerging concepts and radical policy options found in significant writings that have influenced curriculum theory and practice during the 20th century.
RESTRICTIONS: Open only to students in the Ed.D. program in educational leadership.

EDUC 964 PRE-CANDIDACY STUDY 3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.
RESTRICTIONS: Not open to students who have been admitted to candidacy.

EDUC 969 DOCTORAL DISSERTATION 1-12 PF

ENGINEERING TECHNOLOGY

EGTE 104 INTRODUCTION TO LAND SURVEYING 1
Topographic surveying, mapping and measurement of distance, area and earth volume for applications in natural resource management, landscaping and construction.

EGTE 107 WELDING AND METALS 2
Arc welding, gas welding, soldering, sheet metal layout and fabrication, and properties of metals.

EGTE 108 UTILITIES 2
Domestic water supply and waste disposal, house wiring, heating systems.

EGTE 112 PERSONAL COMPUTERS AND TECHNOLOGY 3
Introduction to personal computers. PC operation systems, programming, and software packages such as spreadsheets and word processing. Statistical and numerical analysis techniques are applied to production problems in engineering technology.

EGTE 115 INTRODUCTION TO COMPUTER BASED PROBLEM SOLVING 4
Provides foundation in the application of computers and engineering principles for agriculture, industry and the environmental sciences. Emphasizes fundamentals of computer programming, problem solving and practical applications within the field. Includes a design project and laboratory.
COREQ: MATH 117 or higher.

EGTE 165 FRESHMAN SEMINAR 0 PF
Career opportunities in agricultural engineering, AET curriculum information, undergraduate research opportunities, professional concepts and organizations, and faculty and student presentations. Focuses on academic services, career exploration and preparation, campus resources, and practical skills that are helpful in mastering the freshman year.
RESTRICTIONS: Limited to freshmen in the College of Agriculture and Natural Resources.

EGTE 209 TECHNICAL AND COMPUTER AIDED DRAFTING 3
Two dimensional drafting including layouts, geometric constructions, lettering, dimensioning, multiview projections, sectional and auxiliary views using AutoCAD for drafting, entity creation and modification and data management.

EGTE 215 APPLIED FLUID MECHANICS 4
Fluid properties, fluid statics, conservation of mass, energy, and momentum as applied to engineering systems. Pipe flow, distribution systems, pumps, open channel flow, hydraulics structures. Laboratory includes flow measurements, energy measurements and analysis of data.
PREREQ: EGTE 115, MATH 221/241 and PHYS 201/207.

EGTE 223 SURVEYING 3
Error propagation, distance measurement, trigonometric leveling, traversing, area measurement, route surveys, field astronomy, coordinate systems, and GPS.
May be cross-listed with CIEG 222.
PREREQ: EGTE 104 or CIEG 126.
RESTRICTIONS: Requires competency in trigonometry.

EGTE 231 FUNDAMENTALS OF STATIC AND STRENGTH OF MATERIALS 4
Analysis of forces and equilibrium on bodies in two and three dimensions and forces on building components. Stresses, displacement and failure in beams and columns. Strength of wood, steel, concrete and masonry.
PREREQ: MATH 221/241, PHYS 201/207.

EGTE 244 ELECTRICITY FOR ENGINEERING TECHNOLOGY 4
Electrical power systems for buildings, including distribution equipment and motor selection. Fundamentals of alternating current, single phase and three phase circuits. Laboratory emphasizes control logic and electro-mechanical devices.

EGTE 245 ANALOG ELECTRONICS 3
Foundation in the analysis, selection and integration of analog electronics to meet modern industrial challenges. Selected applications include diodes, field effect and bipolar transistors, amplifiers, thyristors and introduction to frequency analysis.
PREREQ: EGTE 244.

EGTE 306 COST ESTIMATING 3
Building components, bill of materials and cost estimating using cost of materials plus labor system.
PREREQ: EGTE 112, EGTE 209.

EGTE 311 FUNDAMENTALS OF THERMODYNAMICS 3
PREREQ: EGTE 215
COREQ: MATH 222 or MATH 242.
EGTE 312  FUNDAMENTALS OF SOIL MECHANICS  3
Engineering properties of soils, soil testing and classification, permeability and drainage, soil stresses, shear strength, bearing capacity, compaction, slope stability, and design of foundations.
PREREQ: EGTE231.

EGTE 321  STORM WATER MANAGEMENT  4
Hydrology for small (urban/suburban/rural) watersheds. Design of culverts, storm drains, spillways, vegetated waterways, and storm-water management systems.
PREREQ: EGTE215.

EGTE 328  WASTEWATER TREATMENT SYSTEMS  3
Properties of municipal and food processing wastes. Wastewater treatment, biosolids management and wastewater utilization.
PREREQ: CHEM102 or 104, and MATH221, and one semester of general biology.

EGTE 366  INDEPENDENT STUDY  1-3

EGTE 417  PROJECT MANAGEMENT  3
Basic procedures for finding the limiting sequence of events, constructing a flow network describing the project steps, and project planning and control for optimum scheduling. Project analysis using Critical Path Method (CPM), Project Evaluation and Review Technique (PERT) and linear programming.
PREREQ: EGTE112 or EGTE115.

EGTE 418  MANUFACTURING  3
Basic processes, technologies, and process systems. Processes include metal cutting, forming, plastic molding, packaging, and food processing. Current advances and technologies include lean manufacturing, robotics, just-in-time inventory control, ergonomics, controls and quality management.
RESTRICTIONS: Junior or senior standing in engineering technology or engineering or permission of instructor.

EGTE 420  SAFETY AND HEALTH IN THE WORKPLACE  3
Managing safety and health issues, including laws (OSHA) and standards, accident investigations, injury prevention techniques, job safety analysis, and ethical aspects. Case study method used to develop a corporate safety plan. Developing safety inspection sheets, analyzing incident data, and designing hazard control programs.
PREREQ: Statistics, biology, chemistry, and computer use.
RESTRICTIONS: Intended for juniors, seniors and graduates.

EGTE 435  MACHINE DESIGN  3
Various aspects of machine design including static and fatigue failure, and the design of machine elements including fasteners, welded joints, bearings, shafts, and power transmission components. Projects include a semester-long design problem with a customer, a design-draw-build exercise in a machine shop, and the programming of a computer-based design tool.
PREREQ: MATH243/222; EGTE115; EGTE209; EGTE231.

EGTE 440  PLANT LAYOUT AND MATERIALS HANDLING  3
Fundamentals of spatial relationships, work flow patterns, equipment selection, conveyor sizing and motion economy applied to production and processing facilities.
PREREQ: EGTE115, EGTE209, EGTE215, EGTE231, and EGTE244.

EGTE 443  INSTRUMENTATION  3
Selection, operating principles and application of physical and chemical devices for indicating, recording and controlling laboratory and field conditions or processes.
PREREQ: PHYS202 or 208, EGTE242 or equivalent. EGTE344 suggested.

EGTE 444  PROGRAMMABLE LOGIC CONTROL APPLICATIONS  3
Designed to teach application of PLCs and how to use them effectively. Major topics include control systems and terminology, PLC structure and instruction sets, control of sequential processes, and safety and implementation. Applications will be programmed and tested on actual PLCs.
PREREQ: EGTE115, EGTE242 or equivalent.

EGTE 445  FOOD ENGINEERING TECHNOLOGY  4
See FOSC445 for course description.

EGTE 449  APPLIED CONTROLS  3
The selection, operating principles and application of electrical, mechanical and mechatronic systems for industrial, agricultural and environmental applications. Includes a laboratory and design project.
RESTRICTIONS: Requires junior or senior status in the major or approval of the department.

EGTE 450  TECHNICAL PRACTICUM IN INDUSTRY  1-3
Structured experience in industry. A minimum of 40 hours of technical activities per credit hour. Upon completion, students present results to the department faculty and industrial sponsor through written reports and oral presentations. May be repeated twice for credit. Proposals approved in advance by the department faculty, and a designated faculty advisor is required.
RESTRICTIONS: Junior standing.

EGTE 451  SENIOR DESIGN  3
Work with engineering and technology advisors from industry, state agencies, and faculty on design projects requiring knowledge and skills acquired in previous courses.
RESTRICTIONS: Requires senior status in engineering technology.

EGTE 454  WOOD AND STEEL STRUCTURES  3
Analysis and design of structures using wood and steel for building materials. Design aspects of building construction.
PREREQ: EGTE231, PHYS201/207.

EGTE 455  CONCRETE AND MASONRY STRUCTURES  3
The use of concrete and masonry in building structures. Includes analysis and design with concrete and masonry.
PREREQ: EGTE231, PHYS201/207.

EGTE 456  FUNDAMENTALS OF HEATING, VENTILATION AND AIR CONDITIONING  3
Heating, ventilating and air conditioning of rural, residential and light commercial buildings. Heat transmission in structures, space heating and cooling loads, air distribution, piping and fluid flow, heat and water production in livestock and poultry structures, environmental systems for specific plant and animal structures.
PREREQ: EGTE115, EGTE112, EGTE215 and EGTE311.

EGTE 466  INDEPENDENT STUDY  1-3

ELEG 205  ANALOG CIRCUITS I  4
Laws of the electric circuit, analysis of DC and AC circuits, network equations and network theorems.
PREREQ: MATH242 and PHYS207.

ELEG 212  SIGNALS AND COMMUNICATIONS  4
Introduction to signals, systems and communications. Covers discrete and continuous time systems, sampling, and conversion between analog and digital signals. Example systems studied may include voice coding, telephony, television and digital audio.
PREREQ: MATH242.

ELEG 240  PHYSICAL ELECTRONICS  4
Introduction to semiconductor devices, electromagnetic fields and waves, and optics. Covers basic electronic devices including diodes, transistors, lasers, antennas and optical elements.
PREREQ: MATH243, ELEG205.

ELEG 302  INTRODUCTION TO DEVICES AND MATERIALS  3
Emphasizes concepts and properties of materials important in modern solid state electronics; topics include structure and processing of electrical materials, band structure, carrier concentration and dynamics, junction phenomena and optical and magnetic phenomena.
PREREQ: MATH243 and PHYS208.

ELEG 305  SIGNAL PROCESSING I  3
Continuous and discrete time signals and systems at the introductory and intermediate levels. Covers transforms, filtering, sampling, and reconstruction. Applications discussed may include digital signal processing, communications and multimedia.
PREREQ: ELEG212.
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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ELEG 306</td>
<td>Signal Processing II</td>
<td>3</td>
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<tr>
<td></td>
<td>Continues topics introduced in ELEG305 at a more advanced level. Introduces filter design, transmission line analysis, the discrete Fourier transform, the fast Fourier transform and roundoff effects. PREREQ: ELEG305.</td>
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<tr>
<td>ELEG 309</td>
<td>Electronic Circuit Analysis I</td>
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<td></td>
<td>Introduction to physical principles of solid state electronic devices. Quantitative study of elementary circuits including biasing, linear power amplifiers, low-frequency small signal analysis, multiple transistor circuits and feedback. PREREQ: ELEG205.</td>
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<td>ELEG 310</td>
<td>Random Signals and Noise</td>
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<td>Introduction to probability as applied to random signals and noise. Includes random variables, densities, distributions, random processes, spectral representations and statistics. PREREQ: ELEG305.</td>
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<td>ELEG 312</td>
<td>Electronic Circuit Analysis II</td>
<td>4</td>
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<td></td>
<td>Low-frequency and high-frequency response of RC-coupled amplifiers, Class A tuned amplifiers, tuned power amplifiers, frequency response and stability of feedback amplifiers, oscillators, modulation and demodulation circuits. PREREQ: ELEG309.</td>
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<tr>
<td>ELEG 314</td>
<td>Electronics and Instrumentation</td>
<td>4</td>
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<tr>
<td></td>
<td>Steady state circuit analysis, diode, power supplies and filters. Rotating machinery. Integrated circuits, operational amplifiers, A to D converters and digital building blocks with applications to informational handling. PREREQ: PHYS208 and MATH302. RESTRICTIONS: Not for major credit.</td>
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<tr>
<td>ELEG 320</td>
<td>Field Theory I</td>
<td>3</td>
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<tr>
<td></td>
<td>Study of theory and problems in electrostatic and magnetostatic fields. Maxwell's equations. PREREQ: PHYS208, MATH342 and ELEG205.</td>
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<tr>
<td>ELEG 340</td>
<td>Solid State Electronics</td>
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<td>Introduction to the concepts necessary to establish electronic phenomena in solids. Application to electronic devices such as diodes, transistors, FETs and integrated circuits. Emphasis on the reduction of the physical device to a circuit model. PREREQ: ELEG309, ELEG240, MATH243.</td>
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<tr>
<td>ELEG 366</td>
<td>Independent Study</td>
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<td>May be cross-listed with CPEG409.</td>
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<tr>
<td>ELEG 370</td>
<td>Engineering Electromagnetics</td>
<td>4</td>
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<td></td>
<td>Electromagnetic fields and waves. Static and dynamic solutions of Maxwell's equations, transmission lines, waves and radiating systems. Associated computational methods. PREREQ: MATH342, ELEG240.</td>
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<tr>
<td>ELEG 403</td>
<td>Communication Systems Engineering</td>
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<td>Review of signal theory, Fourier transforms, linear and time-invariant systems; review of probability and random signals; information theory, source entropy, channel capacity, baseband data transmission, modulation, noise in analog systems and digital carrier modulation. PREREQ: ELEG305.</td>
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<tr>
<td>ELEG 409</td>
<td>Signals and Communication Design I</td>
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<td>Part I of a two semester design course, ELEG/CPEG409/410. Students learn the background material for development of a major design project in signal processing or communications. May be cross-listed with CPEG409. PREREQ: ELEG305 and knowledge of C/C++.</td>
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<tr>
<td>ELEG 410</td>
<td>Signals and Communications Design II</td>
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<td>Design of signal processing, control and communications systems. A major design project is required. Students study, design, build and test their projects. Periodic oral and written reports are required. May be cross-listed with CPEG410. PREREQ: ELEG409.</td>
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<tr>
<td>ELEG 411</td>
<td>Field Theory II</td>
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<td>ELEG 418</td>
<td>Digital Control Systems</td>
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<td>Study of closed-loop digital control systems. Emphasis is on simulation methods and pole placement techniques for controller development. Both root locus and input/output pole placement using the Diphantine equation are used to generate designs. MATLAB is used for computer aided design.</td>
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<tr>
<td>ELEG 419</td>
<td>Multimedia Communications</td>
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<td></td>
<td>The theory and principles of multimedia communications, including data compression, CD-ROMs, multimedia networking and standards (JPEG, MPEG, H261, H263, RTP, etc.).</td>
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<td>ELEG 420</td>
<td>Electronic Circuit Design</td>
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<td>Design with and application of operational amplifiers using integrated circuit units. Design of discrete element clamping and clipping circuits, logic circuits, multivibrators, etc. Analysis and simulation of digital integrated circuits. Laboratory studies involve extensive use of analog and digital computers. PREREQ: ELEG312.</td>
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<td>ELEG 421</td>
<td>Solid State Nanotechnology</td>
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<td>Introduces the principles of solid state physics for electronics and photonics. Topics including material structure, the states and statistics of charge carriers, and the properties of conductors, insulators, and semiconductors. Provides a foundation for understanding nanotechnology applications and nanophase materials. PREREQ: Senior standing.</td>
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<td>ELEG 422</td>
<td>Semiconductor Materials Processing</td>
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<td>The basic goals, principles and techniques of semiconductor materials processing are discussed. The emphasis is on physical explanations of how devices and processes work rather than on elaborate mathematical models.</td>
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<td>ELEG 423</td>
<td>Electrical Properties of Matter</td>
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<td>Provides basic understanding of electronic behavior in materials used for fabricating semiconductor devices. Introduces fundamentals of electron theory; elementary quantum mechanics (as applied to semiconductors); concept of energy bands; electronic behavior in crystals; electrical conduction in metals, alloys, semiconductors and insulators; metal-semiconductor contacts and metallization. PREREQ: ELEG320 and ELEG340.</td>
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<tr>
<td>ELEG 424</td>
<td>Quantum Mechanics</td>
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<td>See PHYS424 for course description.</td>
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<td>ELEG 426</td>
<td>Photonic Crystal Devices</td>
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<td>Introduces design and fabrication tools required for photonic crystal structures. It begins with a working knowledge of their basic operation physics and then introduces mathematical and computational methods for their design. Various fabrication methods will be discussed such as lithographic and self-assembly methods.</td>
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<td>ELEG 427</td>
<td>Terahertz and Millimeter-Wave Light Generation and Detection</td>
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<td>Light is treated as an antenna phenomenon at radio wavelengths and a quantum effect near the visible. At terahertz frequencies and millimeter-wavelengths, these distinctions are blurred and both technologies exist. These technologies are described and a unified view of their principles is described. PREREQ: ELEG240.</td>
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<td>ELEG 428</td>
<td>Systems Analysis and Control</td>
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<td>Involves the study of closed-loop analog control systems. Emphasis on stability analysis and the translation of performance specifications into a control system design using the root locus method. Implementation issues are covered. Computer aided design techniques involving the use of MATLAB are stressed.</td>
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<td>ELEG 430</td>
<td>Microwave Circuit Design Principles</td>
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<td>Provides a comprehensive introduction to time and frequency domain integrated circuit design in the picosecond/GHz regime. Major design project required. PREREQ: ELEG312 and ELEG320.</td>
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<tr>
<td>ELEG 438</td>
<td>Theory and Design of Diffraction Optics</td>
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<td>Applications of Fourier analysis to diffraction, imaging optical data processing and holography. Major design project required. PREREQ: ELEG305, ELEG370.</td>
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<tr>
<td>ELEG 440</td>
<td>Opto-electronics</td>
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<td>Provides an introduction to the operating principles of optoelectronic devices used in various digital transmission and information processing systems. Emphasis is on the generation (via lasers) and detection of optical signals. PREREQ: Senior standing with completion of all core physics and math courses required or permission of instructor.</td>
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<tr>
<td>ELEG 441</td>
<td>Antenna Theory and Design</td>
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<td>The radiation characteristics of antennas, numerical and analytical antenna analysis methods and design techniques for many types of antenna. Topics include wire antennas, antenna arrays, broadband antennas and microstrip antennas. PREREQ: ELEG370.</td>
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</table>
ELEG 442  BIOMEDICAL NANOTECHNOLOGY 3
Applications of nanotechnology in biomedical engineering. Topics include nanomedicine in medical diagnostics, molecular manufacturing and transport, nano-scale manipulation, nanomaterials and nanosensors for medical applications.

ELEG 444  MICRO-ELECTRO-MECHANICAL SYSTEMS 3
Explores the world of silicon-based micromachines. Topics include lithography, pattern transfer with etching and additive techniques, bulk and surface micromachining, LIGA; scaling laws and applications.

ELEG 445  OPTICAL COMMUNICATION SYSTEMS 3
Studies the components and system design issues of fiber optic based communications systems. Topics include the propagation of lightwaves in fibers, the coupling of light into fibers, a review of sources and detectors used in fiber-based systems, link analysis, and overall architecture issues.
PREREQ: ELEG440 or permission of instructor.

ELEG 446  NONLINEAR DYNAMICS 3
Introduces the operating principles of nanoscale optical and electronic devices, with emphasis on how nanotechnology and quantum mechanics affect devices with reduced sizes and dimensions. Develops the performance and limitations of devices based on quantum wells, wires, dots, and nanophase materials.

ELEG 447  OPTICAL PROPERTIES OF SOLIDS 3
Techniques for the design of optical filters and optoelectronic devices with thin films and the fundamental electromagnetic and solid state physics that determine the optical properties of solids.
PREREQ: ELEG240.

ELEG 449  NANOMATERIALS AND APPLICATIONS 3
A practical introduction to various areas of nanomaterials with applications in engineering and science. Includes details of processing and characterization of materials for nanotechnology such as nanoparticles, carbon nanotubes, nanostructured ferromagnetism, quantum wires, organic compounds and polymers, and biological materials.
PREREQ: PHYS207, PHYS208.

ELEG 450  SEMICONDUCTOR DEVICE DESIGN AND FABRICATION 4
Instruction in design and fabrication of simple bi-polar and MOS integrated circuits. Specific topics include semiconductor device and integrated circuit design, photolithographic mask design and fabrication, photolithography, N+diffusion and P+diffusion; P-MOS, metallization and device and integrated circuit testing.

ELEG 460  HIGH TECHNOLOGY ENTREPRENEURSHIP 3
Focuses on the critical financial, legal, scientific and engineering issues that must be confronted during the initial planning stages of a startup enterprise. Students work in teams to develop a business plan for a real world/business product offering.

ELEG 466  INDEPENDENT STUDY 1-6

ELEG 470  BIOPHYSICS OF EXCITABLE MEMBRANES 3
Includes passive and active membrane properties, temporal/spatial integration of synaptic inputs, salutory conduct, and the relationship between the molecular structure and conduction properties of the major classes of voltage-gated and ligand-gated ion channels.
PREREQ: ELEG471, or BISC306, or PSYC320, or PSYC626, or instructor's permission.
RESTRICTIONS: Open to all seniors and graduate students.

ELEG 471  INTRODUCTION TO BIOMEDICAL ENGINEERING 3
Introduction to human physiology at all hierarchical levels including molecular, biochemical, cellular, tissue, organ, and integrated systems.

ELEG 472  CELL AND MOLECULAR BIOLOGY FOR ENGINEERS 3
Overview of cell biology and molecular mechanisms. Covers some intercellular interactions, but main focus is on an intracellular structure, organization, and function.

ELEG 473  SIGNAL PROCESSING IN NEURAL SYSTEMS 3
Signal processing in real neural systems, with emphasis on mammalian/human sensory systems. Stimulus transduction, complex receptive fields, encodin, feature binding, and experimental techniques in visual, somatosensory, auditory and olfactory systems.
PREREQ: ELEG471 or instructor's permission.

ELEG 474  NONLINEAR DYNAMICS IN NEURAL SYSTEMS 3
Introduction to the mathematical tools, theory, and experimental observations that concern nonlinear dynamics of biological nervous systems. Classical methods employed to develop a unified approach to the study and understanding of nonlinear dynamics, chaos, synchronicity, bifurcation, and self-organization.
PREREQ: MATH243.

ELEG 475  IMAGE PROCESSING WITH BIOMEDICAL APPLICATIONS 3
Fundamentals of digital image processing, including image formation, acquisition, transformations, enhancement, restoration, coding, and reconstruction from projections. Attention is given to biomedical imaging modalities, including X-ray, computed tomography (CT), magnetic resonance (MR) imaging, and ultrasound.
PREREQ: ELEG305.

ELEG 477  BIOSIGNAL PROCESSING 3
Biomedical signal characteristics, biomedical systems and models, applications of Fourier transform, wavelet transforms, and joint-time frequency analysis of biomedical signals. Systems studies include ultrasounds, EKG's, CAT scans, MRI's, X-rays, and others.
PREREQ: ELEG305, ELEG310, or equivalent.

ELEG 490  CAREER SKILLS FOR ENGINEERS 1
See CPEG490 for course description.
RESTRICTIONS: Open to engineering seniors, or by permission of instructor.

ELEG 611  LINEAR SYSTEMS THEORY 3
Reviews the fundamentals of matrix and linear algebra, introduces the ideas around state-space representations of linear systems and demonstrates application areas in signal processing including estimation and control of dynamic systems.

ELEG 616  KINETIC THEORY AND THERMODYNAMICS 3
See PHYS516 for course description.

ELEG 619  MULTIMEDIA COMMUNICATIONS 3
The theory and principles of multimedia communications, including data compression, CD-ROMs, multimedia networking and standards (JPEG, MPEG, H261, H263, RTP, etc.).

ELEG 620  SOLAR ELECTRIC SYSTEMS 3
Examines the issues critical to the deployment of photovoltaic systems. Focuses on systems that have an electricity generating capacity of three kilowatts and larger.

ELEG 621  SOLID STATE NANOTECHNOLOGY 3
Introduces the principles of solid state physics for electronics and photonics. Topics include material structure, the states and statistics of charge carriers, and the properties of conductors, insulators, and semiconductors. Provides a foundation for understanding nanotechnology applications and nanophase materials.

ELEG 622  ELECTRONIC MATERIALS PROCESSING 3
Theory and current technology of semiconductor fabrication processes, including crystal growth, wafer preparation, lithography, liquid and vapor phase epitaxy, molecular-beam epitaxy of ultra-thin layers and superlattices, oxide growth, thin-film deposition, diffusion, ion implantation, etching and metallization.

ELEG 624  FUNDAMENTAL DEVICE PRINCIPLES 3
Introduces fundamental principles of semiconductor devices and derives the operating characteristics of several important device examples. Topics covered include semiconductor basics, equilibrium and nonequilibrium properties, Fermi levels, transport, injection, generation, recombination, p-n junctions bias, Fermi potentials, capacitance, IV characteristics, bipolar transistors, junction field effect transistors, MOS transistors, ideal MOS structure, microwave and optoelectronic devices.

ELEG 625  OPTICAL FIBER COMMUNICATIONS 3
Introduces the fundamental aspect of optical fiber communications as well as some advanced topics, such as all optical communications and networks. Topics include optical fiber structure, characteristics and fabrications, wave propagation in dispersive medium, optical sources and coupling, optical detectors, communication systems and advanced system techniques.
RESTRICTIONS: Undergraduate students require permission of instructor.

ELEG 626  PHOTONIC CRYSTAL DEVICES 3
Introduces design and fabrication tools required for photonic crystal structures. It begins with a working knowledge of their basic operation physics and then introduces mathematical and computational methods for their design. Various fabrication methods are discussed such as lithographic and self-assembly methods.
PREREQ: ELEG648.

ELEG 627  TERAHERTZ AND MILLIMETER-WAVE LIGHT GENERATION AND DETECTION 3
Light is treated as an antenna phenomenon at radio wavelengths and a quantum effect near the visible. At terahertz frequencies and millimeter-wavelengths, these distinctions are blurred and both technologies exist. These technologies are described and a unified view of their principles is described.
PREREQ: ELEG240 Physical Electronics.
ELEG 628  SOLAR ENERGY TECHNOLOGY AND APPLICATION  3
Introduces basics of solar cell technology, applications, and systems. Presents critical issues in research, manufacturing, cost and performance. Compares Si wafer and thin film solar technology. Analyzes off-grid, residential, building integrated, centralized power systems. Discusses other solar energy concepts.

ELEG 630  INFORMATION THEORY  3
Information theory establishes the theoretical limits that can be achieved in communications systems, and provides insights about how to achieve these limits in practical systems. Covers lossless and lossy compression, and studies the maximum information rate achievable in communications over noisy channels.

ELEG 631  DIGITAL SIGNAL PROCESSING  3
Theory of discrete-time signals and systems with emphasis on the frequency domain description of digital filtering and discrete spectrum analysis, fast Fourier transform, z-transform, digital filter design, relationship to analog signal processing. PREREQ: ELEG305.

ELEG 632  MATHEMATICAL METHODS FOR SIGNAL PROCESSING  3
The application of mathematics to signal processing. Topics include, among others, applications of linear and matrix algebra, iterative and recursive methods, and optimization techniques. Example applications include Karhunen-Loeve approximation, subspace techniques, steepest descent, expectation maximization and Hidden Markov Models, Viterbi algorithm. PREREQ: Linear and matrix algebra and digital signal processing. RESTRICTIONS: Undergraduates need permission of the instructor.

ELEG 633  IMAGE PROCESSING  3
Review of concepts of linear systems and spectral analysis, human visual response, scanning and display of images, Fourier optics, image enhancement and feature extraction, design of digital filters for image processing, 2D fast Fourier transform algorithms and computed tomography. RESTRICTIONS: Requires permission of instructor.

ELEG 634  SIGNALS AND SYSTEMS  3
Reviews basic concepts of discrete and continuous time signals, control systems, and linear algebra. Transforms, sampling, aliasing, linear algebra and systems of equations, matrix factorizations, eigenvalues and eigenvectors, least squares, and the Cayley-Hamilton theorem are studied. PREREQ: ELEG305 and MATH342 or MATH349 or equivalents.

ELEG 635  DIGITAL COMMUNICATION  3
The theory and applications of digital communications including modulation, pulse shaping, and optimum receiver design for additive, white gaussian noise and bandlimited channels. PREREQ: Undergraduate course in probability, signals and linear systems.

ELEG 636  STATISTICAL SIGNAL PROCESSING  3

ELEG 638  THEORY AND DESIGN OF DIFRACTIVE OPTICS  3
Applications of fourier analysis to diffraction, imaging, optical data processing and holography. Major design project required. PREREQ: ELEG305, ELEG306 and ELEG320.

ELEG 640  OPTO-ELECTRONICS  3
Provides an introduction to the operating principles of optoelectronic devices used in various digital transmission and information processing systems. Emphasis is on the generation (via lasers) and detection of optical signals.

ELEG 641  ANTENNA THEORY AND DESIGN  3
The radiation characteristics of antennas, numerical and analytical antenna analysis methods and design techniques for many types of antenna. Topics include wire antennas, antenna arrays, broadband antennas and microstrip antennas. PREREQ: ELEG370 or ELEG413.

ELEG 642  BIOMEDICAL NANOTECHNOLOGY  3
Applications of nanotechnology in biomedical engineering. Topics include nanomedicine in medical diagnostics, molecular manufacturing and transport, nano-scale manipulation, nanomaterials and nano-sensors for medical applications.

ELEG 643  COMPUTATIONAL METHODS FOR ELECTROMAGNETICS  3
Develop and apply numerical techniques for solving Maxwell's equations as they apply to radiation, propagation and scattering problems. Techniques such as the finite-difference time and frequency-domain methods, finite element method, method of moments and the boundary element method are introduced.

ELEG 644  MICRO-ELECTRO-MECHANICAL SYSTEMS  3
Explores the world of silicon-based micromachines. Topics include lithography, pattern transfer with etching and additive techniques, bulk and surface micromachining, LIGA, scaling laws and applications.

ELEG 645  OPTICAL COMMUNICATION SYSTEMS  3
Studies the components and system design issues of fiber optic based communications systems. Topics include the propagation of lightwaves in fibers, the coupling of light into fibers, a review of sources and detectors used in fiber-based systems, link analysis, and overall architecture issues. PREREQ: ELEG640 or permission of instructor.

ELEG 646  NANOELECTRONIC DEVICE PRINCIPLES  3
Introduction to the operating principles of nanoscale optical and electronic devices, with emphasis on how nanotechnology and quantum mechanics affect devices with reduced sizes and dimensions. Develops the performance and limitations of devices based on quantum wells, wires, dots, and nanophase materials.

ELEG 647  OPTICAL PROPERTIES OF SOLIDS  3
Techniques for the design of optical filters and optoelectronic devices with thin films and the fundamental electromagnetic and solid state physics that determine the optical properties of solids. PREREQ: ELEG240 or equivalent.

ELEG 648  ADVANCED ENGINEERING ELECTROMAGNETICS  3
Development and application of Maxwell's equations as they apply to the analysis of guided wave, radiation, and scattering problems. Topics include wave propagation, reflection and transmission, vector potentials, transmission lines and cavities, and special emphasis on antennas and scattering structures.

ELEG 649  NANOMATERIALS AND APPLICATIONS  3
Introduction to various areas of nanomaterials with practical applications in engineering and science. Includes details of processing and characterization of materials for nanotechnology such as nanoparticles, carbon nanostructures, nanostructured ferromagnetism, quantum wires, organic compounds and polymers, and biological materials. PREREQ: PHYS207, PHYS208 or equivalent.

ELEG 650  SEMICONDUCTOR DEVICE DESIGN AND FABRICATION  3
Instruction in design and fabrication of simple bi-polar and MOS integrated circuits. Specific topics include semiconductor device and integrated circuit design, photolithographic mask design and fabrication, photolithography, N-diffusion and P-diffusion, PMOS, NMOS, and device and integrated circuit testing. PREREQ: ELEG340.

ELEG 651  COMPUTER NETWORKING COMMUNICATIONS  3
Presents basic concepts in computer network analysis and design. Emphasizes generic principles developed over the last two decades in the specification, implementation and evaluation of modern computer networks and networking systems. PREREQS: Requires undergraduate mathematical maturity, including calculus, analytical geometry and infinite series and courses in operating systems and computer architecture.

ELEG 652  PRINCIPLES OF PARALLEL COMPUTER ARCHITECTURES  3
Provides an introduction to the principles of parallel computer architecture. Begins at a level that assumes experience in introductory undergraduate courses such as digital system design, computer architecture, and microprocessor based systems.

ELEG 653  COMPUTER SYSTEM SECURITY  3
Surveys current topics in computer network security, including technology to protect networks, protocols and applications from intrusion and theft. Topics include techniques for authentication, privacy, denial of service and non-repudiation. PREREQ: ELEG651 or CISC650 or permission from the instructor.

ELEG 660  HIGH TECHNOLOGY ENTREPRENEURSHIP  3
Focuses on the critical financial, legal, scientific and engineering issues that must be confronted during the initial planning stages of a startup enterprise. Students work in teams to develop a business plan for a real world/business product offering.

ELEG 661  MATERIALS AND DEVICES SEMINAR  0 PF
Lectures and discussions by faculty and students on specialized topics in materials and devices.

ELEG 662  DIGITAL SYSTEMS SEMINAR  0 PF
Lectures and discussions by faculty and students on specialized topics in digital systems.

ELEG 663  SIGNAL PROCESSING SEMINAR  0 PF
Lectures and discussions by faculty and students on specialized topics in signal processing and communications.
ELEG 664  BIOMEDICAL ENGINEERING SEMINAR  3
Lectures and discussions by guest speakers, faculty, and students on specialized topics in biomedical engineering.

ELEG 670  BIOPHYSICS OF EXCITABLE MEMBRANES  3
Includes passive and active membrane properties, temporal/spatial integration of synaptic inputs, sodium and calcium, and the relationship between the molecular structure and conduction properties of the major classes of voltage-gated and ligand-gated ion channels.
PREREQ: ELEG471, or BISC306, or PSYC320, or PSYC626, or instructor’s permission.
RESTRICTIONS: Open to all seniors and graduate students.

ELEG 671  INTRODUCTION TO BIOMEDICAL ENGINEERING  3
Introduction to human physiology at all hierarchical levels including molecular, biochemical, cellular, tissue, organ, and integrated systems.
RESTRICTIONS: Seniors, graduate students only.

ELEG 672  CELL AND MOLECULAR BIOLOGY FOR ENGINEERS  3
Overview of cell biology and molecular mechanisms. Covers some intercellular interactions, but main focus is on intracellular structure, organization, and function. Emphasis placed on application of cell properties to analysis of common biological data sets, including genomic, proteomic data.

ELEG 673  SIGNAL PROCESSING IN NEURAL SYSTEMS  3
Signal processing in real neural systems, with emphasis on mammalian/human sensory systems. Stimulus transduction, complex receptive fields, encoding, feature binding, and experimental techniques in visual, somatosensory, auditory and olfactory systems.
PREREQ: ELEG471/671 or instructor’s permission.

ELEG 674  NONLINEAR DYNAMICS IN NEURAL SYSTEMS  3
Introduction to the mathematical tools, theory, and experimental observations that concern nonlinear dynamics of biological nervous systems. Classical methods employed to develop a unified approach to the study and understanding of nonlinear dynamics, chaos, synchronization, bifurcation, and self-organization.

ELEG 675  IMAGE PROCESSING WITH BIOMEDICAL APPLICATIONS  3
Fundamentals of digital image processing, including image formation, acquisition, transforms, enhancement, restoration, coding, and reconstruction from projections. Attention given to biomedical imaging modalities, including X-ray, computed tomography (CT), magnetic resonance (MR) imaging, and ultrasound.
PREREQ: ELEG305 or equivalent.

ELEG 676  BIOINFORMATICS AND BIOSYSTEMS ANALYSIS I  3
Examines basic principles and methodology in algorithm/system design used in bioinformatics. Topics include: biological sequence comparison, dynamic programming and heuristic methods, phylogenetic analysis, hidden Markov models, Bayesian techniques, statistical methods, microarray analysis and gene prediction.

ELEG 677  BIOSIGNAL PROCESSING  3
Biomedical signal characteristics, biomedical systems and models, applications of Fourier transform, wavelet transforms, and joint-time frequency analysis of biomedical signals. Systems studies include ultrasounds, EKG’s, CAT scans, MRI’s, X-rays, and others.
PREREQ: ELEG305, ELEG310, or equivalent.

ELEG 681  REMOTE SENSING OF ENVIRONMENT  3
See MAST681 for course description.

ELEG 811  CHANNEL CODING THEORY AND PRACTICE  3
Standard and modern developments in channel coding. Reviews information theory topics, then introduces convolutional codes and trellis-coded modulation, iterative decoding, including turbo codes and low-density parity check codes.

ELEG 812  WIRELESS DIGITAL COMMUNICATIONS  3
Fundamentals and current techniques in wireless digital communications, including propagation, modem design, fading countermeasures, and multiple access techniques, such as FDMA, TDMA, and CDMA.
PREREQ: Probability and linear systems.

ELEG 813  STATISTICAL MECHANICS AND THERMODYNAMICS  3
See PHYS813 for course description.

ELEG 819  TOPICS IN NETWORKING I  3
Examines standard routing protocols for wired networks such as OSPF and BGP, protocols for wireless mesh and ad hoc networks. Includes theoretical analysis of protocols and examination of data collected from networks. Topics such as load balancing, multicasting, and cross-layer interactions are covered.
PREREQ: CPEG419, CIS450, CIS650, or ELEG631.

ELEG 820  TOPICS IN NETWORKING II  3
Examines standard and recently proposed transport layer protocols for wired single-hop wireless and multi-hop wireless networks. Includes analysis of transport layer protocols based on hybrid-systems models, stochastic models, and utility-based models. Examines contemporary active queue management algorithms. Traffic analysis and network provisioning are covered.
PREREQ: CPEG419, CIS450, CIS650, or ELEG631.

ELEG 832  WAVELETS AND FILTER BANKS  3
Systematically studies wavelets, wavelet transforms, multi-rate filter bank theory and their applications in digital communications and signal and image processing. Applications considered include wavelet denoising and wavelet subband image/video compression.
PREREQ: ELEG631 and linear algebra.

ELEG 840  ADVANCED COMPUTATIONAL ELECTROMAGNETICS I  3
Studies the finite-difference time-domain (FDTD) method. Various properties for electromagnetic modeling such as the incorporation of symmetry aspects to reduce computational costs are introduced. Also, several applications including electromagnetic scattering, antenna design, micro-optical modeling are explored.
PREREQ: ELEG648.

ELEG 841  ADVANCED COMPUTATIONAL ELECTROMAGNETICS II  3
Introduces the major modern computational methods for the analysis of frequency domain electromagnetics problems. The finite element method and the method of moments are covered. Students will apply these techniques to radiation and scattering problems involving metal and dielectrics.

ELEG 842  RADIO FREQUENCY AND MICROWAVE TECHNOLOGY  3
Modern telecommunications and datacom systems operate at frequencies in the radio frequency (RF) and microwave range. The basic concepts and technologies required to design RF and microwave devices and circuits are explained. Examples of applications to wireless and lightweight systems are discussed.
RESTRICTIONS: Undergraduates require permission from the instructor.

ELEG 844  NANO-ELECTRO-MECHANICAL SYSTEMS  3
Explores the world of quantum controlled nano-electro-mechanical systems (NEMS). Topics such as quantum mechanics, scaling laws, principles for NEMS, modeling of NEMS devices and structures, nanoelectromagnetics, nanomaterials and nanofabrication for NEMS sensors.

ELEG 845  HIGH SPEED HETEROJUNCTION DEVICES  3
Develops the operating principles of heterojunction devices and describes their performance using microwave techniques.

ELEG 853  INTEGRATED OPTICS  3
Discusses basic goals, principles and techniques of integrated optics. Topics include optical wave guides, scattering and absorption, couplers, electro-optic modulators, acousto-optic modulators, semiconductor lasers and optical detectors. Includes applications of optical integrated circuits.
PREREQ: ELEG320 and ELEG340.

ELEG 855  MICROWAVE AND MILLIMETER-WAVE TECHNOLOGY  3
Describes principles of device operation and circuit characteristics for the microwave FET, IMPATT, TRAPATT, Gunn diode, varactor diode, p-i-n diode, tunnel diode and heterojunction devices. Covers both wave guide circuits and microwave integrated circuits.

ELEG 868  RESEARCH  1-6
ELEG 869  MASTER’S THESIS  1-6
Laboratory study conducted for the purpose of contributing new data and theory in some fields of electrical engineering in which information is lacking. Although supervised, the work will be independent in character to encourage the development of initiative.

ELEG 876  BIOINFORMATICS AND BIOSYSTEMS ANALYSIS II  3
Focuses on machine learning techniques and microarray analysis. Students work on recent research papers and engage in a project allowing them to acquire hands-on experience in applying biological information to real bioinformatic problems.
PREREQ: ELEG 676, CISC 889, or permission of instructor.

ELEG 964  PRE-CANDIDACY STUDY  3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required coursework.
RESTRICTIONS: Not open to students who have been admitted to candidacy.

ELEG 969  DOCTORAL DISSERTATION  1-12 PF

ENGLISH

ENGL 011  ENGLISH ESSENTIALS  3 RP
Required of students whose admissions credentials indicate a need for additional training in the fundamentals of composition prior to enrollment in ENGL 110. Individual (tutorial) conferences and small-group instruction.

ENGL 015  PREPARATORY ENGLISH  3 RP
English fundamentals for students inadequately prepared for college composition.

ENGL 110  CRITICAL READING AND WRITING  3
Expository and argumentative composition through analysis of selected readings.
RESTRICTIONS: Required of all freshmen.

ENGL 166  SPECIAL PROBLEM  1-3
Prepares English education majors for student teaching by providing them with a comprehensive, systematic coverage of traditional and non-traditional approaches to grammar, punctuation, usage, and spelling.
PREREQ: ENGL 110.
RESTRICTIONS: Open only to English education majors.

ENGL 200  APPROACHES TO LITERATURE  3
Dual emphasis on reading and writing. Offers an introduction to poetry, fiction and drama, and provides for extensive practice in writing about literary subjects.
PREREQ: ENGL 110.

ENGL 202  BIBLICAL AND CLASSICAL LITERATURE  3
Study of Greek, Roman, and Biblical literatures, set in their mythical, historical and cultural contexts, introducing appropriate critical concepts.
May be cross-listed with CMLT 202, FLIT 202 and/or JWST 202.
PREREQ: ENGL 110.

