UD
COURSE DESCRIPTIONS

UNIVERSITY OF DELAWARE
2005-2006
### Interpretation of the Course Listings

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 is the maximum number of credits that a student may take in this course in a semester. An equivalent preparation may be satisfied by the course or courses indicated or by the course or courses taken in the same semester as the course.
4. **Grade types.**
   a. A grade of C or better is required for baccalaureate credit.
   b. A grade of B or better is required for graduate credit.
   c. A grade of C or better is required for professional credit.
5. **Brief description of the course.**
6. **Prerequisites.**
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. These semesters are indicated here.

**Interpretation of course numbers:**

- **001-099:** Introductory-level courses.
- **100-299:** Introductory and intermediate courses, usually required as a prerequisite knowledge or experience in the discipline.
- **300-399:** Courses with specific prerequisites that focus on the subject matter in a particular discipline.
- **400-499:** Advanced courses for majors and other qualified students.
- **500-599:** Graduate-level courses for the non-specialist.
- **600-699:** Graduate-level courses.
- **800-899:** Graduate-level courses.
- **900-999:** Ph.D. level courses.
- **X6:** Special problems and independent study.
- **X67:** Experimental course (may be offered twice).

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, 200-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 single standard of expectation and grading for all students 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.

### Codes for Subject Areas

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject Area</th>
<th>Example Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT</td>
<td>Accounting</td>
<td>368</td>
</tr>
<tr>
<td>AFSC</td>
<td>Air Force Science</td>
<td>369</td>
</tr>
<tr>
<td>AGRI</td>
<td>Agriculture</td>
<td>370</td>
</tr>
<tr>
<td>AMCS</td>
<td>American Material Culture Studies</td>
<td>372</td>
</tr>
<tr>
<td>ANSC</td>
<td>Animal Science</td>
<td>373</td>
</tr>
<tr>
<td>ANTH</td>
<td>Anthropology</td>
<td>374</td>
</tr>
<tr>
<td>ARAB</td>
<td>Arabic</td>
<td>375</td>
</tr>
<tr>
<td>ARTS</td>
<td>Arts</td>
<td>376</td>
</tr>
<tr>
<td>ARTC</td>
<td>Art Conservation</td>
<td>380</td>
</tr>
<tr>
<td>ARTH</td>
<td>Art History</td>
<td>384</td>
</tr>
<tr>
<td>ATED</td>
<td>Agricultural and Technology Education</td>
<td>385</td>
</tr>
<tr>
<td>BMAS</td>
<td>Business-Management</td>
<td>386</td>
</tr>
<tr>
<td>BMBA</td>
<td>Business-Multidisciplinary Business Administration</td>
<td>387</td>
</tr>
<tr>
<td>BME</td>
<td>Biomedical Engineering</td>
<td>389</td>
</tr>
<tr>
<td>BREC</td>
<td>Business Administration</td>
<td>393</td>
</tr>
<tr>
<td>BUSP</td>
<td>Business and Economics</td>
<td>394</td>
</tr>
<tr>
<td>BUSG</td>
<td>Cognitive Science</td>
<td>204</td>
</tr>
<tr>
<td>CHEE</td>
<td>Chemical Engineering</td>
<td>396</td>
</tr>
<tr>
<td>CHEM</td>
<td>Chemistry and Biochemistry</td>
<td>399</td>
</tr>
<tr>
<td>CHIN</td>
<td>Chinese</td>
<td>400</td>
</tr>
<tr>
<td>CIEE</td>
<td>Civil and Environmental Engineering</td>
<td>404</td>
</tr>
<tr>
<td>CISC</td>
<td>Computer and Information Sciences</td>
<td>408</td>
</tr>
<tr>
<td>CMRT</td>
<td>Comparative Literature</td>
<td>409</td>
</tr>
<tr>
<td>COMM</td>
<td>Communication</td>
<td>411</td>
</tr>
<tr>
<td>CPED</td>
<td>Computer Engineering</td>
<td>412</td>
</tr>
<tr>
<td>CRJU</td>
<td>Criminal Justice</td>
<td>414</td>
</tr>
<tr>
<td>CSCE</td>
<td>Computer Science and Culture</td>
<td>414</td>
</tr>
<tr>
<td>CSEM</td>
<td>Early American Culture</td>
<td>415</td>
</tr>
<tr>
<td>ECSC</td>
<td>Economics</td>
<td>417</td>
</tr>
<tr>
<td>EDAM</td>
<td>Education Library Media</td>
<td>418</td>
</tr>
<tr>
<td>EDUC</td>
<td>Education Engineering</td>
<td>427</td>
</tr>
<tr>
<td>EGET</td>
<td>Electrical Engineering</td>
<td>429</td>
</tr>
<tr>
<td>ENGL</td>
<td>English</td>
<td>431</td>
</tr>
<tr>
<td>ENVS</td>
<td>Environmental Science</td>
<td>432</td>
</tr>
<tr>
<td>ENTW</td>
<td>Entomology and Wildlife Conservation</td>
<td>437</td>
</tr>
<tr>
<td>FASH</td>
<td>Fashion and Apparel Studies</td>
<td>438</td>
</tr>
<tr>
<td>FINR</td>
<td>Finance</td>
<td>441</td>
</tr>
<tr>
<td>FLIT</td>
<td>Foreign Languages and Literature</td>
<td>442</td>
</tr>
<tr>
<td>FOSC</td>
<td>Food Science</td>
<td>445</td>
</tr>
<tr>
<td>FRED</td>
<td>Food and Resource Economics</td>
<td>446</td>
</tr>
<tr>
<td>FREN</td>
<td>French</td>
<td>448</td>
</tr>
<tr>
<td>GEOG</td>
<td>Geography</td>
<td>451</td>
</tr>
<tr>
<td>GEOY</td>
<td>Geology</td>
<td>454</td>
</tr>
<tr>
<td>GREE</td>
<td>Greek</td>
<td>456</td>
</tr>
<tr>
<td>GRMN</td>
<td>German</td>
<td>460</td>
</tr>
<tr>
<td>HSBW</td>
<td>Hebrew</td>
<td>466</td>
</tr>
<tr>
<td>HEDF</td>
<td>Human Services, Education and Public Policy</td>
<td>466</td>
</tr>
<tr>
<td>HEPF</td>
<td>Health and Exercise Sciences</td>
<td>462</td>
</tr>
<tr>
<td>HESC</td>
<td>History</td>
<td>467</td>
</tr>
<tr>
<td>HIST</td>
<td>History Promotion</td>
<td>468</td>
</tr>
<tr>
<td>HURO</td>
<td>Health Studies</td>
<td>468</td>
</tr>
<tr>
<td>HSCM</td>
<td>Hotel, Restaurant and Institutional Management</td>
<td>470</td>
</tr>
<tr>
<td>HSSM</td>
<td>Health Services Administration</td>
<td>470</td>
</tr>
<tr>
<td>HUGD</td>
<td>Individual and Family Studies</td>
<td>473</td>
</tr>
<tr>
<td>ITA</td>
<td>Italian</td>
<td>475</td>
</tr>
<tr>
<td>JAPN</td>
<td>Japanese</td>
<td>475</td>
</tr>
<tr>
<td>JWST</td>
<td>Jewish Studies</td>
<td>476</td>
</tr>
<tr>
<td>LATN</td>
<td>Latin</td>
<td>477</td>
</tr>
<tr>
<td>LEAD</td>
<td>Leadership</td>
<td>477</td>
</tr>
<tr>
<td>LEST</td>
<td>Legal Studies</td>
<td>479</td>
</tr>
<tr>
<td>LING</td>
<td>Linguistics</td>
<td>480</td>
</tr>
<tr>
<td>MARC</td>
<td>Liberal Studies</td>
<td>483</td>
</tr>
<tr>
<td>MATH</td>
<td>Mathematics</td>
<td>487</td>
</tr>
<tr>
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<td>487</td>
</tr>
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<td>Medical Technology</td>
<td>488</td>
</tr>
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<td>Mechanical Engineering</td>
<td>492</td>
</tr>
<tr>
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<td>Military Science</td>
<td>493</td>
</tr>
<tr>
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<td>Materials Science</td>
<td>494</td>
</tr>
<tr>
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<td>Museum Studies</td>
<td>495</td>
</tr>
<tr>
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<td>Music Education</td>
<td>496</td>
</tr>
<tr>
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<td>Music</td>
<td>502</td>
</tr>
<tr>
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<td>504</td>
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<tr>
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<td>Nutrition and Dietetics</td>
<td>508</td>
</tr>
<tr>
<td>NERS</td>
<td>Operations Research</td>
<td>508</td>
</tr>
<tr>
<td>ORES</td>
<td>Philosophy</td>
<td>510</td>
</tr>
<tr>
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<td>Philosophy</td>
<td>512</td>
</tr>
<tr>
<td>PHYS</td>
<td>Physics and Astronomy</td>
<td>514</td>
</tr>
<tr>
<td>PYTH</td>
<td>Physical Therapy</td>
<td>518</td>
</tr>
<tr>
<td>PSCI</td>
<td>Plant and Soil Science</td>
<td>518</td>
</tr>
<tr>
<td>PORT</td>
<td>Portuguese</td>
<td>522</td>
</tr>
<tr>
<td>POSC</td>
<td>Political Science</td>
<td>525</td>
</tr>
<tr>
<td>PSYC</td>
<td>Psychology</td>
<td>525</td>
</tr>
<tr>
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<td>Psychology</td>
<td>526</td>
</tr>
<tr>
<td>RUSS</td>
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<td>526</td>
</tr>
<tr>
<td>SCEN</td>
<td>Science</td>
<td>529</td>
</tr>
<tr>
<td>SCIC</td>
<td>Sociology</td>
<td>532</td>
</tr>
<tr>
<td>SPAN</td>
<td>Spanish</td>
<td>533</td>
</tr>
<tr>
<td>STAT</td>
<td>Statistics</td>
<td>533</td>
</tr>
<tr>
<td>THEA</td>
<td>Theatre</td>
<td>536</td>
</tr>
<tr>
<td>UAPP</td>
<td>Urban Affairs and Public Policy</td>
<td>541</td>
</tr>
<tr>
<td>UNIV</td>
<td>University Courses</td>
<td>541</td>
</tr>
<tr>
<td>WOMS</td>
<td>Women's Studies</td>
<td>542</td>
</tr>
</tbody>
</table>