ENGL 204  AMERICAN LITERATURE  3
Study of representative nineteenth and twentieth century works, set in their historical and cultural contexts, introducing appropriate critical concepts.
PREREQ: ENGL 110.
RESTRICTIONS: Not for major credit.

ENGL 205  BRITISH LITERATURE I  3
Study of representative Medieval and Renaissance British works, set in their historical and cultural contexts, introducing appropriate critical concepts.
PREREQ: ENGL 110.

ENGL 206  BRITISH LITERATURE II  3
Study of representative eighteenth through twentieth century British works, set in their historical and cultural contexts and introducing appropriate critical concepts.
PREREQ: ENGL 110.

ENGL 207  INTRODUCTION TO POETRY  3
Representative masterworks of English, American and world verse.
PREREQ: ENGL 110.

ENGL 208  INTRODUCTION TO DRAMA  3
Representative masterworks from the classical era to the present. May be cross-listed with CMLT 218.
PREREQ: ENGL 110.

ENGL 209  INTRODUCTION TO THE NOVEL  3
Representative masterworks of fiction, emphasizing those of Europe and America. May be cross-listed with CMLT 219.
PREREQ: ENGL 110.

ENGL 210  SHORT STORY  3
Study of the short story as a narrative form, with readings from American and foreign short story traditions.
PREREQ: ENGL 110.
RESTRICTIONS: Not for major credit.

ENGL 211  GREAT WRITERS OF THE WESTERN WORLD I: 1100-1700  3
See CMLT 207 for course description.

ENGL 212  GREAT WRITERS OF THE WESTERN WORLD II: 1650-1950  3
See CMLT 208 for course description.

ENGL 214  LITERATURE AND GENDER  3
Specific concepts of gender in society, as manifested in the literature of writers of both sexes.
PREREQ: ENGL 110.

ENGL 217  INTRODUCTION TO FILM  3
Focuses on different techniques of acting, mise-en-scene, cinematography, editing, sound and color to assess how films encourage audiences to respond in the ways they do. May be cross-listed with CMLT 217.
PREREQ: ENGL 110.

ENGL 266  SPECIAL PROBLEM  1-3

ENGL 300  TEXTS AND CONTEXTS  3
Examines cultural, historical, and theoretical contexts of a broad range of literary, critical and nontraditional texts.
PREREQ: ENGL 202, ENGL 205 and ENGL 206.
RESTRICTIONS: Any two of the three prerequisites acceptable.

ENGL 301  EXPOSITORY WRITING  3
Expository writing, with related studies in grammar, diction and rhetoric.
PREREQ: ENGL 110.
RESTRICTIONS: Does not count toward English major.

ENGL 302  ADVANCED COMPOSITION  3
Expository writing in a variety of forms, with emphasis on literary analysis.
PREREQ: ENGL 110.

ENGL 303  SCRIPT WRITING  3
Instruction in script writing and preparation of a script.
PREREQ: ENGL 110.
RESTRICTIONS: Final enrollment set after first class and submission of a script.

ENGL 304  POETRY WRITING  3
Practice in writing a variety of verse forms.
PREREQ: ENGL 110.
RESTRICTIONS: Final enrollment set after first class and submission of five poems.

ENGL 305  FICTION WRITING  3
Practice in writing the short story.
PREREQ: ENGL 110.
RESTRICTIONS: Final enrollment set after first class and submission of a short story.

ENGL 306  TOPICS IN WRITING  3
Special topics in writing (for example, autobiography). Variable content.
PREREQ: ENGL 110.
RESTRICTIONS: Final enrollment set after first class and submission of appropriate written sample.

ENGL 307  NEWS WRITING AND EDITING  3
News judgment, news gathering, feature writing, libel problems, and ethics. Assignments include writing for the campus newspaper.
PREREQ: ENGL 110.
RESTRICTIONS: Minimum grade of B required in ENGL 110. Counts toward English major only as part of journalism concentration.

ENGL 308  REPORTER’S PRACTICUM  3
Builds on ENGL 207 with extensive reporting and writing for the campus newspaper. Attention to libel and privacy issues.
PREREQ: ENGL 307.
RESTRICTIONS: Counts toward English major only as part of journalism concentration.
ENGL 309 Feature and Magazine Writing 3
All aspects of the newspaper and feature article. Developing ideas, researching, interviewing, writing, and marketing.
PREREQ: ENGL307.
RESTRICTIONS: Counts toward English major only as part of journalism concentration.

ENGL 310 Copy Editing and Layout 3
Newspaper copy editing, headline writing and layout, with emphasis on practical experience. Explores improvement or updating of news stories by rewriting.
PREREQ: ENGL307.
RESTRICTIONS: Counts toward English major only as part of journalism concentration.

ENGL 312 Written Communications in Business 3
Examines the role of written communication in corporate decision making. Students write memos, letters, proposals and reports that simulate on-the-job communication tasks, and are encouraged to use materials from their fields of specialization.
PREREQ: ENGL110.
RESTRICTIONS: Counts toward English major only as part of the concentration in business and technical writing.

ENGL 314 Introduction to Folklore and Folk Life 3
Traditional forms of folklore with emphasis on modern folklore as it functions in contemporary societies.
May be cross-listed with CMLT314.
PREREQ: ENGL110.

ENGL 315 Ballad and Folksong 3
PREREQ: ENGL110.

ENGL 316 Peer Tutoring/Advanced Composition 3
See ARSC316 for course description.

ENGL 317 Film History 3
History of American or various foreign national cinemas.
May be cross-listed with CMLT317.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 318 Studies in Film 3
Special topics such as film genres, major directors and Soviet cinema.
May be cross-listed with CMLT318, JWST318 and/or WOMS318.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 320 The Bible as Literature 3
Studies the cultural contexts, narrative strategies, poetic forms, and literary archetypes of the Hebrew and Christian scriptures.
PREREQ: ENGL110.

ENGL 321 Medieval Literature and Culture 3
Study of selected topics in medieval literature (romance, Chaucer’s contemporaries, drama). Texts usually read in English translations. Emphasis on medieval culture as a European phenomenon. Variable content.
May be cross-listed with CMLT321.
PREREQ: ENGL110.

ENGL 322 Chaucer 3
The Canterbury Tales (in part), Troilus and Criseyde, and some of the shorter poems.
PREREQ: ENGL110.

ENGL 324 Shakespeare 3
Representative histories, comedies and tragedies.
PREREQ: ENGL110.

ENGL 325 Renaissance Literature 3
Survey of varied literature written in England during the sixteenth and seventeenth centuries, from the age of the Reformation through the English Civil Wars. For example, selected works of Wyatt, Sidney, Spenser, Marlowe, Shakespeare, Jonson, Webster, Herbert, Vaughan, Marvell and Milton.
PREREQ: ENGL110.

ENGL 328 Milton 3
Milton’s major poetry and selected prose.
PREREQ: ENGL110.

ENGL 330 The Detective in Film and Fiction 3
See CRJU336
PREREQ: CRJU201.

ENGL 331 The Age of Satire 3
Dryden, Pope, Swift and their contemporaries.
PREREQ: ENGL110.

ENGL 332 Studies in Restoration and Eighteenth Century Literature 3
Studies of selected topics in Restoration and eighteenth century literature and culture, e.g., the epistolary novel, Restoration and eighteenth century drama and women in eighteenth century literature.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 333 British Romanticism 3
Poetry and prose of the British Romantic writers.

ENGL 336 Victorian Poetry 3
Tennyson, the Brownings, Arnold, the Brontes and their contemporaries.
PREREQ: ENGL110.

ENGL 337 Victorian Prose 3
Carlyle, Ruskin, Arnold and their contemporaries.
PREREQ: ENGL110.

ENGL 338 Victorian Fiction 3
Authors may include Dickens, the Brontes, Eliot, Hardy and their contemporaries.
May be cross-listed with WOMS337.
PREREQ: ENGL110.

ENGL 340 American Literature to the Civil War 3
PREREQ: ENGL110.

ENGL 341 American Literature: Civil War to World War II 3
PREREQ: ENGL110.

ENGL 342 American Literature Since World War II 3
PREREQ: ENGL110.

ENGL 344 African American Literature I 3
Literature by African American writers from the eighteenth century to the Harlem Renaissance.
May be cross-listed with BAMS313.
PREREQ: ENGL110.

ENGL 345 African American Literature II 3
Literature by African American writers from the Harlem Renaissance to the present.
May be cross-listed with BAMS345.
PREREQ: ENGL110.

ENGL 347 Studies in American Literature 3
Special topics, ranging from the beginnings to contemporary American literature; may include studies in a single author or authors [e.g., the detective stories of Poe] or period and genre studies [e.g., the Harlem Renaissance or the humor of the old southwest]. Variable content.
May be cross-listed with BAMS347.
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 348 Contemporary Jewish-American Literature 3
Lectures and discussions of outstanding contemporary Jewish American novelists, short story writers, and others.
May be cross-listed with JWST348.
PREREQ: ENGL110.

ENGL 349 Introduction to Jewish Sources: Text and Interpretation 3
Examines the central texts which form the basis of Jewish thought, religion and culture—the Torah, or Hebrew Bible [in translation] and the interpretive traditions which have evolved to understand it [e.g., Midrash, Rashi, contemporary theology] as sources of uniquely Jewish meanings.
May be cross-listed with JWST349.

ENGL 351 Introduction to Irish Literature 3
Survey emphasizing modern and contemporary writers of various genres such as Yeats, Synge, Joyce, Beckett, Heaney and Boland. Critical reading set in mythic, historic and cultural contexts.
PREREQ: ENGL110.

ENGL 352 Studies in Nineteenth Century Literature 3
Special topics in an author or authors, a genre, literary movement, or an idea.
May be cross-listed with WOMS352.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated once for credit when topics vary.
ENGL 353 T WENTIETH CENTURY BRITISH LITERATURE  3
Broadly focused study of literature in several genres, including a variety of eras and movements such as turn-of-the-century realism, war poetry, modernism, and post-colonial writing.
May be cross-listed with WOMS353.
PREREQ: ENGL110.

ENGL 355 K ING ARTHUR IN LITERATURE  3
Study of the historical background and literary treatments of Arthurian characters and themes in English literature.
PREREQ: ENGL110.

ENGL 356 S TUDIES IN MODERN/CONTEMPORARY LITERATURE  3
Study of selected topics in 20th century British, American and world literature, e.g., the contemporary epic novel, post-colonial writing and politics. May be cross-listed with BAMS356.
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 357 L ITERATURE OF LONDON  3
The interaction between London and a variety of literary works. RESTRICTIONS: Offered only through the Semester in London Program.

ENGL 358 L INGUIS TICS AND LANGUAGE ARTS  3
See EDUC358 for course description.

ENGL 359 G RAMMAR AND USAGE  3
Study of patterns and structures of language use, with an emphasis on correctness. Covers grammar, punctuation, mechanics, and style. Intended for prospective English teachers.
PREREQ: LING101.

ENGL 361 L ITERARY CRITICISM AND THEORY  3
Study of problems in textual interpretation and aesthetics from the ancient world through the present, with attention to both the principal movements in critical theory and the social and philosophical contexts of interpretation. May be cross-listed with CMLT361.
PREREQ: ENGL110.

ENGL 365 S TUDIES IN LITERARY GENRES, TYPES AND MOVEMENTS  3
Particular areas or writers to be announced. May be cross-listed with JWST365.

ENGL 366 I NDEPENDENT STUDY  1-6

ENGL 368 L ITERATURE AND SCIENCE  3
Comparative examination of literature and science in several important philosophical, methodological, cultural and social aspects, including the study of elementary philosophy, history of science and theory, history of literature and the analysis of individual scientific and literary texts.
PREREQ: ENGL110.

ENGL 369 L ITERATURE AND MEDICINE  3
Critical examination of the relationship between medicine and literature; ways society has viewed the physician as reflected in literature.

ENGL 371 S TUDIES IN FICTION  3
Special topics in the novel and short story. Topics may emphasize an author or authors, a type or types of fiction, a period or theme.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 372 S TUDIES IN DRAMA  3
Special topics in an author or authors, a type or types of drama, a period or theme.
PREREQ: ENGL110.

ENGL 373 S TUDIES IN POETRY  3
Special topics in a poet or poets, a type or movement, a period or theme.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 379 I NTRODU CTION TO ETHNIC AND CULTURAL STUDIES  3
Focuses on representations of ethnicity, social class, race, gender, and other constructions of identity in literature, arts, and folk culture.
PREREQ: Any two of the following: ENGL202, ENGL205, ENGL206, ENGL324.
RESTRICTIONS: Required for concentrations in ethnic and cultural studies.

ENGL 380 W OMEN WRITERS  3
Study of a variable set of women writers. Addresses such topics as the idea of a woman's tradition, formation of the canon, use of genre, language and form. May be cross-listed with WOMS380.
PREREQ: ENGL110.

ENGL 381 W OMEN IN LITERATURE  3
Cultural representations of women by male as well as female writers. Variable in historical range, geography, and genre. May be cross-listed with WOMS381.
PREREQ: ENGL110.

ENGL 382 S TUDIES IN MULTICULTURAL LITERATURE IN ENGLISH  3
Consideration of multiculturalism as it pertains to American culture or literature in English from Africa and other non-European societies. Variable in historical range, geography, and genre.
May be cross-listed with BAMS382, JWST382 and/or WOMS382.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 385 S TUDIES IN LITERARY CRITICISM AND THEORY  3
Studies in selected topics in literary criticism and critical theory. May be cross-listed with CMLT385.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 390 E NGLISH LINGUIS TICS  3
General introduction to the study of the English language, with emphasis on modern linguistic approaches. May be cross-listed with LING390.
PREREQ: ENGL110.

ENGL 391 H ONORS COLLOQUIUM  3
See ARSC390 for description.
PREREQ: ENGL110.

ENGL 403 L ITERATURE FOR ADOLESCENTS  3
See EDUC403 for course description.

ENGL 404 A DVANCED POETRY WRITING  3
Intensive practice in composition. Group discussion and individual conferences. Wide reference to professional poems as well as models. Emphasis on student competence in traditional prosody as well as exploring freer forms.
PREREQ: ENGL304.
RESTRICTIONS: Final enrollment set after first class and submission of five poems. May be repeated once for credit.

ENGL 405 A DVANCED FICTION WRITING  3
PREREQ: ENGL305.
RESTRICTIONS: Final enrollment set after first class and submission of a short story. May be repeated once for credit.

ENGL 407 A DVANCED REPORTING  3
In-depth reporting, research methods, ethics, and other topics.
PREREQ: ENGL307 and either ENGL308 or ENGL309 or both.
RESTRICTIONS: Maximum of three credits for any registration with no more than six credits toward graduation. Counts toward English major only as part of journalism concentration.

ENGL 408 S PORTS WRITING  3
Training and covering all major sports including both women's and men's sports. Topics include keeping statistics, game coverage, player profiles, and sports columns.
PREREQ: ENGL307.

ENGL 409 T OPICS IN JOURNALISM  3
Special studies and writing in selected kinds of journalism (opinion writing, science journalism) or in an aspect of the profession (history of American journalism, ethics of journalism). Variable content.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated once for credit when topics vary. Counts toward English major only as part of the journalism concentration.

ENGL 410 T ECHNICAL WRITING  3
Selected problems in technical communications, the preparation of reports and technical editing.
PREREQ: ENGL110.
RESTRICTIONS: Counts toward English major only as part of the concentration in business and technical writing.
ENGL 411 Rhetoric for Business and Technical Writers 3
Study of rhetorical theories and strategies within the context of business and technical skills.
PREREQ: ENGL415 or equivalent.

ENGL 412 Business and Technical Publication 3
Advanced instruction in the production of business publications and technical documents; team projects provide practical experience in preparing instruction manuals, research proposals, formal reports, brochures and newsletters.
PREREQ: ENGL415 or equivalent.

ENGL 413 Topics in Technical Writing 3
Special studies and writing in selected kinds of business and technical communication (e.g., computer software documentation) or in an aspect of business and technical communication (e.g., ethics of business and technical communication).
PREREQ: ENGL12, ENGL410, or ENGL415.
RESTRICTIONS: Counts toward English major only as part of the concentration in business and technical writing. May be repeated for credit when topics vary.

ENGL 414 Technical Editing 3
Practical work and study of the editorial procedures essential in editing technical publications and documentation.

ENGL 415 Writing in the Professions 3
Designed to improve the communications skills of students aiming toward careers in any of the professions.
PREREQ: ENGL110.

ENGL 416 Designing Online Information 3
Focuses on the design of information displayed on websites including the theory of information design and its practical application. Lecture sessions cover such topics as user and task analysis, interface design, website navigation, information architecture, and usability. The lab sessions provide instruction on Dreamweaver and Fireworks, as well as some HTML.

ENGL 417 Film Theory and Criticism 3
Survey of major theories of film.
PREREQ: ENGL217.

ENGL 464 Internship in Business/Technical Writing 3 PF
Students work on writing projects at local corporations, government divisions, or public organizations. The internship involves approximately ten hours of work a week.
PREREQ: ENGL415, ENGL411 and ENGL412 or permission of instructor.
RESTRICTIONS: Open to qualified students on the basis of a portfolio review by all concentration faculty.

ENGL 465 Studies in Literature Genres, Types and Movements 3
Particular areas or writers to be announced. May be cross-listed with CMAT465 and/or WOMS465.
PREREQ: ENGL110.

ENGL 466 Independent Study 1-9
Faculty sponsored research.

ENGL 468 Undergraduate Research 1-6

ENGL 469 Internship 3-6
Internship experiences that have been arranged or are currently sponsored by an English Department faculty member.

ENGL 472 Studies in the Drama 3
Special topics in an author or authors, a type or types of drama, a period or theme.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 477 The Structure of English 3
See LING477 for course description.
PREREQ: LING101.

ENGL 479 Literacy and Literature 3
Explores the concept of literacy using a variety of perspectives: scientific, historical, cultural, sociological, political, and literary. Designed for teacher education students and incorporates field work and addresses the state standards that teachers are asked to have their students meet.
RESTRICTIONS: Offered for students in the Milford ETE program.

ENGL 480 Seminar 3
Intensive capstone program in creative writing or study of some aspect of literature, be it a critical problem (e.g., reader response criticism), a movement (e.g., experimental American literature), a single author (e.g., John Keats), a group of authors (e.g., Fitzgerald, Hemingway, Steinbeck), or a genre (e.g., autobiography). Stresses critical writing and literary research. May be cross-listed with JWST480 and/or WOMS480.

ENGL 481 Teaching English in Secondary School 3 PF
Accompanies student teaching in secondary school English. Deals with classroom management and other professional issues.
PREREQ: ENGL110.
COREQ: EDUC400.
RESTRICTIONS: Open only to student teachers in English.

ENGL 482 Seminar in Teaching English I 3
Prepares English education seniors and graduate students to teach oral and written composition at the secondary school level.
COREQ: ENGL483.
RESTRICTIONS: Enrollment limited to English education seniors.

ENGL 483 Seminar in Teaching English II 3
Prepares English education seniors and graduate students to teach adolescent literature, classic literature and non-print literary expression at the secondary school level.
COREQ: ENGL482/682.
RESTRICTIONS: Enrollment limited to English education seniors.

ENGL 494 History of the English Language 3
The development of Modern English with emphasis on changes in sounds, inflections, spelling, and vocabulary. Attention also to usage, dialects, attitudes toward language, and cultural history.
PREREQ: ENGL110.

ENGL 600 Methods of Research 3
Research methods and problem-solving strategies in literary and cultural studies.

ENGL 604 Poetry Writing Workshop 3
Intensive practice in verse composition. Group discussions and individual conferences. Wide reference to professional poems as models. Emphasis on student competence in traditional prosody as well as in free verse.
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 621 Medieval Literature and Culture 3
Survey of medieval culture and ideas as expressed in literature (e.g., Beowulf, The Canterbury Tales, The Divine Comedy) and/or in history, philosophy, etc. (e.g., Boethius, Augustine, Thomas Aquinas), and topics (e.g., orality and literacy, epic and romance, genres).

ENGL 625 Studies in the Renaissance 3
Survey of a wide selection of authors (e.g., More, Wyatt, Sidney, Spenser, Marlowe, Donne, Herbert, Marvell, Jonson, Webster, Middleton, the Cavalier poets, Marvell, Milton); some of Shakespeare's works may also be included.
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 627 Seventeenth Century Literature 3
Survey of representative examples of prose, poetry, and drama from Jacobean comedies, tragedies, and masques to the satire, burlesque, and mannered literature of the Restoration. Points of focus are the counsels and propositions of Francis Bacon and his followers; developments in lyrical, narrative, descriptive, and meditative poetry of Donne, Herbert, Vaughan, Marvell and Milton; classicism from Jonson to Cowley and Dryden; romance and prose fiction.

ENGL 631 Eighteenth Century Literature 3
Topics may include (but are not restricted to) general survey (i.e., selected poetry, drama, fiction), genre survey, gender studies (e.g., women writers), or thematic issues (e.g., literature and politics).
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 634 Studies in Nineteenth Century Literature 3
Survey of Romantic and/or Victorian Literature
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 636 Twentieth Century Literature 3
Broadly focused to include multiple genres and/or movements (e.g., turn-of-the-century realism, war poets, modernism, postmodern drama) from before and after World War II. May include American, European and post-colonial, in addition to British literature.

ENGL 639 Studies in Modern/Contemporary Literature 3
Study of selected poetry, prose, and drama of the twentieth century, with an emphasis on the major texts of English and American literature during the period. Some attention given to other literary traditions and writings.
RESTRICTIONS: May be repeated for credit when topics vary.
ENGL 641  AMERICAN LITERATURE: PERIOD STUDIES 3
Historical survey of American literature of the Colonial, Romantic, or Realistic period, emphasizing "canonical" works of major authors along with selected "non-canonical" writings.

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 651  IRISH LITERATURE: PERIOD STUDIES 3
Study of a set of Irish writers related by genre or period, set in historical and political contexts.

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 671  STUDIES IN FICTION 3
Special topics in the novel and short story. Topics may emphasize an author or authors, a type or types of fiction, a period or theme.

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 672  STUDIES IN THE DRAMA 3
Special topics on an author or authors, a type or types of drama, a period or theme.

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 673  STUDIES IN POETRY 3
Special topics on a poet or poets, a type or movement, a period or theme.

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 677  THE STRUCTURE OF ENGLISH 3
See LING677 for course description.

ENGL 680  SEMINAR 3
Prepares English education seniors and graduate students to teach oral and written composition at the secondary school level.

COREQ: ENGL683.

RESTRICTIONS: Enrollment limited to English education seniors and graduate students.

ENGL 681  SEMINAR IN TEACHING ENGLISH I 3
Prepares English education seniors and graduate students to teach oral and written composition at the secondary school level.

COREQ: ENGL683.

RESTRICTIONS: Enrollment limited to English education seniors and graduate students.

ENGL 683  SEMINAR IN TEACHING ENGLISH II 3
Prepares English education seniors and graduate students to teach adolescent literature, classic literature and non-print literary expression at the secondary school level.

RESTRICTIONS: Enrollment limited to English education seniors and graduate students.

ENGL 684  LITERARY THEORY AND CRITICISM 3
Introduction to some of the leading problems in contemporary literary theory, with some attention to their historical precedents.

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 685  CULTURAL THEORY AND CRITICISM 3
A topical introduction to cultural theory, emphasizing such varied topics as semiotics, deconstructionism, feminism, post-colonial and third-world studies, and problems of representation and signification in literary and non-literary texts. May be cross-listed with ARTH685.

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 688  TEACHING COMPOSITION 3
Study of current composition theory, with emphasis on the relationship between theory and classroom practices.

ENGL 694  HISTORY OF THE ENGLISH LANGUAGE 3
Development of Modern English, with emphasis on changes in sounds, inflections, spelling, and vocabulary. Attention also given to usage, dialects, attitudes toward language, and cultural history.

ENGL 802  STUDIES IN OLD AND MIDDLE ENGLISH 3
A study of the English language either from before 1100 or between 1100 and 1400 with selected readings in Old or Middle English poetry and prose. May be cross-listed with LING802.

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 804  STUDIES IN MEDIEVAL LITERATURE AND CULTURE 3
Intensive study of literature and language in Old English or Middle English, with attention to history and culture. Recent course titles: Chaucer, Beowulf, The Gawain-Poet, The Age of Langland, The Romance.

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 806  STUDIES IN RENAISSANCE LITERATURE 3
Focuses on one or two authors (e.g., Shakespeare or Spenser), genres (e.g., narrative verse and prose, the lyric, drama) or specific periods (Elizabethan, Jacobean, the Civil War).

ENGL 815  STUDIES IN SEVENTEENTH CENTURY LITERATURE 3
Research seminars on writers (Danne and Janson; Bacon, Browne, Hobbes, and Locke; the Fletchers, Cowley, and Milton); genres (classical, metaphysical, and neo-classical poetry; Jacobean, Caroline, and Restoration drama); or topics and themes (empiricism; skepticism; gender and society; literature of the civil wars; Puritan culture).

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 820  STUDIES IN EIGHTEENTH CENTURY LITERATURE 3
Variable content. Possible topics include: Restoration Theatre; English Neoclassicism; The Rise of the Novel; individual writers or groups of writers; applications of theory.

ENGL 830  STUDIES IN NINETEENTH CENTURY LITERATURE 3
Seminar in Romantic and/or Victorian literature with emphasis on selected writers, genres, and/or topics. Possible course topics: women and nature poetry; Dickens; religious doubt; the provincial novel.

ENGL 840  STUDIES IN TWENTIETH CENTURY LITERATURE 3
Variable content. Concentrated study of an aspect of twentieth century British, European, American and/or post-colonial literatures. Possible focuses: a genre, a set of writers, cultural issues (e.g., gender, race, the Holocaust, aesthetics vs. politics).

ENGL 844  SEMINAR: SPECIAL TOPICS IN AMERICAN LITERATURE 3
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 846  SEMINAR: SPECIAL TOPICS IN ENGLISH LITERATURE 3
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 848  SPECIAL TOPICS IN COMPARATIVE LITERATURE 3

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 850  STUDIES IN COLONIAL AMERICAN LITERATURE 3
Topics may include New England Puritanism, Southern Colonial Literature, and Major Early American Authors.

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 852  SEMINAR: AMERICAN REALISM AND NATURALISM 3
Classic works by Clemens, James, Crane, Chapin, Dreiser, Stein, and Wharton, with focus on theoretical and aesthetic assumptions or on general categories for the period (Realism, Naturalism).

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 853  MODERN/POSTMODERN AMERICAN LITERATURE 3
Modern American novelists (Fitzgerald, Hemingway, Faulkner); modern and postmodern American novelists (Fitzgerald, Hemingway, Faulkner, Bellow, Barth, Heller, Morrison, Pynchon); modernist poetry ( Pound, Eliot, Stevens); Drama of the Absurd.

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 855  MODERN/POSTMODERN LITERATURE 3
Modern and postmodern American literature. Topics of writers, cultural issues (e.g., gender, race, the Holocaust, aesthetics vs. politics).

ENGL 890  STUDIES IN LINGUISTICS 3
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 893  DOCTORAL DISSERTATION 1-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.

RESTRICTIONS: Not open to students who have been admitted to candidacy.

ENGL 896  PRE-CANDIDACY STUDY 3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.

RESTRICTIONS: Not open to students who have been admitted to candidacy.

ENGL 899  DOCTORAL DISSERTATION 1-12 PF

ENVIRONMENTAL SCIENCE

ENSC 366  INDEPENDENT STUDY 1-6

ENSC 425  ENVIRONMENTAL FIELD METHODS 3

Introduction to the instrumentation and measurement techniques involved in the study of environmental science. Includes laboratory and fieldwork.

RESTRICTIONS: Environmental science majors are given preference in enrollment.
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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>ENWC 105</td>
<td>Insects in Our World</td>
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<tr>
<td>ENWC 201</td>
<td>Wildlife Conservation and Ecology</td>
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<tr>
<td>ENWC 202</td>
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<td>ENWC 204</td>
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<td>ENWC 315</td>
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<td>ENWC 322</td>
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<td>ENWC 340</td>
<td>Plants of Ecuador</td>
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<td>ENWC 341</td>
<td>Tropical Forest Ecology</td>
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<td>ENWC 346</td>
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<td>ENWC 347</td>
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<td>ENWC 351</td>
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<td>ENWC 355</td>
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<td>ENWC 356</td>
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<td>ENWC 366</td>
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<td>ENWC 367</td>
<td>Insect Structure and Function</td>
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<tr>
<td>ENWC 375</td>
<td>Independent Study</td>
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<td>ENWC 380</td>
<td>Insect Conservation - Taxonomy</td>
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<tr>
<td>ENWC 382</td>
<td>Insect Identification - Taxonomy</td>
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<tr>
<td>ENWC 385</td>
<td>Medical, Veterinary and Forensic Entomology</td>
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<tr>
<td>ENWC 386</td>
<td>Human Dimensions in Wildlife Conservation</td>
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**Environmental Science**

**ENSC 437 Applied Environmental Science**
Introduction to the diverse field of environmental consulting: an application of science to the solution of environmental problems. Topics include project planning, data collection and analysis, health and safety, work products, business management, accounting and contracts, marketing, professional responsibility and ethics.

**RESTRICTIONS:** Open to junior and seniors or by permission of instructor.

**ENSC 450 Preseminar in Environmental Science**
Discussion of the history and state of environmental science as well as its relation to current environmental problems. Survey of research topics and methodologies in the current scientific literature.

**RESTRICTIONS:** Open to environmental science majors only, or requires permission of instructor.

**ENSC 464 Internship in Environmental Science**
On the job experience in governmental or private planning, consulting, environmental or engineering agencies.

**ENSC 466 Independent Study**

**ENSC 475 Statistics for Environmental Science**
See STAT 475 for course description.

**PREREQ:** MATH 243 and GEOG 250.

**RESTRICTIONS:** Degree credit only be given for one of the following: STAT/ENSC 475, MATH 300, STAT 370, STAT 371 or MATH 450.

**Entomology and Wildlife Conservation**

**ENWC 105 Insects in Our World**
The nature and importance of insects: what makes them unique, how they have survived so long, why they are important to ecosystems, why we hate them, and why we need them.

**RESTRICTIONS:** Only 3 credits from ENWC 105 and ENWC 205 may count toward graduation. Not for credit for entomology or wildlife conservation majors.

**ENWC 165 New Student Seminar**
Study and careers in entomology and wildlife conservation: opportunities, expectations, duties and preparation, including skills for success in college. Readings, discussions, written and oral assignments, speakers and field trips.

**RESTRICTIONS:** First term majors.

**ENWC 201 Wildlife Conservation and Ecology**
Basic principles of ecology. Ecological and sociological problems and solutions in the conservation of biodiversity (i.e., habitat, species, and genetic variety.)

**RESTRICTIONS:** Should precede BISC 302.

**ENWC 205 Elements of Entomology**
Lives of insects, emphasizing interactions with humans. Basic insect identification, structure, function, behavior, ecology, evolution, pest control and impact on human society, history and culture.

**ENWC 214 Apology and Apiculture**
Scientific study of the life of honey bees, including their biology, behavior and communication; introduction to techniques of culturing and managing honey bees for honey production and crop pollination.

**ENWC 215 Entomology Laboratory**
Insect structure, physiology, behavior, taxonomy, evolution and ecology studied through field trips, dissection and experiments. Insect collection (with identification to orders) required.

**COREQ:** ENWC 205.

**ENWC 224 Apology and Apiculture Laboratory**
Laboratory and field work to complement topics in ENWC 214. Bee identification and culture; hive management. Work with bees in an apiary to develop confidence in keeping bee colonies.

**COREQ:** ENWC 214.

**ENWC 300 Principles of Animal and Plant Genetics**
See ANSC 300 for course description.

**ENWC 310 Animal and Plant Genetics Laboratory**
See ANSC 310 for course description.

**ENWC 314 Comparative Terrestrial and Marine Ecology**
Comparative overview of similarities and dissimilarities of life in terrestrial and marine environments. Topics include geological history, subsistence, growth and development, life history, reproduction, dispersal, population regulation, and impact of humans.

**May be cross-listed with MAST 314.**

**PREREQ:** BISC 208.

**ENWC 315 Insect Conservation Ecology**
Conservation biology with emphasis on the insect component of biodiversity. Rationale for insect and biodiversity conservation; island biogeography; and endangered species and mechanisms of species loss.

**PREREQ:** ENWC 201 and ENWC 205.

**ENWC 322 Wildlife Management**
Introduction to solving wildlife management problems. Development of management plans with consideration of habitat, human and animal population components.

**PREREQ:** ENWC 201.

**COREQ:** BISC 302.

**RESTRICTIONS:** Requires junior status.

**ENWC 340 Plants of Ecuador**
See PLSC 340 for course description.

**ENWC 341 Tropical Forest Ecology**
Ecology of major forest types in Ecuador and the Galapagos Islands. Lectures and field trips to demonstrate techniques and provide field experience in forest ecology. Guest experts are used for their experience in particular forest types.

**May be cross-listed with PLSC 341.**

**PREREQ:** BISC 207 and BISC 208.

**COREQ:** PLSC 340.

**RESTRICTIONS:** Taught in Ecuador in Winter Session.

**ENWC 344 Forest Ecology**
Dendrology, measurement techniques, tree biology, forest ecology, and concepts of forest management. Field work, demonstrations and guest lecturers in major forest types of the mid-Atlantic region.

**May be cross-listed with PLSC 344.**

**PREREQ:** BISC 208.

**ENWC 351 Nature and Wildlife Photography**
Basic principles and techniques of nature and wildlife photography. Students execute projects that demonstrate their technical skill and knowledge of exposure, composition and content.

**RESTRICTIONS:** Students must have own camera equipment. Usually offered as part of international or domestic trips in Winter or Summer Sessions.

**ENWC 366 Independent Study**

**ENWC 405 Insect Structure and Function**
Comparative functional anatomy and evolution of arthropods, especially the Insects. Emphasis on structures and their functions as adaptive responses to selective pressures. Laboratory dissections emphasizing anatomical variation within external and internal systems.

**PREREQ:** ENWC 215.

**ENWC 406 Insect Identification - Taxonomy**
Lecture and laboratory; the collection, preservation and classification of common insect families.

**PREREQ:** ENWC 205.

**ENWC 408 Insect Field Taxonomy**
Collection, classification, preservation and curation of insects. An insect collection is required.

**COREQ:** ENWC 406.

**ENWC 410 Medical, Veterinary and Forensic Entomology**
Ecology, transmission, and control of diseases carried by insects, ticks and mites; interactions of vectors, animal hosts, and humans. Biting and stinging arthropods and forensic entomology, including evidence collection and species succession. Labs and field trips emphasize identification and field assessment of medically important arthropods.

**PREREQ:** BISC 208, ENWC 205, or permission of instructor.

**ENWC 411 Insect Pest Management**
Principles of managing insect populations in an environmentally compatible manner to reduce losses caused by insects attacking our food, fiber, buildings, domestic animals and human populations. Diagnostic recognition, control and habits of major pest species.

**PREREQ:** ENWC 205.

**ENWC 413 Human Dimensions in Wildlife Conservation**
Review and analysis of social and natural science information and theory needed for sustainable conservation strategies. Integrates traditional conservation principles with ecosystem approach, emphasizing human aspects in conservation and land management.

**PREREQ:** ENWC 201.

**RESTRICTIONS:** Open to juniors and seniors. Offered in Winter Session only.
ENWC 415 WILDLIFE RESEARCH TECHNIQUES 3
Research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts. PREREQ: ENWC325, FREC408 or STAT200; and two courses from ENWC318, ENWC418, ENWC424 or ENWC425. COREQ: PLSC212 or PLSC402 or ENWC344. RESTRICTIONS: Open only to seniors.

ENWC 418 ORNITHOLOGY 3
Avian biology: diversity, evolution, form and function, behavior and communication, reproduction and development, and conservation. Natural history and identification of taxa. Labs with frequent field trips. PREREQ: BISC208.

ENWC 419 BIOLOGICAL CONTROL 3
The use of beneficial organisms to manage and control populations of other organisms. Theory, practices, and case histories for manipulation of natural enemies to minimize the impact of pests. PREREQ: ENWC205 or equivalent.

ENWC 420 HERPETOLOGY 3
Comparative functional anatomy and evolution of amphibians. Emphasis on structures and their functions as adaptive responses to selective pressures. Laboratory dissections emphasizing anatomical variation within external and internal systems. PREREQ: ENWC215 and ENWC406. RESTRICTIONS: Requires permission of instructor.

ENWC 421 WILDLIFE POPULATION DYNAMICS 3
Understand population processes by combining a discussion of theory and practical applications. Studies exponential, logistic, and age specific growth as well as predation, competition, disease, harvest, and metapopulations. Model building exercises actively used to understand wildlife population dynamics. PREREQ: ENWC325.

ENWC 422 INSECT PHYSIOLOGY 4
Physiology and biochemistry of major organs and tissues of insects. Laboratory experiments on structures and their functions as adaptive responses to selective pressures. Laboratory dissections emphasizing anatomical variation within external and internal systems. PREREQ: ENWC215. RESTRICTIONS: Open only to seniors.

ENWC 423 WILDLIFE RESEARCH TECHNIQUES 3
Research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts. PREREQ: ENWC325, FREC408 or STAT200; and two courses from ENWC318, ENWC418, ENWC424 or ENWC425. COREQ: PLSC212 or PLSC402 or ENWC344. RESTRICTIONS: Open only to seniors.

ENWC 424 HERPETOLOGY 3
Comparative functional anatomy and evolution of amphibians. Emphasis on structures and their functions as adaptive responses to selective pressures. Laboratory dissections emphasizing anatomical variation within external and internal systems. PREREQ: ENWC215 and ENWC406. RESTRICTIONS: Requires permission of instructor.

ENWC 425 MAMMALOGY 3

ENWC 426 AQUATIC INSECTS 3

ENWC 427 ZOOLOGY 3
Comparison of the anatomy and physiology of vertebrates. Emphasis on evolutionary relationships and adaptations. Integration of cultural, biological, host resistance and other management strategies to achieve control in an economically and environmentally sound manner. May be cross-listed with PLSC440. PREREQ: ENWC205 and PLSC303.

ENWC 428 INSECT MANAGEMENT 3
Introduction to the theory and practice of insect management (IPM), especially of insects and plant pathogens. Integration of cultural, biological, host resistance and other management strategies to achieve control in an economically and environmentally sound manner. May be cross-listed with PLSC440. PREREQ: ENWC205 and PLSC303.

ENWC 429 INSECT STRUCTURE AND FUNCTION 4
Studies of invertebrates in the mechanics of conserving tropical biodiversity. Focuses on groups project aligning and comparing the diversity of montane cloud forests, lowland rainforests and tropical dry forests. May be cross-listed with BISC440. PREREQ: ENWC205 and PLSC303.

ENWC 430 CLOSE-UP NATURE PHOTOGRAPHY 3
Lecture-laboratory treating the collection, preservation and classification of immature stages of insects. Emphasis on holometabolous orders, with special attention to aquatic insects. May be cross-listed with PLSC440. PREREQ: ENWC215 and ENWC406.

ENWC 431 ADVANCED NATURE AND WILDLIFE PHOTOGRAPHY 3
Builds on basic principles and skills learned in ENWC351. Students develop a journal of technical aspects and intended outcome of each image and complete projects to demonstrate increased technical skill and knowledge of exposure, composition, content. PREREQ: ENWC351. RESTRICTIONS: Students must own camera equipment. Usually offered as part of international and domestic trips in Winter and Summer Sessions.

ENWC 432 WILDLIFE RESEARCH TECHNIQUES 3
Research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts. PREREQ: ENWC325, FREC408 or STAT200; and two courses from ENWC318, ENWC418, ENWC424 or ENWC425. COREQ: PLSC212 or PLSC402 or ENWC344. RESTRICTIONS: Open only to seniors.

ENWC 433 WILDLIFE RESEARCH TECHNIQUES 3
Research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts. PREREQ: ENWC325, FREC408 or STAT200; and two courses from ENWC318, ENWC418, ENWC424 or ENWC425. COREQ: PLSC212 or PLSC402 or ENWC344. RESTRICTIONS: Open only to seniors.

ENWC 434 WILDLIFE RESEARCH TECHNIQUES 3
Research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts. PREREQ: ENWC325, FREC408 or STAT200; and two courses from ENWC318, ENWC418, ENWC424 or ENWC425. COREQ: PLSC212 or PLSC402 or ENWC344. RESTRICTIONS: Open only to seniors.

ENWC 435 WILDLIFE RESEARCH TECHNIQUES 3
Research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts. PREREQ: ENWC325, FREC408 or STAT200; and two courses from ENWC318, ENWC418, ENWC424 or ENWC425. COREQ: PLSC212 or PLSC402 or ENWC344. RESTRICTIONS: Open only to seniors.

ENWC 436 WILDLIFE RESEARCH TECHNIQUES 3
Research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts. PREREQ: ENWC325, FREC408 or STAT200; and two courses from ENWC318, ENWC418, ENWC424 or ENWC425. COREQ: PLSC212 or PLSC402 or ENWC344. RESTRICTIONS: Open only to seniors.

ENWC 437 WILDLIFE RESEARCH TECHNIQUES 3
Research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts. PREREQ: ENWC325, FREC408 or STAT200; and two courses from ENWC318, ENWC418, ENWC424 or ENWC425. COREQ: PLSC212 or PLSC402 or ENWC344. RESTRICTIONS: Open only to seniors.

ENWC 438 WILDLIFE RESEARCH TECHNIQUES 3
Research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts. PREREQ: ENWC325, FREC408 or STAT200; and two courses from ENWC318, ENWC418, ENWC424 or ENWC425. COREQ: PLSC212 or PLSC402 or ENWC344. RESTRICTIONS: Open only to seniors.

ENWC 439 WILDLIFE RESEARCH TECHNIQUES 3
Research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts. PREREQ: ENWC325, FREC408 or STAT200; and two courses from ENWC318, ENWC418, ENWC424 or ENWC425. COREQ: PLSC212 or PLSC402 or ENWC344. RESTRICTIONS: Open only to seniors.

ENWC 440 INTEGRATED PEST AND DISEASE MANAGEMENT 3
Introduction to the theory and practice of integrated pest management (IPM), especially of insects and plant pathogens. Integration of cultural, biological, host resistance and other management strategies to achieve control in an economically and environmentally sound manner. May be cross-listed with PLSC440. PREREQ: ENWC205 and PLSC303.

ENWC 441 WILDLIFE RESEARCH TECHNIQUES 3
Research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts. PREREQ: ENWC325, FREC408 or STAT200; and two courses from ENWC318, ENWC418, ENWC424 or ENWC425. COREQ: PLSC212 or PLSC402 or ENWC344. RESTRICTIONS: Open only to seniors.

ENWC 442 WILDLIFE RESEARCH TECHNIQUES 3
Research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts. PREREQ: ENWC325, FREC408 or STAT200; and two courses from ENWC318, ENWC418, ENWC424 or ENWC425. COREQ: PLSC212 or PLSC402 or ENWC344. RESTRICTIONS: Open only to seniors.

ENWC 443 WILDLIFE RESEARCH TECHNIQUES 3
Research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts. PREREQ: ENWC325, FREC408 or STAT200; and two courses from ENWC318, ENWC418, ENWC424 or ENWC425. COREQ: PLSC212 or PLSC402 or ENWC344. RESTRICTIONS: Open only to seniors.

ENWC 444 WILDLIFE RESEARCH TECHNIQUES 3
Research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts. PREREQ: ENWC325, FREC408 or STAT200; and two courses from ENWC318, ENWC418, ENWC424 or ENWC425. COREQ: PLSC212 or PLSC402 or ENWC344. RESTRICTIONS: Open only to seniors.
ENWC 611  INSECT PEST MANAGEMENT  3
Principles of managing insect populations in an environmentally compatible manner to reduce losses caused by insects attacking our food, fiber, buildings, domestic animals, and human population. Diagnostic recognition, control and habits of major pest species.
PREREQ: ENWC205.

ENWC 615  WILDLIFE RESEARCH TECHNIQUES  3
Research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts. Class and individually designed field projects focus on regional wildlife and their habitats. 
PREREQ: ENWC212; FREC408 or STAT200; and two courses from ENWC318, ENWC418, ENWC424, or ENWC425.
COREQ: PSLC212 or PSLC402 or ENWC344.
RESTRICTIONS: Open to graduate students only or by permission of instructor.

ENWC 617  FIELD NATURAL HISTORY  1-3
An extended field trip or several shorter trips to natural and managed areas. Emphasis on identification and observation of biota, field notes, knowledge of natural habitats, ecological processes and wildlife conservation issues and practices. Individual projects.
RESTRICTIONS: Requires junior status and consent of instructor. Credit depends on extent of travel; maximum of three credits allowed toward major.

ENWC 618  ORNITHOLOGY  3
Avian biology: diversity, evolution, form and function, behavior and communication, reproduction and development, and conservation. Natural history and identification of taxa. Labs with frequent field trips.
PREREQ: BISC208.

ENWC 619  PRINCIPLES OF BIOLOGICAL CONTROL OF INSECTS  3
Use of beneficial organisms to manage and control populations of other organisms. Theory, practices, and case histories for manipulation of natural enemies to minimize the impact of pests.

ENWC 620  BEHAVIORAL ECOLOGY  3
Theoretical treatment of the factors that have dominated the evolution of animal behavior; hypothesis testing emphasized.
PREREQ: BISC302.

ENWC 622  TOXICOLOGY OF INSECTICIDES  3
Principles of insecticide toxicology. Classification, biochemical and physiological bases of toxic action, animal and plant metabolism, and environmental dynamics of insecticides.
PREREQ: CHEM213.

ENWC 624  HERPETOLOGY  3
Biology and ecology of reptiles and amphibians. Evolution, feeding behavior, life history, reproduction, physiology, population structure and dynamics, migration and movements, and conservation.
PREREQ: BISC302.

ENWC 625  MAMMALOGY  3
PREREQ: BISC208.
RESTRICTIONS: Open to graduate students only or by permission of instructor.

ENWC 626  AQUATIC INSECTS  3
Biology and systematics of aquatic insects with emphasis on the fauna of North America. Collection of immature aquatic insects required.
PREREQ: ENWC215.
RESTRICTIONS: Requires junior status.

ENWC 630  CLOSE-UP NATURE PHOTOGRAPHY  3
Introduction to the principles of close-up and ultra close-up photography of natural history subjects. Lens and electronic flash systems for biological photography, plus field and indoor techniques. In-class analysis of assigned student slides.
RESTRICTIONS: Requires permission of instructor.

ENWC 635  WILDLIFE POPULATION DYNAMICS  3
Studies exponential, logistic, and age specific growth as well as predation, competition, disease, and metapopulations. Model building exercises actively used to understand wildlife population dynamics.
PREREQ: ENWC325.

ENWC 640  INTEGRATED PEST AND DISEASE MANAGEMENT  3
Introduction to the theory and practice of integrated pest management (IPM), especially as it applies to insects and plant pathogens. Integration of cultural, biological, host resistance and other management strategies to achieve control in an economically and environmentally sound manner. May be cross-listed with PLSC640.
PREREQ: ENWC205 and PLSC303.

ENWC 652  CONSERVATION OF AFRICAN WILDLIFE  3

ENWC 653  COMMUNITY-BASED CONSERVATION  3
Basic philosophical, economic, and ecological aspects of the bottom-up approach to conservation. This form of conservation is experienced first-hand by living with aboriginal people and seeing how they conserve natural resources.
RESTRICTIONS: Offered only during Winter Session in Tanzania.

ENWC 655  CONSERVATION GENETICS  3
Principles of genetics applied to the conservation of animal and plant populations. Fundamentals of basic and population genetics. Examination of case studies of species from a variety of taxonomic groups. Presentation of cases by students.
PREREQ: BISC208.

ENWC 803  WRITING RESEARCH PROPOSALS  1
Conception, design and composition of M.S. and Ph.D. research proposals for professional granting agencies in the biological sciences.

ENWC 805  INSECT-PLANT CHEMICAL ECOLOGY  2
Chemically mediated interactions between insects and plants and other organisms involved in the relationship. Perceptual organs, behavioral and physiological response, plant-insect interactions, insect and plant defense, and intraspecific interactions that relate to natural chemicals produced by plants and insects.
Presentation-discussion format.
May be cross-listed with PLSC805.

ENWC 814  ADVANCED ECOLOGY  3
Interaction of animals with their environment as it influences their distribution, abundance, life history and evolution. Emphasis on primary research literature.
PREREQ: BISC302 or equivalent.

ENWC 854  PRE-CANDIDACY STUDY  1-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.
RESTRICTIONS: Not open to students who have been admitted to candidacy.

ENWC 864  DOCTORAL DISSERTATION  1-12 PF
A seminar with lectures on a variety of topics related to entomology and wildlife biology.

FASH 110  SEEING AND BEING IN A VISUAL WORLD  3
Focuses on how people see, process and respond to visual information embedded in the world, from immediate personal environments to the larger places in which we live. Creative problem solving and innovation are highlighted.

FASH 114  FASHION, STYLE AND CULTURE  3
Introduces the concepts of fashion, style, and culture as they relate to how products are conceived and developed. The impact of cultural contexts and societal diversity on apparel industry practices are considered.

FASH 122  APPAREL PRODUCT ASSEMBLY  3
Basic clothing construction procedures, fitting techniques and methods of evaluation for apparel.

FASH 213  TWENTIETH CENTURY DESIGN: ETHNIC INFLUENCE  3
Examines the culture and clothing practices of various ethnic groups and their influences on Western apparel fashion and textile arts during the 20th Century.

FASH 214  COSTUME HISTORY BEFORE 1600  3
Costume as a mirror of civilization in Western Europe and the Middle East from antiquity through the 16th century. Influence of societal, economic and aesthetic factors upon the development of costume.
FASH 215  FUNDAMENTALS OF TEXTILES I  3
Fundamental concepts related to textile materials. Emphasis on structure/property relationships in fibers. Related chemical concepts are included. 
PREREQ: CHEM102. 
RESTRICTIONS: Limited to majors only. 

FASH 217  ACCOUNTING PRACTICE FOR MERCHANDISE  3
Introduction to basic accounting principles used in the retailing of apparel and other fashion products. Emphasis placed on the retail method of inventory, perpetual and periodic systems, LIFO, FIFO, development of gross margin statement and the effects of cash/trade discounts and cumulative mark-on on profitability. 

FASH 218  FASHION MERCHANDISING  3
An overview of the fashion industry which examines the interrelationship between primary, auxiliary and retail fashion markets; trends in fashion retailing, promotion and manufacturing. 

FASH 220  FUNDAMENTALS OF TEXTILES II  3
Fundamental concepts relating to yarns, fabric structures coloration and finishes. Emphasis placed upon structural properties as they relate to end-use characteristics and finishing processes. 
PREREQ: FASH215. 
RESTRICTIONS: Fashion merchandising and apparel design majors only 

FASH 221  APPAREL STRUCTURES  3
Comparative study of foundation principles and processes of apparel design utilizing draping, flat pattern, drafting and computer-aided design techniques. Includes development of master patterns. Execution of advanced garment assembly processes. 
PREREQ: FASH122. 

FASH 222  APPAREL PRODUCT ANALYSIS  3
PREREQ: FASH122 for APD majors. 

FASH 224  CLOTHING DESIGN AND PRODUCTION: 1600 TO THE EDWARDIAN PERIOD  3
Clothing design and production in America and Western Europe since 1600. Study of craft skills, growth of ready-to-wear industry, and Haute Couture. 

FASH 233  FASHION DRAWING AND RENDERING  3
Drawing from the fashion model; emphasis on rendering clothing character, fabrics and fashion details using various media; introduction to flat sketching via computer; translation of drawings to finished fashion illustrations. 
PREREQ: ART129. 

FASH 313  MULTICULTURAL FASHION ACCESSORIES  3
Examines design and production of accessory apparel and body adornment objects created by cultures throughout the world. Ornamental and functional accessories from African, Asian, Indian, American and Far Eastern cultures are emphasized. Students produce accessories inspired by self-conducted research. 
PREREQ: FASH122. 

FASH 314  APPAREL DESIGN BY FLAT PATTERN  3
Advanced pattern-making techniques using both traditional and computer-aided design methods. Design and execution of apparel based on variations of the torso block. Execution of apparel utilizing dressmaker tailoring techniques. 
PREREQ: FASH221. 

FASH 318  FASHION MERCHANDISE PRODUCTS  3
Examines various types of fashion merchandise including the range of characteristics, sources and manufacturing processes. Emphasis on leather, furs, jewelry, kitchen and home furnishings, and allied merchandise areas. 

FASH 319  DRESSING AND CULTURE  3
Examination of similarities and differences in the dress of culturally distinct groups: analysis of functions served by dress and factors influencing changes in cultural forms of dress. 
PREREQ: PSYC100 and SOCI201. 

FASH 320  FASHION AND APPAREL INTERNSHIP  3-6
An off-campus supervised and coordinated field study program in fashion/apparel related areas. 
RESTRICTIONS: Requires permission of instructor. Students must register for 3 or 6 credits. May be repeated once for a maximum of 6 credits total. 

FASH 321  TRAVEL STUDY PROGRAM  1-6
Study of the domestic and/or international textiles, apparel, interior and allied fashion industries through visits and research projects. 
RESTRICTIONS: Requires FASH faculty approval through an application process. Offered at regular intervals. 

FASH 322  RETAIL DESIGN AND CONSUMER BEHAVIOR  3
Exploration of the effects of retail design on consumer behavior: logos, packaging, point-of-purchase display, signage, personnel and store layout are examined. May be cross-listed with HRIM322. 

FASH 324  APPAREL DESIGN BY DRAPING  3
Exploration of three dimensional methods of apparel design. Design and execution of draped garment structures required. 
PREREQ: FASH314. 

FASH 325  PRESENTATION TECHNIQUES  3
Development of oral, written, graphic, problem-solving and personal skills for professional presentations. Techniques include computer graphics, photography, as well as audio and video applications as they relate to professional presentations. 

FASH 328  FASHION ADVERTISING AND PROMOTION  3
An introduction to advertising and promotion in the fashion industry. Emphasis is on the role of advertising and other promotional mix elements that support an integrated marketing communications (IMC) program in the textiles and apparel industry. 
PREREQ: FASH218, FASH318, BUAD301. 

FASH 333  FASHION FORECASTING AND DESIGN  3
Introduction to trend research, presentation, and collection design for targeted markets. Utilizes advanced techniques in computer graphics and web development for fashion design, emphasizing concept development, visualization, storyboard layout, and design presentation. 
PREREQ: FASH233. 

FASH 365  FASHION MERCHANDISING AND APPAREL DESIGN SEMINAR  1 PF
Creates awareness of career opportunities and develops techniques for success in apparel design and textile clothing career options. 
RESTRICTIONS: APD and FM majors only. 

FASH 366  INDEPENDENT STUDY  1-6

FASH 380  PRODUCT DEVELOPMENT  3
Introduces concepts and methods used by buyers/merchandisers to create store-branded merchandise for targeted customer segments. The process of developing products, from trend research to production to distribution, is studied. 
PREREQ: FASH218, FASH222. 

FASH 415  TOPICS IN TEXTILES  3
One topic is covered each semester; either fiber science, textile analysis, or textile dyeing and finishing. 

FASH 416  MULTI-CHANNEL MERCHANDISING  3
Examines the scope and application of retail delivery systems including direct marketing technologies. Target market segmentation and product fulfillment are examined as they apply to the fashion industry. 
PREREQ: FASH218, FASH318. 

FASH 418  MERCHANDISE PLANNING  4
Focuses on computer applications related to mathematical concepts and calculations used in developing merchandise budgets. Spreadsheets are used to develop merchandise plans for sales, inventories, markdowns, shrinkage, receipts, open-to-buy and gross margin. Other industry-related planning systems are examined. 
PREREQ: FASH218, BUAD301, ACCT207 or FASH217, and ACCT160. 

FASH 419  SOCIAL PSYCHOLOGICAL ASPECTS OF CLOTHING  3
Study of clothing and appearance as contributors to human interactions; consideration of the importance of clothing in individual and collective behavior. Analysis of how dress reflects self-feelings, establishes social identities and affects interpersonal encounters. 
PREREQ: FASH114, PSYC100 and SOCI201. 

FASH 420  ASSORTMENT PLANNING AND BUYING STUDIO  2
Explores how merchandise budgets translate into buying decisions. Emphasis on assortment planning and purchasing. Computer applications are involved. 
PREREQ: FASH418. 

FASH 421  PROFESSIONAL PORTFOLIO DEVELOPMENT  1
Conceptualization and development of a professional portfolio of design work. Design conceptualization, fashion illustration, and photo documentation techniques emphasized. 
PREREQ: FASH424. 
RESTRICTIONS: Open to apparel design seniors only. 

FASH 424  APPAREL COLLECTION DEVELOPMENT  3
Conceptualization, design and execution of a coordinated apparel collection. Advances and expands knowledge and skills from previous courses. 
PREREQ: FASH324.
FASH 426 FUNDAMENTALS OF TEXTILE CONSERVATION 3
Introduces scientific principles relevant to the cleaning, repair, storage and exhibition of antique textiles. Evaluates treatment procedures that eliminate damaging agents, retard their effects, or shield textiles from them.

FASH 430 TOPICS IN FASHION MARKETING AND PROMOTION 3
Topics related to aspects of marketing and promotional activities in the fashion industry. Current practices and trends within the industry are explored. Topics vary. PREREQ: FASH218, BUAD301.

FASH 433 PRODUCT DEVELOPMENT AND MANAGEMENT STUDIO 3
Focuses on all phases of apparel product development for a targeted market from conceptualization through execution of sample garments for mass production. Further develops skills in computer-aided pattern designing, grading, marker making and data management (e.g., sizing, specifications, operations and costing). Includes field trips. PREREQ: FASH314, FASH533.

FASH 455 TEXTILES AND APPAREL IN THE GLOBAL ECONOMY 3
Overview of the global textile and apparel industries. Examines the United States textile complex and the United States market within an international context. PREREQ: FASH218, ECON151 or ECON152.

FASH 465 SEMINAR 1-3 PF
RESTRICTIONS: May be repeated to a maximum of three credits.

FASH 466 INDEPENDENT STUDY 1-6

FINANCE

FINC 200 FUNDAMENTALS OF FINANCE 3
Provides non-business majors with an overview of the role of finance within a business organization. Topics include financial statement analysis, time value of money, capital budgeting, valuation and the cost of capital.

FINC 201 INTRODUCTION TO INVESTMENTS 3
Provides non-business majors with an overview of the principles and theory of investments and financial markets. Topics include the analysis of investment opportunities and the management of investment portfolios.

FINC 311 PRINCIPLES OF FINANCE 3
Introduces the fundamental techniques and concepts related to the financial management of business firms. Topics include the time value of money, valuation, capital budgeting, working capital management, cost of capital, capital structure analysis, short and long term financing.

FINC 312 INTERMEDIATE FINANCIAL MANAGEMENT 3
Focuses on the role of the corporate financial manager in shareholder wealth maximization. Enhances the understanding of material covered in FINC311 through the application of analytical methods, cases and the effective use of information technology in a contemporary financial environment.

FINC 313 FINANCIAL MARKETS 3
Analyses domestic and international financial markets and examines the characteristics of market makers such as investment bankers, brokers, and dealers. The focus is on the fixed income financial instruments used in money and capital markets with emphasis on relevant risk, liquidity, and risk-return trade-offs.

FINC 314 INVESTMENTS 3
Examines the valuation of securities, the functioning of securities markets and the theory and practice of modern portfolio management. Topics include advanced techniques in security valuation, standards and practices in investment management, portfolio evaluation standards and applications using real-time data.

FINC 392 SEMINAR ON INTERNATIONAL FINANCIAL MANAGEMENT 3
Seminar at an overseas location on selected topics in international financial management. Combines lectures and visits to local organizations. Research paper. PREREQ: FINC311.

FINC 412 FINANCIAL INSTITUTIONS 3
Examines various types of financial institutions. Topics include structure, performance, asset/liability management, regulation and current issues that impact operational structures.

FINC 413 ADVANCED CORPORATE FINANCE 3
Examines such areas as financial theory, practice, financial analysis, financial benchmarking, and small business finance. Topics vary by semester.

FINC 414 BANK MANAGEMENT 3
Examines the management of commercial banks and similar institutions. Topics include funds and capital management, liquidity and credit standards, and lending and trust operations.

FINC 415 INTERNATIONAL FINANCE 3
Examines the international monetary environment and its impact on financial planning for the firm. Topics include exchange rates, currency restrictions, tax regulations, direct investment theory, capital budgeting, financing, risk management, and working capital management.

FINC 416 DERIVATIVE SECURITIES AND RISK MANAGEMENT 3
Examines the trading, valuation and theory of pricing futures and forward contracts, options, swaps and other derivative securities. Emphasis is placed on the use of derivatives for hedging and risk management.

FINC 417 REAL ESTATE FINANCE 3
Introduces real estate theory and management. Topics include financing, evaluation and property management, housing policy, and governmental regulation and participation.

FINC 418 SEMINAR IN CORPORATE GOVERNANCE 3
Examines current issues in corporate governance. Topics include executive compensation, shareholder resolutions and board of director ownership and accountability.

FINC 850 FINANCIAL MANAGEMENT 3
Provides an introduction to the fundamental concepts of the finance function with an emphasis on the decision-making techniques relevant to financial and nonfinancial managers. Topics include valuation, risk and return, capital budgeting, cost of capital, financial analysis and planning, and working capital management.

FINC 851 CORPORATE FINANCIAL ANALYSIS 3
Examines major policy-making areas in corporate finance and the impact of alternative policies on the value of the firm. Emphasis is placed on strengthening financial decision-making skills. Advanced topics include capital investment policy, financing and capital structure policies, dividend policy, and corporate control.

FINC 852 INVESTMENT ANALYSIS AND PORTFOLIO MANAGEMENT 3
Examines the role and functioning of securities markets, valuation techniques, and the theory and practice of portfolio management. Topics include portfolio construction and evaluation metrics, relative valuation techniques and an introduction to derivative security pricing.

FINC 853 INTERNATIONAL FINANCIAL MANAGEMENT 3
Examines the financial management of multinational firms and the interrelationships between financial planning and the international economic environment. Topics include direct investment theory, capital budgeting, financing and capital investments, risk management and working capital management.

FINC 854 SPECIAL TOPICS IN FINANCE 1-3
Examines selected topics of current interest in various areas of finance, including corporate financial management, investment analysis and portfolio management, or financial institutions and markets.

FINC 855 FINANCIAL INSTITUTIONS AND MARKETS 3
Examines the nature, purpose, and management of financial institutions and markets.
FINC 856  FINANCIAL ENGINEERING AND RISK MANAGEMENT  3
Introduces the pricing, trading and use of derivative securities (forwards, futures, swaps and options contracts), emphasizing the management of risk arising from the volatility of exchange rates, interest rates and commodity and equity prices. 
PREREQ: FINC850.

FINC 858  CORPORATE GOVERNANCE  3
Introduces issues pertaining to corporate governance and oversight, and examines topics of current interest concerning the relationships between corporate boards, company management, and shareholders. 
PREREQ: FINC850.

FINC 859  SEMINAR IN FINANCE  3
Emphasis is on financial research and the application of alternative research methods to a project or current interest. Involves individual inquiry, written communication of results, and presentation of findings by each student. 
PREREQ: Six credit hours of graduate work in finance. 
RESTRICTIONS: Requires 24 M.B.A. credit hours.

FINC 860  FINANCING NEW VENTURES  1
Explores issues associated with financing new ventures, focusing on the economics of the venture, the characteristics of private equity and bank financing deals involving private companies. Designed for those planning to manage start-up firms as well as those who plan to work in the private equity industry. 
PREREQ: FINC850. 
RESTRICTIONS: May only be taken as part of the New Venture Creation Concentration.

FOREIGN LANGUAGES AND LITERATURES

FLLT 100  ESSENTIAL FOREIGN LANGUAGE: LANGUAGE  1 PF
Basic, practical vocabulary and idiomatic expressions for beginners in the Foreign Language (e.g. French, Spanish, Chinese, Bulgarian, Hungarian) during Winter or Summer Session abroad. 
RESTRICTIONS: Open only to students who have never studied the language or have had less than two years in high school. Not for major credit. Taught abroad only.

FLLT 101  ESSENTIAL FOREIGN LANGUAGE: LANGUAGE  2 PF
Basic, practical vocabulary and idiomatic expressions for beginners in the Foreign Language (e.g. French, Spanish, Chinese, Hungarian, Swedish, etc.), and an introduction to the foreign culture. 
RESTRICTIONS: Open only to students who have never studied the language or have had less than two years in high school. Not for major credit. Taught abroad only.

FLLT 105  MODERN LANGUAGE I - ELEMENTARY  4
Various modern languages outside normal departmental offerings, e.g., Korean, Modern Greek. An introduction to the language and a development of speaking, listening, reading and writing skills through the use of basic texts.

FLLT 106  MODERN LANGUAGE II - ELEMENTARY/INTERMEDIATE  4
Completion of the basic modern language. Increasing mastery of the basic skills (speaking, listening, reading and writing). PREREQ: FLLT105.

FLLT 107  MODERN LANGUAGE III - INTERMEDIATE  4
Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty. PREREQ: FLLT106. 
RESTRICTIONS: Satisfies Arts and Sciences foreign language requirement.

FLLT 202  BIBLICAL AND CLASSICAL LITERATURE  3
See ENGL202 for course description.

FLLT 203  LANGUAGES OF THE WORLD  3
See LING203 for course description.

FLLT 309  POLITICAL CULTURE BY COUNTRY  3
See POSC309 for course description. 
RESTRICTIONS: Offered only in conjunction with travel abroad programs. May be repeated for credit when topics vary.

FLLT 316  CLASSICAL MYTHOLOGY  3
Cosmological myths and heroic sagas in the literature and art of Greece and Rome. The influence of the mythology in later art and literature. 
May be cross-listed with CMIT316. 
RESTRICTIONS: Open to first-year students.

FLLT 320  VARYING AUTHORS AND GENRES  3
Cultural, especially cross-cultural and/or interdisciplinary studies with primary emphasis on the aesthetic context of the announced topic, e.g., Nordic Saga and Myth; Courtly Love; and the European Postwar Novel. 
May be cross-listed with CMIT320 and/or WOMS320. 
RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 321  TOPICS: CHINESE LITERATURE IN TRANSLATION  3
Study of the works of one or more outstanding authors or of a special theme. Taught in English. Topics vary and are announced in registration booklet. 
May be cross-listed with WOMS321. 
RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 322  TOPICS: CLASSICAL LITERATURE IN TRANSLATION  3
Special topics in Greek and Roman culture and civilization. Particular areas and writers to be announced, e.g., ancient epic, ancient drama, Greek literature in translation. 
May be cross-listed with CMIT322 and/or WOMS322. 
RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 324  TOPICS: FRENCH LITERATURE IN TRANSLATION  3
Study of the works of one or more outstanding authors or of a special theme. Taught in English. Topics vary and are announced in registration booklet. 
RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 325  TOPICS: GERMAN LITERATURE IN TRANSLATION  3
Study of the works of one or more outstanding authors or of a special theme. Taught in English. Topics may vary and are announced in registration booklet. 
RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 326  TOPICS: HISPANIC LITERATURE IN TRANSLATION  3
Study of the works of one or more outstanding authors or of a special theme. Taught in English. Topics vary and are announced in registration booklet. 
RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 327  TOPICS: RUSSIAN LITERATURE IN TRANSLATION  3
Study of the works of one or more outstanding authors or of a special theme. Taught in English. Topics may vary and are announced in registration booklet. 
RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 328  TOPICS: JAPANESE LITERATURE IN TRANSLATION  3
Study of the works of one or more outstanding authors or of a special theme. Taught in English. Topics vary and are announced in registration booklet. 
RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 329  TOPICS: ITALIAN LITERATURE IN TRANSLATION  3
Study of the works of one or more outstanding authors or of a special theme. Taught in English. 
May be cross-listed with WOMS329. 
RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 330  VARYING AUTHORS, THEMES AND MOVEMENTS  3
Cultural, especially cross-cultural, study with primary emphasis on the historical development of the announced area, e.g., The Faust Theme in Western Literature, Dante Through the Ages, Don Juan, and the Transformation of a Myth. 
Topics vary and are announced in registration booklet. 
May be cross-listed with CMIT330 and/or WOMS330. 
RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 331  INTRODUCTION TO CHINESE FILMS  3
Inquiry into Chinese films from the prewar period to the present. Both aesthetic and technical elements of film production and reception featured. Discussion intensive.

FLLT 338  LIGHT AND SHADOW - JAPANESE FILMS  3
Inquiry into Japanese films from the immediate postwar period to the present. Both aesthetic and technical elements of film production and reception featured. Discussion intensive.

FLLT 360  HUMANITIES COLOQUIUM  3
Papers and discussion by faculty members and students participating in Humanities Semester offerings. Interdisciplinary approach.

FLLT 366  INDEPENDENT STUDY  1-6

FLLT 375  TOPICS: RUSSIAN AND SOVIET CULTURE IN TRANSLATION  3
Special topics in Russian and Soviet culture. Taught in English. Topics vary and are announced in registration booklet. 
May be cross-listed with WOMS375. 
RESTRICTIONS: May be repeated for credit when topics vary.
**FLLT 380**  **Topics: Japanese Culture in Translation**  
Special topics in Japanese culture. Taught in English. Topics vary and are announced in registration booklet.  
RESTRICTIONS: May be repeated for credit when topics vary.

**FLLT 383**  **Topics: Chinese Culture in Translation**  
Special topics in Chinese culture. Taught in English. Topics vary and are announced in registration booklet.  
RESTRICTIONS: May be repeated for credit when topics vary.

**FLLT 401**  **Historical Linguistics**  
See LING401 for course description.  
PREREQ: Completion of two years of a college language.

**FLLT 421**  **Methods of Teaching Foreign Languages**  
Description, discussion and analysis of techniques pertinent to the teaching and learning of foreign languages. Emphasis on contributions of contemporary linguistic science.  
May be cross-listed with LING421.

**FLLT 422**  **Language Syllabus Design**  
Study of approaches to language syllabus design and materials development, including grammatically sequenced, situational, functional-functional and task-based approaches. Topics: materials development, textbook evaluation and adaptation, design and implementation of learning units for second-language special purpose and bilingual learners. Includes one and a half hour weekly practicum and 25 hours of observation in high school classrooms.  
May be cross-listed with LING422.

**FLLT 424**  **Second Language Testing**  
Study of the principles and techniques of second-language testing, including measurement of the four skills and of communicative competence. Bilingual measures. Practice in item construction and analysis.  
May be cross-listed with LING424.

**FLLT 429**  **Methods of Teaching Foreign/Second Languages in Elementary Schools**  
Familiarizes students with appropriate teaching methods and techniques for the elementary foreign language classroom. Includes demonstrations by experienced FLES teachers, peer-analysis of video-taped model lessons prepared by participants, and an introduction to testing, materials and course design.  
May be cross-listed with EDUC429.

**FLLT 436**  **Politics and Literature**  
See POSC436 for course description.

**FLLT 466**  **Independent Study**  
1-6

**FLLT 475**  **Varying Topics: Literary Criticism in a Foreign Language Context**  
Overview of literary criticism with special emphasis on criticism important to French, Spanish, Italian, Russian and German literatures. May be organized as an historical survey or as a survey of a particular period, including the contemporary period.  
May be cross-listed with EDUC475.

**FLLT 601**  **Historical Linguistics**  
See LING601  
PREREQ: Completion of two years of a college language.

**FLLT 621**  **Methods of Teaching Foreign Languages**  
Description, discussion and analysis of techniques pertinent to the teaching and learning of foreign languages. Emphasis on contributions of contemporary linguistic science. Includes demonstrations and practical exercises.  
May be cross-listed with LING621.

**FLLT 622**  **Language Syllabus Design**  
Study of approaches to language syllabus design and materials development, including grammatically sequenced, situational, functional-functional and task-based approaches. Topics: materials development, textbook evaluation and adaptation, design and implementation of learning units for second-language special purpose and bilingual learners.  
May be cross-listed with LING622.

**FLLT 623**  **Principles of Foreign Language**  
Current perspectives on foreign language instruction and extensive hands-on experience with the implementation of effective language teaching strategies. Emphasis given to the enhancement of students’ proficiency in class planning, syllabus design and materials preparation.  
RESTRICTIONS: Graduate students only.
<table>
<thead>
<tr>
<th>Course CODE</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOSC 329</td>
<td>Food Analysis</td>
<td>4</td>
<td>May be cross-listed with ANSC 329.</td>
</tr>
<tr>
<td></td>
<td>Theory and practice of food analysis.</td>
<td></td>
<td>Determine the chemical composition and characteristics of food. Introduction to instrumention; spectrometry, chromatography, electrophoresis, enzyme analysis and titration. Critically examine food analytical methods and data from journal articles including official AOAC and AACC methods and prepare scientific reports and presentations including a scientific poster. May be cross-listed with ANSC 329.</td>
</tr>
<tr>
<td>FOSC 359</td>
<td>Topics in Food Science</td>
<td>1</td>
<td>Students select a topic in food science, search the literature or other sources for information on the topic, critically examine the information and prepare a presentation to the class. Work is done in groups or individually. Opportunities to discuss careers are provided.</td>
</tr>
<tr>
<td>FOSC 366</td>
<td>Independent Study</td>
<td>1-6</td>
<td>RESTRICTIONS: Contract must have department chair signature. Independent study to involve library or lab research.</td>
</tr>
<tr>
<td>FOSC 399</td>
<td>Teaching Assistant</td>
<td>1-2 PF</td>
<td>Practical teaching experience. Students participate and assist in instruction of undergraduate course.</td>
</tr>
<tr>
<td>FOSC 409</td>
<td>Food Processing</td>
<td>4</td>
<td>Covers the rationale and history of food processing; organizing unit operations; the maintenance of food quality including food palatability and nutritive value; separation technology including initial operations, size reduction, mixing, filtration, centrifugation and crystallization; and preservation methods including fresh food storage, low temperature and high temperature methods. May be cross-listed with ANSC 409.</td>
</tr>
<tr>
<td>FOSC 411</td>
<td>Food Science Capstone</td>
<td>4</td>
<td>A team-taught capstone for seniors to complete food science learning experience by participating in a food product development team that simulates the real-world operation and requires integrated knowledge in areas of general food science, food chemistry, food analysis, food microbiology and food processing. PREREQ: FOSC 328, FOSC 329, FOSC 409 and FOSC 439.</td>
</tr>
<tr>
<td>FOSC 439</td>
<td>Food Microbiology</td>
<td>4</td>
<td>The role and significance of microorganisms in foods with particular reference to food spoilage, preservation, fermentation, sanitation and poisoning. Current methodology used in the microbiological examination of foodstuffs. PREREQ: BISC 300.</td>
</tr>
<tr>
<td>FOSC 445</td>
<td>Food Engineering Technology</td>
<td>4</td>
<td>Engineering fundamentals for processing of food materials, including applied thermodynamics and heat transfer principles and operations. May be cross-listed with EGTE 445. PREREQ: MATH 222, and PHYS 104 or PHYS 201. RESTRICTIONS: Not open to majors in mechanical or chemical engineering.</td>
</tr>
<tr>
<td>FOSC 449</td>
<td>Food Biotechnology</td>
<td>4</td>
<td>Traditional food biotechnology and biotechnology based on genetic engineering are explored through in-depth study of current examples. Technical, economic and social aspects of biotechnology are researched and analyzed through individual and group assignments and lectures. Field trips provide a view of local biotechnology enterprises. PREREQ: BISC 300, CHEM 214 or CHEM 227, or FOSC 439.</td>
</tr>
<tr>
<td>FOSC 464</td>
<td>Practicum in the Food Industry</td>
<td>1-3</td>
<td>Provides hands-on supervised practice in research, processing equipment and methodology, product development and testing, and/or other activities in the food industry. RESTRICTIONS: May be repeated once for credit. Separate application form for off campus or campus courses.</td>
</tr>
<tr>
<td>FOSC 466</td>
<td>Independent Study</td>
<td>1-6</td>
<td>RESTRICTIONS: Contract must have department chair signature. Independent study to involve library or lab research.</td>
</tr>
<tr>
<td>FOSC 609</td>
<td>Food Processing</td>
<td>4</td>
<td>Rational and history of food processing; organizing unit operations; maintenance of food quality including food palatability and nutritive value; separation technology including initial operations, size reduction and screening, mixing, filtration, centrifugation and crystallization; and preservation methods including fresh food storage, low temperature and high temperature methods.</td>
</tr>
<tr>
<td>FOSC 611</td>
<td>Food Science Capstone</td>
<td>4</td>
<td>A team-taught capstone for graduate students to advance food science training by participating in a food product development team that simulates the real-world operation and requires integrated knowledge in the areas of general food science, food chemistry, food analysis, food microbiology and food processing.</td>
</tr>
<tr>
<td>FOSC 628</td>
<td>Food Chemistry</td>
<td>4</td>
<td>Composition of food materials, reaction mechanisms leading to deterioration, interaction of food components to form desirable and undesirable products, pigments, characterization of food polymers. Effect of physical and chemical factors on the structure and functionality of food.</td>
</tr>
<tr>
<td>FOSC 629</td>
<td>Food Analysis</td>
<td>4</td>
<td>Theory and practice of food analysis. Determine the chemical composition and characteristics of food. Introduction to spectroscopy, chromatography, electrophoresis, enzyme analysis and titration. Examine food analytical methods and data from journal articles including official AOAC and AACC methods. Prepare scientific reports and presentations including a scientific poster. May be cross-listed with ANSC 629.</td>
</tr>
<tr>
<td>FOSC 639</td>
<td>Food Microbiology</td>
<td>4</td>
<td>The role and significance of microorganisms in foods with particular reference to food spoilage, preservation, fermentation, sanitation and poisoning. Current methodology used in the microbiological examination of foodstuffs. May be cross-listed with ANSC 639. PREREQ: BISC 300.</td>
</tr>
<tr>
<td>FOSC 645</td>
<td>Food Engineering Technology</td>
<td>4</td>
<td>Engineering fundamentals for processing of food materials, including applied thermodynamics and heat transfer principles and operations. PREREQ: MATH 222 and PHYS 201. RESTRICTIONS: Not open to majors in mechanical or chemical engineering.</td>
</tr>
<tr>
<td>FOSC 649</td>
<td>Food Biotechnology</td>
<td>4</td>
<td>Traditional food biotechnology and biotechnology based on genetic engineering are explored through in-depth study of current examples. Technical, economic and social aspects of biotechnology are researched and analyzed through individual and group assignments and lectures. Field trips provide a view of local biotechnology enterprises.</td>
</tr>
<tr>
<td>FOSC 665</td>
<td>Seminar</td>
<td>1-3</td>
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<tr>
<td>FOSC 668</td>
<td>Research</td>
<td>1-6</td>
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</tr>
<tr>
<td>FOSC 869</td>
<td>Master's Thesis</td>
<td>1-6</td>
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## Food and Resource Economics

<table>
<thead>
<tr>
<th>Course CODE</th>
<th>Course Title</th>
<th>Credits</th>
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</tr>
</thead>
<tbody>
<tr>
<td>FREC 100</td>
<td>Issues in Natural Resources and the Environment</td>
<td>3</td>
<td>Surveys pressing issues in the management of natural resources, environmental protection, and international development. Requires critical evaluation of these issues by applying basic policy analysis, considering the ethical dimensions of policy, and drawing on economic indicators of environmental quality and human health. RESTRICTIONS: Students with majors in the College of Agricultural and Natural Resources cannot use this course to satisfy the Agricultural and Biological Sciences requirement in their major.</td>
</tr>
<tr>
<td>FREC 110</td>
<td>Introduction to Food and Agribusiness Industry</td>
<td>1</td>
<td>Introduction to the food and agribusiness industry. The economic structure and importance of the industry is discussed.</td>
</tr>
<tr>
<td>FREC 135</td>
<td>Introduction to Data Analysis</td>
<td>3</td>
<td>Introduction to computer systems, with an emphasis on microcomputer systems, and their use to process and analyze data. Emphasis on application programs used in agricultural sciences including spreadsheets, graphics, database management, electronic communications and word processing.</td>
</tr>
<tr>
<td>FREC 150</td>
<td>Economics of Agriculture and Natural Resources</td>
<td>3</td>
<td>Introduction to economic and management principles and their applications to agriculture, including agribusiness, natural resources and the environment. RESTRICTIONS: Not open to juniors and seniors.</td>
</tr>
<tr>
<td>FREC 201</td>
<td>Records and Accounts</td>
<td>3</td>
<td>Introductory course. Emphasis on concepts and principles and the uses of accounting for control and decision-making purposes. RESTRICTIONS: Designed for non-business and non-accounting majors.</td>
</tr>
<tr>
<td>FREC 212</td>
<td>Food Retailing and Consumer Behavior</td>
<td>3</td>
<td>Topics include consumer market environment, demographic characteristics of the population, food retail marketing and financial strategies, product merchandising planning, new product development strategies and site location analysis.</td>
</tr>
<tr>
<td>FREC 240</td>
<td>Quantitative Methods in Agricultural Economics</td>
<td>3</td>
<td>Basic quantitative applications of agricultural economics principles and theory. Determination of market equilibria and optimization of static models. PREREQ: MATH 115, and FREC 150 or ECON 151.</td>
</tr>
</tbody>
</table>

409
## Role of Foreign Trade in Development Process

Increasing agricultural productivity and food supply in developing countries. Biotechnology issues include consumer acceptance, labeling, risk assessment, market structure, trade, patents, and environmental impacts. Current technologies and future trends are examined.

### Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>FREC 270</td>
<td>Biotech: Science and Socioeconomic Issues</td>
<td>3</td>
</tr>
<tr>
<td>FREC 302</td>
<td>Management of Agribusiness Firms</td>
<td>3</td>
</tr>
<tr>
<td>FREC 305</td>
<td>Management and Leadership Development</td>
<td>3</td>
</tr>
<tr>
<td>FREC 316</td>
<td>Economics of Biotechnology and New Technologies</td>
<td>3</td>
</tr>
<tr>
<td>FREC 335</td>
<td>Advanced Data Management</td>
<td>3</td>
</tr>
<tr>
<td>FREC 345</td>
<td>Strategic Selling and Buyer Communication</td>
<td>3</td>
</tr>
<tr>
<td>FREC 350</td>
<td>Farm Management</td>
<td>3</td>
</tr>
<tr>
<td>FREC 366</td>
<td>Independent Study</td>
<td>1-6</td>
</tr>
<tr>
<td>FREC 404</td>
<td>Food and Fiber Marketing</td>
<td>3</td>
</tr>
<tr>
<td>FREC 406</td>
<td>Agricultural and Natural Resource Policy</td>
<td>3</td>
</tr>
<tr>
<td>FREC 408</td>
<td>Statistical Research Methods I</td>
<td>3</td>
</tr>
<tr>
<td>FREC 409</td>
<td>Research Methods II</td>
<td>3</td>
</tr>
<tr>
<td>FREC 410</td>
<td>International Agricultural Trade and Marketing</td>
<td>3</td>
</tr>
<tr>
<td>FREC 412</td>
<td>Strategic Marketing Competition</td>
<td>1-3</td>
</tr>
<tr>
<td>FREC 420</td>
<td>Agriculture in Economic Development</td>
<td>3</td>
</tr>
<tr>
<td>FREC 424</td>
<td>Resource Economics</td>
<td>3</td>
</tr>
<tr>
<td>FREC 427</td>
<td>Agribusiness Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>FREC 429</td>
<td>Community Economic Development</td>
<td>3</td>
</tr>
<tr>
<td>FREC 430</td>
<td>Establishing and Managing a Food and Agribusiness Enterprise</td>
<td>3</td>
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<tr>
<td>FREC 435</td>
<td>Advanced Data Management</td>
<td>3</td>
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<tr>
<td>FREC 444</td>
<td>Economics of Environmental Management</td>
<td>3</td>
</tr>
<tr>
<td>FREC 450</td>
<td>Topics in Environmental Law</td>
<td>3</td>
</tr>
<tr>
<td>FREC 464</td>
<td>Agribusiness Internship</td>
<td>1-3</td>
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<tr>
<td>FREC 465</td>
<td>Seminar</td>
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<td>FREC 466</td>
<td>Independent Study</td>
<td>1-6</td>
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<tr>
<td>FREC 471</td>
<td>Futures and Option Markets</td>
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<tr>
<td>FREC 480</td>
<td>Geographic Information Systems in Natural Resource Management</td>
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<tr>
<td>FREC 492</td>
<td>Agriculture in Economic Development</td>
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<td>FREC 494</td>
<td>Resource Economics</td>
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<td>FREC 497</td>
<td>Financial Management</td>
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<td>FREC 500</td>
<td>Geographic Information Systems in Natural Resource Management</td>
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<td>FREC 510</td>
<td>International Agricultural Trade and Marketing</td>
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<tr>
<td>FREC 512</td>
<td>Strategic Marketing Competition</td>
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<tr>
<td>FREC 520</td>
<td>Agriculture in Economic Development</td>
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<tr>
<td>FREC 524</td>
<td>Resource Economics</td>
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<td>FREC 527</td>
<td>Agribusiness Financial Management</td>
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<td>FREC 529</td>
<td>Community Economic Development</td>
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<td>FREC 530</td>
<td>Establishing and Managing a Food and Agribusiness Enterprise</td>
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<td>FREC 535</td>
<td>Advanced Data Management</td>
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<td>FREC 544</td>
<td>Economics of Environmental Management</td>
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<td>FREC 550</td>
<td>Topics in Environmental Law</td>
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<td>FREC 564</td>
<td>Agribusiness Internship</td>
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<td>FREC 565</td>
<td>Seminar</td>
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<td>FREC 566</td>
<td>Independent Study</td>
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<tr>
<td>FREC 571</td>
<td>Futures and Option Markets</td>
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<td>FREC 580</td>
<td>Geographic Information Systems in Natural Resource Management</td>
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<td>FREC 592</td>
<td>Agriculture in Economic Development</td>
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<td>FREC 594</td>
<td>Resource Economics</td>
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<td>FREC 597</td>
<td>Financial Management</td>
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<td>FREC 600</td>
<td>Independent Study</td>
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<td>FREC 604</td>
<td>Geographic Information Systems in Natural Resource Management</td>
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<td>FREC 608</td>
<td>Statistical Research Methods</td>
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<tr>
<td>FREC 611</td>
<td>Regional Watershed Management</td>
<td>3</td>
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<tr>
<td>FREC 615</td>
<td>Advanced Pricing and Statistics</td>
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<tr>
<td>FREC 674</td>
<td>Applied Data Base Management</td>
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<tr>
<td>FREC 682</td>
<td>Spatial Analysis of Natural Resources</td>
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<td>Course Code</td>
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<tr>
<td>FREC 801</td>
<td>Applied Demand and Marketing Analysis</td>
<td>3</td>
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<tr>
<td></td>
<td>Deals with research techniques and procedures in applied economics with focus on empirical applications of economic theory and econometric tools in consumer demand and marketing analysis.</td>
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<tr>
<td>FREC 806</td>
<td>Research Techniques and Procedures</td>
<td>3</td>
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<tr>
<td></td>
<td>Planning research projects with emphasis on methods of collecting and analyzing data, and the presentation of results. A problems course. May be cross-listed with ORES806. PREREQ: FREC608.</td>
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<tr>
<td>FREC 810</td>
<td>International Agricultural Trade Special Topics</td>
<td>3</td>
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<tr>
<td></td>
<td>Advanced theory, issues and policies in international agricultural trade emphasizing international finance and agriculture, agricultural trade and development, empirical and methodological issues and international market modeling. May be cross-listed with ORES810.</td>
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<tr>
<td>FREC 826</td>
<td>Issues in Domestic and Foreign Rural Development</td>
<td>3</td>
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<tr>
<td></td>
<td>Rural economic development in the United States and in developing countries; growth vs development issues, government policies, analytical techniques - export base, shift share, input-output, growth and development models; empirical analysis and case studies.</td>
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<tr>
<td>FREC 827</td>
<td>Advanced Production Economics</td>
<td>3</td>
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<tr>
<td></td>
<td>Specification, identification and estimation of dual models for use in the evaluation, hypothesis testing and control of firm-level technological and production problems. May be cross-listed with ECON827 and/or ORES827. PREREQ: ECON801 and an econometrics/statistics course. RESTRICTIONS: Requires permission of instructor.</td>
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<tr>
<td>FREC 834</td>
<td>Seminar in Resource Economics</td>
<td>3</td>
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<tr>
<td></td>
<td>Quantitative analyses of natural resource markets, resource depletion and the design of optimal management strategies. May be cross-listed with ORES834.</td>
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<tr>
<td>FREC 868</td>
<td>Research</td>
<td>1-9</td>
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<tr>
<td>FREC 869</td>
<td>Master's Thesis</td>
<td>1-6</td>
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**FREN**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>FREN 101</td>
<td>Elementary French I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Introduction to the French language and development of speaking, listening, reading and writing skills through the use of basic texts.</td>
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</tr>
<tr>
<td>FREN 102</td>
<td>Elementary French II</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Completion of basic French. PREREQ: FREN101 or FREN105.</td>
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</tr>
<tr>
<td>FREN 105</td>
<td>French I - Elementary</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Introduction to the French language and development of speaking, listening, reading and writing skills through the use of basic texts.</td>
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<tr>
<td>FREN 106</td>
<td>French II - Elementary/Intermediate</td>
<td>4</td>
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<tr>
<td></td>
<td>Completion of basic French. Increasing mastery of the basic skills of speaking, listening, reading and writing. PREREQ: FREN105. RESTRICTIONS: Two to three years of high school French acceptable in lieu of prerequisite.</td>
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</tr>
<tr>
<td>FREN 107</td>
<td>French III - Intermediate</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty. PREREQ: FREN106. RESTRICTIONS: Four years of high school French acceptable in lieu of prerequisite. Satisfies College of Arts and Sciences language requirement.</td>
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</tr>
<tr>
<td>FREN 111</td>
<td>Intermediate French I</td>
<td>3</td>
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<tr>
<td></td>
<td>Review of grammar. Increasing mastery of the basic skills of speaking, listening, reading and writing. PREREQ: FREN102 or FREN106. RESTRICTIONS: Three years of high school French acceptable in lieu of prerequisite.</td>
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</tr>
<tr>
<td>FREN 112</td>
<td>Intermediate French II</td>
<td>3</td>
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<tr>
<td></td>
<td>Continued practice in speaking and writing, reading texts of average difficulty. Grammar review as needed. PREREQ: FREN111. RESTRICTIONS: Four years of high school French acceptable in lieu of prerequisite. Satisfies Arts and Sciences foreign language requirement.</td>
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</tr>
<tr>
<td>FREN 200</td>
<td>Grammar and Composition</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Intensive grammar review of all major verb tenses and grammatical concepts (such as object pronouns). Emphasis is on grammar improvement through reading and writing. PREREQ: FREN107 or FREN112.</td>
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</tr>
<tr>
<td>FREN 205</td>
<td>French Conversation</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Practical use of French by means of oral reports and discussions. Emphasis on improvement of basic conversational skills. Grammar review where appropriate, and/or some written work. PREREQ: FREN107 or FREN112 or one 200-level course. RESTRICTIONS: Minimum grade of B required for prerequisites. Not intended for native speakers of French.</td>
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<tr>
<td>FREN 206</td>
<td>Culture through Conversation</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Discussion of topics drawn from contemporary French life. Designed for students who wish to broaden their knowledge of French culture while improving their oral and aural language skills. PREREQ: FREN107 or FREN112. RESTRICTIONS: Taught in France.</td>
<td></td>
</tr>
<tr>
<td>FREN 207</td>
<td>French Caribbean Past and Present</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Introduction to contemporary French Caribbean, its history, its culture, its people, their way of life and the issues confronting them. Focuses on Martinique. RESTRICTIONS: Taught in English during Winter Session abroad. Not for minor credit.</td>
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</tr>
<tr>
<td>FREN 208</td>
<td>Contemporary France I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>An introduction to contemporary France, its culture, its people, their way of life and the issues confronting them. RESTRICTIONS: Not for major credit. Taught abroad only, in both English and French. Does not satisfy the foreign language requirement.</td>
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</tr>
<tr>
<td>FREN 209</td>
<td>French Conversation through Film</td>
<td>3</td>
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<tr>
<td></td>
<td>Development of oral proficiency in French through discussion and analysis of major French films. Some written work and grammar review where appropriate. PREREQ: FREN107 or FREN112 or one 200-level French course. RESTRICTIONS: Minimum grade of B required for prerequisites.</td>
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<tr>
<td>FREN 211</td>
<td>French Reading and Composition</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Reading and discussion of French literature. Frequent compositions. Grammar review where appropriate. PREREQ: FREN200 with a minimum grade of C or FREN107 with a minimum grade of A- or FREN112 with a minimum grade of A+.</td>
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</tr>
<tr>
<td>FREN 250</td>
<td>Introduction to Business French</td>
<td>3</td>
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<tr>
<td></td>
<td>Familiarizes students with characteristics of business French (terminology, syntactical patterns, etc.) and policies and practices of the French business community. PREREQ: Any 200-level course taught in the French language.</td>
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<tr>
<td>FREN 255</td>
<td>France in the News</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Explores topics in contemporary French society, culture and politics as expressed in the news media. Emphasis on current events and issues of France. Focus of study is the French press: newspapers and magazines printed in the French language. PREREQ: Any 200-level course taught in the French language or FREN107 or FREN112 with a minimum grade of A.</td>
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<tr>
<td>FREN 301</td>
<td>Introduction to French Literature: Prose</td>
<td>3</td>
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<tr>
<td></td>
<td>Selected readings, with discussion and analysis, of the various genres of prose fiction (contes, nouvelles, romans) and nonfiction (essais) from the middle ages to the present. PREREQ: FREN211 and any 200-level course taught in the French language.</td>
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<tr>
<td>FREN 302</td>
<td>Introduction to French Literature: Poetry and Theatre</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Selected readings, with discussion and analysis, of the various genres of poetry (lyrical, epic, narrative) and theatre (comedy, tragedy, drama) from the middle ages to the present. PREREQ: FREN211 and any 200-level course taught in the French language.</td>
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<tr>
<td>FREN 303</td>
<td>French Conversation and Composition</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Discussion of cultural, social and political topics in French-speaking countries. Vocabulary building, grammar exercises and compositions. PREREQ: FREN205 and any other 200-level course in French. RESTRICTIONS: Not intended for native speakers of French.</td>
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</tr>
<tr>
<td>FREN 306</td>
<td>Practical Oral/Written Expression</td>
<td>3</td>
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<tr>
<td></td>
<td>Strengthens grammar and vocabulary skills in preparation for advanced courses. Class exercises include oral exposures, discussion of articles and videos, textual analysis and compositions. PREREQ: Any two 200-level French courses conducted in French. RESTRICTIONS: Taught abroad only.</td>
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</tr>
</tbody>
</table>
FREN 308 Contemporay France 3
Discussion and study of issues related to contemporary cultural, political and social developments in France, including its people in today's European community.
PREREQ: Any two 200-level French courses taught in the French language.
RESTRICTIONS: Course taught abroad only. Taught in French.

FREN 314 French Phonetics 3
Studies the sounds of the French language (both individual phonemes and items of connected speech, such as liaison, linking, intonation, etc.). Helps improve pronunciation of the language.
PREREQ: Any two 200-level French courses.
RESTRICTIONS: Not intended for native speakers of French.

FREN 325 French Civilization I 3
A study of French cultural history from Gaul to the French Revolution.
PREREQ: Any two 200-level French courses.

FREN 326 French Civilization II 3
A study of French cultural history from the French Revolution to 1945.
PREREQ: Any two 200-level French courses.

FREN 350 Advanced Business French 3
Development of strategies to initiate and maintain oral and written communication in the world of business. Acquisition of commercial vocabulary, practice in speaking French in business situations, letter writing and article reading. Functional and cultural approach.
PREREQ: Any two 200-level French courses, one preferably being FREN250.

FREN 355 Special Topics: 3
Explores an area of special interest in French literature or culture studies.
RESTRICTIONS: Taught abroad.

FREN 366 Independent Study 1-3
FREN 403 Structure of French 3
Study of the sounds, morphology and syntax of the French language, as well as of discursive phenomena. Introduces students to the science of linguistics as applied to French. Taught in French.
PREREQ: Two 300-level French courses, one of which should be FREN314.

FREN 404 Advanced Composition and Grammar 3
Intensive writing practice in French (seven compositions, all to be revised), with systematic grammar review: past tenses, articles, adjectives, participles, passive voice, the conditional, the subjunctive, concordance of verb tenses, demonstrative pronouns.
PREREQ: Two 300-level French courses.

FREN 405 Translation and Stylistics 3
Focuses on vocabulary and translation skills (from French into English and vice-versa).
PREREQ: Two 300-level French courses with a minimum grade of B+.

FREN 406 Advanced French Language 3
Grammatical structure and stylistics with special attention given to technical vocabulary and discourse.
PREREQ: Any 300-level French course.
RESTRICTIONS: Taught abroad only.

FREN 411 Great Authors I: 1100-1750 3
Selected readings of master authors and works from the Middle Ages to the Age of Enlightenment. Authors may include Villon, Rabelais, La Fontaine, Molière, Madame de Lafayette, Montesquieu, Voltaire, and others.
PREREQ: Any two 300-level French literature courses.

FREN 412 Great Authors II: 1750-Present 3
Selected readings of master authors and works from the dawn of Romanticism to the present. Authors may include Prevost, Rousseau, Hugo, Flaubert, Baudelaire, Gide, Proust, Camus, Sartre, Ionesco, Beckett, Duras and others.
PREREQ: Any two 300-level French literature courses.

FREN 423 French Medieval Literature 3
Survey of French literature to 1500.
PREREQ: Any two 300-level French literature courses.

FREN 424 French Renaissance Literature 3
Selected works by Rabelais, the poets of the Pleiade, Montaigne and others.
PREREQ: Any two 300-level French literature courses.

FREN 437 Seventeenth Century French Theatre 3
Growth of French dramatic literature before 1715 and analysis of the principal plays of Corneille, Racine and Moliere.
PREREQ: Any two 300-level French literature courses.

FREN 438 Seventeenth Century French Poetry and Prose 3
Representative novelists, poets, critics and moralists from Descartes and Pascal to La Fontaine, Boileau, Madame de La Fayette and others.
PREREQ: Any two 300-level French literature courses.

FREN 441 The Eighteenth Century: The Age of Voltaire 3
Novels, plays, essays and poetry of such authors as Montesquieu, Marivaux, Prevost and Voltaire.
PREREQ: Any two 300-level French literature courses.

FREN 442 The Eighteenth Century: The Age of Rousseau 3
Novels, plays, essays and poetry of such authors as Diderot, Rousseau, Beaumarchais and Chénier.
PREREQ: Any two 300-level French literature courses.

FREN 445 Nineteenth Century French Novel 3
The novel from Romanticism to Naturalism. Chateaubriand, Balzac, Stendhal, Flaubert, Zola and others.
PREREQ: Any two 300-level French literature courses.

FREN 446 Nineteenth Century French Poetry and Theatre 3
Poets and dramatists representative of Romanticism, Realism and the Symbolist movement.
PREREQ: Any two 300-level French literature courses.

FREN 451 Twentieth Century French Literature: The Age of Anxiety and the Absurd 3
Main trends from Gide, Celine and Malraux to Camus, Sartre and Beckett, including Surrealism, Existentialism and the Theatre of the Absurd.
PREREQ: Any two 300-level French literature courses.

FREN 452 Aspects of Contemporary French Literature 3
A study of contemporary French literature, including novels, plays, essays and poetry of such authors as Robbe-Grillet, Sarrutre, Perè, Tournier, Duras, Ponge, Bonañey, Jaccottet and Barthes.
PREREQ: Any two 300-level French literature courses.

FREN 453 Contemporary French Civilization: 1958-Present 3
Culture, customs and political and economic life in France since 1958.
PREREQ: Any two 300-level French courses.

FREN 454 French Cinema 3
Study of modern French cultural history through the films of such masters as Vigo, Gance, Pagnol, Renoir, Bresson, Resnais, Malle and others.
PREREQ: Any two 300-level French literature courses.

FREN 455 Selected Authors, Works and Themes 3
Works of one or more outstanding authors or on a special theme.
PREREQ: Any two 300-level French literature courses.
RESTRICTIONS: May be repeated for credit when topics vary.

FREN 456 French Theater Workshop 3
Study of French theater of different periods and genres, with an emphasis on staging and performance. Class activities include dramatic readings, improvisation, and exercises to improve diction. May culminate in a public presentation of the students' work.
PREREQ: Any two 300-level French literature courses.

FREN 457 The Francophone World 3
Examines the social, cultural, political and historical aspects of various regions of the Francophone world (the Maghreb, Sub-Saharan Africa, the Caribbean, South East Asia [Vietnam] and Lebanon) as well as the Beur (descendants of the first generation of Maghrebi immigrants) phenomenon in the French banlieue (suburbs). Texts and films serve as points of entry into these multicultural communities.
PREREQ: Any two 300-level French courses.

FREN 458 Topics in Francophone Literature 3
Varying aspects of Francophone studies, such as women's writing, literature of Quebec, colonial literature, African literature and cinema, literature of immigration.
PREREQ: Any two 300-level French literature courses.

FREN 459 Negritude, Antillanite, Creolité 3
Focuses on the literary movements of Negritude, Antillanite, and Creolite, and their relation to Caribbean identity, culture and history, as well as to the field of Francophone postcolonial studies.
PREREQ: Any two 300-level French literature courses.

FREN 466 Independent Study 1-3
FREN 533 French Readings for Ph.D. Candidates 3
PF
A basic course with emphasis on developing reading comprehension.
RESTRICTIONS: Designed for graduate students in other disciplines who have had little or no previous experience with French.

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FREN 605 Translation and Stylistics 3
Focuses on vocabulary and translation skills (from French into English and vice versa). Literary, commercial and journalistic texts serve as stylistic models.

FREN 611 Great French Authors I: 1100-1750 3
Selected readings of master authors and works from the Middle Ages to the Age of Enlightenment. Authors may include Villon, Rabelais, Montaigne, Molière, Corneille, Mme. de Lafayette, Montesquieu, Voltaire and others.

FREN 612 Great French Authors II: 1750-Pre 3
Selected readings of master authors and works from the dawn of Romanticism to the present. Authors may include Prevost, Rousseau, Hugo, Flaubert, Baudelaire, Gide, Proust, Camus, Sarthe, Ionesco, Beckett, Duras and others.

FREN 623 French Medieval Literature 3
Survey of French literature to 1300.

FREN 624 French Renaissance Literature 3
Selected works by Rabelais, the poets of the Pleiade, Montaigne and others.

FREN 637 Seventeenth Century French Theatre 3
Growth of French dramatic literature before 1715 and analysis of the principal plays of Corneille, Racine and Molière.

FREN 638 Seventeenth Century French Poetry and Prose 3
Representative novelists, poets, critics and moralists from Descartes and Pascal to La Fontaine, Boileau, Mme. de La Fayette and others.

FREN 641 The Eighteenth Century: The Age of Voltaire 3
Novels, plays, essays and poetry of such authors as Montesquieu, Marivaux, Prevost and Voltaire.

FREN 642 The Eighteenth Century: The Age of Rousseau 3
Novels, plays, essays and poetry of such authors as Diderot, Rousseau, Beaumarchais and Chenier.

FREN 645 Nineteenth Century French Novel 3
The novel from Romanticism to Naturalism: Chateaubriand, Balzac, Stendhal, Flaubert, Zola and others.

FREN 646 Nineteenth Century French Poetry and Theatre 3
Poets and dramatists representative of Romanticism, Realism and the Symbolist movement.

FREN 651 Twentieth Century French Literature: The Age of Anxiety and the Absurd 3
Main trends from Gide, Celine and Malraux to Camus and Beckett, including Surrealism, Existentialism and the Theater of the Absurd.

FREN 652 Aspects of Contemporary French Literature 3
A study of contemporary French literature, including novels, plays, essays and poetry of such authors as Robbe-Grillet, Sarraute, Feric, Tourtier, Duras, Pangé, Bonnefoy, Jaccottet and Barthes.

FREN 653 Selected Authors, Works and Themes 3
Works of one or more outstanding authors or on a special theme. RESTRICTIONS: May be repeated for credit when topics vary.

FREN 658 Topics in Francophone Literature 3
Varying aspects of Francophone studies, such as women’s writing, literature of Quebec, colonial literature, African literature and cinema, literature of immigration.

FREN 659 Negritude, Antillanité, Créolité 3
Focuses on the literary movements of Negritude, Antillanite, and Creolite, and their influence on culture, ethics and aesthetics as contexts for human perceptions and the creation of varied human habitats.

FREN 665 Aspects of Contemporary French Literature 3
A study of contemporary French literature, including novels, plays, essays and poetry of such authors as Robbe-Grillet, Sarraute, Feric, Tourtier, Duras, Pangé, Bonnefoy, Jaccottet and Barthes.

FREN 653 Selected Authors, Works and Themes 3
Works of one or more outstanding authors or on a special theme. RESTRICTIONS: May be repeated for credit when topics vary.

FREN 658 Topics in Francophone Literature 3
Varying aspects of Francophone studies, such as women’s writing, literature of Quebec, colonial literature, African literature and cinema, literature of immigration.

FREN 659 Negritude, Antillanité, Créolité 3
Focuses on the literary movements of Negritude, Antillanite, and Creolite, and their relation to Caribbean identity, culture and history, as well as to the field of Francophone postcolonial studies.

FREN 869 Master’s Thesis 1-6
Study of selected topics, authors and works in the various fields of French literature. Emphasizes preparation of seminar presentations and term paper. RESTRICTIONS: May be repeated for credit when topics vary.

GEOG 101 Physical Geography: Climatic Processes 3
Introduction to processes responsible for weather, climate and climatic change. Implications of climate for ecosystems and human activities. Earth-sun relations, geographic coordinate systems and map interpretation. Together GEOG101 and 106 form a comprehensive introduction to physical geography and its tools.

GEOG 102 Human Geography 3
Examination of the spatial distribution of human activities worldwide. Particular attention is given to those factors and processes that have led to spatial inequality and locational conflict from the international scale to the neighborhood scale.

GEOG 106 Physical Geography: Land Surface Processes 3
Introduction to processes responsible for the development, modification, distribution and variety of landforms and soils. Implications for human activities. Analysis of topographic maps and air photo interpretation. Together GEOG101 and 106 form a comprehensive introduction to physical geography and its tools.

GEOG 111 Climatic Processes Laboratory 1
Laboratory investigation of processes responsible for weather, climate and climatic change. Implications of climate for ecosystems and human activities. Earth-sun relations, geographic coordinate systems and map interpretation. COREQ: GEOG101.

GEOG 120 World Regional Geography 3
Introduction to the geographic regions of the world and the changing relations between regions. Emphasis is on environmental, economic, and political geographic relationships between industrial and developing nations.

GEOG 152 Climate and Life 4
Introduction to those physical and biological processes that shape our climatic environment. Important themes include the exchanges of energy and mass between the atmosphere and both vegetation and built environments, and the influence of climate on humans and humans on climate.

GEOG 166 Special Problem 1-3
Introductory study of people, landscapes and cultures through time. Emphasis is on culture, ethics and aesthetics as contexts for human perceptions and the creation of varied human habitats.

GEOG 203 Introduction to Cultural Geography 3
Areal variation on the earth’s surface of human activities related to producing, exchanging and consuming wealth. World distributional patterns of the major economic activities.

GEOG 210 Economic Geography 3
Analysis of the atmosphere, weather elements, air masses, fronts and storms. Principles of weather forecasting, especially as it relates to severe weather.

GEOG 225 Historical Geography of the United States 3
Persistence and change of settlements, economic activities and social/cultural behavior in development of different geographical regions of the United States.

GEOG 226 Geography of Latin America 3
Physical, historical and cultural geography of Latin America.

GEOG 230 Humans and the Earth Ecosystem 3
An examination of the historical and contemporary role of humans as major agents of biological change in the earth’s ecosystem.

GEOG 235 Conservation of Natural Resources 3
Physical, social and economic problems involved in integrating resource management and maintaining environmental quality.

GEOG 236 Conservation: Global Issues 3
Introduces the global nature of resource management and discusses the relationships between population growth, the market economy, agricultural production and mineral and energy exploitation, worldwide.

GEOG 240 Environment and Behavior 3
An interdisciplinary introduction to individual and group behavior in relation to developed and natural environments. The implications of such human environment interactions for planning.

GEOG 250 Computer Methods for Geographic and Environmental Sciences 4
Modern Fortran programming for application to data analysis and modeling, with examples and applications from the geographical and environmental sciences. Topics include the basics of data reduction, numerical modeling, and design and use of scientific graphics. PREREQ: MATH115 or MATH117.

GEOG 255 Applied Climatology 3
Application of climatic information to practical problems of agriculture, irrigation and crop scheduling, health, clothing, water resources, architecture and industry.

GEOG 270 Mapping and Design 3
History, design and use of maps as tools for effective communication of geographic ideas.

GEOGRAPHY

GEOG 101 Physical Geography: Climatic Processes 3
Introduction to processes responsible for weather, climate and climatic change. Implications of climate for ecosystems and human activities. Earth-sun relations, geographic coordinate systems and map interpretation. Together GEOG101 and 106 form a comprehensive introduction to physical geography and its tools.
GEOG 271 INTRODUCTION TO GEOGRAPHIC DATA ANALYSIS 4
A survey of computational, statistical, and graphical techniques used in scientific data analysis with particular emphasis on the special nature of geographic and spatial data. Includes spreadsheet and scripting language programming.

GEOG 272 MAP AND AIR PHOTO INTERPRETATION 3
Analysis of maps, aerial photos and selected remote sensing techniques to interpret physical and cultural environments. Includes measurement of phenomena on air photos, photogrammetry and maps, and cartometrics.

GEOG 310 SOCIAL GEOGRAPHY 3
Examines the geographical settings of minorities - ethnic groups, women, children, elderly and the homeless - and the ways institutions, media and political processes affect the spatial location and place experiences of these groups.

GEOG 315 NEWARK, DELAWARE: PEOPLE, POLITICS AND PLACE 3
Compares college towns across the country to see how they look, feel and respond to town/gown challenges and takes a critical look at Newark, Delaware. Examines the social diversity of Newark’s population; the history and politics behind local zoning, housing policies and city ordinances; and the geography of UD students. Off-campus research and/or service-learning projects required.

GEOG 316 MAPPING OUR WORLD: THE ENVIRONMENT OF THE MID-ATLANTIC REGION 3
Provides an overview of the environmental features of the Mid-Atlantic region with a focus on the Delaware basin.

GEOG 317 INTRODUCTION TO AERIAL PHOTOGRAPHY 3
Introduces the principles and practice of aerial photography. Includes the use of digital cameras and image processing software.

GEOG 320 WATER AND SOCIETY 3
Study of the physical occurrence and distribution of water in all parts of the hydrologic cycle: introduces the nature of human demands for water, the possibilities of obtaining additional supplies and the difficult legal, economic and political questions of management of water resources.

GEOG 325 URBAN GEOGRAPHY 3
Spatial relationships of urban areas, focusing on the structure of towns, the organization of urban space and the external relationships of cities.

GEOG 326 INTRODUCTION TO URBAN STUDIES 3
Introduces the field of urban studies, including the history, theory, and practice of urban research. Focuses on metropolitan areas.

GEOG 327 URBAN SOCIOLOGY 3
Examines the social, economic, political, and cultural aspects of urban life.

GEOG 328 TRANSPORTATION GEOGRAPHY 3
Geographical factors in the development of transportation and influences of transportation innovations on spatial patterns of settlement and regional growth.

GEOG 329 INTERNATIONAL MIGRATION 3
See POSC329 for course description.

GEOG 330 BIOGEOGRAPHY 3
Interactions among environmental, biological and cultural processes that have led to present landscapes. Field trip required.

GEOG 331 THE ENVIRONMENTAL SCIENCE OF GLOBAL CHALLENGES 3
Examines the science and policy of global environmental challenges such as climate change, biodiversity loss, and resource depletion.

GEOG 332 BIODIVERSITY 3
Influences of weather and climate on animals, plants and humans, and their distributions; adaptation to normal and extreme environments; and environmental measurement and interpretation.

GEOG 333 CLIMATIC GEOMORPHOLOGY 3
Influence of climate and vegetation elements on rock weathering and soil erosion rates. Landform assemblages and surface materials produced under present and past climatic regimes.

GEOG 334 CULTURAL GEOGRAPHY 3
Broad principles of the field. Human mobility and stasis. Material and symbolic landscapes. Individual and group values in landscape formation and change.

GEOG 335 URBAN CULTURAL GEOGRAPHY 3
City landscapes as expressions of attitudes and ideals. Oriental and Western; classical, modern and future. Humanizing the urban landscape.

GEOG 336 PALEOClimatOLOGY 3
A survey of earth’s climatic history, with emphasis on the methods used to reconstruct that history and the relevance of past climate changes as indicators of the sensitivity of the current climate.

GEOG 337 INDEPENDENT STUDY 1-6
Introduces the principles, concepts, and technical issues of geographic information systems and science. Basic cartographic principles of map design and construction are covered. Provides hands-on training in the use of a professional grade GIS package for the mapping and spatial analysis of geographic phenomena and processes. COREQ: GEOG 250 or GEOG 271.

GEOG 338 GEOMORPHOLOGY 4
See GEOL385 for course description.

GEOG 339 HONORS COLLOQUIUM 3
See ARSC390 for description.

GEOG 340 FLUVIAL GEOMORPHOLOGY 3
See GEOG411 for course description.

GEOG 341 PHYSICAL CLIMATOLOGY 4
Energy and moisture exchange between the atmosphere and land surface for characteristic natural and human-modified environments. PREREQ: MATH241 and GEOG250.

GEOG 342 SEMINAR IN CLIMATE CHANGE 3
Examines facts and fallacies regarding global warming and climate science and assesses the current state of scientific understanding of and ability to forecast climate change.

GEOG 343 MINING AND CIVIL ENGINEERING GEOLOGY 3
Focuses on the geological aspects of mining and civil engineering, including soil mechanics, mineral deposits, and environmental impacts.

GEOG 344 URBANMASTER PLANNING 3
Focuses on land use planning and development in urban areas.

GEOG 345 WORLD CITIES IN COMPARATIVE PERSPECTIVE 3
World city as a new and distinctive geographic urban form in the world economy. Case studies explore common features of internal structure and external relationships of world cities, their growing environmental problems and extent to which they have decoupled from national cultures and economies.

GEOG 346 ENVIRONMENT AND SOCIETY 3
Considers the relationships between environmental and social processes from the theoretical, philosophical and methodological perspectives of geography. Explores the ethical and contextual implications of framing environmental questions and posing solutions. Examines approaches to the geographical analysis of environmental problems.

GEOG 347 SYNTHETIC CLIMATOLOGY 4
Physical processes involved with development and transportation of weather systems, including relationships between upper atmospheric flow and surface weather phenomena, synoptic evaluation of air masses, synoptic techniques for environmental analysis. PREREQ: GEOG220.

GEOG 348 NEW EUROPE: CULTURE, GEOPOLITICS, MILIEU 3
Post-Soviet Europe is examined in terms of emerging economic, cultural, and ethnic configurations; tensions between national and supra-national territories; the role of mass media in ethnic, political and ecologic space; processes of transformation in former Soviet states; dynamics of regional cooperation on environmental issues.

GEOG 349 WATER BUDGET IN ENVIRONMENTAL ANALYSIS 3
The development of the climatic water budget and its use in understanding problems in hydrology, agriculture, forestry, urban planning and the distribution of environmental systems. Evaluation of the influence of different human activities on the factors of the water budget.
GEOG 456  HYDROCLIMATOLOGY  3
Study of the hydrologic cycle as it relates to water in the atmosphere and on
and in the Earth's surface. Hydrologic processes including precipitation, soil moisture,
evapotranspiration, runoff and streamflow are examined.
PREREQ: MATH241 and GEOG250 or equivalent.

GEOG 460  WOMEN IN INTERNATIONAL DEVELOPMENT  3
See SOC460 for course description.

GEOG 464  INTERNSHIP IN GEOGRAPHY  1-6
On the job experience in governmental or private planning, consulting,
environmental or engineering agencies.

GEOG 466  INDEPENDENT STUDY  1-6

GEOG 469  SENIOR RESEARCH AND THESIS  1-6

GEOG 470  COMPUTER CARTOGRAPHY  4
Introduction to cartographic theory and computational methods necessary for
drawing maps with the aid of a digital computer.
PREREQ: GEOG250.

GEOG 471  ADVANCED GEOGRAPHIC INFORMATION SYSTEMS  4
Expands upon the principles and concepts covered in GEOG372 to examine
advanced data structures and spatial analysis techniques, uncertainty, and
visualization methods of geographic data and analysis results. Extensive
experience using a professional grade GIS package. Experience is also gained in
customizing the software and automating the processing through a scripting
language.
PREREQ: GEOG250 or GEOG271, GEOG372, MATH115 or MATH117.

GEOG 474  INTRODUCTION TO ENVIRONMENTAL REMOTE SENSING  3
Introduces the fundamental characteristics of electromagnetic radiation, energy
interactions, instruments, and ways to extract meaningful geophysical information
from remote sensing data to solve geographical and environmental problems. Airphoto interpretation, photogrammetry, and digital image processing techniques
are described through in-class demonstrations and hands on exercises using a
professional grade image processing system.
PREREQ: GEOG250 or GEOG271, MATH115 or MATH117.

GEOG 477  SPATIAL DATA ANALYSIS  3
Special approaches to analysis of data associated with points, lines and areas on
the Earth's surface commonly encountered in environmental sciences. Introduces
mapping, graphical and quantitative approaches to analyzing spatial data.
Fortran programs developed and used.
PREREQ: GEOG250.

GEOG 482  PHYSICAL GEOGRAPHY OF COLD ENVIRONMENTS  3
Survey and analysis of land surface processes in polar and mountain
environments. Emphasis on the ground thermal regime, permafrost, periglacial
(cold climate, nonglacial) landforms and environmental problems in cold regions.
May be cross-listed with GEOL482.
PREREQ: GEOL106 or GEOL105/115 or GEOL107.

GEOG 600  PRELUCDE TO GEOGRAPHY  1
Introduction to contemporary American geography, especially its research and
educational frontiers. Also emphasizes theoretical and practical considerations in
formulating, carrying out and evaluating geographic research. Students required
attend (and then discuss) the Department's Friday afternoon guest lectures.
RESTRICTIONS: Open to graduate students in geography and climatology only.

GEOG 601  PROSEMINAR IN GEOGRAPHY I  2
Examines the contemporary structure of geography, its theories and approaches to
inquiry. Surveys the discipline's historical development, and introduces
bibliographic and electronic literature searches, how to formulate a research
question and organize research into that question.
RESTRICTIONS: Open to graduate students in geography and climatology only.

GEOG 602  PROSEMINAR IN GEOGRAPHY II  2
Deepens ability to conduct research into a thesis or dissertation problem. By the
end of the course, students are expected to have a complete draft of the literature
review chapter of their thesis or dissertation.
PREREQ: GEOG601.
RESTRICTIONS: Open to graduate students in geography and climatology.

GEOG 605  COMPUTER PROGRAMMING FOR ENVIRONMENTAL RESEARCH  1
Using a mixture of guided self-study and lecture, students learn modern Fortran
programming for application to environmental data analysis and atmospheric and
geological modeling. Older language features and use of legacy codes are also
covered lightly.
COREQ: GEOG250.

GEOG 611  FLUVIAL GEOMORPHOLOGY  3
See GEO1611 for course description.

GEOG 612  PHYSICAL CLIMATOLOGY  4
Energy and moisture exchange between the atmosphere and land surface for
characteristic natural and human-modified environments.
PREREQ: MATH241 and GEOG250.

GEOG 614  THE AMERICAN SUBURB  3
See UAPP614 for course description.

GEOG 615  URBAN, REGIONAL AND ENVIRONMENTAL PLANNING  3
See UAPP615 for course description.

GEOG 617  SEMINAR IN CLIMATE CHANGE  3
Examines facts and fallacies regarding global warming and climate science and
assesses the current state of scientific understanding of and ability to forecast
climate change.
PREREQ: GEOG101 or GEOG152 or GEOG220 or equivalent.

GEOG 620  ATMOSPHERIC PHYSICS  3
Introduction to energy and moisture flows in the atmosphere at small scales.
Includes atmospheric thermodynamics, cloud physics and radiation.
PREREQ: MATH242 and GEOG220.
COREQ: GEOG250.

GEOG 622  RESOURCES, DEVELOPMENT AND THE ENVIRONMENT  3
Focuses on food, resources, energy and population issues in relationship to
economic development and the global environment. Engages students in
discussion and debate on sustainable development policies.
May be cross-listed with UAPP622.

GEOG 623  ATMOSPHERIC DYNAMICS  3
Investigates atmospheric motion in a quantitative manner. Expands basic
conservation laws to derive the equations of atmospheric motion and to develop
the concepts of vorticity and circulation. Discusses atmospheric wave motion and
general circulation.
PREREQ: MATH242 and GEOG220.
COREQ: MATH243.

GEOG 628  ISSUES IN LAND USE AND ENVIRONMENTAL PLANNING  3
Examines theory and contemporary practice in land use and environmental
planning with emphasis on creating an integrative framework that balances
development demands for urban, suburban, and agricultural land against the
needs to conserve and enhance environmental and cultural resources.
May be cross-listed with UAPP628.

GEOG 635  THE EVOLUTION OF THE AMERICAN URBAN LANDSCAPE  3
See UAPP635 for course description.

GEOG 636  RESEARCH TOPICS IN HISTORIC PRESERVATION  3
See UAPP636 for course description.

GEOG 638  WORLD CITIES IN COMPARATIVE PERSPECTIVE  3
World city as a new and distinctive geographic urban form in the world economy.
Case studies explore common features of internal structure and external
relationships of world cities, their growing environmental problems and extent to
which they have decoupled from national cultures and economies.
May be cross-listed with UAPP638.

GEOG 645  METHOD AND THEORY IN GEOGRAPHY  3
The nature of geography, its history, methodology and applications in research
and societal problems. A preprofessional course.

GEOG 649  ENVIRONMENT AND SOCIETY  3
Considers the relationships between environmental and social processes from
theoretical, philosophical, and methodological perspectives of geography.
Explores the ethical and contextual implications implied in framing environmental
questions and posing solutions. Examines approaches to the geographical analysis
of environmental problems.

GEOG 651  MICROCLIMATOLOGY  4
Introduction to instrumentation and techniques involved in microclimatic monitoring
and sampling. Students have the unique opportunity to collect data through a
semester long research project. Research results are written to the specifications of
a peer-reviewed scientific journal.
PREREQ: GEOG412 or GEOG612.

GEOG 652  SEMINAR IN CLIMATOLOGY  3
General theoretical and practical considerations of research in climatology.
RESTRICTIONS: Requires permission of instructor.

GEOG 653  SYNOPTIC CLIMATOLOGY  3
The physical processes involved with the development and transportation of
weather systems. Selected topics include relationships between upper atmospheric
flow and surface weather phenomena, synoptic evaluation of air masses and
sympatic and topographic techniques for environmental analysis.
PREREQ: GEOG220.
GEOG 654  NEW EUROPE: CULTURE, GEOPOLITICS, MILIEU  3
Post-Soviet Europe is examined in terms of emerging economic, cultural and ethnic configurations; tensions between national and supranational territories; the role of mass media in ethnic, political and ecologic space; processes of transformation in former Soviet states; dynamics of regional cooperation on environmental issues.

GEOG 655  WATER BUDGET IN ENVIRONMENTAL ANALYSIS  3
The development of the climatic water budget and its use in understanding problems in hydrology, agriculture, forestry, urban planning and the distribution of environmental systems. Evaluation of the influence of different human activities on the factors of the water budget.

GEOG 656  HYDROCLIMATOLOGY  3
Study of the hydrologic cycle as it relates to water in the atmosphere and in and on the earth's surface. Hydrologic processes including precipitation, soil moisture, evapotranspiration, runoff and streamflow will be examined. PREREQ: MATH241 and GEOG250 or equivalent.

GEOG 657  CLIMATE DYNAMICS  3
Investigation of the physical processes controlling global climate, starting with the earth-sun relationship and adding additional processes to increase complexity and realism. Extensive use of models to explore the importance of each process. PREREQ: GEOG250 and MATH302.

GEOG 670  COMPUTER CARTOGRAPHY  4
Introduction to cartographic theory and computational methods necessary for drawing maps with the aid of a digital computer. PREREQ: GEOG250.

GEOG 671  ADVANCED GEOGRAPHIC INFORMATION SYSTEMS  4
Commercial geographical information systems (GIS) are introduced and used to analyze a wide variety of spatial data bases. Georeferenced data are acquired, restructured and manipulated in a GIS environment. GIS methods are applied to local-scale geographical, environmental and land planning problems. PREREQ: GEOG250 and GEOG270 or GEOG372 or GEOG470.

GEOG 672  SEMINAR IN GEOGRAPHIC INFORMATION SYSTEMS  3
Principles underlying geographic information systems (GIS) are examined, and sample geographic problems are analyzed. Design and programming of modules for data acquisition and storage, map projection, map overlay, spatial data analyses, and graphic output are considered. Geographic themes and data vary each time the seminar is offered. PREREQ: GEOG470, GEOG670 or GEOG471.

GEOG 674  SATELLITE CLIMATOLOGY  3
Use of satellite observations to study the climate system. Discussions consider the development of satellite climatology, sensors, platforms and methodologies used to estimate climate variables from radiation measurements. Aspects of climate that are emphasized include cloud climatologies, cloud systems, atmospheric moisture, radiation budget, land-surface conditions. PREREQ: GEOG250 and GEOG412.

GEOG 677  SPATIAL DATA ANALYSIS  3
Special approaches to analysis of data associated with points, lines and areas on the earth's surface commonly encountered in environmental sciences. Introduces mapping, graphical and quantitative approaches to analyzing spatial data. Fortran programs developed and used. PREREQ: GEOG250.

GEOG 681  REMOTE SENSING OF ENVIRONMENT  3
See MAS1681 for course description.

GEOG 682  PHYSICAL GEOGRAPHY OF COLD ENVIRONMENTS  3
Survey and analysis of land surface processes in polar and mountain environments. Emphasis on the ground thermal regime, permafrost, periglacial (cold climate, non-glacial) landforms and environmental problems in cold regions. May be cross-listed with GEOL682.