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*Course Descriptions*
ACCOUNTING

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,
planning, and changing prices; preparation of the statement of
variance analysis, contribution approach to decision analysis, absorption and
direct costing.
PREREQ: ACCT 207
RESTRICTIONS: Not open to freshmen.

ACCT 207  ACCOUNTING I  3
An introduction to financial accounting. Topics: the accounting cycle, merchandise
accounting, accounting procedures for cash, receivables, payables, inventories,
plant and equipment, stocks and bonds.
PREREQ: ACCT 207
RESTRICTIONS: Not open to freshmen.

ACCT 208  ACCOUNTING II  3
An introduction to managerial accounting. Topics: manufacturing accounting, cost
volume-profit analysis, job-order accounting, budgeting, standard costs and
variance analysis, contribution approach to decision analysis, absorption and
direct costing.
PREREQ: ACCT 207

ACCT 261  INTRODUCTION TO BUSINESS INFORMATION SYSTEMS II  3
Introduction to management information systems. Programming techniques for
problem solving with business productivity tools and software. Emphasis on business
applications.
PREREQ: ACCT 160.

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: ACCT 208, ACCT 160.

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: ACCT 207, ACCT 208.

ACCT 316  INTERMEDIATE ACCOUNTING II  3
Continuation of ACCT 315. 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: ACCT 315.

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: ACCT 208.

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’ legal 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: ACCT 350.

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 383  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: ACCT 207.

ACCT 395  SEMINAR: INTERNATIONAL ACCOUNTING  3
Seminar on selected topics in international accounting. Combines lectures and
visits to local organizations.
PREREQ: ACCT 207.

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: ACCT 316.

ACCT 413  INCOME TAX ACCOUNTING  3
Analysis of recent revenue acts; use of federal law and regulations to determine
tax liability.
PREREQ: ACCT 315.

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. Students use acquired skills to
explore corporate and partnership taxation concepts.
PREREQ: ACCT 413.

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: ACCT 316.

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: ACCT 316.

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: ACCT 302 and ACCT 316.

ACCT 466  INDEPENDENT STUDY  1-6

ACCT 614  FEDERAL TAX RESEARCH AND PLANNING  3
Introduces the master’s student to the techniques and tools of technical tax
research. Using these developing skills, the student begins exploration of the
corporate and partnership taxation area.
PREREQ: ACCT 413 or comparable undergraduate accounting course.

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.
AGRICULTURE

AGRI 399  TEACHING ASSISTANT  1-4 PF
Practical teaching experience. Students participate and assist in instruction of 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 ANTH216 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.

AMCS 464  AMERICAN MATERIAL CULTURE STUDIES INTERNSHIP  3
Internship practicum supplementing theoretical and methodological background in administration, collections management, exhibition, research, interpretation, and public programming and services of museums. Students intern at the University Gallery or other acceptable museum, related institution or organization in the United States.
PREREQ: ANTH216
RESTRICTIONS: Open to majors only.

ANIMAL SCIENCE

ANSC 101  INTRODUCTION TO ANIMAL SCIENCE  3
An introduction to the practical nature of animal agriculture. Discusses similarities and differences in the vital life processes and management practices with emphasis on cattle, sheep, swine, horses and poultry.
COREQ: ANSC111
RESTRICTIONS: Corequisite mandatory for majors, optional for nonmajors Offered in Fall only.

ANSC 111  ANIMAL SCIENCE LABORATORY  1
Laboratory providing the opportunity to handle animals and to become familiar with common management practices.
COREQ: ANSC101
RESTRICTIONS: Corequisite mandatory for majors, optional for nonmajors Offered in Fall only.

ANSC 140  FUNCTIONAL ANATOMY OF DOMESTIC ANIMALS  4
Identification of relationship between form and function in domestic farm animals. Comparative examination of body systems in order to better understand the various management practices employed in animal agriculture. Serves as prerequisite for advanced departmental courses.
RESTRICTIONS: Offered in Spring only.

ANSC 166  SPECIAL PROBLEM  1-3
RESTRICTIONS: Contract must have department chair signature. Independent study to involve library or lab research.

ANSC 220  INTRODUCTION TO EQUINE SCIENCE  4
Study of equine science and husbandry. Instruction focuses on physiology, anatomy, genetics, behavior, reproduction and nutrition. Complement lab stress: systems care, safety, handling, feed identification and basic equipment and use. Accentuates unique equine biology and science foundational to understanding function and husbandry.
PREREQ: ANSC101 or permission of instructor.

ANSC 251  LIVESTOCK NUTRITION AND FEEDING  4
Comparative study of nutrients and their metabolism in animals of agricultural importance, nutrient requirements of animals, nutritional value of food ingredients and the principles of ration formulation. Emphasis on effects of the plane of nutrition on productivity, health and well-being of animals.
PREREQ: ANSC101 and ANSC140.

ANSC 262  PRACTICAL VETERINARY EXPERIENCE  1-3 PF
Opportunity to gain experience by working with a veterinarian. Student is responsible for making contact with the veterinarian.
RESTRICTIONS: Not for major credit. Offered in Winter only.

ANSC 265  SOPHOMORE SEMINAR  1
Emphasis on career development. Preparation for veterinary medicine and other careers in light of current and future trends in the field.
RESTRICTIONS: Open only to sophomore animal science majors.

ANSC 266  SPECIAL PROBLEM  1-3
RESTRICTIONS: Contract must have department chair signature. Independent study to involve library or lab research.

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

ANSC 328  FOOD PROCESSING  3
See FOSC328 for course description.

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 odd-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.
ANSC 418 SWINE PRODUCTION 4
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.