GEOG 803  TOPICS IN GEOMORPHOLOGY  1-3
See GEOB803 for course description.

GEOG 855  CLIMATOLOGICAL RESEARCH  3
Techniques of research in basic and applied climatology: to include field study, and the analysis of climatological data. RESTRICTIONS: Requires permission of instructor.

GEOG 868  RESEARCH  1-9 PF

GEOG 869  MASTER'S THESIS  1-6

GEOG 964  PRE-CANDIDACY STUDY  3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work. RESTRICTIONS: Not open to students who have been admitted to candidacy.

GEOG 969  DOCTORAL DISSERTATION  1-12 PF

GEOL 105  GEOLOGICAL HAZARDS AND THEIR HUMAN IMPACT  3
Geological processes and events that adversely affect humans and civilization. Methods for predicting and dealing with geological hazards. May be taken with a 1 credit lab, GEOL115.

GEOL 107  GENERAL GEOLOGY  4
Principles of physical geology and its application in interpreting earth processes. Laboratory covers identification of earth materials and the interpretation of topographic and geographic maps.

GEOL 108  VOLCANOES AND EARTHQUAKES  3
Violent geologic activity as illustrated by volcanoes and earthquakes. The nature, causes and origins of volcanic and earthquake activity, their interactions with humans and their potential control.

GEOL 109  PLANETS, ASTEROIDS AND IMPACTS  3
Composition, structure, surface features, origin, and evolution of the planets, satellites, asteroids, and comets. Also explores the possible connection between meteorite impacts and mass extinctions. Did an asteroid kill off the dinosaurs?

GEOL 110  EARTH HISTORY: EVOLUTION, EXTINCTION AND THE GEOLOGICAL RECORD  3
History of the earth and its biota. Origins, evolution and mass extinctions of major groups of organisms as demonstrated by the earth's fossil record. History of the Pleistocene Ice Ages and the evolution of humans.

GEOL 111  GEOLOGY OF DELAWARE AND ITS NEIGHBORS  3
Introduction to the geologic setting of Delaware and neighboring states. Rocks and fossils of the region. Emphasis on formation and evolution of the region through geologic time. Studies Delaware's coastal zone and the effect of coastal processes on recent geologic history of Delaware.

GEOL 112  EARTH RESOURCES AND PUBLIC POLICY  3
Introduction to the geologic occurrence of resources including water, metals and industrial minerals. Discussion of the geology, politics and economics of resource extraction and utilization. Environmental implications of resource use; methods of estimation of resource availability.

GEOL 113  EARTH SCIENCE  4
Earth materials, structure and the geologic phenomena that produce them. Physical and temporal aspects of earth history. Laboratory examination of rocks, minerals and fossils. Experiments in geological processes and interpretation of geologic maps. RESTRICTIONS: Open to education majors and other selected programs. Does not satisfy Group D requirement in Arts and Sciences.

GEOL 115  GEOLOGICAL HAZARDS LABORATORY  1
Laboratory investigation of environmental geological processes and their impact on society: earthquakes, volcanoes, coastal hazards, rivers and streams, groundwater. Identification of earth materials and study of earth processes using topographical, geological and tectonic maps. COREQ: GEOL105.

GEOL 300  THE EARTH'S MATERIALS I: MINERALS  4
Systematics, identification, properties and associations of minerals and other raw materials of the earth. Economically significant minerals and their uses. PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113.

GEOL 301  SYSTEMATIC AND EVOLUTIONARY PALEONTOLOGY  3
Classification of fossils, organic evolution, paleoecology; and application to geologic principles. PREREQ: GEOL107.

GEOL 302  THE EARTH'S MATERIALS II: ROCKS  4
Identification, description, occurrences, origins and uses of rocks and ores. PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113; GEOL300.

GEOL 303  THE EARTH'S SURFACE I: SURFICIAL PROCESSES  4
Uplift, weathering, sediment transport, depositional processes and selected depositional environments. Quaternary history and geochronology. Subsurface fluid flow in surficial environments. Environmental and applied aspects of surficial processes. PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113.

GEOL 304  THE EARTH'S SURFACE II: STRATIGRAPHY  4
Description and correlation of stratigraphic units; concepts of time and methods of absolute dating; environments of deposition and modern/ancient analogs and facies analysis; basin analysis. PREREQ: GEOL105 and GEOL115, GEOL107, or GEOL113; GEOL303.
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<tr>
<td>GEOL 305</td>
<td>THE EARTH’S LITHOSPHERE I: STRUCTURAL GEOLGY AND PLATE TECTONICS</td>
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<td>GEOL 306</td>
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<td>GEOL 307</td>
<td>THE EARTH’S HISTORY I: PALEOBIOLOGY</td>
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<td>GEOL 308</td>
<td>THE EARTH’S HISTORY II: EARTH SYSTEM SCIENCE</td>
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<td>GEOL 417</td>
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<td>GEOL 422</td>
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<td>GEOL 428</td>
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<td>GEOL 430</td>
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<td>GEOL 434</td>
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<td>GEOL 446</td>
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<td>GEOL 453</td>
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<td>GEOL 454</td>
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<td>GEOL 466</td>
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<td>GEOL 482</td>
<td>PHYSICAL GEOGRAPHY OF COLD ENVIRONMENTS</td>
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<td>GEOL 501</td>
<td>TOPICS IN MIDDLE SCHOOL GEOLOGY EDUCATION: WATERSHEDS</td>
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<td>GEOL 502</td>
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GEOL 601  GEOLOGICAL SCIENCES AT DELAWARE  1 PF
Overview of the graduate program in geology at the University of Delaware. Research opportunities and current activities. Orientation in departmental practices and procedures. Guidelines for preparation of research proposals. Professional activities and career options.

GEOL 602  CASE STUDIES OF NEAR SURFACE GEOLOGIC SYSTEMS  3
Broad overview of the history and processes of selected near surface geologic systems. Environmental and applied aspects of near surface geologic systems. RESTRICTIONS: Graduate students only.

GEOL 603  NUMERICAL MODELING OF NEAR SURFACE GEOLOGICAL SYSTEMS  3
Computer simulation of selected geologic processes. Numerical solution of partial differential equations with applications in geomorphology, hydrogeology, stratigraphy and geophysics. Signals and time series. PREREQ: GEOG250 or equivalent or permission of instructor. RESTRICTIONS: Graduate students only.

GEOL 604  FIELD METHODS - NEAR SURFACE GEOLOGIC SYSTEMS  3
Training and experience in obtaining and interpreting surface and shallow subsurface data. Emphasis on the correlation and interpretation of morphostratigraphic relationships and history. Field methods to be employed include: augering and coring, shallow geophysical methods and modern surveying techniques. RESTRICTIONS: Graduate students only.

GEOL 605  STRATIGRAPHY  3
Principles of stratigraphy and application of stratigraphic methods [e.g., lithostratigraphy, biostratigraphy, chronostratigraphy, sequence stratigraphy and magnetic stratigraphy] for basin analysis. Interpretation of sedimentary facies. Application of sequence stratigraphy to the Quaternary Period. RESTRICTIONS: Graduate students only.

GEOL 606  PETROLOGY  3
Petrography, chemistry, origin and tectonic significance of the major classes of igneous, sedimentary, or metamorphic rocks.

GEOL 611  FLUVIAL GEOMORPHOLOGY  3

GEOL 612  GEOLOGICAL APPROACHES TO ARCHAEOLOGY AND HISTORY  3
Geological techniques in interpretation of archaeological sites and their surrounding geographic terrain; paleogeographies of archaeological settings; and uses of geology for interpretations of history.

GEOL 614  QUATERNARY GEOLOGY AND GEOCHRONOLOGY  3
Survey of the stratigraphy and chronology of marine and terrestrial records and theories of climatic change. Studies of the stratigraphy of significant Quaternary successions throughout the world and their correlation and absolute dating.

GEOL 616  PALEOECOLOGY  3
Paleoenvironmental and stratigraphic interpretation of sediments and fossils. Basic statistics, bioturbation models, well-logging, and sequence stratigraphy. Application to geology problems.

GEOL 621  ENVIRONMENTAL AND APPLIED GEOLOGY  3
The application of geologic principles to matters of environmental concern. Discussion, examples, techniques and case histories in water supply, waste disposal, zoning and land use, mining, legislation, regulation and professionalism emphasizing the role of the geologist and the educated citizen.

GEOL 622  OSHA 40-HOUR HAZARDOUS MATERIALS SAFETY TRAINING  3
OSHA 40-Hour safety training certification hazardous waste operations health and safety training program. Includes material from environmental regulations, hazard recognition, toxicology, environmental monitoring, personal protective equipment, site characterization and analysis, site zone and control, health and safety plans, decontamination, and spill response recovery.

GEOL 628  HYDROGEOLOGY  3

GEOL 631  MARINE GEOLOGY  3
The geology of the ocean basins and their continental margins; sedimentation within the marine environment and its uses in interpreting geologic history and paleoecology.

GEOL 634  GEOLOGY OF COASTS  3
Erosional, depositional and tectonic processes; morphology and classification; and geologic history of the coastal areas of the world.

GEOL 644  GENERAL GEOCHEMISTRY  3
Chemical principles applied to geologic processes and environments. Thermochemistry of mineral equilibria; and mineral stabilities at high temperature and pressure. Radioisotopes and methods of geochronology. The geochemical history of the earth.

GEOL 653  ELEMENTARY GEOPHYSICS I  3
Fundamentals of seismology, wave propagation, refraction and reflection of seismic waves. Seismic and ground-penetrating radar (GPR) exploration methods and interpretations, with emphasis on near-surface problems.

GEOL 654  ELEMENTARY GEOPHYSICS II  3
Gravity and the shape of the earth, theories of isostasy. Geomagnetism, magnetization of rocks and paleomagnetism. Gravity and magnetic surveys and interpretations. Electrical and radioactive surveying and well logging.

GEOL 655  STATISTICS FOR EARTH SCIENCES  3
See STAT657 for course description.

GEOL 656  PHYSICAL GEOGRAPHY OF COLD ENVIRONMENTS  3
See GEOG682 for course description.

GEOL 801  TOPICS IN PLANETOLOGY  1-3
Selected topics in planetology. Topics vary according to instructor’s preference. RESTRICTIONS: May be taken more than once for graduate credit.

GEOL 802  TOPICS IN GEOPHYSICS  1-3
Selected topics in geophysics. Topics vary according to instructor’s preference. RESTRICTIONS: May be taken more than once for graduate credit.

GEOL 803  TOPICS IN GEOMORPHOLOGY  1-3
Selected topics in geomorphology. Topics vary according to instructor preference. May be cross-listed with GEOG803.

GEOL 804  TOPICS IN GEOCHEMISTRY  1-3
Selected topics in geochemistry. Topics vary according to instructor preference. RESTRICTIONS: May be taken more than once for graduate credit.

GEOL 807  TOPICS IN MINERALOGY AND PETROLOGY  1-3
Selected topics in mineralogy and petrology. Topics vary according to instructor’s preference. RESTRICTIONS: May be taken more than once for graduate credit.

GEOL 808  TOPICS IN STRUCTURAL GEOLOGY  1-3
Selected topics in structural geology. Topics vary according to instructor’s preference. RESTRICTIONS: May be taken more than once for graduate credit.

GEOL 809  TOPICS IN SEDIMENTOLOGY AND STRATIGRAPHY  1-3
Selected topics in sedimentology and stratigraphy. Topics vary according to instructor’s preference. RESTRICTIONS: May be taken more than once for graduate credit.

GEOL 818  TOPICS IN PALEOBIOLOGY  1-3
Selected topics in paleobiology. Topics vary according to instructor’s preference. RESTRICTIONS: Requires permission of instructor.

GEOL 857  PALEOCEANOGRAPHY  3
See MAST857 for course description. RESTRICTIONS: Requires permission of instructor.

GEOL 868  RESEARCH  1-9
Enables students to begin planning work and research before admission to dissertation candidacy and GEOG969.

GEOL 869  MASTER’S THESIS  1-6
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work. RESTRICTIONS: Not open to students who have been admitted to candidacy.

GEOL 969  DOCTORAL DISSERTATION  1-12 PF
**GREK 213**  *Ancient Prose: Intermediate Greek*  3
Prepares students to read ancient Greek literary works in the original language. Emphasizes building a basic vocabulary and acquiring essential grammar. Prepares students to read ancient Greek literary works in the original language. Includes discussion of ancient Greek culture and civilization.

**PREREQ:** GREK101 or equivalent.

**GREK 214**  *Ancient Poetry: Intermediate Greek*  3
Focuses on the works of one or more poets with particular attention to the issues of either poetic inspiration or the interpretation of a text. Readings are drawn from the epic and tragic works of Homer and Hesiod, and from the dramatic works of Aeschylus, Sophocles, and Euripides. Includes an introduction to the study of ancient Greek literature.

**PREREQ:** GREK213 or equivalent.

**GREK 311**  *Intermediate Ancient Greek I*  3
Continued practice in speaking and writing, reading texts of average difficulty. Grammar review as needed. Satisfies Arts and Sciences foreign language requirement.

**PREREQ:** GREK101 or equivalent.

**GREK 312**  *Intermediate Ancient Greek II*  3
Systematic review of elementary and intermediate Greek grammar. Emphasis on improvement of basic conversational skills. Grammar review where appropriate, and/or some written work.

**PREREQ:** GREK213 or equivalent.

**RESTRICTIONS: Satisfies College of Arts and Sciences language requirement.**

**GREK 313**  *Ancient Prose: Advanced Intermediate Greek*  3
Focuses on the works (in the original language) of one or more authors such as Homer, Hesiod, and the tragic poets. Readings will be drawn from the philosophical, historical, and oratorial works of authors such as Plato, Herodotus, Xenophon, and Demosthenes, and from the epic and tragic works of Homer.

**PREREQ:** GREK214 or equivalent.

**RESTRICTIONS: Meets with GREK213.**

**GREK 314**  *Ancient Poetry: Advanced Intermediate Greek*  3
An advanced intermediate level course in ancient Greek focusing on the works (in the original language) of one or more poets. Readings will be drawn from the epic, lyric, and dramatic (tragic and comic) works of authors such as Homer, Sappho, Pindar, Aeschylus, Sophocles, Euripides, and Aristophanes in rotation or in combination.

**PREREQ:** GREK214 or equivalent.

**RESTRICTIONS: Meets with GREK214.**

**GRMN 101**  *Elementary German I*  3
Introduction to the German language and a development of speaking, listening, reading and writing skills through the use of basic texts.

**GRMN 102**  *Elementary German II*  3
Completion of basic German. Improves knowledge of German grammar. Conversational practice.

**PREREQ:** GRMN101 or GRMN105.

**GRMN 105**  *German I - Elementary*  4
Introduction to the German language and development of speaking, listening, reading and writing skills through the use of basic texts.

**GRMN 106**  *German II - Elementary/Intermediate*  4
Completion of basic German. Increasing mastery of the basic skills of speaking, listening, reading and writing. Improves knowledge of German grammar. Conversational practice.

**RESTRICTIONS: Two to three years of high school German acceptable in lieu of prerequisite.**

**GRMN 107**  *German III - Intermediate*  4
Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty. Satisfies College of Arts and Sciences language requirement.

**PREREQ:** GRMN106.

**RESTRICTIONS: Four years of high school German acceptable in lieu of prerequisite.**

**GRMN 111**  *Intermediate German I*  3
Review of grammar. Increasing mastery of the basic skills of speaking, listening, reading and writing. Satisfies College of Arts and Sciences language requirement.

**PREREQ:** GRMN102 or GRMN106.

**RESTRICTIONS: Three years of high school German acceptable in lieu of prerequisite.**

**GRMN 112**  *Intermediate German II*  3
Continued practice in speaking and writing, reading texts of average difficulty, grammar review as needed. Satisfies Arts and Sciences foreign language requirement.

**PREREQ:** GRMN111.

**RESTRICTIONS: Four years of high school German acceptable in lieu of prerequisite.**

**GRMN 200**  *German Grammar Review*  3
Systematic review of elementary and intermediate German grammar. Emphasis on improvement of basic conversational skills. Grammar review where appropriate, and/or some written work.

**PREREQ:** GREK213 or equivalent.

**RESTRICTIONS: Not intended for students who have already taken a 300 or 400-level course in German.**

**GRMN 205**  *German Conversation*  3
Practical use of German by means of oral reports and discussions. Emphasis on improvement of basic conversational skills. Grammar review where appropriate, and/or some written work.

**PREREQ:** GRMN107 or one 200-level German course.

**RESTRICTIONS: Prerequisites require minimum grade of B. Not intended for students who have already taken a 300 or 400-level course in German.**

**GRMN 206**  *Culture Through Conversation*  3
Discussion of topics drawn from contemporary German life. Designed to broaden knowledge of German culture while improving oral and aural language skills.

**PREREQ:** GREK213 or equivalent.

**RESTRICTIONS: Taught abroad only.**

**GRMN 208**  *Contemporary Germany I*  3
An introduction to contemporary Germany, its culture, its people, their way of life and the issues confronting them.

**RESTRICTIONS: Taught abroad only.**

**GRMN 211**  *German Reading and Writing*  3
Reading and discussion of 20th-century German short stories and novellas. Several short compositions. Grammar review where appropriate.

**PREREQ:** GREK213 or equivalent.

**RESTRICTIONS: Not intended for students who have already taken a 300 or 400-level course in German.**

**GRMN 219**  *Modern German Literature II*  3
Explores topics in contemporary German society, culture and politics as expressed in the news media. Emphasis on current events and issues of Germany. Focus of study is the German press: newspapers and magazines printed in the German language.

**PREREQ:** Any 200-level course taught in the German language.

**GRMN 305**  *German Conversation and Phonetics*  3
Discussion of current cultural, social and political topics in German-speaking countries. Pronunciation exercises and vocabulary building.

**PREREQ:** Any two 200-level German courses.

**GRMN 306**  *Practical Oral/Written Expression*  3
Strengthens grammar and vocabulary skills in preparation for advanced courses. Class exercises include oral exposes, discussion of articles and videos, textual analysis and compositions.

**PREREQ:** Any two 200-level German courses.

**RESTRICTIONS: Taught abroad only.**

**GRMN 308**  *Contemporary Germany II*  3
Discussion and study of issues related to contemporary cultural, political and social developments in Germany, including its place in today’s European community.

**PREREQ:** Any two 200-level German courses.

**RESTRICTIONS: Taught abroad only.**

**GRMN 311**  *Introduction to Modern German Literature*  3
Masterpieces of poetry, narrative prose and drama from the 18th century to the present.

**PREREQ:** Any two 200-level German courses.

**GRMN 325**  *German Civilization and Culture*  3
A survey of the major cultural, social and political developments in Germany from the mid-18th century to the present.

**PREREQ:** Any two 200-level German courses.

**RESTRICTIONS: GRMN211.**
GRMN 350 INTRODUCTION TO BUSINESS GERMAN 3
Familiarizes students with characteristics of business German (vocabulary, terminology, and syntactical patterns) and aspects of the German business community.
PREREQ: Any two 200-level German courses.

GRMN 355 SPECIAL TOPICS 3
Explores an area of special interest in German literature or culture studies. The subject matter varies and will be announced in the registration booklet.
PREREQ: Any two 200-level German courses.
RESTRICTIONS: May be repeated for credit when topics vary.

GRMN 366 INDEPENDENT STUDY 1-3

GRMN 406 ADVANCED GERMAN LANGUAGE 3
Grammatical structure and style with special attention given to technical vocabulary and discourse, e.g., business, law, science and agriculture.
PREREQ: Any 300-level German course.
RESTRICTIONS: Taught abroad only.

GRMN 412 EARLY GERMAN LITERATURE 3
Representative authors and themes: 12th-17th centuries. *Courtly love* and *"knighthood"* (Minnesang, Das Nibelungenlied); *bourgeoisie* vs. *peasantry* during the Reformation (Sachs's Fastnachtspiele, Eulenspiegel); and the Baroque themes of *"carpe diem"* and *"memento mori"* (Grimmelshausen's Simplicissimus, Gryphius's plays, Baroque poetry).
PREREQ: Two of GRMN311, GRMN355 and any 300-level German course.

GRMN 422 AGE OF GOETHE 3
Major works by Lessing, Lenz, Goethe, Schiller and their contemporaries. The importance of the Enlightenment, the Storm and Stress movement, the Classical period and early Romanticism.
PREREQ: Two of GRMN311, GRMN355 and any 300-level German course.

GRMN 433 NINETEENTH-CENTURY GERMAN LITERATURE 3
Studies major literary trends and figures (Heine, Buechner, Droste-Huelshoff, Grillparzer, Hebbel, Keller, Stifter, Storm and Nietzsche) from the end of Romanticism to Naturalism.
PREREQ: Two of GRMN311, GRMN355 and any 300-level German course.

GRMN 442 FROM NATURALISM TO EXPRESSIONISM 3
Main literary currents from the 1880's to the 1920's. The drama from Hauptmann to Kaiser; the poetry of Hofmannsthal, Rilke, Lasker-Schueler, and others; narrative prose including Thomas Mann and Kafka.
PREREQ: Two of GRMN311, GRMN355 and any 300-level German course.

GRMN 453 GERMAN LITERATURE: 1945 TO 1989 3
Major authors and literary movements from the end of World War II until German unification. Works by Boell, Grass, Frisch, Duerrenmatt, Bachman, Handke and Christa Wolf.
PREREQ: Any two 300-level German courses.

GRMN 455 SELECTED AUTHORS, WORKS AND THEMES 3
Works of one or more outstanding authors or a special theme.
PREREQ: Two of GRMN311, GRMN355 and any 300-level German course.
RESTRICTIONS: May be repeated for credit when topics vary.

GRMN 465 POSTWALL GERMANY: LITERATURE AND CULTURE 3
Explores reunited Germany's cultural and literary landscape and examines how reunification has affected East and West Germans. Focuses on how reunification has (re)shaped German national identity, affected the way Germans remember the (Nazi) past and contributed to the formation of a multicultural society.

GRMN 466 INDEPENDENT STUDY 1-3

GRMN 533 GERMAN READINGS FOR PH.D. CANDIDATES 3 PF
A basic course in German for graduate students in other disciplines who have had little or no previous experience in the language. Emphasis on developing reading comprehension.

GRMN 612 EARLY GERMAN LITERATURE 3
Representative authors and themes: 12th-17th centuries. *"Courtly love"* and *"knighthood"* (Minnesang, Das Nibelungenlied); *bourgeoisie verses peasantry* during the Reformation (Sachs's Fastnachtspiele, Eulenspiegel); Baroque themes of *"carpe diem"* and *"memento mori"* (Grimmelshausen's Simplicissimus, Gryphius's plays, Baroque poetry).

GRMN 622 AGE OF GOETHE 3
Major works by Lessing, Lenz, Goethe, Schiller and their contemporaries. The importance of the Enlightenment, the Storm and Stress movement, the Classical period and early Romanticism.

GRMN 623 NINETEENTH CENTURY GERMAN LITERATURE 3
A study of major literary trends and figures (Heine, Buechner, Droste-Huelshoff, Grillparzer, Hebbel, Keller, Stifter, Storm and Nietzsche) from the end of Romanticism to Naturalism.

GRMN 642 NATURALISM TO EXPRESSIONISM 3
Main literary currents from the 1880's to the 1920's. The drama from Hauptmann to Kaiser; the poetry of Hofmannsthal, Rilke, Lasker-Schueler and others, and narrative prose including Thomas Mann and Kafka.

GRMN 653 GERMAN LITERATURE: 1945 TO 1989 3
Major authors and literary movements from the end of World War II until German unification. Works by Boell, Grass, Frisch, Duerrenmatt, Bachman, Handke and Christa Wolf.

GRMN 655 SELECTED AUTHORS, WORKS AND THEMES 3
Works of one or more outstanding authors or a special theme.
RESTRICTIONS: May be repeated for credit when topics vary.

GRMN 665 POSTWALL GERMANY: LITERATURE AND CULTURE 3
Explores reunited Germany's cultural and literary landscape and examines how reunification has affected East and West Germans. Focuses on how reunification has (re)shaped German national identity, affected the way Germans remember the (Nazi) past and contributed to the formation of a multicultural society.

GRMN 869 MASTER'S THESIS 1-6

GRMN 875 SEMINAR: TOPICS IN GERMAN LITERATURE 3
Study of selected topics, authors and works in the various fields of German literature. Variable content. Emphasizes preparation of seminar presentations and term paper.
RESTRICTIONS: May be repeated for credit when topics vary.

HEBR 105 HEBREW I - ELEMENTARY 4
Introduction to the Hebrew alphabet and language, and development of basic speaking, listening, reading and writing skills. May be cross-listed with JWST105.

HEBR 106 HEBREW II - ELEMENTARY/INTERMEDIATE 4
Continuation of Elementary Hebrew. Increasing mastery of the basic skills of speaking, listening, reading, and writing through texts, conversations and songs. May be cross-listed with JWST106.
PREREQ: HEBR105. Those with background other than HEBR105 should see instructor for appropriate placement.

HEBR 107 HEBREW III - INTERMEDIATE 4
Strengthening grammar skills, continued practice in speaking, listening, writing and reading through conversation, texts and songs. May be cross-listed with JWST107.
PREREQ: HEBR106. Those with background other than HEBR106 should see instructor for appropriate placement.
RESTRICTIONS: Satisfies College of Arts and Sciences language requirement.

HEBR 205 HEBREW CONVERSATION 3
Practical use of Hebrew by means of discussions and oral reports on a variety of topics including family, school and work life. Emphasis on improvement of conversational skills for social situations, as well as grammatical and reading comprehension through multicultural themes including the revival of the Hebrew language and various issues related to Hebrew culture. May be cross-listed with JWST205.
PREREQ: HEBR107 or equivalent.

HEBR 366 INDEPENDENT STUDY 1-3

HEBR 466 INDEPENDENT STUDY 1-6

HEPP 100 INTRODUCTORY SEMINAR 1
Designed for freshmen and transfer students in the CHEP College, and provides students an opportunity to gain a greater understanding of the University and the CHEP College. Students learn practical skills helpful in mastering the freshman year or first year for transfer students. Attention given to time management and study skills, academic resources, and out-of-classroom opportunities. Other helpful tips to ease the transition into college are also covered. Fulfills the First Year Experience (FYE) requirement for freshmen students.
HEPP 102  CIVICS AND ECONOMICS FOR TEACHERS  3  
Provides teacher candidates with an understanding of the fundamental content and concepts embedded within the core social studies subjects of civics and economics as they relate to K-8 standards-based instruction. Focuses on developing an understanding of the content in the two subject areas and how that content might be taught effectively. May be cross-listed with ECON102 and/or POSC102.

RESTRICTIONS: Elementary teacher education majors only. Cannot be taken for credit toward economics major or minor.

HEPP 160  SPECIAL TOPICS  3  
Freshman level interdisciplinary course on topics drawn from disciplines within the College of Human Services, Education and Public Policy. Content varies each semester. May be repeated for credit as topics change.

HEPP 260  SPECIAL TOPICS  3  
Sophomore level interdisciplinary course on topics drawn from the disciplines within the College of Human Services, Education and Public Policy. Content varies each semester. May be repeated as topics change.

HEPP 360  SPECIAL TOPICS  3  
Junior level interdisciplinary course on topics drawn from the disciplines within the College of Human Services, Education and Public Policy. Content varies each semester. May be repeated as topics change.

HEPP 400  SERVICE LEARNING PRACTICUM  3-6  
Structured experience in a public or private, business, educational or nonprofit setting as part of the Human Services, Education and Public Policy major. Requires written documentation of the experience by the student through various means such as a paper, portfolio, report, journal, etc.

HEPP 433  INTERNET LITERACY  3  
Provides the conceptual background and the online skills needed to become Internet literate. Includes a hands-on tutorial on creating Web pages and using search engines to conduct research. Reflects on the impact of emerging technologies on the future of schooling and communications.

HEPP 460  SPECIAL TOPICS  3  
Senior level interdisciplinary course on topics drawn from the disciplines within the College of Human Services, Education and Public Policy. Content varies each semester. May be repeated as topics change.

HEPP 465  SENIOR SEMINAR IN DISABILITIES STUDIES  3  
Culminates the Disabilities Studies minor with an integrative seminar requiring a significant project in the student’s area of specialization.

PREREQ: IFST270 and EDUC230.

HEPP 533  INTERNET LITERACY  3  
Provides the conceptual background and the online skills needed to become Internet literate. Includes a hands-on tutorial on creating Web pages and using search engines to conduct research. Reflects on the impact of emerging technologies on the future of schooling and communications.

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HEALTH AND EXERCISE SCIENCES

HESC 120  PHYSICAL EDUCATION  1 PF  
Introduces knowledge and skills in physical activity. The program is geared toward lifetime sports and allows for selection.

HESC 121  WATER SAFETY INSTRUCTION  2  
Prepares students with the skills and knowledge to teach people to swim and be safe in and around water. Topics covered: basic water safety, swimmer strokes, advanced lifesaving skills, first aid, artificial resuscitation, teaching techniques, lesson plans, unit plans and practical teaching experience.

RESTRICTIONS: Requires current Red Cross Advanced Lifesaving Certificate.

HESC 122  LIFEGUARD TRAINING  2  
Skills and knowledge for the professional lifeguard. Topics include the professional lifeguard; rescue skills; breathing and cardiac emergencies; first aid; oxygen administration in the use of Automated External Defibrillation (AED); and spinal injuries.

HESC 124  AEROBIC INSTRUCTOR TRAINING CERTIFICATION  2  
Provides the potential teacher with pertinent, current knowledge on aerobic dance, to allow the design of safe and effective programs. Emphasis on effective leadership skills.

RESTRICTIONS: Requires aerobic dance experience and permission of instructor.

HESC 132  SCUBA  2  
Prepares students with the skills and knowledge necessary to continue their training for open water scuba certification.

HESC 135  FRESHMAN SEMINAR  2  
Covers basic survival skills; effective coping strategies to meet personal, academic, career and social challenges. Enhances student success and develops positive lifelong learning skills.

RESTRICTIONS: Open to first semester freshmen.

HESC 138  LIFEGUARD TRAINING INSTRUCTOR  2  

RESTRICTIONS: Current certification in First Aid, CPR and Lifeguard Training.

HESC 139  CURRICULUM IN PHYSICAL EDUCATION  3  
Focuses on curriculum and teaching methods for K-12 physical education. Examines student characteristics, domains of learning, movement concepts, planning and assessment to meet national and state content standards.

RESTRICTIONS: Open to HPE majors.

HESC 140  FUNDAMENTAL SKILLS ANALYSIS  3  
Designed to develop cognitive understanding and practical experience for the teaching and refinement of fundamental skills in grades K-12. Emphasis on processes of perceiving, extending, refining and applying fundamental skills through teaching progressions, lead-up games, and activities.

RESTRICTIONS: Must be completed for upper division clearance. Open to HPE majors only.

HESC 141  ADVENTURE CHALLENGE AND OUTDOOR RECREATION  1  
Provides the opportunity to develop skills and techniques, learn methods and acquire knowledge of designated outdoor recreation skills and adventure challenge activities. Emphasis on developing readiness for presenting such activities in group settings.

RESTRICTIONS: Open to HPE majors only.

HESC 143  SKILLS, TECHNIQUES AND KNOWLEDGE OF STUNTS AND TUMBLING  1  
Preparation for teaching elementary school gymnastics using developmentally appropriate experiences with minimal equipment, including concepts of weight transfer, rolling, balance skills, and muscle fitness.

RESTRICTIONS: Open to health and physical education interest students only.

HESC 155  PERSONAL HEALTH MANAGEMENT: AN APPROACH FOR A LIFETIME  3  
Utilizing group problem solving techniques and online resources, students develop a comprehensive approach to managing their own health.

RESTRICTIONS: Not open to students who have taken HESC214.

HESC 160  HEALTH BEHAVIOR SCIENCE FIRST YEAR SEMINAR  1  
Exposure to career opportunities within the health behavior science field.

HESC 168  FRESHMAN SPECIAL TOPICS  1-3  
Freshman level independent study.

HESC 200  ISSUES IN HEALTH BEHAVIOR SCIENCE  3  
Issues surrounding health behavior science, with emphasis on the role of the professional in promoting individual and community behavior change.

RESTRICTIONS: Open to health behavior science majors only.

HESC 202  FOUNDATIONS OF SPORT MANAGEMENT  3  
Overview of the sport management field and the segments of the sport industry, including types of employment opportunities, as well as skills, educational background, and experiences essential for a successful career in the sport industry.

HESC 205  FRESHMAN SEMINAR IN EXERCISE SCIENCE  1 PF  
Introduction to biomechanics, exercise physiology, and motor control, including familiarization with types of laboratory research and career opportunities associated with each discipline.

HESC 207  FOUNDATIONS OF LEISURE AND SPORT MANAGEMENT  3  
History, theory, and philosophy of leisure and sport and their influence on society, with emphasis on the principles and objectives of program planning and execution.

HESC 210  EMERGENCY MANAGEMENT OF INJURIES AND ILLNESSES  3  
Emergency management of life-threatening and non-life-threatening injuries and illnesses. Includes CPR skills and initial and secondary assessments; first aid for wounds, burns, heat illnesses, and cold illnesses; and injuries to the head, spine, chest, and extremities.

RESTRICTIONS: Open to majors within the Department of Health, Nutrition and Exercise Sciences only.
HESC 214  WELLNESS: A WAY OF LIFE  
Principles of personal and public health including present and future problems of environmental control. Includes health services, health education and healthy school environment.
RESTRICTIONS: Open to majors only in Fall. Not open to students who have taken HESC 155.

HESC 220  ANATOMY AND PHYSIOLOGY  
Structure and function of the human body: skeletal, muscular, circulatory, respiratory, nervous, endocrine, digestive and urinary systems. A foundation course for all areas of physical education and athletics.
RESTRICTIONS: Open to majors only.

HESC 225  OFFICiating RECREATIONAL SPORTS  
Theory and practice of officiating recreational sports. Introduced as a lifetime activity, emphasis is placed on practical experience with the intramural program. Minimal classroom time. Offers excellent leadership training.
RESTRICTIONS: Meets one half of a semester. Spring sports: basketball and softball.

HESC 230  GROUP FACILITATION SKILLS IN HEALTH AND PHYSICAL EDUCATION  
Effective group facilitation, management and communication proficiency modeled and practiced. Students participate in a variety of group models to enhance delivery of diverse classroom topics. Students develop preliminary health education planning skills including communication of sensitive issues.
RESTRICTIONS: Open to health and physical education majors only.

HESC 240  INTRODUCTION TO ATHLETIC TRAINING  
Orientation to athletic training as a career in the health care industry and introduction to the prevention and care of injuries in the physically active population.
PREREQ: HESC 220.
RESTRICTIONS: Restricted to Athletic Training Interest (ATI) students only. Not open to students who have taken HESC 350.

HESC 250  MOTOR DEVELOPMENT  
RESTRICTIONS: Open only to HPE and EXSC majors.

HESC 251  SKILLS, TECHNIQUES AND KNOWLEDGE OF RHYTHMS AND DANCE  
Preparation of physical education teachers. Provides the opportunity to develop skills, learn methods and techniques and acquire knowledge of the above activities. Emphasis on developing readiness for presenting such activities in public school settings.

HESC 252  LIFETIME LEISURE ACTIVITIES  
Provides the opportunity to develop skills, learn teaching methods and instructional techniques in selected lifetime sports including archery, golf, and bowling. Emphasis on developing readiness for presenting such activities in public school settings.
RESTRICTIONS: Open only to HPE majors only.

HESC 255  SKILLS, TECHNIQUE AND KNOWLEDGE OF RACQUET SPORTS  
Preparation of physical education teachers. Provides opportunity to develop skills, learn methods and techniques and acquire knowledge of racquetball, tennis, badminton and pickleball. Emphasis on developing readiness for presenting such activities in public school settings.
RESTRICTIONS: Open to HPE majors only.

HESC 257  ATHLETIC TRAINING PRACTICUM I  
Supervised clinical experience in athletic training. Development of competencies and proficiencies in content areas comprising the role of an athletic trainer, as specified in the NATA’s Athletic Training Educational Competencies.
PREREQ: HESC 240.
RESTRICTIONS: Open to athletic training majors only.

HESC 258  ADVANCED TAPING AND BRACING TECHNIQUES  
Laboratory experience in advanced taping, wrapping, bracing and splinting; variations for upper and lower extremity orthopedic injuries; emergency and non-emergency on-field transportation techniques; and equipment fitting and modification techniques.
RESTRICTIONS: Open to athletic training majors only.

HESC 261  LEADERSHIP IN LEISURE AND SPORT MANAGEMENT  
Dynamics of group interaction and the theories, principles, and practices of leadership. Review of research in leadership and group dynamics. Practical experience in applying theories and techniques through group execution of a major campus-wide special event.
PREREQ: HESC 207.
RESTRICTIONS: Open to health behavior science majors and sport management majors.

HESC 263  LEADERSHIP PRACTICUM  
Students work under the auspices of an appointed professional to develop leadership skills in fitness activities.

HESC 268  SOPHOMORE SPECIAL TOPICS  
Sophomore level independent study.

HESC 275  TACTICAL APPROACH TO TEACHING SPORTS  
Uses tactical problems to teach invasion, wall/net and fielding/run-scoring activities. Students analyze strategies for successful transfer across similar games. Appropriate practices and outcomes of quality physical education programs emphasized.
PREREQ: HESC 140.
RESTRICTIONS: Open to HPE majors only.

HESC 276  TECHNOLOGY IN HEALTH AND PHYSICAL EDUCATION  
Focuses on future educators integrating technology into the classroom. Hands-on work involves designing educational experiences for professional and student use.
RESTRICTIONS: Open to HPE majors only.

HESC 300  ISSUES IN PHYSICAL ACTIVITY STUDIES AND SPORTS  
Composes professional issues and social forces to various philosophical systems. Examines personal belief, values and assumptions for the purpose of developing and/or refining a professional philosophy and a professional plan of action.
RESTRICTIONS: Open to junior and senior HPE majors only.

HESC 302  PRACTICUM IN SPORT MANAGEMENT  
A pre-internship professional experience in a sport management/recreation agency. Students work under the auspices of a faculty supervisor and professional mentor to gain practical experience.
PREREQ: HESC 202 and HESC 207.
RESTRICTIONS: Open to sport management majors only.

HESC 303  PRACTICUM IN SPORT MANAGEMENT  
A pre-internship professional experience in a sport management agency. Students work under the auspices of a faculty supervisor and professional mentor to gain practical experience.
PREREQ: HESC 202, HESC 207 and HESC 302.
RESTRICTIONS: Open to sport management majors only.

HESC 305  FUNDAMENTALS OF ATHLETIC TRAINING  
The organization and administration of an athletic training program and the prevention, diagnosis and treatment of athletic injuries, including physical therapy, taping and training room. First aid, safety measures and prevention of injuries.
PREREQ: HESC 220 or HESC 310.

HESC 306  ADVANCED SEMINAR IN SPORTS ORTHOPAEDICS I  
Provides an understanding of diagnostic and decision making processes for common orthopaedic sports injuries. Rationale for the use of diagnostic tests and principles of consultation and referral emphasized.
PREREQ: HESC 220 or HESC 310.

HESC 307  ADVANCED SEMINAR IN SPORTS ORTHOPAEDICS II  
Provides student with an understanding of special tests used in the diagnosis of common orthopaedic injuries and their anatomic and pathomechanical basis.
PREREQ: HESC 220 or HESC 310.
RESTRICTIONS: Open to athletic training majors only or with permission of instructor.

HESC 310  PRE-ClinICAL ANATOMY AND PHYSIOLOGY  
Structure and function of the human body for pre-professionals in clinical and allied health fields. Emphasis on skeletal, muscular and nervous systems, with additional coverage of circulatory, respiratory, endocrine and immune systems.
RESTRICTIONS: Restricted to exercise science majors.

HESC 315  INSTRUCTIONAL STRATEGIES FOR DRUG EDUCATION  
Practices and outcomes of quality physical education programs emphasized.
PREREQ: HESC 214 and HESC 230.
RESTRICTIONS: Open to sport management majors only.

PREREQ: HESC220 or HESC310.

COREQ: HESC320 is a prerequisite or corequisite.

HESC 319 Health Related Fitness
Provides knowledge/techniques for teaching K-12 students to incorporate daily physical activity and nutrition into their personal wellness plans. Emphasis on health-related fitness, lifetime physical activity and nutrition using a nationally approved program.
PREREQ: NTDT200.
RESTRICTIONS: Open to HPE majors only.

HESC 320 Principles of Strength/Conditioning
Addresses scientific basis of strength and conditioning based upon principles related to biomechanics, exercise physiology, injury prevention techniques and anatomy. Emphasis on program design, energy systems, advanced lifting techniques, nutrition, plyometrics, ergogenic aids and effects of strength training on the cardiovascular system.
PREREQ: HESC220.
RESTRICTIONS: Open to HSC majors only.

HESC 324 Measurement and Evaluation
Measurement and evaluation of physical skills and knowledge as related to physical education. Includes descriptive statistics, knowledge tests, grading, physical performance tests and tests of sports skills.
PREREQ: Three-credit math course.
RESTRICTIONS: Open to HPE majors only.

HESC 325 Instructional Strategies for Human Sexuality
Develops content knowledge and presents teaching methodologies relative to all facets of human sexuality. Emphasis on the process of integrating information into effective age specific educational strategies.
PREREQ: HESC315.
RESTRICTIONS: HPE majors or permission of instructor.

HESC 326 Research Methods and Statistics for Behavioral Science
Overview of the types of research and statistical techniques commonly used in health behavior science, including research proposal development.
RESTRICTIONS: Open only to juniors and seniors in a major within the Department of Health, Nutrition and Exercise Sciences.

HESC 329 Dynamics of Team Problem Solving
Development of teaming skills and their application in solving real life health-related issues. Topics include facilitation and leadership, dialogue and discussion, team maintenance and development and conflict resolution.

HESC 330 Teaching Community and Mental Health
Development of teaching approaches for mental health issues such as death and dying, suicide, depression, stress reduction and self-esteem. Emphasis on developing partnerships with community-based health programs and accessing pertinent health information.
PREREQ: HESC214.
RESTRICTIONS: Open to HPE majors only.