ANSC 419 TOPICS IN INTERNATIONAL ANIMAL AGRICULTURE 3-4
Instruction in animal production taught as part of a study abroad course. Topics vary with program location and focus.
PREREQ: ANSC 101

ANSC 420 EQUINE REPRODUCTIVE MANAGEMENT 4
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

ANSC 421 POULTRY PRODUCTION 4
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

ANSC 436 IMMUNOLOGY OF DOMESTIC ANIMALS 3
Comparative study of the immune response of domestic animals including dog, cat, horse, pig, chicken and others. General topics include ontology of the immune system, reproductive immunity, neonatal immunity, immunodeficiencies, and autoimmunity.
PREREQ: ANSC332 and BISC207
RESTRICTIONS: Offered in Fall of even-numbered years

ANSC 438 IMMUNOLOGICAL TECHNIQUES 1
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

ANSC 441 REPRODUCTIVE PHYSIOLOGY OF DOMESTIC ANIMALS 3
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

ANSC 442 LACTATIONAL PHYSIOLOGY 3
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

ANSC 445 COMPARATIVE PHYSIOLOGY OF DOMESTIC ANIMALS 3
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.

ANSC 454 RUMINANT NUTRITION 3
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

ANSC 464 ANIMAL SCIENCE FIELD EXPERIENCE 1-12 PF
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.

ANSC 466 INDEPENDENT STUDY 1-6
Restrictions: Contract must have department chair signature. Independent study to involve library or lab research.

ANSC 470 PRINCIPLES OF MOLECULAR GENETICS 3
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

ANSC 615 VERTEBRATE DEVELOPMENTAL BIOLOGY 3
See BISC615 for course description.
PREREQ: B ISC401/411 and B ISC403/413
RESTRICTIONS: Requires approval of instructor.

ANSC 624 MONOGASTRIC NUTRITION 3
Advanced study of the digestion, absorption and metabolism of nutrients in terms of the needs of monogastrics. Application of principles to swine, poultry and equine nutrition.
May be cross-listed with NTD624.
PREREQ: ANSC442 or NTD400, and CHEM214
RESTRICTIONS: Offered in Spring of odd-numbered years.

ANSC 629 FOOD ANALYSIS 4
See FOSC629 for course description.

ANSC 630 TRACE MINERALS AND VITAMINS 3
See NTD630 for course description.

ANSC 632 ELEMENTS OF PATHOLOGY 3
Microscopic and gross changes in cells, tissues and organs as a result of a disease process.
PREREQ: ANSC332 or ANSC633.

ANSC 633 PULTRY PATHOLOGY 3
Study of poultry diseases with emphasis on their causes, prevention, treatment and control.
PREREQ: ANSC332, ANSC431 and ANSC635.

ANSC 635 INTRODUCTION TO VIROLOGY 3
Biological properties and processes of animal viruses influencing the pathogenesis, diagnosis and control of disease. Laboratory emphasis on standard methods of detecting viral activity.
PREREQ: ANSC431 or BISC300
RESTRICTIONS: Offered in Fall of odd-numbered years.

ANSC 636 IMMUNOLOGY OF DOMESTIC ANIMALS 3
Comparative study of the immune response of domestic animals including dog, cat, horse, pig, chicken and others. General topics include ontology of the immune system, reproductive immunity, neonatal immunity, immunodeficiencies, and autoimmunity.
PREREQ: ANSC332 and BISC207
RESTRICTIONS: Offered in Fall of even-numbered years.

ANSC 637 AVIAN IMMUNOLOGY 3
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.

ANSC 638 IMMUNOLOGICAL TECHNIQUES 1
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.

ANSC 639 FOOD MICROBIOLOGY 4
See FOSC639 for course description.

ANSC 644 BIOINFOMATICS 3
Examines computer applications to biological sciences with emphasis placed upon genomics and proteomics applications. No computer programming experience required.

ANSC 654 ADVANCED RUMINANT NUTRITION 3
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 NTD654.
PREREQ: Undergraduate or graduate courses in nutrition, microbiology, biochemistry, ANSC454 or equivalents. ANSC404 or ANSC417 recommended

ANSC 668 RESEARCH 1-6

ANSC 670 PRINCIPLES OF MOLECULAR GENETICS 3
Fundamentals of nucleic acid biochemistry (replication, repair, and 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

ANSC 842 AVIAN MICROANATOMY 3
Study of avian histology using microscopy. Examines the microscopic structure, cytochemical and functional aspects of cells, tissues and organ systems using domestic fowl as the prototype species. Lectures supplemented with laboratory examination of tissue sections.
PREREQ: Basic physiology
ANTH 851 Special Topics in Animal Nutrition 1–3
Advanced study in selected current topics of ruminant and/or nonruminant nutrition
PREREQ: Course in advanced nutrition
RESTRICTIONS: May be repeated for credit when topics vary

ANTH 865 Seminar 1

ANTH 869 Research 1–9

ANTH 874 Topics in Molecular Biology 1
Provides a forum for the discussion of current topics in molecular biology, with critical reading of relevant primary literature.
May be cross-listed with PLSC 874.
RESTRICTIONS: Requires permission of instructor

ANTH 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.

ANTH 969 Doctoral Dissertation 1–12 PF

ANTHROPOLOGY

ANTH 101 Introduction to Social and Cultural Anthropology 3
Major ideas and areas of study in social and cultural anthropology. Use of ethnographic data and film to illustrate the anthropologist's view of societies in their sociocultural and ecological dimensions.

ANTH 102 Introduction to Biological Anthropology 3
Genetic basis for human evolution; emergence of racial differences and ongoing human evolution, nonhuman primates and fossil evidence for human evolution.
RESTRICTIONS: Only one of either ANTH 102 or ANTH 104 can count for degree credit.

ANTH 103 Introduction to Prehistoric Archaeology 3
Fundamental concepts and research procedures of archaeology. The history of archaeology, methods of fieldwork and artifact analysis, and theories of human behavior in archaeological research.
RESTRICTIONS: Only one of either ANTH 103 or ANTH 104 can count for degree credit.

ANTH 104 Introduction to Archaeology and Biological Anthropology 3
The fossil and archaeological record of human biological and cultural evolution. Emphasis on how archaeological and biological anthropological research are conducted, and how their treatment of data distinguish them as scientific disciplines.
RESTRICTIONS: Degree credit for ANTH 102 or ANTH 104 not granted if ANTH 104 is taken.

ANTH 105 Introduction to Historical Archaeology 3
Introduces principal ideas, approaches, and research methods in historical archaeology. Presented through a comparative case study of the emergence of the modern world.

ANTH 202 Human Evolution and the Fossil Record 3
A survey of the human fossil record from the origin of the human species to the establishment of agriculture. Includes evolutionary theory, anatomical interpretation and reconstruction of early social behavior.

ANTH 205 Anthropology and Human Nature 3
Archaeological, biological and cultural anthropology organized around the theme of human nature.

ANTH 216 Introduction to Material Culture Studies 3
Introduces students to material culture studies, broadly defined as study of all things people make and all the ways people have altered the physical world. Explores the approaches, concepts, and methods of numerous disciplines that investigate material culture.
May be cross-listed with AMCS 216 and/or HIST 216.

ANTH 222 Technology and Culture 3
Primitive and preindustrial technologies. Theoretical issues of innovation, diffusion and adaptation. The relationship between technology and other aspects of culture.

ANTH 225 Peasant Societies 3
Comparative study of peasant communities in Europe, Asia, African and Latin American societies, including case studies of family life, religion and forms of social control and relationships to the ruling classes.

ANTH 227 American Culture 3
Concepts and methods of cultural anthropology in contemporary America. The culture concept, American social structure, language, values and beliefs.

ANTH 228 Peoples and Cultures of the Southwest 3
Cultures, institutions and ethnic groups of southwestern United States. Analysis of both prehistoric and historic cultures, continuity and change.

ANTH 229 Indians of North America 3
An introductory comparative study of Native American cultures as they existed prior to their disruption by European contact. Uses the culture area approach.

ANTH 230 Peoples of the World 3
Anthropological studies of societies and culture areas throughout the world to illustrate their characteristics and anthropological issues.

ANTH 239 Arts and Crafts of Native North America 3
Anthropological analysis of indigenous technologies, arts, and crafts of native peoples of North America, including textiles, stoneworking, and ceramics.

ANTH 245 Contemporary Native American Culture Issues 3
An overview of cultural identity issues for Native Americans in the contemporary United States, including how Native Americans view their own cultures and society, perspectives they bring to the Euro-American and native encounters and to persistent denials of their distinctiveness in modern American society.

ANTH 251 Introduction to Ethnic Arts 3
General survey of the ethnocrafts from Africa, the Americas and the Pacific, including sculpture, painting, decoration and their interrelationships with oral literature, music, dance, games and ritual.

ANTH 255 Applied Anthropology 3
Anthropology applied to practical problems, including community development, directed change, agrarian reform and urban dislocation, particularly in Third World countries.

ANTH 259 Hunting Societies 3
The role of hunting in human evolution, especially as biobehavioral adaptation; the technology and political, social, economic and religious behavior and institutions of a sample of hunting peoples.

ANTH 261 Peoples and Cultures of the Middle East 3
Cultures, institutions and ethnic groups of the Middle East. Description and analysis of major cultural traditions and social institutions. May be cross-listed with JWST 261.

ANTH 265 High Civilizations of the Americas 3
The origin and development of pre-Columbian civilizations in the Gulf Coast lowlands, Central Mexico, Yucatan peninsula and Andean area.

ANTH 269 Early Civilizations of the Old World 3
Early civilization in Southeast Asia, the Near East, Egypt, China and India.

ANTH 275 Delaware Prehistoric Archaeology 3
Overview of the prehistoric lifeways of Delaware. Considers the relationships between people and their environments on the Delmarva Peninsula from the first inhabitants at the end of the Ice Age to the arrival of the European colonists.

ANTH 278 Historic Cultures of the Middle Atlantic Region 3
Explores the development of American culture utilizing the Middle Atlantic region—today's states of Delaware, Maryland, New Jersey, Pennsylvania, New York and Virginia—as a microcosm. Takes a comparative and synthetic approach, drawing on the work of scholars in several disciplines.
May be cross-listed with HIST 278.

ANTH 300 Primatology 3
Survey of the nonhuman primates, including their taxonomy and biological characteristics, and the study of their behavior and how it relates to human behavior.

ANTH 305 The Evolution of Human Sex Roles and Reproduction 3
Survey of the evolution of human reproduction and sex differences. Evidence derived from the human fossil record, living non-human primates, modern biological differences between human males and females and cross-cultural comparisons of reproductive behavior and sex roles.
May be cross-listed with WOM 305.

ANTH 320 Prehistory of North America 3
Major cultural and social developments of prehistoric humans in North America, from the entrance of the Paleolithians to the arrival of the Europeans in the 16th century.
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<td>Old World Archaeology</td>
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<td>Peoples of Europe</td>
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<td>Development and Underdevelopment</td>
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<td>Historical Archaeology of American Battlefields</td>
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<td>Honors Colloquium</td>
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<td>Art and Architecture</td>
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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 ARTH 657

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 HIST 663 and/or MSST 663

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: ARAB 105
RESTRICTIONS: Two to three years of high school Arabic acceptable in lieu of ARAB 105

ARAB 107 Arabic III - Intermediate 4
Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty
PREREQ: ARAB 106
RESTRICTIONS: Four years of high school Arabic acceptable in lieu of ARAB 106
Satisfies Arts and Sciences foreign language requirement.

Arts and Science

ARTS 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: ART 112 and ART 113
RESTRICTIONS: Open to majors only

ARTS 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: ART 112 and ART 113
RESTRICTIONS: Open to majors only

ARTS 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

ARTS 130 Drawing I 3
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: ART 111 and ART 116
RESTRICTIONS: Open to majors only

ARTS 133 Design 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
PREREQ: ART 110
COREQ: ART 113 and ART 117
RESTRICTIONS: Open to majors only

ARTS 134 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: ART 110, 111, 112 or 113

ARTS 135 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: ART 110 and ART 111
RESTRICTIONS: Open to majors only

ARTS 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 HIST 136
RESTRICTIONS: May be repeated for credit when topics vary.

ARTS 199 Honors Forum 1
Topics vary.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTS 205 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.

ARTS 296 Honors Forum: Multicultural 1
Recent topics include Passing the Torch: An Interdisciplinary Look at a World Paced 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.

ARTS 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 ENGL 316

ARTS 366 Independent Study 1-6
First year interdisciplinary Honors seminar. May be team-taught, specific topics vary.

ARTS 390 Honors Colloquium 3
First year interdisciplinary Honors seminar. May be team-taught, specific topics vary.

ARTS 392 Honors Colloquium: Multicultural 3
First year interdisciplinary Honors seminar. May be team-taught, specific topics vary.

ARTS 466 Independent Study 1-6
ARTS 869 Master's Thesis 1-6
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
COREQ: ART210
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 NEEDED TO DETERMINE ADVANCED COURSEWORK
RESTRICTIONS: May be repeated 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
PREREQ: ART210
COREQ: ART201
RESTRICTIONS: Requires permission of instructor

ART 230  FIGURE DRAWING  3
Drawing the human figure with emphasis on structure, proportion, volume and anatomy. Various drawing media explored
PREREQ: ART112

ART 231  BEGINNING PAINTING  3
An exploration of color theory as related to oil painting and an examination of both traditional and experimental painting methods as a means for providing students a foundation for discovering their unique potential for self expression

ART 241  BEGINNING LITHOGRAPHY  3
Introduction to basic lithographic processes including stone and plate lithography

ART 243  INTRODUCTION TO PRINTMAKING  3
Introduction to a variety of print techniques including silkscreen, lithography, etching, woodcut and monoprinting and to the development of multiple and one-of-a-kind images

ART 244  DIGITAL PRINTMAKING  3
Use of the computer is investigated as a tool for imagemaking by scanning, originating and manipulating digital imagery, both photographic and hand drawn. Exploration of contemporary and traditional printmaking techniques are used to produce printed editions of created digital images

ART 246  BEGINNING SCREENPRINTING  3
Introduction to basic screenprinting including stencil, drawing fluid, resist and photo emulsion techniques

ART 250  BEGINNING SCULPTURE  3
Introduction to basic tools, processes and safety employed in the creation of sculptural ideas. Past and current concepts are studied through library, slide, video, exhibitions and field trips. Students learn how to best display and present their work through regular class critiques and exhibitions in the sculpture building viewing space. Individual expression is encouraged

ART 274  COMMON THREADS: MULTICULTURAL SURVEY OF FIBER PROCESSES  3
In nonwestern cultures, basic life sustaining necessities, e.g., food preparation, clothing, spiritual and/or actual shelter, often involve textile processes which give actual, symbolical and transformational meaning over time. Studio assignments using weaving, surface design and off-loom techniques will probe both process and content

ART 280  BEGINNING PHOTOGRAPHY  3
Introduction to the tools, techniques, processes and aesthetics of black and white photography

ART 290  BEGINNING CERAMICS  3
Introduction to the tools, processes and aesthetics of ceramics

ART 302  GRAPHIC DESIGN I  3
Exploration of visual systems, conceptual principles and procedures underlying the practice of graphic design. In particular the process of solving problems through visual design; the visualization of problems and solutions; and the correlation of forms with their content, function and context.
PREREQ: ART210 and ART211
COREQ: ART304

ART 303  GRAPHIC DESIGN II  3
Development of sound visual concepts and economy of thought in basic graphic forms. Emphasis on the medium and message of design through the integration of typography and images
PREREQ: ART302
COREQ: ART305

ART 304  ADVERTISING DESIGN I  3
Introduction to the design of advertising, emphasizing the responsibilities of the art director. Projects stress development of creative strategies, evaluation of marketing strategies, conceptual thinking and creative composition for solutions to consumer and trade magazine, newspaper and outdoor advertising.
PREREQ: ART201 and ART211
COREQ: ART302

ART 305  ADVERTISING DESIGN II  3
Application of the principles of concept and design to more complex advertising problems. Development of basic presentation and communication skills as well as the analysis and implementation of creative strategies.
PREREQ: ART304
COREQ: ART303

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, films, 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 or 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*  
Examination of current issues of content and form; developments in technology and social, political and cultural issues affecting contemporary visual art and art criticism.  
RESTRICTIONS: Completion of 60 credit hours.  