HESC 332 Health Behavior Theory and Assessment
Provides an understanding and application of health behavior theory to program development and evaluation. Emphasis placed on skills and competencies necessary for programming and evaluation including needs assessments, research, communication and team process.
PREREQ: HESC326.
RESTRICTIONS: Open to students in health behavior science majors only.

HESC 333 Health Behavior Theory and Program Planning
Health behavior theories as they relate to youth health behaviors and development of health education programs, including development and use of instruments for assessing health behaviors.
RESTRICTIONS: Open only to HPE majors.

HESC 335 Health and Aging
The aging process is addressed from a biopsychosocial perspective. Particular emphasis is placed on developing an understanding of the complex interrelations among aging, health and social structure.
RESTRICTIONS: Open to health behavior science majors only.

HESC 340 Management of Sport Information
An analysis of the information management process in the sport industry. The relationship between sport organizations and their publics and the media are explored.
PREREQ: HESC202 and HESC207.
RESTRICTIONS: Open to sport management majors only.

HESC 341 Principles of Outdoor Recreation
Presents an orientation to the field of outdoor recreation. Attention given to heritage, trends, resources, economics, management approaches, ecological and educational goals and ethics toward an outdoor natural environment. Laboratory section involves participation and skill development in a variety of outdoor recreation activities.

HESC 342 Survey in Adaptive Physical Education and Recreation
Study of prevalent abnormalities found in a general population including causes, prevention, care and treatment. Methods of screening students for determination of these disabilities are presented as a laboratory experience.
RESTRICTIONS: Open to majors only.

HESC 344 Financial Aspects of Sport Management
Analysis of economic and societal variables impacting the financial viability of professional, intercollegiate and Olympic sport organizations.
PREREQ: HESC202, HESC215 and FINC200.
RESTRICTIONS: Open to sport management majors only.

HESC 347 Legal Aspects of Sports Management
An introduction to the legal system and liability issues of tort law, agency law, antitrust labor law and constitutional law as they apply to professional and amateur sports.
RESTRICTIONS: Open to sport management majors, health behavior science majors with a concentration in leisure service management, and legal studies minors.

HESC 350 Basic Concepts in Kinesiology
A review of myocardial anatomy and lever systems provides the foundation for analyzing human movement. Practical kinesiological evaluation focuses on common fitness and health related exercises. Movement analysis and proper techniques discussed for cardiovascular machines, abdominal work, stretching, etc.
PREREQ: HESC220 or HESC310.
RESTRICTIONS: Open to majors only.

HESC 353 Seminar in Exercise Physiology
1 PF
Prepares students in the exercise physiology concentration with the planning of employment and/or advanced degree opportunities. Includes in-depth resume and cover letter writing, interviewing techniques, and personalized career inventory and career exploration projects.
RESTRICTIONS: Must be in exercise physiology concentration. Requires junior status.

HESC 354 Seminar
1 PF
Explores internship opportunities in (1) recreation and leisure services field for the recreation major or (2) the fitness management field for the fitness management major. Completion of necessary paperwork for placement in an agency that will assist students in meeting career objectives is required.
RESTRICTIONS: Requires junior status. Recreation/leisure service is limited to recreation majors; fitness management is limited to fitness management majors.

HESC 355 Figure Skating Practicum I
3 PF
Survey in figure skating science covering the basics of coaching and teaching including an in-depth review of the instructional and competitive programs of the Ice Skating International Association and U.S.F.S.A. Extensive study and work in the basic badge programs of the I.S.I.A. and U.S.F.S.A. Open to figure skating coaching minors only.

HESC 356 Figure Skating Practicum II
3 PF
Concentration in the areas of pairs and ice dance with emphasis on teaching and coaching techniques related to the basic through intermediate levels with an analysis of progression and sequencing.
RESTRICTIONS: Open to figure skating coaching minors only.

HESC 357 Athletic Training Practicum I
3 PF
Supervised clinical experience in athletic training. Development of competencies and proficiencies in content areas comprising the role of an athletic trainer, as specified in the NATA’s Athletic Training Educational Competencies.
PREREQ: HESC267.
RESTRICTIONS: Open to athletic training majors only.

HESC 358 Athletic Training Practicum III
3 PF
Supervised clinical experience in athletic training. Development of competencies and proficiencies in content areas comprising the role of an athletic trainer, as specified in the NATA’s Athletic Training Educational Competencies.
PREREQ: HESC357.
RESTRICTIONS: Open to athletic training majors only.

HESC 368 Junior Special Topics
1-3
Junior level independent study.
HESC 371  OUTDOOR ADVENTURE LEADERSHIP 3
Introduces recreation leadership in outdoor adventure activities. Attention directed toward conceptual and technical aspects of adventure programs.

HESC 375  NEUROMECHANICAL BASIS OF HUMAN MOVEMENTS 3
Functional aspects of the neuromuscular and sensory systems and elementary mechanics are employed to explain the mechanical characteristics and control mechanisms underlying basic groups of human motor activities. PREREQ: HESC220 or 310, and PHYS201 or 207.

HESC 380  METHODS AND MATERIALS IN SECONDARY PHYSICAL EDUCATION 3

HESC 381  ADVENTURE CHALLENGE EDUCATION 3
An introduction to adventure challenge education and its concepts. Counseling concepts in adventure challenge education introduced. Activities including low-level group initiatives through participation on high level "ropes courses" are emphasized. Activities create the atmosphere for individual and group development.

HESC 390  PRINCIPLES OF COACHING 3
Introduces students to the general philosophy and methods of coaching. Covers communication skills, teaching skills, sport psychology and managing team related responsibilities and relationships, including risk management. RESTRICTIONS: Open to coaching science minors only.

HESC 395  SPORT MEDICINE PHARMACOLOGY 3
Provides an understanding of the origin, chemistry, effects and uses of medications commonly used in sports medicine. Major topics include pharmacokinetics, indications, contraindications, adverse reactions, management of overdose, pharmacophobias, iontophoresis, drugs affecting skeletal muscle, pain and inflammation. RESTRICTIONS: Open to athletic training majors only.

HESC 400  RESEARCH METHODS 3
Introduction to research on health and physical activity, including types of research, research design, matching appropriate statistical tools with research designs, research writing style and format and ethical issues related to research. PREREQ: Junior or senior standing. Completion of STAT200 with at least a C. RESTRICTIONS: Restricted to majors in the Department of Health, Nutrition and Exercise Sciences.

HESC 401  FOUNDATIONS OF HUMAN SEXUALITY 3
See IFST401 for course description.

HESC 403  PRACTICUM IN ADAPTED PHYSICAL EDUCATION 3-9 PF
Experience working with special children in a physical education setting. Clinical experiences may include work with a particular group of disabled children (e.g. mentally retarded, visually or hearing impaired or orthopedically handicapped). Variable time involvement up to a maximum of 14 weeks. PREREQ: HESC320, satisfactory completion of teaching. RESTRICTIONS: Open to majors only.

HESC 405  REHABILITATION OF ATHLETIC INJURIES 3
Students plan and implement comprehensive individualized rehabilitation programs including determination of therapeutic goals and objectives, selection of therapeutic exercises, methods of evaluating and recording rehabilitation progress and development of criteria for progression and return to competition. RESTRICTIONS: Open to athletic training majors only.

HESC 407  PREVENTION AND RECOGNITION OF ATHLETIC INJURIES 3
Procedures for preventing, diagnosing, treating and rehabilitating athletic injuries. Emphasis on early detection of both the nature and extent of injury. PREREQ: HESC480 and HESC481.

HESC 409  THERAPEUTIC MODALITIES 4
Provides both theory and clinical experience in the use of the most common types of therapeutic modalities utilized in sports medicine. RESTRICTIONS: Open to athletic training majors only.

HESC 414  METHODS AND MATERIALS IN HEALTH EDUCATION 3
Emphasis on health education in the school curriculum: curriculum content and organization of materials for instructional purposes. PREREQ: HESC210, HESC214, HESC276, HESC315, HESC325 and HESC330. Satisfactory completion of Praxis I. RESTRICTIONS: Junior status, upper division clearance, minimum gpa of 2.50, major index of 2.75 and completion of all skills requirements.

HESC 420  FUNCTIONAL HUMAN ANATOMY 4
Anatomical individuality, functional significance and human performance interpretations involved through the consideration of muscular, skeletal and nervous systems. Laboratory experience emphasizes the meaning and significance of musculoskeletal movements and utilizes prospected human specimens, models, x-rays, dry biological materials and other aids.

HESC 422  ORGANIZATION AND ADMINISTRATION OF LEISURE SERVICES 3
Study of the operation and management of sport, recreation and fitness facilities. Emphasis placed on developing the skills necessary to conduct the day-to-day operations and manage these types of facilities. RESTRICTIONS: Open to junior health behavior science majors.

HESC 425  BIOMECHANICS OF HUMAN MOTION 4
Study of the fundamental mechanical principles governing the human body in motion and at rest, including application of statics and dynamics in the quantitative analysis of sport and exercise.

HESC 426  BIOMECHANICS I 4
Application of mechanical principles in the study of the human musculoskeletal system, including analysis of joint forces, as well as the mechanical properties of bone, muscle, and connective tissues. PREREQ: PHYS201 or 207, HESC310, and HESC375. RESTRICTIONS: Open to exercise science majors only.

HESC 427  BIOMECHANICS II 3
Provides information on the measurement of human motion in three dimensions and on the calculation of inverse dynamics in two dimensions as applied to the analysis of human motion. PREREQ: HESC426 and MATH242.

HESC 428  MOTOR CONTROL AND LEARNING 3
Control and learning of human movement, with emphasis on historical and contemporary theories, psychomotor aspects of movement, learning and performance, and the fundamental systems related to perception and action. PREREQ: HESC310 and HESC375. COREQ: HESC429. RESTRICTIONS: Exercise science majors only.

HESC 429  MOTOR CONTROL AND LEARNING LABORATORY 1
Laboratory experiences related to motor control & learning. PREREQ: HESC310 and HESC375. COREQ: HESC428. RESTRICTIONS: Majors in exercise science only.

HESC 430  PHYSIOLOGY OF ACTIVITY 3
Study of integration of the body systems in performance of exercise, work and environment, stress situations.

HESC 431  PHYSIOLOGY OF ACTIVITY LABORATORY 1
Laboratory experiences include the measurement of physiological parameters under exercise conditions. COREQ: HESC430.
### HEALTH AND EXERCISE SCIENCES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>HESC 422</td>
<td>Exercise Testing and Prescription</td>
<td>4</td>
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<tr>
<td></td>
<td>Basic exercise prescription and fitness testing, including considerations for populations with special needs. Provides background content for the American College of Sports Medicine’s Health Fitness Instructor exam.</td>
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<td></td>
<td>PREREQ: HESC220 or 310, and HESC430.</td>
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<td>RESTRICTIONS: Open only to majors within the Department of Health, Nutrition and Exercise Sciences.</td>
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<tr>
<td>HESC 434</td>
<td>Exercise Test Technology</td>
<td>3</td>
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<td></td>
<td>Emphasizes American College of Sports Medicine objectives for cardiac rehabilitation exercise technologist certificate. Basic electrophysiology, exercise physiology, stress test administration, medications, report preparations, program considerations and facilities development.</td>
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<td>RESTRICTIONS: Open to HESC majors only.</td>
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<tr>
<td>HESC 437</td>
<td>Sport Marketing</td>
<td>3</td>
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<td></td>
<td>A study of basic marketing concepts with applications to sport organizations, both amateur and professional. Topics include promotions and public relations, sport consumer behavior, strategic market planning, marketing information management, marketing communications and sponsorship.</td>
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<td>PREREQ: BUAD100.</td>
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<td>RESTRICTIONS: Open to junior and senior sport management majors.</td>
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<tr>
<td>HESC 438</td>
<td>Sport Event and Facility Management</td>
<td>3</td>
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<tr>
<td></td>
<td>Management of sport events and facilities, including sponsorship acquisition, marketing and promotions, volunteer management, budgeting, participant registration, facility design, and event and facility operations.</td>
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<td>PREREQ: HESC261, HESC437.</td>
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<td>RESTRICTIONS: Open only to junior and senior sport management majors.</td>
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<tr>
<td>HESC 439</td>
<td>Ethics and Issues in Sport Management</td>
<td>3</td>
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<td>Examination of the importance of sport in society as a transmitter of values, including major ethical theories in sport and ethical perspectives on current issues in sport.</td>
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<td>PREREQ: HESC438.</td>
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<td>RESTRICTIONS: Open only to junior or senior sport management majors.</td>
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<tr>
<td>HESC 440</td>
<td>Strategies for Athletic Peak Performance</td>
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<td></td>
<td>Presentation of methods and techniques for the mental preparation necessary to attain athletic peak performance. Provides experiential activities in the areas of relaxation, visual imagery, visual motor behavior rehearsal, hypnosis stress reduction and concentration techniques.</td>
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<tr>
<td>HESC 447</td>
<td>Advanced Topics in Strength and Conditioning</td>
<td>3</td>
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<td></td>
<td>Theoretical principles for developing individualized strength and conditioning programs based on biomechanical, physiological and neural concerns, including calculations of volume, intensity and tonnage. Topics include teaching progressions and technique training for Olympic style exercises, weight room safety and weight room design.</td>
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<td>PREREQ: Junior or senior standing. Completion of HESC320, HESC350 and HESC425 or HESC426 with at least a C. HESC426 may be a corequisite.</td>
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<td></td>
<td>RESTRICTIONS: Restricted to minors in strength and conditioning.</td>
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<tr>
<td>HESC 448</td>
<td>Organization and Administration</td>
<td>3</td>
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<td>Information for prospective certified athletic trainers on organization and administration of athletic training programs as identified by the NATA. Topics include record keeping, purchasing and maintenance of equipment and facilities and policies and procedures for the operation of an athletic training program.</td>
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<td>RESTRICTIONS: Open to athletic training majors only.</td>
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<tr>
<td>HESC 449</td>
<td>Advanced Topics in Sports Medicine</td>
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<td></td>
<td>Exposure to a variety of medical specialists and allied health professionals, including physical therapists, dentists, nurses and specialists in orthopedics, neurology, cardiology, pediatrics, internal medicine, ophthalmology and physical medicine.</td>
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<td>RESTRICTIONS: Open to athletic training majors only.</td>
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<tr>
<td>HESC 450</td>
<td>Facility and Park Management</td>
<td>3</td>
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<tr>
<td></td>
<td>Study of the principles and procedures involved in planning for parks and recreation resources, land acquisition and utilization, maintenance of park and recreation areas, facilities and equipment.</td>
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<tr>
<td>HESC 451</td>
<td>Exercise Testing/Prescription</td>
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<td>Methods of evaluating cardiovascular function through graded exercise tests as well as principles of exercise prescription. Theoretical as well as practical covering of administrative aspects of testing, metabolic calculations, a variety of testing protocols, basic exercise physiology and exercise prescription.</td>
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<tr>
<td>HESC 453</td>
<td>Aquatic Management</td>
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<td>Equips individuals with the knowledge, techniques and skills required to operate an aquatic facility as manager or director.</td>
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<tr>
<td>HESC 455</td>
<td>Figure Skating Practicum III</td>
<td>3 PF</td>
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<td>Concentration on advanced teaching/coaching techniques related to the skill required in I.S.I.A. and U.S.F.S.A. Levels with an analysis of progression and sequencing. Seminar sessions to include professional responsibilities, business practices, skating pedagogy, special programs and precision skating.</td>
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<td>RESTRICTIONS: Open only to figure skating coaching minors only.</td>
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<tr>
<td>HESC 456</td>
<td>Figure Skating Practicum IV</td>
<td>3 PF</td>
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<tr>
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<td>Direct involvement in the teaching/coaching of beginner elite national and world competitors under the supervision of Ice Skating Development Center professional staff.</td>
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<td>RESTRICTIONS: Open to figure skating coaching minors only.</td>
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<tr>
<td>HESC 457</td>
<td>Athletic Training Practicum IV</td>
<td>3 PF</td>
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<td></td>
<td>Supervised clinical experience in athletic training. Development of competencies and proficiencies in content areas comprising the role of an athletic trainer, as specified in the NATA’s Athletic Training Educational Competencies.</td>
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<td>PREREQ: HESC358.</td>
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<td>RESTRICTIONS: Open to athletic training majors only.</td>
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<tr>
<td>HESC 458</td>
<td>Athletic Training Practicum V</td>
<td>3 PF</td>
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<tr>
<td></td>
<td>Supervised clinical experience in athletic training. Development of competencies and proficiencies in content areas comprising the role of an athletic trainer, as specified in the NATA’s Athletic Training Educational Competencies.</td>
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<td></td>
<td>PREREQ: HESC457.</td>
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<td>RESTRICTIONS: Open to athletic training majors only.</td>
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<tr>
<td>HESC 459</td>
<td>Athletic Training Practicum VI</td>
<td>3 PF</td>
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<tr>
<td></td>
<td>Supervised clinical experience in athletic training. Development of competencies and proficiencies in content areas comprising the role of an athletic trainer, as specified in the NATA’s Athletic Training Educational Competencies.</td>
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<td>PREREQ: HESC458.</td>
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<td>RESTRICTIONS: Open to athletic training majors only.</td>
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<tr>
<td>HESC 460</td>
<td>Coaching/Performance Practicum</td>
<td>1-3 PF</td>
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<td>Practical coaching/performance experience in a scholastic/clinical setting with the season chosen corresponding to each student’s interest. The student must keep a daily log of methods and experiences and choose an appropriate project. Observations will be made by the minor coordinator and the cooperating supervisor.</td>
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<td>PREREQ: HESC210, HESC220, HESC320 and HESC390.</td>
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<td>RESTRICTIONS: Junior status or higher.</td>
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<tr>
<td>HESC 462</td>
<td>Practicum in Strength and Conditioning</td>
<td>3 PF</td>
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<tr>
<td></td>
<td>Directed practical experience in a strength and conditioning environment.</td>
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<td></td>
<td>PREREQ: Admission to the strength and conditioning minor and completion of HESC320, HESC432 and HESC447 with at least a C.</td>
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<tr>
<td>HESC 463</td>
<td>Practicum in Exercise Science</td>
<td>1-6 PF</td>
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<td></td>
<td>Directed practical experiences in clinical aspects of exercise science.</td>
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<td></td>
<td>PREREQ: Admission to the exercise physiology or biomechanics concentration.</td>
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<td>RESTRICTIONS: Junior status or higher.</td>
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<tr>
<td>HESC 464</td>
<td>Internship</td>
<td>9 PF</td>
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<tr>
<td>HESC 465</td>
<td>Teaching Seminar in Health and Physical Education</td>
<td>3</td>
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<td></td>
<td>Examines the role of the health and physical education teacher in the elementary and secondary schools. Provides a forum for analyzing and discussing topics of interest to preprofessionals and includes participation of professionals from the school community.</td>
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<td>COREQ: EDUC400.</td>
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<td>RESTRICTIONS: Open to HPE majors only.</td>
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<tr>
<td>HESC 468</td>
<td>Senior Special Topics</td>
<td>1-3</td>
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<tr>
<td></td>
<td>Senior level independent study.</td>
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<tr>
<td>HESC 470</td>
<td>Baseball and Society</td>
<td>3</td>
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<tr>
<td></td>
<td>Study of baseball as a reflection of society and how it pervades American culture. Examines baseball as a game, sport, business and social institution as portrayed in literature, memorabilia, film, ballparks and scandals.</td>
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<tr>
<td>HESC 480</td>
<td>Upper Extremity and Spine Evaluation</td>
<td>3</td>
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<tr>
<td></td>
<td>Evaluation of the upper extremity, cervical spine and facial injuries. SOAP format evaluation, on-field evaluation, mechanics and pathomechanics of joint movement, detailed anatomy, etiology of specific injuries and special and stress tests will be discussed.</td>
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<td>PREREQ: HESC220 and HESC240.</td>
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<td>RESTRICTIONS: Open to athletic training majors only.</td>
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</tbody>
</table>
HEALTH AND EXERCISE SCIENCES

HESC 481 LOWER EXTREMITY AND SPINE EVALUATION 3
Evaluation of the lower extremity, lumbar spine and sacroiliac joint. SOAP format evaluation, on-field evaluation, mechanics and pathomechanics of joint movement, detailed anatomy, etiology of specific injuries and special and stress tests will be discussed.
PREREQ: HESC220 and HESC240.
RESTRICTIONS: Open to athletic training majors only.

HESC 484 WOMEN IN SPORTS 3
Historical and contemporary perspectives on the female athlete, encompassing biological, psychological, sociological, and legal issues that are gender dependent and culturally unique. May be cross-listed with WCMS484.

HESC 485 RESEARCH IN EXERCISE SCIENCE 1-3
Undergraduate laboratory research experience in biomechanics, exercise physiology, or motor control.
RESTRICTIONS: Restricted to exercise science majors. Consent of instructor required. May be repeated for up to six credits.

HESC 490 DEVELOPMENT OF HEALTH PROMOTION PROGRAMS 3
Prepares students to plan, create and implement health promotion programs in the workplace, focusing on program selection, promotion, evaluation and expansion.
PREREQ: HESC332 and a statistics course.

HESC 601 RESEARCH METHODS 3
Emphasis on procedures for designing experimental research studies including choice of subjects, group design, choice of proper instrumentation, statistical design, formulation of experimental group programs and technical writing for proposals and publication.

HESC 602 ELEMENTARY COMPUTER STATISTICS 3
Overview of elementary statistics and their use in research. Emphasis on the use and interpretation of packaged computer routines (SPSS). Discusses experimental designs utilizing analysis of variance and other research procedures.

HESC 603 SEMINAR IN EXERCISE SCIENCE 0 PF
Guest and student presentations on research or other topics related to exercise science.

HESC 604 SENSORIMOTOR CHARACTERISTICS OF INJURY 3
Nervous system attributes related to acute injury and overuse syndromes, including mechanoreceptor function, muscle tone and stiffness regulation, dynamic restraint, neuromuscular dyskinesis, and neurocognitive traits. Implications for research and clinical outcomes are discussed.
PREREQ: HESC220 or equivalent.

HESC 605 PATHOETIOLOGY OF MUSCULOSKELETAL INJURIES 3
Physiological, mechanical, and neuromuscular mechanisms of common musculoskeletal injuries with implications for both clinical and research environments.
PREREQ: HESC220 or equivalent.
RESTRICTIONS: Restricted to graduate students.

HESC 606 EVIDENCE-BASED SPORTS MEDICINE 3
Theory and practice of evidence-based sports medicine for both clinical and research environments, with emphasis on understanding results of health care interventions and practices for patients and research subjects.

HESC 607 MOTOR LEARNING AND CONTROL 3
Exploration of theoretical perspectives of motor learning and control, with a focus on contemporary approaches. Surveys neurological systems involved in perception and motor performance. Application of specific principles of learning and control of movement to the teaching of motor skills in daily living activities, physical education and sport.

HESC 609 SURVEY RESEARCH METHODS 3
Emphasis on procedures for designing survey-based research studies, including choice of subjects, development of proper instrumentation, statistical design and analysis, and formulation of proposals appropriate for publication.
RESTRICTIONS: Restricted to students in the M.S. programs in health promotion and human nutrition.

HESC 615 USING ASSESSMENT IN PHYSICAL EDUCATION 3
Authentic assessment strategies for K-12 programs using national and state content standards in physical education. Topics include current practices, educational reform, teacher and student accountability and technological resources.

HESC 616 SPORT MARKETING 3
Marketing applications for amateur and professional sport organizations and the use of sport in the marketing of traditional products and services. Topics include the marketing mix, sport consumer behavior, strategic market planning, branding, and sponsorship.

HESC 620 INTERNATIONAL SPORT MANAGEMENT AND MARKETING 3
Overview of the global sport industry, including the bid and host process for international sport competitions, the organization of the international sport community, the penetration strategies of American sport leagues and products into international markets, and the structure of sport in other countries.

HESC 634 SPORT BUSINESS AND FINANCE 3
Principles of financial management and microeconomics as applied to the sport industry, with a focus on spectator sports at both professional and collegiate levels. Topics include the financing of sport facility construction, budgeting in collegiate athletics, and the financial effects of collective bargaining agreements.

HESC 644 OUTDOOR EXPERIENTIAL EDUCATION FOR TEACHERS AND RECREATORS 3
Focuses on development of a broad spectrum of curriculum materials and instructional aids utilized in outdoor education programs. Includes techniques in social studies, science, art, language arts, physical education, music and math. Examines the meaning, scope and value of outdoor education and the evolution of the outdoor education movement in schools in America. Investigates activities both in and around schools and in natural areas.

HESC 645 ADVENTURE BASED COUNSELING IN EDUCATION 3
Presents a model for teachers to challenge students and alter learning capabilities through cooperative behaviors. Participants develop new skills utilizing physically challenging activities to expand their curriculum in the area of adventure education.

HESC 647 LEGAL ASPECTS OF SPORT MANAGEMENT 3
Overview of the legal principles relevant to sport managers, including tort law, contract law, constitutional law, agency law, risk management, judicial review and administrative law related to the operations and administration of sport and athletic programs.

HESC 650 LIFE SPAN MOTOR DEVELOPMENT 3
Theoretical and empirical inquiry into developmental changes in movement patterns across the life span. Focus placed on changes in behavioral aspects of human motor behavior and the underlying mechanisms to which these changes relate. Students design and complete research project.

HESC 651 NEUROPHYSIOLOGICAL BASIS OF HUMAN MOVEMENT 3
Neural control of human movement, including gradation of muscular force, motor unit control principles, neuromuscular aspects of strength, segmental motor control, the organization of ballistic movements, adaptation in the control movement, and aging. Students learn related research techniques through hands-on demonstrations.
PREREQ: HESC220 or equivalent.

HESC 655 ADVANCED PHYSIOLOGY OF EXERCISE 3
Consists of three basic parts: a survey of completed research on the effects of exercise upon the human body as it specifically relates to physical education and athletics; instruction in the use of stress testing equipment; and completion of an independent research project.

HESC 656 CARDIOVASCULAR ASSESSMENT I 3
Fundamentals for administering the 12-lead and single-lead electrocardiograms and stress test protocols for individuals recovering from cardiovascular disease. Emphasis on determining rate, rhythm, axis, hypertrophy and infarction.

HESC 657 CARDIOVASCULAR ASSESSMENT II 3
Prepares the student to direct exercise programs in the rehabilitative setting. Addresses theoretical and practical aspects of exercise testing and prescription in addition to administrative issues of programs. Students design an exercise program for phase I, II or III cardiac rehabilitation.

HESC 677 SEMINAR IN EXERCISE PHYSIOLOGY 3
Introduction to contemporary and classical research literature in exercise physiology with an emphasis on the acute and chronic effects of exercise on performance and health. Lecture/discussion format.

HESC 680 EXERCISE, NUTRITION AND BONE HEALTH 3
See NTD1680
PREREQ: BISC276 or equivalent and NTD1200 or equivalent.

HESC 685 ADVANCED EXERCISE PRESCRIPTION 3
Instructs students in exercise recommendations for populations with special needs. Exercise prescription for cardiac patients, diabetics, pulmonary diseases and others with special needs will be discussed.
PREREQ: CV I and CV II.

HESC 687 SEMINAR IN BIOMECHANICS 3
Introduction to contemporary and classical research literature on the biomechanics of human movement with an emphasis on exercise, clinical and sport applications. Lecture/discussion format.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>HIST 278</td>
<td>Historic Cultures of the Middle Atlantic Region</td>
</tr>
<tr>
<td></td>
<td>See ANTH278 for course description.</td>
</tr>
<tr>
<td>HIST 291</td>
<td>Women's History through Film</td>
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<td>See WOMS291 for course description.</td>
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<tr>
<td>HIST 300</td>
<td>Women in American History</td>
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<tr>
<td></td>
<td>The position of women in American life viewed from a historical perspective</td>
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<td></td>
<td>including such topics as home and family life, women in the work force,</td>
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<td>women as agents of social change and feminism.</td>
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<td>May be cross-listed with WOMS300.</td>
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<tr>
<td>HIST 302</td>
<td>The World in Our Time</td>
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<td>An examination of current events within the context of historical forces.</td>
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<tr>
<td>HIST 305</td>
<td>Images of Race and Ethnicity in American Culture</td>
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<td>Study of how images have shaped attitudes toward race and ethnicity in American culture from the colonial era to the present. Will study Native Americans, African-Americans and immigrants. Visual materials include works of fine art, folk art, photographs, cartoons, motion pictures and popular illustrations. May be cross-listed with BAMS305.</td>
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<tr>
<td>HIST 306</td>
<td>History of American Foreign Policy</td>
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<td></td>
<td>Foreign policy of the United States and the nation’s changing relations with the outside world. Covers the period 1900 to the present. Special attention given to presidential personality, how a President’s background and personality affect the making of foreign policy.</td>
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<tr>
<td>HIST 307</td>
<td>The United States in the Early National Period</td>
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<td></td>
<td>Political and cultural change in America from 1789-1825, from the presidency of George Washington through James Monroe. Particular attention to national politics under the new Constitution, westward expansion under Jefferson and Madison, and cultural life in the early republic.</td>
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<tr>
<td>HIST 308</td>
<td>The United States in the Antebellum Period</td>
</tr>
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<td></td>
<td>Social transformation and politics in America from 1825 to the eve of the Civil War. Particular attention to the presidency of Andrew Jackson, changes in institutions and culture related to expansion, and conflicts leading to disunion.</td>
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<tr>
<td>HIST 309</td>
<td>United States Business and Political Economy</td>
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<td>A history of the United States as a capitalist civilization, particularly since the nineteenth-century rise of the modern corporation. Emphasis on business history, business-government relations and the larger social history of U.S. political economy.</td>
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<tr>
<td>HIST 310</td>
<td>Postwar America I: 1945-1963</td>
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<tr>
<td></td>
<td>Social, political and diplomatic history of the United States from 1945 to 1963.</td>
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<tr>
<td>HIST 311</td>
<td>Postwar America II: 1963-Present</td>
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<td></td>
<td>Social, political and diplomatic history of the United States from 1963 to the present.</td>
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<tr>
<td>HIST 312</td>
<td>Crime and Punishment in American History</td>
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<td>See CRJU312 for course description.</td>
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<tr>
<td>HIST 313</td>
<td>Early Twentieth Century America</td>
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<td></td>
<td>The rise of big business and the ways that farmers, labor leaders, socialists and middle-class reformers responded to the new industrialism.</td>
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<td>HIST 314</td>
<td>Twentieth Century America</td>
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<td>Causes and consequences of American intervention in the two world wars, and the social, political and economic history of the U.S. during the years between the wars.</td>
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<td>HIST 316</td>
<td>First Encounters: Indians and Europeans in Early America</td>
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<td>Explores the initial contacts between Native Americans and Europeans during the sixteenth and seventeenth centuries. Focuses on encounters between the Indians and the Spanish in Mexico, the French in Canada and the British along the Atlantic seaboard.</td>
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<td>HIST 318</td>
<td>Colonial America</td>
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<td>The transit of culture from England to America and its modification there during the seventeenth century. The development of mature colonial societies to 1760.</td>
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<tr>
<td>HIST 319</td>
<td>Revolutionary America</td>
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<td>The American colonies and the new nation from 1760-1789 with particular emphasis on political and cultural developments in the age of the American Revolution.</td>
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<tr>
<td>HIST 321</td>
<td>Civil War and Reconstruction</td>
</tr>
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<td>Sectional conflict and the struggle between rival nationalisms in mid-19th century United States.</td>
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<tr>
<td>HIST 322</td>
<td>The Old South</td>
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<td></td>
<td>The history of the Southern United States from the beginnings of European colonization to the outbreak of the Civil War. Special attention to slavery and how it shaped Southern life.</td>
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<tr>
<td>HIST 324</td>
<td>American Constitutional History</td>
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<td>See CRJU324 for course description.</td>
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<tr>
<td>HIST 325</td>
<td>History of Black America to the Civil War</td>
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<td>See BAMS304 for course description.</td>
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<tr>
<td>HIST 326</td>
<td>History of Black America Since the Civil War</td>
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<td>See BAMS306 for course description.</td>
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<tr>
<td>HIST 328</td>
<td>American Industrial Society from 1815 to the Present</td>
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<td>Exploration of social forces and social impact of American industrialization: rise of the factory system, emergence of an industrial work force, role of cities and immigrants, westward migration, transition from slavery to freedom in the south, reform movements, family life and population change, and social and political conflict.</td>
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<tr>
<td>HIST 329</td>
<td>International Migration</td>
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<td>See POSC329 for course description.</td>
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<tr>
<td>HIST 330</td>
<td>Peasants and Revolution in Africa</td>
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<td>The most remarkable nationalist struggles in modern Africa have been supported by peasants. Special attention paid to these struggles, especially in Guinea-Bissau, Angola, Zimbabwe, Mozambique, and to the Mau Mau of Kenya. Why did the peasants support the revolution? Did they benefit from the victories?</td>
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<tr>
<td>HIST 331</td>
<td>History of the Caribbean</td>
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<td>Examines major themes in Caribbean history from the pre-Columbian period to the period of slavery in 1838. Discussion of the demographic and ecological consequences of European contact, sugar and slavery, the evolution of creole cultures and slave resistance. May be cross-listed with BAMS331.</td>
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<tr>
<td>HIST 332</td>
<td>History of the Caribbean II</td>
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<td>Examines the period from 1838 to the present. Includes a discussion of the social and economic adjustments to emancipation, the making of plural societies with the importation of Asian laborers, American imperialism and political and social movements of the twentieth century. May be cross-listed with BAMS332.</td>
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<tr>
<td>HIST 334</td>
<td>African American Women's History</td>
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<td>Explores the diversity of African American women’s lives and development of women, work, and culture from the colonial era through the late 20th century. Examines the social, political, religious and economic factors affecting change and transformation in the lives of African American women. Provides a broad introduction to the interdisciplinary field of African American Women’s Studies. May be cross-listed with BAMS334 and/or WOMS334.</td>
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<tr>
<td>HIST 336</td>
<td>Topics in Latin American History</td>
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<td>History and culture of Latin American peoples.</td>
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<td>RESTRICTIONS: Only taught abroad in Latin America.</td>
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<tr>
<td>HIST 338</td>
<td>Greek-Roman Sport-Recreation</td>
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<td></td>
<td>Covers period 2000 B.C. to 6th century A.D. from point of view of spectator and participant; use of ancient authors in translation, artistic representations and secondary literature. Extensive use of slides.</td>
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<tr>
<td>HIST 339</td>
<td>Topics in Modern European History</td>
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<td>A reflection of developments in modern European history from the First World War to the present. Emphasis on political, social, cultural and economic patterns of the period, complemented by visits to museums and appropriate historic sites. RESTRICTIONS: Taught abroad only. May be repeated for credit when taken on different study abroad programs.</td>
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<tr>
<td>HIST 340</td>
<td>Ancient Near East and Greece</td>
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<td>Stresses such themes as the way in which the world view of the ancients was different from ours, and the relationship between the individual and society. Readings in ancient historical works and ancient literature. Extensive use of slides.</td>
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<tr>
<td>HIST 341</td>
<td>Ancient Rome</td>
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<td>Students encouraged to form opinions on such questions as why and how Rome came to rule its empire; why Julius Caesar was murdered; and why Augustus succeeded where Julius Caesar had failed. Readings in ancient sources. Extensive use of slides.</td>
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<tr>
<td>HIST 342</td>
<td>Barbarian Europe</td>
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<tr>
<td></td>
<td>A survey of political, social, cultural and economic developments in Europe between 300 and 1050.</td>
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</tbody>
</table>
HIST 343  MEDIEVAL EUROPE: 1050-1350  3
A survey of political, social, cultural and economic developments in Europe between 1050 and 1350.

HIST 344  RENAISSANCE EUROPE  3
Europe from the late 13th to the early 16th century, with stress on the consequences of the Black Death, the reform of the Church and the flowering of cultural and intellectual life in Italy and northern Europe.

HIST 345  EUROPE IN THE REFORMATION ERA: 1517-1648  3
Religion in the realms of thought and action during the rise of "modern" Western civilization: the scientific revolution, the Reformation, the Counter-Reformation and their impact on the behavior and perceptions of men by 1650.

HIST 346  AGE OF LOUIS XIV  3
The culture, society and politics of 17th century France, centered upon the biography of Louis XIV. Emphasis on growth of absolute monarchy in France and the implications for all of Europe.

HIST 347  THE FRENCH REVOLUTION AND NAPOLEON  3
Emphasis on personalities in the Revolution - Louis XIV, Robespierre and Napoleon - and the clash of social forces.

HIST 348  HISTORY OF SPAIN: 1479-PRESENT  3
History of Spain from the unification of the crowns of Aragon and Castile in 1479 to the present. Emphasis on the rise and decline of the Spanish empire, expansion into the New World, and the obstacles for political, social and economic modernization since 1715.

HIST 349  MODERN HISPANIC SOCIETIES: 1800-PRESENT  3
Comparative social history of the Hispanic world. Topics include the social and cultural background of early modern Spain, the formation of Latin American colonial society and the struggle for modernization in contemporary Spain and Latin America.

HIST 351  EUROPE IN CRISIS: 1919-1945  3
Europe from the Paris Peace Conference to the end of World War II, with emphasis on the breakdown of traditional institutions in an age of totalitarianism, economic depression and world conflict.

HIST 352  CONTEMPORARY EUROPEAN SOCIETY  3
A comprehensive survey and analysis of the evolution and structure of postwar society. Emphasis on the role of modern nation states and the impact of national culture.

HIST 353  MODERN GERMANY: 1770-1919  3
German political, socioeconomic, and cultural history from 1770 to the end of the First World War.

HIST 354  GERMANY IN THE TWENTIETH CENTURY: 1914 TO PRESENT  3
German political, socioeconomic, and cultural history from 1914 to the present.

HIST 355  EARLY MODERN INTELLECTUAL HISTORY  3
Examines the major development in thought from around 1600 to 1800. Questions considered are the nature of political order and justice, the character of the good life and moral obligation, the relation between faith and reason, and the development of historical reason and theories of the fine arts. Readings will be from Milton, Locke, Voltaire, Rousseau and others.

HIST 356  MODERN EUROPEAN INTELLECTUAL HISTORY  3
Philosophical and political thought from French Romanticism and German Classicism through Existentialism. Readings from Hegel, Marx, Kierkegaard, Nietzsche and Thomas Mann.

HIST 357  THE EUROPEAN CITY  3
The evolution of cities in European history, emphasizing the development of urban society and culture. Topics vary and may include London and Paris in the Modern Age, London in the Modern Age, Paris in the Modern Age. RESTRICTIONS: May be taught abroad. May be repeated for credit when taken on different city topics.

HIST 359  SOVIET UNION: 1917-1990  3
Political, socioeconomic and cultural developments in the Soviet Union from 1917 to 1990.

HIST 361  TWENTIETH CENTURY FRANCE  3
French political, social, and cultural history from the 1890s to the year 2000.

HIST 362  EUROPEAN CULTURAL HISTORY, 1748-1889  3
Surveys both popular culture and elite culture from the Enlightenment to the centenary of the French Revolution. Subjects include revolutionary culture, Romanticism, realism, railroads, industry, popular pastimes, folklore, moral reform, national identity. Sources include literature, painting, music.

HIST 363  EUROPEAN CULTURAL HISTORY SINCE 1889  3
Surveys both popular and elite culture since the construction of the Eiffel Tower. Subjects include modernism, consumer culture, mass culture, state subsidy, gender, postmodernism. Sources include literature, architecture, painting, music, cinema.

HIST 365  TOPICS IN EAST ASIAN HISTORY  3
Topics vary and may include history of civilization [China, Japan, Korea, Southeast Asia, etc.], women in historical and modern times, European colonialism in Asia, and trade with United States. RESTRICTIONS: Taught only in study abroad program. May be repeated for credit when topics vary.

HIST 366  INDEPENDENT STUDY  1-6

HIST 368  MODERN CHINA: 1600-1920’S  3
The history of China from the rise of the Manchus to the collapse of their dynasty and the emergence of the Republic. Topics include the reform tradition, Opium War and imperialism, modernization, the rise of modern Chinese nationalism and revolution. RESTRICTIONS: Not open to freshmen.

HIST 369  CHINA SINCE 1900  3
History of China from the fall of the last dynasty to present. Topics include the collapse of the ancient regime, the Republican revolution, warlordism and imperialism, rise of modern nationalism, Chiang Kai-shek and Mao Zedong, post-1949 China and the Deng Xiaoping era. RESTRICTIONS: Not open to freshmen.

HIST 370  HISTORY OF MODERN JAPAN  3
History of Japan from 1600 to 1952 with special emphasis on domestic forces of change, impact of the West, Japanese imperialism and militarism, the dilemma of progress and Japan's place in the modern world.

HIST 371  POSTWAR JAPAN  3
Traces the emergence of contemporary Japan in its cultural, social, political, and economic spheres. Explores the dynamic between every day life as depicted in literature, film, journalism, memoirs and historical writings and the national projects of "economic miracle" and the making of the "economic superpower."

HIST 372  POPULAR CULTURE IN URBAN JAPAN  3
Explores the theory and practice of popular culture as manifested in the history of urban Japan from the seventeenth to the twenty-first century. Topics include entertainments, sports, mass media, tourism, fashion, consumerism, sex and gender. Discussion format with intensive reading and writing. May be cross-listed with WOMS372.

HIST 373  MODERN IRELAND: 1534-PRESENT  3
Anglo-Irish relations, the emergence and victory of Irish nationalism and the historical roots and subsequent development of the Ulster problem.

HIST 374  HISTORY OF ENGLAND TO 1715  3
Political, constitutional, social and economic development to 1715.

HIST 375  BRITAIN SINCE 1714  3
British politics, society, and culture in modern times. The rise of parliamentary democracy, industry, liberalism, empire, feminism, social democracy and mass culture.

HIST 377  RADICALISM AND REVOLUTION: ISLAMIC MOVEMENT/ MODERN MIDDLE EAST  3
Addresses the background, historical development and present state of Islamic fundamentalist movements.

HIST 378  NATIONALISM IN THE MODERN MIDDLE EAST  3
Focuses on the ideology of nationalism in an attempt to explain the emergence of the modern countries in the Middle East.

HIST 379  HISTORICAL ARCHAEOLOGY OF THE EASTERN UNITED STATES  3
See ANTH379 for course description.