ART 318  *Applied Design Visits*  
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*  
Students undertake assigned independent research projects relating to applied design topics and projects (i.e., advertising, graphic and design, typography, applied photography, etc.) resulting in visual and written presentations.  
PREREQ: Requires permission of instructor  
COREQ: ART318.

ART 330  *Advanced Figure Drawing*  
Continued study in figure drawing. Emphasis on advanced media technologies, description and personal expression.  
PREREQ: ART230  
RESTRICTIONS: May be repeated up to nine credit hours

ART 331  *Intermediate Painting I*  
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*  
Continuation of the investigations established in ART331 with emphasis on the individual student's development of ideas and techniques through studio practice, fieldtrips and the research of contemporary art.  
PREREQ: ART331

ART 333  *Figure Studio*  
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*  
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*  
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*  
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*  
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*  
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*  
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*  
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 concentration in sculpture, time will be given to portfolio preparation. Research into sculpture is intensified.  
PREREQ: ART350

ART 366  *Independent Study*  
1-6

ART 380  *Intermediate Photography: Black and White*  
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*  
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*  
Non-silver photographic processes such as cyanotype, gum-bichromate, photo transfer, and vandyke brown. Using existing negatives, students will create, alter and manipulate images  
PREREQ: ART280  
RESTRICTIONS: Ability to work independently

ART 383  *Photographic Facilities Management*  
First-hand experience of operating and maintaining a photographic facility, including equipment operation for both black/white and color photography labs, course and out-of-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*  
Continuation of Beginning Ceramics.  
PREREQ: ART290

ART 391  *Intermediate Ceramics II*  
Continuation of Intermediate Ceramics I with emphasis on the technical properties of clay and glazes  
PREREQ: ART290

ART 402  *Advanced Applied Design I*  
Mastering the advanced principles of effective conceptual design through solutions involving advertising design or graphic design problems. Students must have technical knowledge and experience in the field of design.  
PREREQ: ART260 and ART261  
RESTRICTIONS: May be repeated up to six credit hours

ART 403  *Portfolio Preparation I*  
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*  
Continuation of mastering the advanced principles of effective conceptual design through solutions involving advertising design or graphic design problems.  
PREREQ: ART402 and ART403  
COREQ: ART405  
RESTRICTIONS: May be repeated up to six credit hours

ART 405  *Portfolio Preparation II*  
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*  
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 ART313
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 ART313
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, monotyping, 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 quantity 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: ART381
RESTRICTIONS: May be repeated up to nine credit hours

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

ART 486 Photographic Electronic Imagery 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 640 SCULPTURE STUDIO
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
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. RESTRICTIONS: May be repeated up to eighteen credit hours.

### ART 678 SEMINAR: STUDIO INSTRUCTION PRACTICUM
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 CONemporary ART
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
See MSST681 for course description

### ART 682 STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST
See MSST680 for course description

### ART 683 PHOTOGRAPHY
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
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
See MSST685 for course description

### ART 686 ELECTRONIC IMAGING
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
See MSST688 for course description.
ARTC 480 STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING 3
See MSST480 for course description.

ARTC 485 STUDIO MATERIALS AND TECHNIQUES OF PRINTMAKING I 3
See MSST485 for course description.

ARTC 488 STUDIO MATERIALS AND TECHNIQUES OF PRINTMAKING II 3
See MSST488 for course description.

ARTC 490 STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING 3
See MSST490 for course description.

ARTC 491 CERAMICS 3-6
Problems in throwing, glazing and firing techniques
RESTRICTIONS: May be repeated up to eighteen credit hours.

ARTC 492 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 301 CARE AND PRESERVATION OF CULTURAL PROPERTY I 3
Examines philosophy, ethics, practice of art conservation and the issues pertaining to collections management of 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 464 CONSERVATION INTERNSHIP 3

ARTC 466 INDEPENDENT STUDY 1-6

ARTC 480 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-assembly; solvent photo transfer; synthetic fiber canvas, paper, panels, oil pastels, point 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 ART 425 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 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, dyes, 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 analysis and interpretation of cross-sections of paint and varnish stratigraphies.

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
Oral reports on current work in the fields of art conservation, art history, philosophy and museum science.
PREREQ: ARTC650.
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
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. Requirements for this course may be fulfilled by work in cooperating institutions outside the Winterthur Museum.
PREREQ: ARTC654 and ARTC655.
RESTRICTIONS: Full-time fellowship students only.

ARTC 659 TOPICS IN ADVANCED APPRENTICESHIP AND RESEARCH IN ART CONSERVATION II 6
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. Requirements for this course may be fulfilled by work in institutions outside the Winterthur Museum.
PREREQ: ARTC655 and ARTC658.
RESTRICTIONS: Full-time fellowship students only.

ARTC 666 INDEPENDENT STUDY 1-12
### ARTC 670  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 mechanisms 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 I 3
See MSST690 for course description.

### ARTC 870  Internship in Conservation 1-9
A third year of study at an accredited institution working with a master conservator in the student's field of interest.

**PREREQ:** ARTC689.

**RESTRICTIONS:** Full-time fellowship students only. May be repeated for up to eighteen credits when topics vary.

### ARTC 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.

### ARTC 969  Doctoral Dissertation 1-12 PF

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### 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 mythical 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 drawn 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.

### ARTH 156  Rome: From Caesar to Fellini 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 in the art of building. Architecture as cultural expression.

### ARTH 166  Special Problem 1-3
May be cross-listed with BAMS203.

### ARTH 204  Art, Power and Architecture in Africa 3
Explores several African communities including Bamileke, Yoruba, Shona, Edo, Fon, Kuba and Hasua-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  
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 Durer and Pieter Bruegel.

ARTH 217 EARLY RENAISSANCE ART  
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  
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 BAROQUE ART  
Seventeenth-century European painting, sculpture, and architecture in its social-historical context. Emphasis on such major artists as Caravaggio, Bernini, Rubens, Rembrandt, Velasquez, Poussin and Watteau. 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  
Architecture and urban design in Europe from 1680 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  
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  
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 David, Delacroix, Turner, Courbet and Monet.

ARTH 228 MODERN ART II  
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  
Architecture, printing, 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  
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 role of the United States in a position of global power and emergence as an international artistic center.

ARTH 232 ART OF LATIN AMERICA  
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  
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  
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  
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  
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  
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  
Analyze the depiction of women in art from prehistory to the present in light of feminist movements. Topics correspond with particular periods in history. Each class includes a brief discussion of women artists and their works.

ARTH 243 AMERICAN DECORATIVE ARTS, 1700–1900  
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.

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

ARTH 250 RULERS' IMAGES FROM AUGUSTUS TO GEORGE WASHINGTON  
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.

ARTH 301 RESEARCH AND METHODOLOGY IN ART HISTORY  
Current trends in research methodology and critical theory. Methods and major approaches to advanced research and work in art historical professions, such as education, historic preservation, museums and galleries. Experience with original works of art.

ARTH 302 PRINTS AND SOCIETY  
A social history of prints and printmaking techniques, focusing on such major printmakers as Durer, Rembrandt, Frans Hals, 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.

ARTH 303 ART OF THE SPANISH RENAISSANCE  
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 Spain: Spanish-American (European and Native American).

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

ARTH 305 ITALIAN BAROQUE ART: METAPHOR AND MARVEL  
Painting, sculpture and architecture from the time of Caravaggio and the Carracci to Bernini and Borromini. Examines topics such as 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.

ARTH 307 SEURAT TO MATISSE: ART IN FRANCE  
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 Monet, Manet, Pissarro, Degas, Cezanne, Mortisot, Cassatt, Seurat, Van Gogh, Gauguin, Vuillard, Redon, Moreau, Puvis de Chavannes, Rodin, Claudel, Matisse and Picasso.

PREREQ: ART227 or ART228 or permission of instructor

ARTH 308 MODERN ARCHITECTURE II: 1750–1900  
Aesthetic and technological developments in architecture, interior design and the planned environment, beginning with the mid-18th century break from Renaissance tradition to Art Nouveau and the end of 19th-century rise of the skyscraper. Architects such as Ledoux, Soane, Richardson, Sullivan, Horta and Gaudi.
ARTH 426 INVENTION OF TRADITION IN NINETEENTH CENTURY EUROPEAN ARCHITECTURE 3
All across 19th century Europe, architecture, architectural restoration, and town planning were deeply involved in national traditions, as architects attempted to create authentic national styles. Contemporary theoretical texts, 19th century primary sources, and recent works of scholarship are used to explore this process.

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.
FREREQ: ARTH227 or ARTH228 or ARTH230 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 433 SEMINAR IN AMERICAN ART 3
American art from the Colonies to the present. Recent topics include Eakins and American Realism, Early American Modernism, and American Painting and Sculpture after World War II.
May be cross-listed with AMCS433.
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 VERBANDERK 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
May be repeated for credit when topics vary

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 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 599 TOPICS IN ART HISTORY 3
Detailed investigation in a lecture rather than a seminar format of varying topics, e.g., Sr. 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 605 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 Poetry 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 618 EIGHTEENTH CENTURY PARIS: ARCHITECTURE, TOWN PLANNING AND THEORY 3
Examines how architectural practice, patronage, and thought were transformed by the radically new ways of understanding the public and public opinion that developed in eighteenth-century Paris. Analysis of public debates, their relation to contemporary politics, and their impact on practice.

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 3
Topics vary from pre-Dogon 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 3
Art from David to Impressionism. Recent topics include Gericault; Delacroix; Cezanne; Art and Politics (1789–1880): The Theory and Practice of Romanticism; and Center and Periphery: the French Avant-Garde.
RESTRICTIONS: May be repeated for credit when topics vary

ARTH 622 RESEARCH TOPICS IN HISTORIC PRESERVATION 3
See UAPP656 for course description.

ARTH 623 STUDIES IN TWENTIETH CENTURY ART 3
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.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 624 FOLK AND OUTSIDER ART 3
Focuses on the traditional and popular arts of North America. Topics covered include colonial Pennsylvania-German decorative arts, Victorian-Welsh gravestones, African-American textile and basketry crafts and contemporary Inuit 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 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; the social, cultural and artistic contexts; and the critical literature.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 627 STUDIES IN THE HISTORY OF PHOTOGRAPHY 3
RESTRICTIONS: May be repeated for credit when topics vary.
<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTH 628</td>
<td><strong>Seminar in Historic Preservation</strong></td>
<td>3</td>
<td>See UAPP629 for course description.</td>
</tr>
<tr>
<td>ARTH 629</td>
<td><strong>Studies in Modern Architecture</strong></td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>ARTH 630</td>
<td><strong>History of Theories in Material Culture</strong></td>
<td>3</td>
<td>See EAMC605 for course description.</td>
</tr>
<tr>
<td>ARTH 632</td>
<td><strong>Making the American City</strong></td>
<td>3</td>
<td>See UAPP632 for course description.</td>
</tr>
<tr>
<td>ARTH 633</td>
<td><strong>Studies in Nineteenth Century American Architecture</strong></td>
<td>3</td>
<td>The Greek, Gothic, Egyptian and Oriental Revivals; High Victorian Style and its culmination in the Age of Elegance; and Late Nineteenth Century American Architecture. Restrictions: May be repeated for credit when topics vary.</td>
</tr>
<tr>
<td>ARTH 635</td>
<td><strong>American Art to 1865</strong></td>
<td>3</td>
<td>Recent topics include Visual Culture in Antebellum America, Common Ground: Dialectics of High and Low in 19th Century American Visual Arts Restrictions: May be repeated for credit when topics vary.</td>
</tr>
<tr>
<td>ARTH 636</td>
<td><strong>Studies in American Art 1875-Present</strong></td>
<td>3</td>
<td>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. Restrictions: May be repeated for credit when topics vary.</td>
</tr>
<tr>
<td>ARTH 637</td>
<td><strong>Studies in English Art and Architecture</strong></td>
<td>3</td>
<td>The arts 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. Restrictions: May be repeated for credit when topics vary.</td>
</tr>
<tr>
<td>ARTH 640</td>
<td><strong>Seminar in Latin American Art</strong></td>
<td>3</td>
<td>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. Prereq: ARTH214 or ARTH215. Restrictions: May be repeated for credit when topics vary.</td>
</tr>
<tr>
<td>ARTH 654</td>
<td><strong>vernacular Architecture</strong></td>
<td>3</td>
<td>See HIS1654 for course description.</td>
</tr>
<tr>
<td>ARTH 657</td>
<td><strong>Survey of African Art</strong></td>
<td>3</td>
<td>See ANTH657 for course description.</td>
</tr>
<tr>
<td>ARTH 680</td>
<td><strong>Studio in the Materials and Techniques of Drawing in the West</strong></td>
<td>3</td>
<td>See MSST680 for course description.</td>
</tr>
<tr>
<td>ARTH 681</td>
<td><strong>Materials and Techniques of the Contemporary Painter and Draftsman</strong></td>
<td>3</td>
<td>See MSST681 for course description.</td>
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<tr>
<td>ARTH 685</td>
<td><strong>Cultural Theory and Criticism</strong></td>
<td>3</td>
<td>See ENGL685 for course description.</td>
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<tr>
<td>ARTH 688</td>
<td><strong>Studio Materials and Techniques of Painting I</strong></td>
<td>3</td>
<td>See MSST688 for course description.</td>
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<tr>
<td>ARTH 689</td>
<td><strong>Studio Materials and Techniques of Painting II</strong></td>
<td>3</td>
<td>See MSST689 for course description.</td>
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<tr>
<td>ARTH 690</td>
<td><strong>Studio in the Materials and Techniques of PaIntmaking I</strong></td>
<td>3</td>
<td>See MSST690 for course description.</td>
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<tr>
<td>ARTH 801</td>
<td><strong>Introduction to Decorative Arts in America to 1860</strong></td>
<td>3</td>
<td>See EAMC801 for course description.</td>
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<tr>
<td>ARTH 850</td>
<td><strong>Resources in Art History</strong></td>
<td>0PF</td>
<td>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. Restrictions: Offered every Fall semester.</td>
</tr>
<tr>
<td>ARTH 851</td>
<td><strong>Seminar in Art Historical Pedagogy</strong></td>
<td>3PF</td>
<td>Discussion of all aspects of teaching in the field of art history (lectures, discussions, materials, examinations, grading), especially in the context of the teaching of a large introductory survey course Restrictions: Open only to teaching assistants in ARTH153 or ARTH154 May be taken for credit only once.</td>
</tr>
<tr>
<td>ARTH 860</td>
<td><strong>Reading and Research</strong></td>
<td>1-9PF</td>
<td>Readings and conferences on an approved subject under faculty direction. Restrictions: Requires permission of Department Chair. Open to Art History Ph.D. students only.</td>
</tr>
<tr>
<td>ARTH 869</td>
<td><strong>Master's Thesis</strong></td>
<td>1-6</td>
<td></td>
</tr>
<tr>
<td>ARTH 964</td>
<td><strong>Pre-Candidacy Study</strong></td>
<td>3-12PF</td>
<td>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.</td>
</tr>
<tr>
<td>ARTH 969</td>
<td><strong>Doctoral Dissertation</strong></td>
<td>1-12PF</td>
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</tbody>
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**Agricultural and Technology Education**