HIST 380  HISTORY OF THE ARAB-ISRAELI CONFLICT  3
Explores the roots and the historical complexity of the Arab-Israeli conflict. Topics include: the origins of Zionism, the nature of traditional Arab/Ottoman society in the 19th century, the relationship between the early Zionists and indigenous Arab population of Palestine, the creation of a Jewish society, the rise of Palestinian nationalism, and the protracted search for coexistence between Jews and Arabs. May be cross-listed with JWST381.

HIST 381  ISLAM AND THE WEST: THE HISTORY OF MUTUAL PERCEPTIONS  3
Surveys the history of mutual views of Islam and Christianity/Judaism/the West from the Middle Ages to the present. Topics include medieval polemics, Enlightenment attempts at respect and understanding, the question of Orientalism, and the current specter of a clash of civilizations.
HIST 382  HISTORY OF WESTERN MEDICINE  3
Social and cultural forces that have influenced the development of modern medicine.

HIST 389  THE AMERICAN WEST  3
Surveys the American West through the eyes of its diverse population as well as those who are drawn to study and define it. Particular attention given to themes currently debated concerning the legacy, meaning and imagery of the American West.

HIST 390  AMERICAN INDIANS: THE SOUTHWEST  3
Addresses the history of Indians in the American Southwest from pre-European contact to the present. Approaches the subject from multiple disciplinary and cultural perspectives and focuses on the histories of the "Pueblo," Hopi, Apache and Navajo people.

HIST 391  HISTORY OF WORLD WAR II IN ASIA AND THE PACIFIC  3
Social, political and military developments in Asia and the Pacific from c. 1870-1954, focusing on the causes, courses and consequences of World War II. Topics include Western imperialism in Asia, Japanese militarism, occupation and resistance, the Allied counterattack, origins of the Cold War and the rise of nationalism and communism in occupied and affected areas.

HIST 392  BUDDHISM AND POLITICS IN ASIA  3
Addresses the modern phenomenon of politically engaged Buddhism by introducing the historical development of Buddhism and its relations to state and society. Focuses on case studies on Buddhist political movements in modern Asian history, such as the Buddhist Peace Movement during the Vietnam War, Tibetan resistance to Chinese rule, the movement of Untouchables in India.

HIST 393  HISTORY OF MODERN VIETNAM  3
Covers major social, cultural, political, economic and military developments in Vietnamese history from approximately 1500 to the present, including traditional civilization, colonization, nationalism and communism, the Indochina Wars (among them the "Vietnam Conflict"), the Kampuchean Crisis, and life under the Socialist Republic of Vietnam since 1976.

HIST 394  AFRICA SINCE 1960  3
Deals with current political, economic and social problems and progress found in Africa. Historical analysis of the emergence and development of these problems, issues and achievements. Links the present to the past for factual historical analysis.

HIST 395  PAN AFRICANISM  3
Traces the rise, development and varied expressions of the drive towards the liberation and unity of black people on the continent (Africa) and in the diaspora. Covers liberation struggles in Africa and the Civil Rights movement in the United States. May be cross-listed with BAMS395.

HIST 397  HISTORY OF SOUTH AFRICA  3
Surveys the complex historical development of South African society. Topics include African resistance to white expansion, wars of resistance, the impact of agricultural and labor laws on African societies, tensions in white society, Africans in power since 1948, and African struggles for freedom.

HIST 403  HISTORY, PHILOSOPHY, FUNCTIONS AND FUTURE OF MUSEUMS  3
See MSST403 for course description.

HIST 408  PUBLIC HISTORY: RESOURCES, RESEARCH AND PRACTICE  3
Team-taught seminar that acquaints students with the function and resources of American historical organizations and how to use these resources in the non-academic setting for productive historical research. Addressed to those pursuing careers in public history and teaching and scholarship. May be cross-listed with MSST408.

HIST 411  SEMINAR IN AMERICAN HISTORY  3
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 430  SEMINAR IN TWENTIETH CENTURY LATIN AMERICAN REVOLUTIONS  3
Focuses on four 20th century Latin American revolutions, concentrating on the historical background and events of the Mexican, Guatemalan, Cuban and Nicaraguan revolutions.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 439  WOMEN AND REVOLUTION IN AFRICA  3
Discusses the critical roles played by women in African revolutionary movements. Why did women join these revolutionary movements? What is the relationship between feminism and revolution? May be cross-listed with WOMS439.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 440  SEMINAR IN AFRICA UNDER COLONIAL RULE  3
Introduces various Colonial policies of the European powers in Africa, emphasizing the comparisons and contrasts among these policies. Attention paid to the effect of Colonialism on Africa's economic, social and political development.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 444  SEMINAR: WOMEN IN THE ISLAMIC MIDDLE EAST  3
Examines the major developments, themes and problems in women's history in the Middle East from the advent of Islam to the present. By tracing women's legal status, sexual morality, family and social life, and female economic and political participation, it seeks to shed light on the process of women's roles in society and to challenge the notion that gender divisions and roles have been static over time.
May be cross-listed with WOMS444.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 449  SEMINAR: SCIENCE, TECHNOLOGY AND MEDICINE  3
Topics vary and may include The American System, History of Chemistry, or History of Engineering.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 453  SEMINAR: HISTORY THROUGH MEDIA  1-6
Trains students to produce historical documentaries from archival photographs and sound recordings in the United States National Archives and other depositories.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 454  VERNACULAR ARCHITECTURE  3
The study of traditional American folk architecture from the 17th century to the present. Examination of changes in construction, house types and decoration in vernacular buildings, as well as issues of regional differences and individual craftsmanship.
May be cross-listed with ARTH454.

HIST 459  SEMINAR IN UNITED STATES URBAN HISTORY  3
The process of urbanization in America with special emphasis on the Philadelphia-Wilmington area.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 463  HISTORICAL ARCHAEOLOGY AND THE PUBLIC  3
See ANTH463 for course description.

HIST 466  INDEPENDENT STUDY  1-6
May be cross-listed with WAMS466.

HIST 470  SEMINAR IN ANCIENT HISTORY  3
Topics vary and may include Slavery in Antiquity, The Archaeology of the Ancient World or The Greek City State.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 471  SEMINAR IN MEDIEVAL HISTORY  3
Topics may include Europe in the 10th Century, Europe in the 11th Century, and Women in Europe to 1600.
May be cross-listed with WOMS472.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 473  SEMINAR IN EARLY MODERN EUROPEAN HISTORY  3
Topics vary and may include Renaissance Humanism, or Women in Europe from 1100-1600.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 474  SEMINAR IN ENGLISH HISTORY  3
Topics vary and may include Britain Since 1945; English Political Ideas, Hobbes to Burke.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.
HIST 475  Seminar in Modern European History  3
Topics vary and may include The Holocaust, The Cold War, Hitler's Germany, or The Age of Revolution.
May be cross-listed with WOMS475.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 477  Seminar in Latin American History  3
Topics vary and may include History of Mexico, History of the Caribbean or Slavery in the New World.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 479  Seminar in Asian History  3
Topics vary and may include History of Southeast Asia, 20th Century China or Japan in the 20th Century.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 483  Seminar in Comparative History  3
Topics vary, but all compare some aspect of American with European history or Western with non-Western history.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 491  Planning a Course of Instruction  3
Aims, course planning, instructional strategies, evaluation and selection of materials for teaching history and the social sciences in secondary schools.
RESTRICTIONS: The Student Learning Portfolio must be completed by the end of this course in order to student teach in the spring semester.

HIST 493  Problems in Teaching History and Social Sciences  3
Helps beginning teachers carry out planned instructional strategies, analyze their teaching behavior, evaluate the effectiveness of their instruction and modify their instructional plans based on their teaching experience.

HIST 601  United States Historiography  3
Introduces changing interpretations of United States history and examines the development of the American historical profession.

HIST 602  European Historiography  3
Introduces changing interpretations of various aspects of European history.

HIST 603  Historiography of Technology  3
Introduces major historiographic issues and examines the development of this subfield of history.

HIST 604  History and Philosophy  3
Survey of major historians from the Bible and Herodotus through the 19th century, together with some of the most influential philosophers of history.

HIST 605  History of Theories in Material Culture  3
See EAMC605 for course description.

HIST 606  Issues in American Material Culture  3
See EAMC606 for course description.

HIST 607  Readings in American Material Life  3
Readings of recent monograph and serial publications pertaining to American Material Life. Topics include Landscape, Architecture, Work, Department, Family and Religion. Discussion and interpretation of authors' arguments. Review of material life historiography. Emphasis on broad synthesis of material culture literature.

HIST 608  Public History: Resources, Research and Practice  3
Team-taught seminar that acquaints students with the function and resources of American historical organizations and how to use these resources in the non-academic setting for productive historical research. Addressed to those pursuing careers in public history and teaching and scholarship. May be cross-listed with MST608.

HIST 611  Seminar in American History  3

HIST 614  The American Suburb  3
See UAPP614 for course description.

HIST 617  Seminar in Gender and Women's History  3
Reading seminar. Topics vary and may include U.S. Women's History, U.S. Women's History in Comparative Perspective, Gender in History, or European Women's History.

HIST 620  The Invasion of America  3
Reading seminar devoted to exploring the experiences of Native Americans in the present-day United States and Canada from the sixteenth century to the Indian Removal of the 1830s.

HIST 621  Seminar on American Society and Culture before the Revolution  3
Reading seminar in American society and culture from the first settlements to the Revolution.

HIST 623  Age of the American Revolution  3
Reading seminar on political and constitutional changes from 1760 to 1790 and the social and cultural history of that period.

HIST 625  United States Social and Cultural History: 1790-1860  3
Reading seminar on social and cultural change between 1790 and 1860, with emphasis on expansion of population into the West, sectionalism, the rise of urban and industrial revolutions, and reform.

HIST 627  Antebellum America  3
Reading seminar on development of the modern political party system, the American presidency in transition, the transportation revolution, slavery, abolition reform and important changes in American society during the antebellum period.

HIST 629  United States Social and Cultural History: 1850-1929  3
Reading seminar covering interpretive issues in social and cultural history. Topics include social class, social structure and social mobility; work and leisure; reform; and historical memory.

HIST 630  Twentieth Century Latin American Revolutions  3
Examines revolutionary change and obstacles to revolutionary change in Latin America. External and internal process discussed in full context of each country's historical development. Each student is responsible for leading a discussion of several of the required readings.

HIST 631  United States Political, Cultural and Economic History: 1929-Present  3
Reading seminar on major interpretive works illustrating the changing modes by which historians have viewed American political, economic and cultural past from 1929 to the present. May be cross-listed with UAPP631.

HIST 632  Making the American City  3
See UAPP632 for course description.

HIST 633  The United States in the Twentieth Century  3
Reading seminar on 20th century U.S. history.

HIST 635  The Evolution of the American Urban Landscape  3
See UAPP635 for course description.

HIST 636  Research Topics in Historic Preservation  3
See UAPP636 for course description.

HIST 637  Law and Society in Historical Perspective  3
See SOC637 for course description.

HIST 638  Documentation of Historical Structures  1
See UAPP631 for course description.

HIST 640  Africa Under Colonial Rule  3
Introduces various Colonial policies of the European powers in Africa, emphasizing the comparisons and contrasts among these policies. Attention paid to the effect of Colonialism on Africa's economic, social and political development.

HIST 644  Creating European Modernity  3
The origins and spread of rapid, sustained economic growth since 1750.

HIST 647  Non-Western Industrialization  3
Introduces the issues of political economy and the social and cultural dimension of industrialization from a global perspective. Examines a variety of theoretical and historiographical approaches to issues of development within the context of regional case studies focusing on Japan, Africa, China, Latin America, the Middle East and the Caribbean.

HIST 650  Political Economy of the Modern United States  3
A reading seminar introducing the fields and historiographies of U.S. business history, business-government relations planning and modern political economy, from the late 19th century to the present.
HIST 652 **Theory and Practice of Historical Preservation Planning** 3
See UAPP629 for course description.

HIST 654 **Vernacular Architecture** 3
Study of traditional American folk architecture from the 17th century to the present. Examination of changes in construction, house types and decoration in vernacular buildings, as well as issues of regional differences and individual craftsmanship. May be cross-listed with ARTH654, MSST654 and/or UAPP654.

HIST 657 **Historical Archaeology and Museum Interpretation** 3
Introduction to the methods and practices of historical archaeological research from a museum perspective. Readings, demonstration techniques and field work.

HIST 660 **Humanities Colloquium** 3

HIST 663 **Historical Archaeology and the Public** 3
See ANTH663 for course description.

HIST 671 **Studies in Medieval History** 3
Topics vary and may include: Europe in the 10th Century, Europe in the 11th Century, and Women in Europe to 1600.

HIST 673 **Studies in Early Modern European History** 3
Topics vary and may include Renaissance Humanism; Women in Europe, 1100-1600; and Rome and Religion.

HIST 674 **Studies in English History** 3

HIST 675 **Seminar in Modern European History** 3
Topics vary and may include The Holocaust, The Cold War or Hitler's Germany.

HIST 677 **Studies in Latin American History** 3
Topics vary and may include history of Mexico, history of the Caribbean or slavery in the New World.

HIST 679 **Studies in Asian History** 3
Topics vary and may include History of Southeast Asia, 20th Century China or Japan in the 20th Century.

HIST 683 **Studies in Comparative History** 3
Topics vary, but all compare some aspect of American history with European history or Western history with non-Western history.

HIST 692 **Planning a Course of Instruction** 3
Aims, course planning, instructional strategies, evaluation and selection of materials for teaching history and the social sciences in secondary schools.

HIST 693 **Seminar: Problems in Teaching History and Social Science** 3
Helps beginning teachers carry out planned instructional strategies, analyze their teaching behavior, evaluate the effectiveness of their instruction and modify their instructional plans based on their teaching experience.

HIST 802 **Research and Writing Seminar: European History** 3
Original research and writing on subjects in European history. Evaluation of sources, interpretation of evidence and presentation of research papers. Emphasis on professional standards of criticism.

HIST 803 **Research and Writing Seminar: America to 1860** 3
Original research and writing on subjects in American history before 1860. Evaluation of sources, interpretation of evidence and presentation of research papers. Emphasis on professional standards of criticism.

HIST 804 **Museum Internship** 3
See MSST804 for course description.

HIST 805 **Research and Writing Seminar: America 1860-Present** 3
Original research and writing on subjects in American history after 1860. Evaluation of sources, interpretation of evidence and presentation of research papers. Emphasis on professional standards of criticism.

HIST 806 **Research and Writing Seminar: Hagley Library and Archives** 3
Original research and writing on a variety of subjects based on research materials available at the Hagley Museum and Library. Evaluation of sources, interpretation of evidence and presentation of research papers. Emphasis on professional standards of criticism.

HIST 868 **Research** 1-9 PF

HIST 869 **Master's Thesis** 1-6

HIST 964 **Pre-Candidacy Study** 1-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.

RESTRICTIONS: Not open to students who have been admitted to candidacy.

HIST 969 **Doctoral Dissertation** 1-12 PF

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**Health Promotion**

HLPR 610 **Health and the Media** 3
Explores the relationships between health behavior and cognition, and media communications and messages. Specific attention placed on culturally influenced health outcomes, channels of communication, and personal and demographic influences. Health promotion programmatic considerations and interventions related to media factors emphasized.

HLPR 803 **Advanced Health Promotion Programming and Evaluation** 3
Prepares the student with the skills for planning, developing, implementing and evaluating health promotion programs in a variety of settings and populations. Emphasis on the behavioral, epidemiological and socio-ecological issues that impact programming and the skills required to evaluate a program.

RESTRICTIONS: Open to graduate students only.

HLPR 807 **Topics and Issues in Health Promotion** 3
Seminar format and multidisciplinary approach to study current issues. Different faculty review issues from the viewpoint of their disciplines. Students participate in the selection of topics and are required to prepare and present in-depth reports on multiple issues.

RESTRICTIONS: Open to graduate students only.

HLPR 809 **Health Behavior** 3
Health and behavioral science theory and research provide a framework for the analysis of health-related behaviors across the lifespan. Emphasis on the psychological and social determinants of health-related behaviors of individuals. Examines the roles of health professionals in facilitating behavior change.

RESTRICTIONS: Open to graduate students only.

HLPR 813 **Health Psychology and Behavioral Medicine** 3
Relationships among social, psychological, and cultural factors and health, including prevention and treatment of disease and other health behaviors.

RESTRICTIONS: Graduate students only.

HLPR 819 **Social Marketing** 3
Application of marketing principles to health behavior change. Includes the development, implementation and evaluation of social marketing campaigns; theories of behavior change applied to marketing; message development, targeting and segmentation; analysis of current social marketing initiatives.

RESTRICTIONS: Graduate students only.

HLPR 823 **Human Response to Stress** 3
Provides an overview of current models and theories of stress, a review of multidisciplinary approaches to the study of stress in applied settings, and a reading knowledge of selected research findings in the field of stress.

RESTRICTIONS: Open to graduate students only.

HLPR 864 **Internship** 3 PF
Up to a maximum of 450 hours of fieldwork experience in a health promotion setting, completed along with a performance evaluation and term paper.

RESTRICTIONS: Open to graduate students only and successful completion of the qualifying examination.

HLPR 868 **Research** 3 PF
Affords an opportunity to apply information derived from the graduate program of study to a health promotion setting or specific population. Involves selecting, organizing, conducting and evaluating a project related to the field of health promotion.

RESTRICTIONS: Open to graduate students only and successful completion of the qualifying examination.

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**Health Studies**

HLTH 495 **Health Studies Practicum** 6 PF
Directed service learning experience in a health services setting.

RESTRICTIONS: Restricted to senior health studies majors.
HRIM 140  INFORMATION TECHNOLOGY AND SERVICES MANAGEMENT  3
Overview of the service industry, its history, current status and future trends. Uses an integrated approach to the study of services, stressing the importance of understanding the underlying processes of service delivery and the way new technologies are affecting them.

HRIM 144  HOSPITALITY INFORMATION MANAGEMENT, NETWORKS AND SYSTEMS  3
Examines network architectures that support hospitality and retail systems, such as LANs, WANs, UNIX and Internet based networks. Students plan and define the supporting telecommunications and cable infrastructure needed to create data highways in today's hotels and retail operations, using workflow analysis to shape the flow of information.

HRIM 180  INTRODUCTION TO HOSPITALITY  3
Objectives within the industry, the means of achieving these objectives and opportunities for career development. History of hospitality, current trends and related issues.

HRIM 187  INTRODUCTION TO HOSPITALITY INFORMATION MANAGEMENT  3
Provides an overview of the information systems and technology applications used in the hospitality industry to support operations and management decision-making. Also covers hospitality specific software applications.

HRIM 201  FOOD PRINCIPLES  2
Examines the chemical and physical properties of food and its preparation. Includes the composition and structure of food, functional properties of ingredients, and methods to obtain desired sensory and nutritional qualities.
COREQ: HRIM211.

HRIM 211  FOOD PRINCIPLES LABORATORY  1
Principles of food selection and preparation as related to the chemical and physical properties of food. Includes the composition and structure of food, functional properties of ingredients, and methods to obtain desired sensory and nutritional qualities.
COREQ: HRIM201.

HRIM 212  CLUB MANAGEMENT  3
Provides an overview of elements unique to club management such as the nature of private membership, investment, governance, club house operations, food and beverage operations, elements of quality service, financial structures of clubs, accounting and private club marketing.

HRIM 214  ISSUES IN TOURISM MANAGEMENT  3
Examines the scope and organization of the tourism industry, motivations for travel, and the management of micro and macro tourism resources. Economic, social, political and environmental impact of tourism are considered along with the issue of sustainable development within the industry.

HRIM 215  MEETING AND CONFERENCE MANAGEMENT  3
Development of management strategies applicable to meeting and conference management including the methodologies unique to each property and group served by any one operation.

HRIM 217  CATERING MANAGEMENT  3
Application of management principles to the catering function. Topics include: developing catering management systems, catering menu planning and design; on-premise versus off-premise catering management; and food production. Students plan and implement actual catered events.

HRIM 218  BEVERAGE MANAGEMENT  3
Beverages are a complex product category with legal and social issues that require special attention from management. Emphasizes legal and ethical issues associated with serving alcoholic beverages, an in-depth study of wine, mixology, inventory control, and profitable beverage management.

HRIM 219  QUALITY MANAGEMENT FOR THE HOSPITALITY INDUSTRY  3
Examines the quality revolution in the hospitality industry. Control charts, Pareto charts, scatter diagrams, and other tools used in restructuring, re-engineering, and continuous quality improvement are explored. Integrates principles of customer quality focus and organizational behavior as they apply to the hospitality industry.

HRIM 230  EXECUTIVE PRESENTATIONS AND PROBLEM SOLVING  3
Examines various problem solving methods relating to specific issues of the hospitality industry. Also explores oral, written and multi-media executive presentation techniques of problem solving results including personal presentations.

HRIM 238  ASSESSMENT AND EVALUATION IN SERVICE DELIVERY SYSTEMS  3
Introduction to the research process as it applies to the evaluation of service delivery systems, including design, data collection, analysis, interpretation and reporting of findings. Special emphasis is placed on the development and use of service delivery evaluation instruments.
HRIM 382  MANAGERIAL ACCOUNTING AND FINANCE IN THE HOSPITALITY INDUSTRY  3
Generation and analysis of quantitative information for planning, control and
decision making by managers at various levels. Use of timely and relevant
information as a vital tool in management.
PREREQ: ACCT200 or both ACCT207 and ACCT208.

HRIM 425  HISTORIC ROADSIDE ARCHITECTURE  3
Examines various historic hospitality and retail venues with emphasis on their
development throughout this automobile based century. Hotels, motels, diners, fast
food and full service restaurants, roadside attractions and retail outlets are
discussed as they relate to travel and tourism.

HRIM 442  HOSPITALITY COMPUTER-BASED EDUCATION  3
Introduction to the use of computer-based education and training in the hospitality
industry. Focuses on implementing interactive technology-based training in
hospitality learning environments and includes instructional systems design, how to
evaluate and select hardware and software, and the concept of just-in-time
training.

HRIM 448  DATA MINING ANALYSIS IN THE HOSPITALITY INDUSTRY  3
Focuses on the collection of data in hospitality systems environments into an
accessible warehouse, and mining (or organizing) the data into a management
information system. Multi-unit consolidations using traditional polling techniques
and innovative web-based consolidations are the key to organization of data into
an up-to-date and accurate source of management information for analysis.

HRIM 450  MANAGING HOSPITALITY INFORMATION SYSTEMS  3
Takes a life cycle approach to understanding hospitality industry information
systems and includes a study of issues considered in the analysis, design and
implementation of information systems in hospitality operations.
PREREQ: HRIM187 or ACCT160.

HRIM 466  INDEPENDENT STUDY  1-6

HRIM 480  HUMAN RESOURCES MANAGEMENT IN THE HOSPITALITY
INDUSTRY  3
Techniques and philosophies of personnel management as applied to various types of
hospitality operations. Motivation, attitude formation and job satisfaction. Case studies
related to theories of organizational behavior and industrial psychology.

HRIM 481  MARKETING IN THE HOSPITALITY INDUSTRY  3
Application of marketing principles in hotel, restaurant and institutional
management settings. Development of marketing strategies in both profit and non-
profit hospitality operations.

HRIM 482  LAW OF INNKEEPING  3
Introduction to the laws relating to hotel, restaurant and institutional operations.

HRIM 487  MANAGEMENT SYSTEMS IN THE HOSPITALITY INDUSTRY  3
Principles of systems analysis applied to the hospitality industry. Organization of
the operation and subsystems of a property. Case studies and simulations apply
economic and management principles.

HRIM 488  HOTEL, RESTAURANT AND INSTITUTIONAL MANAGEMENT
PRACTICUM I  1-4
Structured experience in a hospitality industry environment. At least 40 hours per
credit hour in planned activities associated with the management and operation of
a subsystem of a hospitality property.
RESTRICTIONS: Requires proof of 800 hours paid work experience in the food
service and lodging industry.

HRIM 489  HOTEL, RESTAURANT AND INSTITUTIONAL MANAGEMENT
PRACTICUM II  1-6
Structured experience in a hospitality industry environment. At least 40 hours per
credit hour in planned activities associated with the management and operation of
a hospitality property.
PREREQ: HRIM321, HRIM325 and HRIM488.

HRIM 601  ADVANCED HOSPITALITY AND TOURISM PRODUCT
MANAGEMENT  3
Reviews different types, styles and quality of hospitality and tourism products.
Examines product management including branding, product lifecycles, positioning
and packaging. Includes the latest trends in product development and theoretical
and practical issues related to multi-unit operations.

HRIM 602  INTERNATIONAL HOSPITALITY AND SERVICE MANAGEMENT  3
Provides an understanding of the service delivery system, its concepts, principles
and theories. The mechanics of identifying and setting organizational vision and
service standards and the impact of technology on service delivery are covered.
PREREQ: HRIM601.

HRIM 603  STRATEGIC HOSPITALITY MANAGEMENT  3
Provides a comprehensive understanding of strategic management concepts and
competitive strategy as applied to the hospitality industry. Examines co-alignment of
environmental scanning, strategy and structure of the hospitality service firm.

HRIM 604  HOSPITALITY FINANCIAL MANAGEMENT ISSUES  3
Examines both managerial accounting and financial management as they are
practiced in the hospitality industry. Applies principles of finance and accounting
to decision-making in the industry, emphasizing industry features and
characteristics.
PREREQ: HRIM382, its equivalent, or permission of instructor.

HRIM 605  ISSUES IN HOSPITALITY INFORMATION TECHNOLOGY  3
Examines issues related to information technology in the hospitality industry,
including systems, networking, databases, telecommunications, the internet and e-
commerce.
PREREQ: HRIM601.

HRIM 642  HOSPITALITY COMPUTER BASED TRAINING  3
A project management approach to the development and implementation of
computer-based training in the hospitality industry. Focuses on understanding
project management concepts and techniques and applying them to the creation of
interactive technology-based training.
PREREQ: HRIM601.

HRIM 643  HISTORIC ROADSIDE ARCHITECTURE  3
See UAPP643 for course description.

HRIM 648  DATA-MINING ANALYSIS IN THE HOSPITALITY INDUSTRY  3
Considers the collection of data in hospitality systems environments and ways to
mine (or organize) the data into a management information system. Focuses on
creating and organizing a data warehouse based on understanding customer
relationship management.

HRIM 664  HOSPITALITY TECHNOLOGY INTERNSHIP  3
Supervised technology-related work experience with a hospitality business or
related organization.

HRIM 668  INDUSTRY PROJECT  3
Provides the opportunity to research, design and/or develop the solution to a real-
world hospitality technology-related problem or issue.

HRIM 669  HOSPITALITY TECHNOLOGY INTERNSHIP  3
Supervised technology-related work experience with a hospitality business or
related organization.

HRIM 687  MANAGEMENT SYSTEMS IN THE HOSPITALITY INDUSTRY  3
Provides a comprehensive understanding of strategic management concepts and
competitive strategy as applied to the hospitality industries. Examines co-alignment of
environmental scanning, strategy and structure of the hospitality service firm.

HEALTH SERVICES ADMINISTRATION

HSAD 604  ADVANCED PRACTICE ROLES FOR HEALTHCARE PROVIDERS  3
Focuses on roles and issues affecting healthcare providers engaged in advanced
practice. Roles are analyzed in relation to current issues and concepts of
advanced practice.
May be cross-listed with NURS604.
RESTRICTIONS: Permission required from department.

HSAD 619  FINANCIAL MANAGEMENT IN HEALTH SERVICES
ORGANIZATIONS  3
Provides the basic principles and concepts of effective management of budgets for
healthcare units. Includes analysis of the environment and departmental
organization and their impact on healthcare.
May be cross-listed with NURS619.
RESTRICTIONS: Permission of department required.

HSAD 635  HEALTH ADMINISTRATION THEORIES  3
Theories of administration, organization and management, their interaction with
other health discipline theories and their influence on management of healthcare
agencies. Includes the interaction of theories with attainment of institutional goals.
May be cross-listed with NURS635.
RESTRICTIONS: HSAD604 required as prerequisite or corequisite.

HSAD 637  HEALTH PLANNING STRATEGIES  3
Analyzes organizational systems and roles of managers and administrators.
Students identify organizational needs, formulate goals and objectives appropriate
to healthcare agencies and identify strategies appropriate to accomplishing goal
attainment with ethical constraints of healthcare.
May be cross-listed with NURS637.
RESTRICTIONS: HSAD604 required as prerequisite or corequisite.
HSAD 638 HEALTH SERVICES EVALUATION 3
Emphasizes the role of managers and administrators in personnel development, promotion of research in clinical settings and development and implementation of quality improvement initiatives and their implications for healthcare. May be cross-listed with NURS638.
RESTRICTIONS: HSAD604 required as prerequisite or corequisite.

HSAD 664 HEALTH SERVICES ADMINISTRATION PRACTICUM 1-3
In conjunction with his/her faculty advisor and based on the student's individualized long range goals, the student selects a preceptor and healthcare setting in which to apply didactic contact in real life settings. Requires 135 hours of on-site experience, which can be taken in one semester or divided over three semesters.
COREQ: HSAD635, HSAD637, or HSAD638.

HSAD 686 RESEARCH: SCHOLARLY PROJECT 1-3
Investigation of a problem in clinical settings related to finance, administration, personnel management, public policy or education, resulting in completion of a scholarly project.
PREREQ: Research and statistics and any two of the following: HSAD635, HSAD637, or HSAD638.

HSAD 890 COLLOQUIUM 0 PF
Lectures by faculty and visiting researchers provide a broad overview of the scope as well as significant results of current research in health sciences.

INDIVIDUAL AND FAMILY STUDIES

IFST 101 HUMAN SERVICES AND CULTURAL COMPETENCE 1
Provides an overview of human services and approaches to culturally competent practices; critical perspectives regarding diversity, society, race, class, gender and social policy are discussed.

IFST 165 SEMINAR 1 PF

IFST 201 LIFE SPAN DEVELOPMENT 3
Exploration and understanding of the social, emotional, cognitive and physical development of the individual from infancy through old age in the context of the family.

IFST 202 FOUNDATIONS OF FAMILY STUDIES 3
Examination of diverse families in the United States with an emphasis on issues of race, ethnicity, class, and gender. Focus on the effects of demographic, historical and social changes.

IFST 210 INTRODUCTION TO CARING FOR YOUNG CHILDREN 3
Introduction of the core competencies needed in early care and education. Topics include a basic orientation to child development; understanding children's cognitive-language developmental domains of children birth to three. Emphasis on nurturing relationships and understanding child development within cultural contexts of children's families. Directed observation in infant/toddler settings.

IFST 220 CHILD DEVELOPMENT I: PRENATAL TO AGE 3 3
Study of prenatal development and the physical, perceptual, social/emotional, and cognitive/language developmental domains of children birth to three. Emphasis on nurturing relationships and understanding child development within cultural contexts of children's families. Directed observation in infant/toddler settings.

IFST 221 CHILD DEVELOPMENT II: 3 TO 10 3
Study of cognitive, social, emotional, and physical development of children three to ten years old. Variables that influence child development including family and school investigated. Directed observation of children.
PREREQ: IFST220 or IFST201.

IFST 222 INCLUSIVE CURRICULUM: BIRTH - GRADE 2 3
Curriculum/programming for optimal development of children birth to second grade in inclusive settings. Focus on curriculum approaches and examination of the role of play, constructivist theories, developmentally appropriate/culturally responsive practice.
PREREQ: IFST220 and IFST221.
COREQ: IFST224.

IFST 224 PRACTICUM IN INCLUSIVE CURRICULUM: BIRTH - GRADE 2 3
Discussion and weekly practicum experience with children in early childhood settings. Focus on application of theory and reflective thinking. Experience in curriculum planning and guidance.
PREREQ: IFST220 and IFST221.
COREQ: IFST222.

IFST 230 FAMILIES AND THEIR COMMUNITIES 3
Discusses the community context of family life, and the interface of family with school, community and work settings. Community development, social capital, collaboration, family and community asset building, and opportunity structure analysis approaches are presented.

IFST 235 SURVEY IN CHILD AND FAMILY SERVICES 3
Introduces the scope of human service agencies focusing on the needs of children and families.
PREREQ: IFST101.

IFST 236 INFANTS AND TODDLERS: DEVELOPMENT AND PROGRAMS 3
Study of the infant and toddler with emphasis on interrelated growth patterns and processes, appropriate curriculum and stimulation, and the effects of prenatal and perinatal conditions on future development.
PREREQ: IFST221.

IFST 270 FAMILIES AND DEVELOPMENTAL DISABILITIES 3
Focuses on people with developmental disabilities in the context of their family and culture from a multidisciplinary perspective. Covers disabilities and their causes; changing needs across the lifespan; gender, cross-cultural and legal issues; and information about prevention/intervention, employment, inclusion, and empowerment.
May be cross-listed with PSYC270 and/or SOCI270.

IFST 275 HUMAN DEVELOPMENT THROUGH THE ARTS 3
Introduction to issues in Individual and Family Studies as viewed through literature, film and other media. Specific genre will vary. Content matched with current and/or classic readings from social sciences. Life span perspective.

IFST 306 READING AND WRITING FROM BIRTH - GRADE 2 3
Covers development of language and literacy from birth to second grade. Explores instructional and assessment strategies for promoting growth in speaking, listening, reading, and writing.
PREREQ: LING101, IFST222 and IFST224.
COREQ: IFST305, IFST412 and IFST432.

IFST 310 PARENTING THROUGH THE LIFESPAN 3
Applied focus on parenting styles, roles, issues and goals through the lifespan.
Parent diversity, interfaces with schools and community, resources, theoretical perspectives and developmental needs of children and parents are examined.
PREREQ: IFST201 or PSYC330.

IFST 328 INTRODUCTION TO THE RESEARCH PROCESS 3
Exposure to the research process through attending and critiquing research presentations, reading and reviewing scholarly papers, and development of a variety of research skills, such as instrument design, coding and data entry. Students' work will contribute to the development of a professional portfolio.
PREREQ: IFST201 and IFST202.

IFST 329 ADOLESCENT DEVELOPMENT 3
Physical, intellectual and social/emotional development of adolescents and youth in the context of the family, peer groups and the community. Emphasis on theories, current research and the transition from adolescence to young adulthood.
PREREQ: EDUC202 or IFST202.

IFST 330 HELPING RELATIONSHIPS 1 PF
Introduction to the core dimensions of counseling and helping relationships: empathy, respect, genuineness and concreteness. Practice in communicating those levels of the core dimensions that are facilitative to interpersonal functioning.

IFST 331 YOUTH-AT-RISK 3
Explores diverse theories regarding the characteristics of youth-at-risk including an examination of individual, family, school, and societal factors. Risk behaviors identified as well as early identification and applying effective, research-based intervention programs.

IFST 332 COUNSELING THEORIES 3
Examination of selected counseling theories from theoretical, personal, functional and philosophical points of view.

IFST 333 DEVELOPMENT OF HUMAN RELATIONSHIPS 3
Developmental theory and research related to intrapersonal and interpersonal conditions, characteristics, attitudes and behaviors necessary for effective human relationships. Basic focus on the psychology of the individual, relationship skills, conflict management and intimacy.
IFST 334  EXPERIENTIAL EDUCATION  3
Field experience combined with a seminar emphasizing professional issues in human services, including portfolio development and career planning.
PREREQ: IFST101.
RESTRICTIONS: Human Services majors only.

IFST 338  SEXUALITY IN CONTEMPORARY SOCIETY  3
A multidisciplinary approach to controversial human sexuality issues which examines and addresses societal solutions to these controversies.

IFST 339  ADULT DEVELOPMENT AND AGING  3
Examines developmental processes, lifespan changes, transitions and stage-related issues of early, middle and late adult life. Explores concepts, theories, historical trends and empirical studies during these life periods; integrates theories with practical applications.
PREREQ: EDUC202 or IFST201.

IFST 340  EARLY CHILDHOOD CURRICULUM II  3
History, research and practical issues in the organization and operation of early childhood programs with emphasis on preschool and kindergarten settings; integrating and adapting the curriculum, facilities, equipment and instructional strategies to the needs of young children. Includes field experience.
PREREQ: IFST222 and IFST224.

IFST 346  DELIVERY OF HUMAN SERVICES  3
Presents approaches to interviewing and working with individuals and families in a variety of community-based human service settings. Discusses prevention, advocacy and empowerment strategies of community intervention. Explores professional and ethical issues in providing family and community services.
PREREQ: IFST235 and IFST334 or permission of instructor.

IFST 347  PROGRAM DEVELOPMENT AND EVALUATION  3
Focuses on program development, administrative procedures, and program evaluation. Basic skills required for the development, delivery and evaluation of a wide range of human service programs including preventive interventions for families and individuals.
PREREQ: IFST235 and IFST334 or permission of instructor.

IFST 350  TECHNOLOGY AND ASSISTIVE TECHNOLOGY IN EARLY CHILDHOOD EDUCATION  3
The study of the impact technology and assistive technology have on teaching and learning in early childhood settings. Focus on the effective use of technology to develop curriculum, gather assessment data, and interact with children and families. Basic operation and evaluation of technical tools.
PREREQ: IFST 222 and IFST 224.
COREQ: IFST306, IFST412 and IFST432.

IFST 355  PROFESSIONAL ISSUES IN EARLY CHILDHOOD DEVELOPMENT AND EDUCATION  3
Overview and analysis of issues for professionals serving children birth to grade two and their families. History, scope and mission of early care and educational programs; controversial issues; theories and program models; ethical and legal issues; emerging careers; public policy and advocacy. Program observations and interviews.
PREREQ: IFST222/224.

IFST 360  LEARNING IN COMMUNITY CONTEXTS  3
See EDUC360 for course description.

IFST 364  FIELD EXPERIENCES IN INDIVIDUAL AND FAMILY STUDIES  2-4
Provides opportunities to work/participate in human service agencies, business and industry, as well as formal and non-formal educational settings.
RESTRICTIONS: May be repeated for up to nine credit hours.

IFST 365  SEMINAR  1-3

IFST 366  INDEPENDENT STUDY  1-12

IFST 390  HONORS COLLOQUIUM  3
Topics vary within the Individual and Family Studies content; often multidisciplinary.

IFST 401  FOUNDATIONS OF HUMAN SEXUALITY  3
A multidisciplinary study of human sexuality focusing on the implications for individuals and society of the biological, psychological and sociocultural determinants of human sexuality. Deals with sexually explicit material. May be cross-listed with HESC401 and/or WOMS401.

IFST 402  CHILD AND FAMILY POLICY  3
Provides an historical overview of family and child policy in the United States, including policies toward children and families in poverty. The role of the economy, politics, race, class, gender, legal and advocacy issues are discussed.

IFST 403  CONCEPTS IN GERONTOLOGY  3
Theories and practices of gerontology with emphasis on their relationships to the elderly and their needs for the development of resources.
PREREQ: EDUC202 or IFST201.

IFST 405  AGING AND THE FAMILY  3
Explores developmental changes of older adults and impact on their family members. A major focus is on kinship and caregiving by family and decision making in selecting respite and institutional care when elders develop cognitive and physical disabilities.

IFST 409  DOMESTIC VIOLENCE SERVICES  3
Examines issues in providing services to families in which domestic violence is occurring. Multiple service systems are explored, with emphasis on service coordination, service gaps, and public policy. May be cross-listed with CRJ409 and/or WOMS409.
PREREQ: IFST235 or SOCI201 or WOMS201.
RESTRICTIONS: Open to juniors and seniors only.

IFST 410  THE HOSPITALIZED CHILD  3
The psychosocial needs of pediatric patients and their caregivers are examined. Emphasis on coping, preparation, medical terminology, play, assessment and family-centered care. Implications for nursing care, child life specialists, pre-medical students and others working with the pediatric population are studied.
PREREQ: IFST221 or PSYC325.

IFST 411  INCLUSIVE CURRICULUM: BIRTH - PRESCHOOL  3
Curriculum/programming for optimal development of children birth-36 months in inclusive settings. Focuses on primary caregiving and continuity of care, routines as a basic for curriculum, environmental designs, building relationships with children and families, and the IFSP process.
PREREQ: IFST222/224.
COREQ: IFST431 and IFST452.

IFST 412  INCLUSIVE CURRICULUM: PRESCHOOL - KINDERGARTEN  3
Curriculum/programming and assessment for optimal development of children in inclusive preschool and kindergarten settings. Focuses on how children learn; methods for teaching math, literacy, arts, science, and social studies in an integrated curriculum; developmentally appropriate and culturally responsive instructional practices; continuum of teaching strategies.
PREREQ: IFST222 and IFST224.
COREQ: IFST306, IFST350 and IFST432.

IFST 413  INCLUSIVE CURRICULUM: KINDERGARTEN - GRADE 2  3
Curriculum and assessment for optimal development of children kindergarten through grade 2 in inclusive settings. Focuses on how children learn; methods for teaching math, literacy, arts, science, and social studies in an integrated curriculum; developmentally appropriate and culturally responsive instructional practices; continuum of teaching strategies.
PREREQ: IFST222, IFST224, IFST306.
COREQ: IFST414, IFST433 and IFST435.

IFST 414  CLASSROOM MANAGEMENT/GUIDANCE AND BEHAVIOR SUPPORT  3
Covers social and emotional development in childhood. Focuses on program planning and structure, roles of environmental antecedent and consequence variables in behavior. Hands-on experiences address practical techniques and specific behavior management strategies including schedules and transitions, and guidance. Functional behavior analysis (mild to severe) is explored.
PREREQ: IFST222/224.
COREQ: IFST413, IFST433 and IFST435.

IFST 422  CAPSTONE IN FAMILY RELATIONSHIPS  3
An integrative analysis of interpersonal relationships and problems in courtship, marriage and the family in contemporary society.
PREREQ: IFST202.

IFST 428  EDUCATIONAL RESEARCH AND ISSUES IN HUMAN RESOURCES  3
Introduction to the research process through study of a problem identified by analysis of clinical experiences; an in-depth examination of selected current educational concerns.
RESTRICTIONS: Requires permission of instructor.

IFST 430  FAMILY LIFE EDUCATION  3
Investigates curriculum and instructional strategies for use in support, prevention and empowerment-based programs across the lifespan. May be cross-listed with WOMS430.
PREREQ: IFST201 or IFST202.

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IFST 431  FIELD EXPERIENCE: BIRTH - PRESCHOOL  1 PF
Field-based experiences in a school, agency, or family setting with children. Collaboration with school, community and families in order to support ongoing work in the setting.
PREREQ: IFST222 and 224.
COREQ: IFST411 and IFST452.