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ATED 166</td>
<td><strong>Special Problem</strong></td>
<td>1-3</td>
<td></td>
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<tr>
<td>ATED 266</td>
<td><strong>Special Problem</strong></td>
<td>1-3</td>
<td></td>
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<tr>
<td>ATED 366</td>
<td><strong>Independent Study</strong></td>
<td>1-6</td>
<td></td>
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<tr>
<td>ATED 425</td>
<td><strong>Agricultural Leadership: Tools and Techniques</strong></td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>ATED 466</td>
<td><strong>Independent Study</strong></td>
<td>1-6</td>
<td></td>
</tr>
<tr>
<td>ATED 480</td>
<td><strong>Career and Technical Education Materials and Approaches I</strong></td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>ATED 481</td>
<td><strong>Career and Technical Education Materials and Approaches II</strong></td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>ATED 600</td>
<td><strong>Internship in Teaching</strong></td>
<td>3-6</td>
<td>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.</td>
</tr>
<tr>
<td>ATED 625</td>
<td><strong>Agricultural Leadership: Tools and Techniques</strong></td>
<td>3</td>
<td>Topics include leadership theories, team work, facilitation, Internet research, problem solving and facilitating team activities focused on the agricultural industries and professions.</td>
</tr>
<tr>
<td>ATED 648</td>
<td><strong>Master's Portfolio</strong></td>
<td>1PF</td>
<td>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.</td>
</tr>
<tr>
<td>ATED 666</td>
<td><strong>Special Problem</strong></td>
<td>1-12</td>
<td></td>
</tr>
</tbody>
</table>
-called-Black-American-Studies
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 freshmen 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

BISC 105  HUMAN HEREDITY AND DEVELOPMENT  3
Heredity and human affairs; pedigree analysis; physical and chemical basis of heredity; health and environment; radiation and mutation; heredity and diseases; and birth defects.
RESTRICTIONS: Open to non-majors only

BISC 106  ELEMENTARY HUMAN PHYSIOLOGY  3
The structure and function of humans; mechanisms of maintenance and reproductive behavior.
RESTRICTIONS: Open to non-majors only

BISC 107  ELEMENTARY EVOLUTIONARY ECOLOGY  3
Describes the fundamental processes in ecology and evolution: natural selection, adaptation, population biology, competition, predation, symbiosis and ecosystem dynamics.
RESTRICTIONS: Open to non-majors only

BISC 110  VIRUSES, GENES AND CANCER  3
Biological study of normal and malignant cells, and current knowledge of the genetic basis of heredity, sex and environment; radiation and mutation; heredity and diseases; and birth defects.
RESTRICTIONS: Open to non-majors only

BISC 113  GENERAL BIOLOGY LABORATORY  1
Structure and function of cells, and selected experiments dealing with the physiology of plants and animals.
COREQ: BISC103.
RESTRICTIONS: Offered only on Associate in Arts Program campuses

BISC 115  HUMAN HEREDITY AND DEVELOPMENT LABORATORY  1
Laboratory exercises dealing with probability, selection, karyotyping and pedigrees of humans.
RESTRICTIONS: Offered only on Associate in Arts Program campuses

BISC 116  ELEMENTARY HUMAN PHYSIOLOGY LABORATORY  1
Selected experiments in physiology that demonstrate some of the concepts developed in BISC106, and a study of human anatomy.
COREQ: BISC106.
RESTRICTIONS: Offered only on Associate in Arts Program campuses

BISC 117  ELEMENTARY EVOLUTIONARY ECOLOGY LABORATORY  1
Laboratory exercises to complement the subject matter of BISC107.
COREQ: BISC107.
RESTRICTIONS: Open to non-majors only. Offered only on Associate in Arts Program campuses

BISC 127  ENVIRONMENTS AND CULTURES IN CONFLICT  4
Examines how individual cultures and advances in technology have impacted our environment. Potential solutions for resolving conflicts are developed by the students and presented in class. Relationships between human cultures, technology, and environmental degradation are stressed.
RESTRICTIONS: Open to non-majors only
BISC 315 EXPERIMENTAL CELL BIOLOGY 2
A series of inquiry-based, multi-session laboratory experiences in cell biology. Major techniques include quantitative and fluorescent microscopy, cell culture and gene expression assays. Students will learn to keep laboratory notebooks, troubleshoot technical problems and design critical control experiments. A simulated grant proposal will be critiqued. PREREQ: BISC208, BISC305, and CHEM104.

BISC 316 EXPERIMENTAL PHYSIOLOGY 2
A series of inquiry-based, multi-session laboratory experiences in physiology. Experiments will be performed on various organ systems, using computers, data acquisition systems and appropriate animal models. Students will learn to keep careful laboratory records, troubleshoot technical problems and design critical control experiments. PREREQ: BISC208, CHEM104, and BISC306.

BISC 317 TROPICAL ECOLOGY 3
Basic aspects of tropical ecology including climatic, geological and adaptive components. Focuses on species’ interactions and ecosystems. Includes at least two field trips. PREREQ: BISC208. RESTRICTIONS: Taught in Costa Rica.

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, Anura, Teratolinae, 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 prokaryotes. 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 eucaryotic cell, chromosomes, viruses, the immune system and recombiant 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 ENVC444 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 444 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 immunopathology. PREREQ: BISC208, BISC401/411 or BISC305, BISC306.

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 prerequisites. 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
In this multisession course, topics may vary from section to section. Information about each section is available in the Biology Office prior to registration. May be cross-listed with CSSC498. 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.
REQUIREMENTS: 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.
REQUIREMENTS: Enrollment limited to in-service high school science educators

BISC 601  IMMUNOLOGY  4
Methods as basic as immunization and as complex as developing monoclonal
antibodies. Methods used to investigate the genetics and protein structure of B-
galactosidase.
PREREQUISITE: BISC 401 or biochemistry
REQUIREMENTS: Requires permission of instructor

BISC 602  MOLECULAR BIOLOGY OF ANIMAL CELLS  3
Examination of eucaryotic genes, synthesis and processing of messenger RNA
and control of protein synthesis with emphasis on regulation of normal cellular
growth and differentiation in the process of cancer cell transformation.
Emphasis on recombinant DNA technology, monoclonal antibody production and
epitope culture
PREREQUISITES: BISC 401 and BISC 403

BISC 604  NUCLEIC ACIDS LABORATORY  4
Introduces techniques of gene cloning, amplification, manipulation and
expression
PREREQUISITE: BISC 401
REQUIREMENTS: 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
PREREQUISITE: BISC 306 or instructor's approval
REQUIREMENTS: 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
REQUIREMENTS: 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 ANSC 615
PREREQUISITES: BISC 401 and BISC 403
REQUIREMENTS: 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.
REQUIREMENTS: 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.
PREREQUISITE: Requires permission of instructor
REQUIREMENTS: Limited by number of computer workstations in laboratory

BISC 619  GENE EXPRESSION LABORATORY  4
Laboratory course in techniques of molecular biology. Students generate recombinant
vectors 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 methylation and/or
unwinding and gel retardation
PREREQUISITE: BISC 401
REQUIREMENTS: Limited to ten students. Preference given to Bachelor of Science
degree students with a concentration in biotechnology

BISC 626  NEUROSCIENCE I  4
See PSYC 626 for course description.
PREREQUISITE: BISC 306, PSYC 314, and PSYC 310 or PSYC 312

BISC 627  NEUROSCIENCE II  3
Further study of the structure and function of the nervous system with emphasis on
molecular, cellular, and network neurophysiology.
May be cross-listed with PSYC 627.
PREREQUISITES: BISC 306, PSYC 310 or PSYC 312, and PSYC 314

BISC 630  ICHTHYOLOGY  4
Biological study of fish, including structure and function, reproduction, development,
behavior, geographic distribution and systematics.
PREREQUISITE: Physiology course

BISC 631  PRACTICE OF SCIENCE  3
Uses historical, philosophical, and sociological perspectives to better understand
the nature of modern science and its practice. Examines "science misconduct" and
satisfies the NIH mandate requiring graduate training in "the responsible
cultural conduct of research." May be cross-listed with CHEM 631.