IFST 432  FIELD EXPERIENCE: PRESCHOOL - KINDERGARTEN  2 PF
Field-based experiences in a school, agency, or family setting with children ages three to six. Observation, instruction, and assessment of children. Collaboration with school, community and families in order to support ongoing work in the setting.
PREREQ: IFST222 and 224.
COREQ: IFST306, IFST350 and IFST412.

IFST 433  FIELD EXPERIENCE: KINDERGARTEN - GRADE 2  1 PF
Field-based experiences in a school, agency or family setting with children, kindergarten through second grade. Observation, instruction, and assessment of children. Collaboration with school, community, and families in order to support ongoing work in the setting.
PREREQ: IFST222 and 224.
COREQ: IFST413, IFST414 and IFST435.

IFST 435  PROGRAMS FOR CHILDREN WITH EXCEPTIONALITIES  3
Philosophy, organization, and operation of programs for children with exceptionalities. Focus on teaching in inclusive settings, and implementing developmentally appropriate practices. Addresses parent-professional partnerships, characteristics of specific disabilities and related interventions, IEP process, adaptation strategies, and positioning and handling techniques.
PREREQ: IFST222, IFST224 and EDUC230.
COREQ: IFST413, IFST414 and IFST433.

IFST 438  LEADERSHIP DEVELOPMENT IN HUMAN SEXUALITY  3
Seminar/practicum for organizing and leading discussion groups in human sexuality. Trains group leaders to facilitate effective communication skills and responsible sexual decisions, integrating research and theories with individual and family life experiences.
PREREQ: IFST238 or IFST401.
RESTRICTIONS: Requires permission of instructor. For undergraduate teaching assistants only.

IFST 440  EARLY CHILDHOOD ADMINISTRATION, LEADERSHIP AND ADVOCACY  3
Organization and administration of programs for young children. Development of effective strategies for leadership and advocacy. Consideration of personnel, facilities, regulations, quality programming and business management.
PREREQ: IFST340.

IFST 445  FAMILY, COMMUNITY AND SCHOOL PARTNERSHIPS  3
Parent-child relationships with a focus on parenting styles, roles, issues and goals geared toward successful utilization of family, school, and community-based resources. Family interfaces with schools and community resources, family diversity and theoretical perspectives, along with developmental needs of parents and children are examined.
PREREQ: IFST101.
COREQ: IFST334 or IFST432.

IFST 449  INTERNSHIP IN FAMILY AND COMMUNITY SERVICES  3-10 PF
On-the-job experience in a community and family service agency.
RESTRICTIONS: Requires permission of instructor.

IFST 452  ASSESSMENT OF CHILDREN  3
Study of multiple roles of formal and informal assessment. Primary focus on integration of curriculum, assessment and programming. Strategies for family involvement will be identified.
PREREQ: IFST220, 221, 222, and 224.
COREQ: IFST411 and IFST431.

IFST 459  CHILD DEVELOPMENT PRACTICUM  1-9 PF
Supervised student teaching experience.
PREREQ: IFST435, IFST452 and IFST470.
RESTRICTIONS: Requires permission of instructor.

IFST 460  WOMEN IN INTERNATIONAL DEVELOPMENT  3
See SOCI460 for course description.

IFST 463  ATYPICAL INFANT AND TODDLER  3
Sensory, motor, affective and psychosocial development in infancy and toddlerhood. Observation and participation with infants. Early diagnosis, assessment and treatment strategies for disabilities of the infant and toddler period.
PREREQ: IFST221 and IFST236.

IFST 465  SEMINAR  1-3
Discusses professional issues in the delivery of human services.
COREQ: IFST449.

IFST 466  INDEPENDENT STUDY  1-12

IFST 470  FAMILIES AND CHILDREN AT RISK  3
Study of social-emotional considerations of disabilities and risk factors upon the development of children and families. Theory, research, and practices are discussed with an emphasis on family-professional collaboration, empowerment, family-focused practice, and cultural sensitivity.
PREREQ: IFST201 or IFST220 or IFST221 or PSYC325.

IFST 475  TOPICS IN INDEPENDENT AND FAMILY STUDIES  1-3
Selected topics focusing on current issues affecting families from an interdisciplinary and global perspective.
RESTRICTIONS: Prerequisites vary by topic and instructor.

IFST 480  STUDENT TEACHING SEMINAR  2 PF
Discussion-oriented and problem-centered seminar with emphasis on the role and contributions of the early childhood education professional.
COREQ: EDUC400.

IFST 490  INSTRUCTIONAL METHODS IN FAMILY AND CONSUMER SCIENCES  3
Identification, selection and evaluation of developmentally appropriate strategies and resources for instruction in Family and Consumer Sciences secondary classrooms and community settings. School practicum required.

IFST 491  CURRICULUM AND ASSESSMENT IN FAMILY AND CONSUMER SCIENCES  3
Foundations of curriculum development and evaluation as applied to Family and Consumer Sciences secondary classrooms and community settings. School practicum required.
PREREQ: IFST490.

IFST 601  THEORIES OF HUMAN DEVELOPMENT  3
Overview and analysis of classic and contemporary theoretical approaches in human development. Special emphasis on research and theory concerning families as contexts of development.

IFST 604  INTERDISCIPLINARY GERONTOLOGY  3
Considers theoretical and practical approaches to the dimensions of aging. Emphasis on the provisions of material and human resources to meet the basic needs of food, shelter, clothing and income adequacy. Relevant community programs and government services studied.

IFST 605  IMPACT OF AGING ON THE FAMILY  3
Psychological, physical and financial impact of aging persons on younger family members; increased dependence; family adjustment, both positive and conflicting.

IFST 606  SKILLS DEVELOPMENT IN INDIVIDUAL AND FAMILY STUDIES  3
Application of theories and concepts necessary to specific skills and techniques central to working within the student’s field of specialization.

IFST 607  SEMINAR IN COMMUNITY DEVELOPMENT AND NONPROFIT LEADERSHIP  1
See UAPP607 for course description.

IFST 608  POVERTY, NEIGHBORHOODS AND COMMUNITY DEVELOPMENT  3
See UAPP608 for course description.

IFST 609  DOMESTIC VIOLENCE SERVICES  3
Examines issues in providing services to families in which domestic violence is occurring. Multiple service systems are explored, with emphasis on service coordination, service gaps, and public policy.

IFST 610  THE HOSPITALIZED CHILD  3
Organization and administration of programs for hospitalized children with emphasis on emotional needs of the children and their parents. Includes terminology and hospital procedures, directed observation and participation in a hospital setting.

IFST 614  EVALUATION PRACTICES  3
Techniques and methods for assessing professional growth of adults as well as performances and learning of adolescents and special clientele; differentiates evaluation and measurement; explores current issues in evaluation.

IFST 615  RESEARCH METHODS  3
Evaluation of existing research reports, articles and monographs, development of data collection techniques, analysis and presentation of data pertaining to child, family and community populations, elements of statistical analysis, evaluation and selection of research designs, preparation of a research project proposal.

IFST 621  FAMILY STUDIES II: EMPIRICAL AND THEORETICAL PERSPECTIVES  3
Examines basic theories in family studies and trends affecting families at the macro level. Includes a survey of the empirical base of the field and covers issues relating to the interface of the family and society and trends in prevention, intervention, education and therapy.

IFST 623  APPLIED HUMAN DEVELOPMENT IN THE SCHOOLS  3
See EDUC623 for course description.
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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>IFST 630</td>
<td>FAMILY LIFE EDUCATION</td>
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<td>Teaching methods to address family life education and issues in formal educational and community settings and designing quality curricula and pedagogy for support, prevention and empowerment-based experiences.</td>
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<td>IFST 637</td>
<td>PROGRAM PLANNING, ASSESSMENT AND EVALUATION</td>
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<td>Methods of program planning, summative and formative evaluation and assessment including models, rationales and evaluation techniques as they relate to individual classrooms, educational programs and community settings.</td>
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<td>IFST 638</td>
<td>ADOLESCENCE AND YOUTH: THEORIES</td>
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<td>A critical review of the theories pertaining to personal, physical and socio-emotional development of the periods from early adolescence through youth by an examination of significant research.</td>
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<td>IFST 639</td>
<td>CURRICULUM METHODS AND ASSESSMENT</td>
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<td>Curriculum, instruction and methods of accountability as they relate to educational programs in community and family service agencies. Includes curriculum development, assessment and developmentally appropriate practices with emphasis on integrating language and literacy, social science, mathematics, science and the arts.</td>
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<td>IFST 640</td>
<td>EARLY CHILDHOOD ADMINISTRATION, LEADERSHIP AND</td>
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<td>ADVOCACY</td>
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<td></td>
<td>Organization, administration and evaluation of early childhood education programs including personnel, facilities, regulations, educational programming, curriculum, management and development. Includes strategies for leadership, professional development and advocacy.</td>
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<td>IFST 641</td>
<td>INFANTS, TODDLERS AND FAMILIES: DEVELOPMENT AND</td>
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<td>PROGRAMMING</td>
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<td>Cognitive, social, emotional and motor development for children from conception to 36 months, with implications for family support and early care and educational programming. Field placement required. PREREQ: IFST601 and IFST621.</td>
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<tr>
<td>IFST 642</td>
<td>LEADERSHIP IN HUMAN SERVICES</td>
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<td>Examination of how leaders influence and control the direction and effectiveness of human service agencies and institutions. Focuses on trends, issues, theories and research on leadership with emphasis on the unique concerns of women.</td>
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<tr>
<td>IFST 645</td>
<td>PROGRAMMING FOR YOUNG CHILDREN WITH SPECIAL NEEDS</td>
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<td>Theories, philosophies, organization and evaluation of programs, both mainstreamed and self-contained for young exceptional children. Emphasis on the multidimensional role of teachers. Focuses on working with parents individually and in groups and on child advocacy.</td>
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<tr>
<td>IFST 650</td>
<td>COMPUTERS IN EARLY CHILDHOOD</td>
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<td>Integration of microcomputers into the early childhood, developmental curriculum. Considers theoretical rationale, operation of computers, selection of software and curriculum development. Includes a practicum with young children using microcomputers. PREREQ: Early childhood course work. RESTRICTIONS: Early childhood experience acceptable in lieu of prerequisites.</td>
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<td>IFST 651</td>
<td>ADVANCED CHILD DEVELOPMENT</td>
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<td>Theoretical approaches in psychosocial development in children; and influences on development of self-concept, sex-role behavior, moral development and prejudice.</td>
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<td>IFST 655</td>
<td>MEASUREMENT TECHNIQUES FOR CHILDREN AND FAMILIES</td>
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<td>Construction and analysis of developmental ratings, behavioral coding procedures, interviews, questionnaires, tests and sociometric measures appropriate for studying the behavioral development of children and families through the life cycle.</td>
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<td>IFST 656</td>
<td>SUPERVISION: FUNCTIONS AND TECHNIQUES</td>
<td>3</td>
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<td>Foundations and principles of effective supervision, methods of mentoring, team participation and use of a consultation model in educational settings and family agencies. Focuses on commonalities of skills, techniques and training needed to develop competent, reflective practitioners. May include field supervision.</td>
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<td>IFST 658</td>
<td>READINGS IN INDIVIDUAL AND FAMILY STUDIES</td>
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<td>Emphasis on either infancy, early and/or middle childhood, adolescence, adulthood, gerontology and/or specialized topics in family studies. Emphasis may vary by semester.</td>
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<td>IFST 660</td>
<td>TEACHING OF LIFE SPAN DEVELOPMENT</td>
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<td>Strategies and techniques for effective teaching of life span development at the post-secondary level, including observation, teaching opportunities and mentorships with faculty.</td>
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<td>IFST 662</td>
<td>CURRICULUM ANALYSIS IN EARLY CHILDHOOD</td>
<td>3</td>
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<tr>
<td></td>
<td>Examination and evaluation of curriculum in early childhood including theoretical analysis of pedagogy, curriculum content and child outcomes.</td>
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<tr>
<td>IFST 663</td>
<td>ATYPICAL INFANT AND TODDLER DEVELOPMENT</td>
<td>3</td>
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<td></td>
<td>Detailed overview of atypical development of infants and toddlers including their sensory, motor, cognitive, communication, and psychosocial development. Family interactions, supports, and early intervention service systems are also addressed.</td>
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<tr>
<td>IFST 665</td>
<td>SEMINAR</td>
<td>1-6</td>
</tr>
<tr>
<td>IFST 668</td>
<td>RESEARCH</td>
<td>1-6</td>
</tr>
<tr>
<td>IFST 669</td>
<td>SUPERVISED FIELD EXPERIENCE AND STUDY</td>
<td>1-12</td>
</tr>
<tr>
<td></td>
<td>Supervised work with children, adults and/or families in educational and/or community settings. RESTRICTIONS: Credit may be distributed over more than one semester.</td>
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<tr>
<td>IFST 670</td>
<td>FAMILY RISK AND RESILIENCY</td>
<td>3</td>
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<tr>
<td></td>
<td>Applied focus on situations which place families at risk across the life span such as poverty, disability, stressors and family dissolution. An examination of family strengths, cultural diversity and techniques for working with families across the life course in community based settings including classrooms, programs, and agencies.</td>
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<tr>
<td>IFST 679</td>
<td>DEVELOPMENT OF COUNSELING SKILLS</td>
<td>3</td>
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<tr>
<td></td>
<td>Focuses on development of needed skills and practices for establishing effective counseling relationships. Includes basic assumptions about helping relationships and emphasizes application of various counseling techniques. RESTRICTIONS: Open to students whose major requires course.</td>
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<tr>
<td>IFST 680</td>
<td>PROFESSIONAL SEMINAR IN COUNSELING AND STUDENT AFFAIRS</td>
<td>3</td>
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<tr>
<td></td>
<td>Introduction to the history, philosophy, roles, organizational structure, professional ethics, professional standards in research, and counseling and student affairs practice in higher education. RESTRICTIONS: Open only to majors in counselor education.</td>
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<tr>
<td>IFST 681</td>
<td>CAREER DEVELOPMENT: THEORIES AND PRACTICE</td>
<td>3</td>
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<tr>
<td></td>
<td>Review of the major career development theories as used in the counseling professions. Emphasis on analyzing the world of work and the use of occupational and educational resources. RESTRICTIONS: Open only to majors in counselor education.</td>
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<tr>
<td>IFST 682</td>
<td>STUDENT DEVELOPMENT IN HIGHER EDUCATION</td>
<td>3</td>
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<tr>
<td></td>
<td>Studies of development in motivation and personality trends in late adolescence and adulthood in the context of higher education institutions. Designed for college counselors and student personnel administrators who deal with student development and institutional impact interactions. RESTRICTIONS: Open only to majors in counselor education.</td>
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<tr>
<td>IFST 683</td>
<td>SEMINAR IN HIGHER EDUCATION ADMINISTRATION</td>
<td>3</td>
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<tr>
<td></td>
<td>Overview of administrative and management issues faced by leaders in higher education. RESTRICTIONS: Open to students whose major requires course.</td>
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<tr>
<td>IFST 684</td>
<td>THEORIES OF COUNSELING</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Theories and techniques used in counseling individuals with personal, social, vocational and educational problems. RESTRICTIONS: Open only to majors in counselor education.</td>
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<tr>
<td>IFST 685</td>
<td>MULTICULTURAL ISSUES IN COUNSELING</td>
<td>3</td>
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<td></td>
<td>Examines the influence of cultural background, including ethnicity, gender, sexual orientation, socio-economic factors, religious preference and age in the counseling relationship. Introduction to nontraditional theories and techniques useful with special populations. Emphasis on increased sensitivity toward cultural influences. RESTRICTIONS: Open only to majors in counselor education.</td>
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<tr>
<td>IFST 686</td>
<td>ASSESSMENT IN COUNSELING</td>
<td>3</td>
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<tr>
<td></td>
<td>Basic concepts in the use of assessment techniques in the counseling of college students. Selection and interpretation of commonly used instruments. Strategies related to other appraisal methods in counseling. RESTRICTIONS: Open only to majors in counselor education.</td>
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<tr>
<td>IFST 687</td>
<td>PRACTICUM IN COLLEGE COUNSELING</td>
<td>3</td>
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<tr>
<td></td>
<td>Closely supervised counseling experience with college students in the areas of educational, vocational and personal problems. Also includes a two-hour weekly seminar in problems of counseling. RESTRICTIONS: Open only to majors in counselor education.</td>
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<tr>
<td>IFST 688</td>
<td>THE LAW AND STUDENT AFFAIRS</td>
<td>3</td>
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<tr>
<td></td>
<td>Legal issues which affect the student affairs practitioner in higher education. Review of federal statutes, court rulings and contract law as applied to administrative rules, legal rights of students and institutional liabilities.</td>
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<tr>
<td>IFST 689</td>
<td>THE AMERICAN COLLEGE STUDENT</td>
<td>3</td>
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<tr>
<td></td>
<td>Survey of the attitudes, values and demographic characteristics of American college students. Examines theories of person-environment interaction and methodologies for identifying student needs and assessing developmental change.</td>
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</tr>
</tbody>
</table>
ITAL 250  INTRODUCTION TO BUSINESS ITALIAN  
Familiarizes students with characteristics of business Italian (vocabulary, technology, terminology and syntactical patterns) and aspects of the Italian business community. PREREQ: ITAL107.

ITAL 305  ADVANCED ITALIAN CONVERSATION AND COMPOSITION  
Discussion of current cultural, social and political topics in Italy. Vocabulary building, grammar exercises and frequent compositions. PREREQ: ITAL211 or ITAL212.

ITAL 306  PRACTICAL ORAL/WRITTEN EXPRESSION  
Offered abroad only, is designed to strengthen skills in grammar and vocabulary in preparation for advanced courses offered in second part of the semester. Class exercises include oral exposés, discussion of articles and videos, textual analysis and compositions. PREREQ: Any two 200-level Italian courses conducted in Italian. RESTRICTIONS: Taught abroad only.

ITAL 308  CONTEMPORARY ITALIAN II  
Discussion and study of issues related to contemporary cultural, political and social developments in Italy, including its place in today’s European community. The course will be conducted in Italian. PREREQ: Any two 200-level Italian courses taught in the Italian language. RESTRICTIONS: Taught abroad only.

ITAL 310  SURVEY OF ITALIAN LITERATURE  
Development of Italian literature from its origins to the mid-17th century. Study and discussion of representative works. PREREQ: ITAL211 or ITAL212.

ITAL 311  SURVEY OF ITALIAN LITERATURE  
Development of Italian literature from the mid-17th century to the present. Study and discussion of representative works. PREREQ: ITAL211 or ITAL212.

ITAL 325  ITALIAN CIVILIZATION AND CULTURE I  
A survey of the major cultural, social and political developments in Italy from the Etruscans to the 15th century. PREREQ: ITAL211 or ITAL212.

ITAL 326  ITALIAN CIVILIZATION AND CULTURE II  
A survey of the major cultural, social and political developments in Italy from its Unification to the present. PREREQ: ITAL211 or ITAL212.

ITAL 355  SPECIAL TOPICS  
Explores an area of special interest in Italian literature or cultural studies. Topics vary and will be announced in the registration booklet. PREREQ: ITAL310 or ITAL311. RESTRICTIONS: May be repeated for credit when topics vary.

ITAL 366  INDEPENDENT STUDY  1-3

ITAL 401  ADVANCED ITALIAN GRAMMAR AND STYLISTICS  
Introduction to the various written and spoken styles of contemporary Italian from colloquial to formal. Exercises in writing and speaking, with special emphasis on the grammatical structure of the Italian language. Some translation. PREREQ: Any two 300-level Italian courses.

ITAL 402  HISTORY OF THE ITALIAN LANGUAGE  
Development of the Italian language from its Latin origins. Exposition of the questione della lingua; linguistic analysis of old Italian texts; and the effects of social, political and cultural factors on usage. Influences from and on other languages. PREREQ: Any two 300-level Italian courses. RESTRICTIONS: **May be offered jointly with ITAL603.**

ITAL 406  ADVANCED ITALIAN LANGUAGE  
Grammatical structure and stylistics with special attention given to technical vocabulary and discourse, e.g., business, law, science and agriculture. PREREQ: Any 300-level Italian course. RESTRICTIONS: Taught abroad only.

ITAL 455  SELECTED AUTHORS, WORKS AND THEMES  
Works of one or more outstanding authors or on a special theme. PREREQ: ITAL310 and ITAL311. RESTRICTIONS: Can be repeated for credit when topics vary. May be offered jointly with ITAL655.

ITAL 466  INDEPENDENT STUDY  1-3

ITAL 603  HISTORY OF THE ITALIAN LANGUAGE  
Development of the Italian language from its Latin origins. Exposition of the questione della lingua; linguistic analysis of old Italian texts; and the effects of social, political and cultural factors on usage. Influences from and on other languages. RESTRICTIONS: **May be offered jointly with ITAL403.**

ITAL 655  SELECTED AUTHORS, WORKS AND THEMES  
Seminar on works of one or more outstanding authors or on a special theme. RESTRICTIONS: Can be repeated for credit when topics vary. May be offered jointly with ITAL455.

JAPANESE

JAPN 105  JAPANESE I - ELEMENTARY  
Introduction to the contemporary Japanese language through developing listening comprehension, speaking, reading, and writing skills, including mastery of the Hiragana and Katakana syllabaries and introduction to Kanji characters. Media Center resources utilized.

JAPN 106  JAPANESE II - ELEMENTARY/INTERMEDIATE  
Continued practice in the aural, oral, reading, and writing skills of contemporary Japanese, including the identification and reproduction of basic Kanji characters. Introduction to formality levels and critical verb forms needed for more advanced communication. Media Center resources utilized. PREREQ: JAPN105. RESTRICTIONS: Two to three years of high school Japanese acceptable in lieu of prerequisite.

JAPN 107  JAPANESE III - INTERMEDIATE  
Development of aural, oral, oral, and writing skills at the intermediate Japanese level, including continued practice in identifying and reproducing Kanji characters, handling a greater variety of formality levels, and verb forms. Media Center resources utilized. PREREQ: JAPN106. RESTRICTIONS: Four years of high school Japanese acceptable in lieu of prerequisite. Satisfies College of Arts and Sciences language requirement.

JAPN 200  JAPANESE GRAMMAR AND COMPOSITION  

JAPN 204  THE ART OF JAPANESE CALLIGRAPHY  
Practical training in Japanese calligraphy, using brush, inkstone and sumi ink. Students will work with both phonetic syllabaries and kanji characters. PREREQ: JAPN105.

JAPN 205  JAPANESE CONVERSATION  
Practical use of Japanese by means of oral reports on a variety of topics including family, school, and work life. Emphasis on improvement of conversational skills for social situations which require different politeness levels, as well as grammatical and written competence. PREREQ: JAPN107. Students encouraged to take JAPN205 after JAPN200. RESTRICTIONS: Prerequisite requires a minimum grade of B.

JAPN 206  CULTURE THROUGH CONVERSATION  
Discussion of topics drawn from contemporary Japanese life. Designed for students who wish to broaden their knowledge of Japanese culture while improving their oral and aural language skills. PREREQ: JAPN107. RESTRICTIONS: Taught abroad only.

JAPN 208  CONTEMPORARY JAPAN I  
Introduction to contemporary Japan, its culture, people, way of life and issues confronting them. RESTRICTIONS: Taught abroad only, in both English and Japanese. Not for major credit. Does not satisfy language requirement.

JAPN 209  INTERMEDIATE SITUATIONAL JAPANESE  
Practical training in Japanese for formal situations. Students will develop all four language skills in such contexts as job interviews, telephone etiquette, correspondence and relations with supervisors. Skills and role-playing featured. PREREQ: JAPN107.

JAPN 305  JAPANESE CONVERSATION AND COMPOSITION  
Discussion of current cultural, social and political topics in Japanese. Vocabulary building, grammar exercises and frequent compositions. PREREQ: Three of the following: JAPN200, JAPN205, JAPN206, JAPN209, or instructor’s permission.
**Jewish Studies**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>JWST 105</td>
<td>Hebrew I - Elementary</td>
<td>4</td>
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<tr>
<td>JWST 106</td>
<td>Hebrew II - Elementary/Intermediate</td>
<td>4</td>
</tr>
<tr>
<td>JWST 107</td>
<td>Hebrew III - Intermediate</td>
<td>4</td>
</tr>
<tr>
<td>JWST 201</td>
<td>Issues and Ideas in Jewish Studies</td>
<td>1</td>
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<tr>
<td>JWST 202</td>
<td>Biblical and Classical Literature</td>
<td>3</td>
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<tr>
<td>JWST 205</td>
<td>Hebrew Conversation</td>
<td>3</td>
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<tr>
<td>JWST 208</td>
<td>Introduction to Jewish Philosophy</td>
<td>3</td>
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<tr>
<td>JWST 254</td>
<td>Jewish Holocaust: 1933-1945</td>
<td>3</td>
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<tr>
<td>JWST 261</td>
<td>Peoples and Cultures of the Middle East</td>
<td>3</td>
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<td>JWST 308</td>
<td>Topics in Jewish Theology</td>
<td>3</td>
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<td>JWST 318</td>
<td>Studies in Film</td>
<td>3</td>
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<tr>
<td>JWST 348</td>
<td>Contemporary Jewish-American Literature</td>
<td>3</td>
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<tr>
<td>JWST 349</td>
<td>Introduction to Jewish Sources: Text and</td>
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<td></td>
<td>Interpretation</td>
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<tr>
<td>JWST 360</td>
<td>Sociology of Religion</td>
<td>3</td>
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<tr>
<td>JWST 365</td>
<td>Studies in Literary Genres, Types and Movements</td>
<td>3</td>
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<tr>
<td>JWST 377</td>
<td>Arab-Israeli Politics</td>
<td>3</td>
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<tr>
<td>JWST 381</td>
<td>History of Arab-Israeli Conflict</td>
<td>3</td>
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<tr>
<td>JWST 382</td>
<td>Studies in Multicultural Literature in English</td>
<td>3</td>
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<tr>
<td>JWST 409</td>
<td>Contemporary Problems of World Politics</td>
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**Latin**

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>LATN 101</td>
<td>Elementary Latin I</td>
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<tr>
<td>LATN 102</td>
<td>Elementary Latin II</td>
<td>3</td>
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<tr>
<td>LATN 213</td>
<td>Cicero</td>
<td>3</td>
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<tr>
<td>LATN 214</td>
<td>Vergil</td>
<td>3</td>
</tr>
<tr>
<td>LATN 215</td>
<td>Roman Letters</td>
<td>3</td>
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<tr>
<td>LATN 222</td>
<td>Historians of the Republic</td>
<td>3</td>
</tr>
<tr>
<td>LATN 366</td>
<td>Independent Study</td>
<td>1-3</td>
</tr>
<tr>
<td>LATN 403</td>
<td>Roman Lyric Poetry</td>
<td>3</td>
</tr>
<tr>
<td>LATN 466</td>
<td>Independent Study</td>
<td>1-3</td>
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**Leadership**

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>LEAD 100</td>
<td>Leadership, Integrity and Change</td>
<td>3</td>
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<tr>
<td>LEAD 101</td>
<td>Understanding Consumers</td>
<td>3</td>
</tr>
<tr>
<td>LEAD 201</td>
<td>Introduction to Consumer Policy</td>
<td>3</td>
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<tr>
<td>LEAD 205</td>
<td>Leadership in Consumer Voice and Customer Service</td>
<td>3</td>
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<tr>
<td>LEAD 209</td>
<td>Presentation Strategies</td>
<td>3</td>
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<tr>
<td>LEAD 304</td>
<td>Leadership, Power and Social Responsibility</td>
<td>3</td>
</tr>
</tbody>
</table>
### LEAD 311  **TOPICS IN CONSUMER RESOURCE MANAGEMENT**  
Topics relating to the development of human and economic resources and productive capacity to meet consumer needs over the life span. Topics will vary.  
**3**

### LEAD 340  **CONSUMER AFFAIRS INTERNSHIP**  
An off-campus supervised and coordinated field study in selected agencies and organizations.  
**3-6**  
**RESTRICIONS:** May be repeated once for credit. Requires permission of instructor.

### LEAD 341  **DECISION-MAKING AND LEADERSHIP**  
Explores basic decision-making theories and models. Examines decision-making as an integral part of leadership in addressing consumer issues.  
**PREREQ:** LEAD100.  
**3**

### LEAD 342  **CONSUMER LAWS AND REGULATIONS**  
In-depth examination of consumer legislation and regulation policies at the federal and state level. Major pieces of consumer legislation and the regulatory agencies responsible for implementing and enforcing these policies are examined.  
**PREREQ:** LEAD201.  
**3**

### LEAD 366  **INDEPENDENT STUDY**  
Topics examine the effects of consumer-oriented policies upon consumer well-being. Topics will vary.  
**PREREQ:** LEAD201.  
**1-6**

### LEAD 401  **TOPICS IN CONSUMER POLICY ANALYSIS**  
Topics examine the effects of consumer-oriented policies upon consumer well-being. Topics will vary.  
**PREREQ:** LEAD201.  
**3**

### LEAD 404  **LEADERSHIP IN ORGANIZATIONS**  
Understanding the process of change and positively affecting change in organizations through the exercise of leadership knowledge.  
**PREREQ:** LEAD100.  
**3**

### LEAD 411  **TOPICS IN LEADERSHIP DYNAMICS**  
Topics relating to aspects of leadership. Themes in leadership dynamics will be explored.  
**PREREQ:** LEAD100.  
**3**

### LEAD 490  **SENIOR CAPSTONE**  
Students will integrate, synthesize and reflect on the importance of personal ethical conduct and social responsibility as both a producer and consumer of products and services.  
**RESTRICTIONS:** Senior LEAD majors only.  
**3**

### LEGAL STUDIES

### LEST 210  **THE LAW AND YOU**  
Provides an opportunity for students to learn more about how the law affects them directly. Prominent guest speakers cover current issues relating to the law, how it operates and how it may affect students and other members of the university community.  
**PREREQ:** LING101.  
**1 PF**

### LEST 301  **INTRODUCTION TO LEGAL STUDIES**  
Introduces legal studies as a multidisciplinary field. May be cross-listed with CRJU301.  
**3**

### LEST 345  **LEGAL ISSUES OF THE MASS MEDIA**  
See COMM345 for course description.  
**3**

### LEST 380  **INTRODUCTION TO LAW**  
See POSC380 for course description.  
**3**

### LEST 383  **LANGUAGE, POWER AND THE LAW**  
See LING383 for course description.  
**3**

### LEST 385  **LANGUAGE AND LAW: COURT INTERPRETATION**  
See LING385 for course description.  
**3**

### LEST 401  **SENIOR SEMINAR**  
Culminates the legal studies minor by requiring an independent research project resulting in a term paper. Seminar provides guidance from professor and chance to share ideas and problems with fellow students.  
**3**

### LEST 408  **ECONOMICS OF LAW**  
See ECON408 for course description.  
**PREREQ:** ECON300 or ECON301.  
**3**

### LEST 450  **TOPICS IN ENVIRONMENTAL LAW**  
See FREC450 for course description.  
**3**

### LEST 466  **INDEPENDENT STUDY**  
**1-6**

### LEST 475  **SOCIAL SCIENCE AND THE LAW**  
See CRJU475 for course description.  
**3**

### LEST 646  **ADMINISTRATIVE LAW**  
See UAPP646 for course description.  
**3**

### LEST 649  **CIVIL RIGHTS LAW AND POLICY**  
See UAPP649 for course description.  
**3**

### LEST 673  **INTERNATIONAL LAW**  
See MASt673 for course description.  
**RESTRICTIONS:** Requires permission of instructor.  
**3**

### LINGUISTICS

### LING 101  **INTRODUCTION TO LINGUISTICS I**  
Nature of language: structure of sounds, words, sentences, and meaning; relationships of language and society, culture, and thought. Emphasis is on language universals and variation both within and between languages, including non-Western and non-white varieties.  
**3**

### LING 102  **LANGUAGE, MIND AND SOCIETY**  
Explores the structural aspects of language variation and the mental representation of language. Topics include: regional and social variation in language, sociolinguistics of multilingual/multicultural communities, language change, role of universal grammar in language learning, lexical access and parsing.  
**PREREQ:** LING101.  
**3**

### LING 130  **AMERICAN SIGN LANGUAGE I**  
Introduction to American Sign Language and to the deaf culture. Topics include WH-questions, yes/no questions, negations, the alphabet and a basic working vocabulary.  
**RESTRICTIONS:** Requires interview with instructor if Sign Language has been studied elsewhere.  
**3**

### LING 131  **AMERICAN SIGN LANGUAGE II**  
Continuation of LING130.  
**PREREQ:** LING130.  
**RESTRICTIONS:** Requires interview with instructor if Sign Language has been studied elsewhere.  
**3**

### LING 203  **LANGUAGES OF THE WORLD**  
Survey of the world’s languages, examining a number of important phenomena from a wide range of languages. Phenomena are both structural (e.g., word order and agreement) and societal or psychological (how multicultural societies choose a common language, the relationship between language and thought). May be cross-listed with FLIT203.  
**3**

### LING 222  **LANGUAGE AND GENDER**  
Explores various ways in which gender is reflected in language. Topics include sexism in language, sexist language and differences in the structural aspects of men’s and women’s language and conversational style. Emphasis on the social implications of these differences. May be cross-listed with WOMS222.  
**3**

### LING 253  **LABORATORY PHONETICS**  
Study of speech sounds, emphasizing the measurement of the acoustic signal. Introduction to acoustic phonetics, concentrating on the source-filter model of speech production. Computer laboratory projects in speech recording, digitization, analysis, variation, synthesis and perception.  
**3**

### LING 265  **STUDIES IN LANGUAGE**  
Topics vary and will be announced in registration booklet.  
**RESTRICTIONS:** May be repeated for credit when topics vary.  
**3**

### LING 301  **DICTIONARIES**  
Lexicographical information on the use of dictionaries in research, teaching, translation, reading and other fields. Sociological and political importance of dictionaries. Introduction to planning and compiling dictionaries: technological developments such as computerization and the dictionary of the future.  
**3**

### LING 358  **LINGUISTICS AND LANGUAGE ARTS**  
See EDUC358 for course description.  
**3**

### LING 366  **INDEPENDENT STUDY**  
**1-6**

### LING 376  **INTRODUCTION TO COMMUNICATION DISORDERS**  
Provides an introduction to the field of communication disorders. Examines the complex behaviors of speech, language and hearing and their changes throughout the lifespan, as well as the variety of communication disorders arising from biological, environmental and behavioral factors.  
**PREREQ:** LING101.  
**3**
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<tr>
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<tbody>
<tr>
<td>LING 377</td>
<td>Clinical Principles and Procedures in Speech Pathology</td>
<td>3</td>
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<tr>
<td>LING 378</td>
<td>Anatomy and Physiology of Speaking</td>
<td>3</td>
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<tr>
<td>LING 383</td>
<td>Language, Power and the Law</td>
<td>3</td>
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<tr>
<td>LING 385</td>
<td>Language and Law: Court Interpretation</td>
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<tr>
<td>LING 390</td>
<td>English Linguistics</td>
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<tr>
<td>LING 401</td>
<td>Historical Linguistics</td>
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<tr>
<td>LING 407</td>
<td>Phonology I</td>
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<tr>
<td>LING 409</td>
<td>Syntax I</td>
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<tr>
<td>LING 417</td>
<td>Language Planning</td>
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<tr>
<td>LING 421</td>
<td>Methods of Teaching Foreign Languages</td>
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<td>LING 422</td>
<td>Language Syllabus Design</td>
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<td>LING 424</td>
<td>Second-Language Testing</td>
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<tr>
<td>LING 433</td>
<td>Introduction to Acoustic Phonetics</td>
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<tr>
<td>LING 462</td>
<td>Language Acquisition</td>
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<td>LING 466</td>
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<td>LING 500</td>
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<td>LING 509</td>
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<td>LING 517</td>
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<td>LING 521</td>
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<td>LING 574</td>
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**LINGUISTICS**
LING 633  INTRODUCTION TO ACOUSTIC PHONETICS  3
Introduction to articulatory, acoustic, and perceptual characteristics of speech with emphasis on the acoustic properties of phonemes. While primarily lecture format with assigned text, a few laboratory sessions provide an introduction to computer-based methods used in instrumental studies of speech.

LING 675  LANGUAGE ACQUISITION  4
See EDUC675 for course description.

LING 677  THE STRUCTURE OF ENGLISH  3
Explores current generative linguistic theories and the analysis of English phonology/morphology and syntax in the light of these theories. Contrastive analysis of English and a second language (such as Spanish). May be cross-listed with EDUC677 and/or ENGL677.

LING 680  INTRODUCTION TO SOCIOLINGUISTICS  3
Theories (e.g., variation theory), research and methods of analysis of the interrelationships of language and society. Particular attention paid to application of sociolinguistic research to the solution of educational problems of various groups.

LING 691  SEMANTICS I  3
Introduction to linguistic theories of meaning. Survey of the semantic issues in reference, ambiguity, presupposition and implicature. Selected linguistic phenomena (e.g., tense, aspect, predication and thematic roles). Some elements of formal semantics. PREREQ: LING101 or equivalent.

LING 697  SOCIOLINGUISTICS OF ENGLISH IN THE INNER CITY  3
Application of sociolinguistic principles and research to the teaching of multicultural students in American educational systems. Topics include societal multilingualism, language attitudes, vernacular language education, diglossia, instructional methods for teaching English as a second dialect, and reactions of the educational community to Black English Vernacular.

LING 698  TEACHING ENGLISH AS A SECOND LANGUAGE  3
Investigation of the literature containing the traditional and modern techniques of teaching the pronunciation, grammar and vocabulary of American English. Devising and presenting lesson plans. PREREQ: Three credits of English at the 200-level.

LING 699  ISSUES IN TEACHING LIMITED ENGLISH PROFICIENT STUDENTS  3
Addresses theoretical and instructional issues related to teaching Limited English Proficient (LEP) students. Topics include issues in bilingual education, theories of L2 acquisition, LEP educational models, integrating language and content instruction, documentation and assessment of LEP skills, and understanding cultural diversity.

LING 801  LINGUISTIC TYPOLOGY  3-6
Introduction to the concerns of linguistic typology and the study of language universals and language documentation. COREQ: LING607, LING609.

LING 802  STUDIES IN OLD AND MIDDLE ENGLISH  3
See ENGL802 for course description.

LING 830  SYNTAX III  3
In-depth investigation of syntactic universals and recent developments in the theory of syntax.
PREREQ: LING610.
RESTRICTIONS: May be repeated for credit when topics vary.

LING 831  TOPICS IN SYNTAX  3
Current topics in syntactic theory, problems in the syntactic analysis of specific languages. PREREQ: LING830.
RESTRICTIONS: May be repeated for credit when topics vary.

LING 832  THE ACQUISITION OF SYNTAX  3
Current issues in the acquisition of syntax, such as: relationship between UG and specific language grammars, parameter setting model in L1 acquisition, effect of input frequency, methods for assessing children's syntax. PREREQ: Syntax I and II, or concurrent enrollment in Syntax II.

LING 848  SEMINAR IN LANGUAGE DEVELOPMENT  3
See EDUC848 for course description.

LING 850  LINGUISTICS AND WRITING  3
Survey of writing systems. Problems of text structure.

LING 851  LINGUISTIC FIELD METHODS  3
Development of skills and techniques in various kinds of field analysis. Use of native informants. Discussion of the relationship between data collecting and grammatical statement.

LING 853  TOPICS IN THE STRUCTURE OF CHINESE  3
Formal analysis of selected aspects of the grammar of Chinese and related dialects. Topics may include phonology, morphology, syntax and semantics. RESTRICTIONS: May be repeated for credit when topics vary.

LING 854  TOPICS IN THE STRUCTURE OF FRENCH  3
Formal analysis of selected aspects of the grammar of French and related dialects. Topics may include phonology, morphology, syntax and semantics. RESTRICTIONS: May be repeated for credit when topics vary.

LING 855  TOPICS IN THE STRUCTURE OF GERMAN  3
Formal analysis of selected aspects of the grammar of German and related dialects. Topics may include phonology, morphology, syntax and semantics. RESTRICTIONS: May be repeated for credit when topics vary.

LING 856  TOPICS IN THE STRUCTURE OF ITALIAN  3
Formal analysis of selected aspects of the grammar of Italian and related dialects. Topics may include phonology, morphology, syntax and semantics. RESTRICTIONS: May be repeated for credit when topics vary.

LING 857  TOPICS IN THE STRUCTURE OF JAPANESE  3
Formal analysis of selected aspects of the grammar of Japanese and related dialects. Topics may include phonology, morphology, syntax and semantics. RESTRICTIONS: May be repeated for credit when topics vary.

LING 861  TOPICS IN PHONOLOGY  3
Detailed examination of one or more current (controversial) issues in phonological theory. PREREQ: LING608.
RESTRICTIONS: May be repeated for credit when topics vary.

LING 862  ACQUISITION OF PHONOLOGY  3
Development of phonology in normal children from babbling stage through acquisition of phonemes and basic phonological rules of a language. Examination of data from a variety of languages, focusing on language: specific and universal phenomena. PREREQ: LING608.

LING 863  PROJECTS IN ACOUSTIC PHONETICS  3
Brief review of the articulatory, acoustic, and perceptual characteristics of speech and computer-based laboratory instrumentation. Students conduct research projects in acoustic phonetics, speech analysis, or speech synthesis. Projects will be suggested by the instructor, however, students may (with instructor's approval) choose a project of their own design.

LING 880  SECOND LANGUAGE ACQUISITION  3
A detailed analysis of current issues in second language acquisition based on extensive readings of research findings. Topics include monitor model, pidginization process, natural versus formal second language acquisition, and adult-versus-child acquisition.

LING 890  STUDIES IN LINGUISTICS  3
Varying topics in linguistics, such as grammatical theory, grammatical analysis, syntax, historical-comparative linguistics, stylistics and grammar testing. May be cross-listed with CGSC890 and/or ENGL890.

LING 964  PRE-CANDIDACY STUDY  3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.
RESTRICTIONS: Not open to students who have been admitted to candidacy.

LING 969  DOCTORAL DISSERTATION  1-12 PF

LIBERAL STUDIES

MALS 600  NATURE AND HUMAN NATURE  3
Concentrates on salient views of nature and human nature, and the ways in which they have been shaped by the historical circumstances and disciplinary perspectives from which they were developed.
RESTRICTIONS: Open to majors only.