BISC 637  POPULATION ECOLOGY  3
Theoretical and experimental aspects of single species growth and multispecies
interactions.
PREREQUISITE: BISC 302

BISC 639  DEVELOPMENTAL NEUROBIOLOGY  4
Developmental biology of the nervous system, including cellular components,
normal induction, development, and neural determination, axon outgrowth and
pathfinding, synapse formation, programmed cell death, neurotrophic factors,
neurodevelopmental disorders, and early critical periods.
REQUIREMENTS: Requires permission of instructor

BISC 641  MICRORIAL ECOLOGY  3
Principles of microbial interactions in natural environments, including applications
to industrial microbiology and certain types of pollution.
PREREQUISITE: BISC 300

BISC 645  BACTERIAL EVOLUTION  3
Explores the development of the enormous bacterial diversity beginning with
current theories on the origin of life. Examines the evolution of viruses and the
"directed evolution" controversy which concerns mechanisms of bacterial
evolution.
PREREQUISITE: BISC 300 or equivalent

BISC 666  PLANT CELL BIOLOGY  3
Examines the cell as an integrated system of localized protein-protein interactions
and their effects on cellular behavior. Examples include interactions between
signaling, protein, and signaling pathways in a microenvironment.
PREREQUISITE: PSYC 310

BISC 667  ADVANCED MOLECULAR BIOLOGY & GENETICS  3
Presents concepts and approaches regarding our current understanding of
molecular biology and molecular genetics in eukaryotic organisms. The course is
taught and requires a solid background in biochemistry, cell biology and
introduction molecular biology.
REQUIREMENTS: Requires permission of instructor
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 673  TOPICS IN IMMUNOGENETICS  
In-depth analysis of important advances in the field of immunology. Groups discuss and present reviews of the primary literature. Topics may include HIV infection, cell function and cytokine regulation of the immune response.
PREREQ: Course in immunology
RESTRICTIONS: With instructor’s permission, may be repeated once for credit

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 microbiology

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 human variation such as cytogentic and cell genetics, biochemical genetics, developmental genetics and teratology, principles of genetic counselling, multi-factorial inheritance and the genetics of cancer.
PREREQ: BISC403

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.
PREREQ: Requires permission of instructor.
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 doctoral dissertation research prior to completion of the Ph.D. Candidacy Examination

BISC 964  PRE-CANDIDACY STUDY  
Independent doctoral dissertation research after completion of the Candidacy Examination

BISC 969  DOCTORAL DISSERTATION  
Independent dissertation research after completion of the Candidacy Examination

BUSINESS: MULTIDISCIPLINARY BUSINESS ADMINISTRATION

BMBA 865  CORE UPDATES SEMINAR  
Topics include accounting, finance, IT, management, marketing and operations management.
PREREQ: BSBA degree required

BIOMECHANICS AND MOVEMENT SCIENCE

BMSC 601  MATHEMATICS FOR BIOMECHANICS  
Mathematical techniques for research in biomechanics and related fields, with emphasis on methods useful for biomedical data acquisition, analysis and modeling. Topics include Fourier analysis, differential equations, and matrix algebra, concentrating on applications.
PREREQ: College calculus (MATH241 and 242 or equivalent)

BMSC 865  SEMINAR  
0 PF

BMSC 866  SPECIAL PROBLEM  
1-12

BMSC 868  RESEARCH  
1-6

BMSC 869  MASTER'S THESIS  
1-6

BMSC 964  PRE-CANDIDACY STUDY  
3-12 PF

BMSC 969  DOCTORAL DISSERTATION  
1-12 PF

BIORESOURCES ENGINEERING

BREG 603  SOIL PHYSICS  
See PLSC603 for course description.
PREREQ: PLSC204

BREG 628  NATURAL WASTEWATER TREATMENT SYSTEMS  
Land treatment systems for wastewater, biosolids and sewage land application, constructed wetlands and aquatic treatment systems, lagoons and decentralized wastewater management.
PREREQ: EGE328 or OIE233

BREG 666  SPECIAL PROBLEM  
1-12

BUSINESS ADMINISTRATION

BUAD 030  COOPERATIVE EDUCATION PROGRAM  
1 RP
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 covered will 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 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: ECON1100 or ECON1152

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.
American University in Washington, D.C.

BUSINESS ADMINISTRATION

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 of 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 students to principles for effective negotiation and providing them with opportunities to develop their skills through the use of simulation exercises. Topics covered 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 globalization of business, or a combination of these.
PREREQ: Senior standing, and at least one of ACCT383, 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

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 BUAD301.

BUAD 466 INDEPENDENT STUDY 1–6

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
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
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUAD 473</td>
<td>BUYER BEHAVIOR</td>
</tr>
<tr>
<td>BUAD 474</td>
<td>MARKETING CHANNELS AND RETAILING</td>
</tr>
<tr>
<td>BUAD 475</td>
<td>INTERNATIONAL MARKETING</td>
</tr>
<tr>
<td>BUAD 477</td>
<td>INFORMATION TECHNOLOGY APPLICATIONS IN MARKETING</td>
</tr>
<tr>
<td>BUAD 478</td>
<td>FIELD PROJECTS IN MARKETING</td>
</tr>
<tr>
<td>BUAD 479</td>
<td>MARKETING STRATEGY FOR THE FIRM</td>
</tr>
<tr>
<td>BUAD 800</td>
<td>STRATEGIC THINKING FOR THE EXECUTIVE LEADER</td>
</tr>
<tr>
<td>BUAD 807</td>
<td>TEAM DEVELOPMENT SKILLS</td>
</tr>
<tr>
<td>BUAD 808</td>
<td>LEADERSHIP SKILLS FOR CHANGE</td>
</tr>
<tr>
<td>BUAD 809</td>
<td>NEGOTIATION SKILLS</td>
</tr>
<tr>
<td>BUAD 811</td>
<td>GLOBALIZATION AND BUSINESS</td>
</tr>
<tr>
<td>BUAD 820</td>
<td>DATA ANALYSIS AND QUALITY MANAGEMENT</td>
</tr>
<tr>
<td>BUAD 831</td>
<td>OPERATIONS MANAGEMENT AND MANAGEMENT SCIENCE</td>
</tr>
<tr>
<td>BUAD 832</td>
<td>OPERATIONS PLANNING AND CONTROL</td>
</tr>
<tr>
<td>BUAD 833</td>
<td>INTERNATIONAL OPERATIONS</td>
</tr>
<tr>
<td>BUAD 834</td>
<td>SPECIAL TOPICS IN OPERATION MANAGEMENT</td>
</tr>
<tr>
<td>BUAD 835</td>
<td>MANAGING NEW PRODUCT DEVELOPMENT PROJECTS</td>
</tr>
<tr>
<td>BUAD 836</td>
<td>PROBLEM STRUCTURING AND ANALYSIS FOR DECISION MAKING</td>
</tr>
<tr>
<td>BUAD 837</td>
<td>DECISION SUPPORT AND EXPERT SYSTEMS FOR BUSINESS</td>
</tr>
<tr>
<td>BUAD 841</td>
<td>MANAGING THE GLOBAL ENTERPRISE</td>
</tr>
<tr>
<td>BUAD 842</td>
<td>SPECIAL TOPICS IN MANAGEMENT OF TECHNOLOGY</td>
</tr>
<tr>
<td>BUAD 843</td>
<td>SPECIAL TOPICS IN GLOBAL BUSINESS</td>
</tr>
<tr>
<td>BUAD 849</td>
<td>SEMINAR IN BUSINESS ADMINISTRATION</td>
</tr>
<tr>
<td>BUAD 851</td>
<td>CREATIVITY AND INNOVATION FOR NEW VENTURES</td>
</tr>
<tr>
<td>BUAD 852</td>
<td>MARKET RESEARCH FOR NEW VENTURES</td>
</tr>
</tbody>
</table>

**Courses Overview:**

- **BUAD 473**: Buyer Behavior
- **BUAD 474**: Marketing Channels and Retailing
- **BUAD 475**: International Marketing
- **BUAD 477**: Information Technology Applications in Marketing
- **BUAD 478**: Field Projects in Marketing
- **BUAD 479**: Marketing Strategy for the Firm
- **BUAD 800**: Strategic Thinking for the Executive Leader
- **BUAD 807**: Team Development Skills
- **BUAD 808**: Leadership Skills for Change
- **BUAD 809**: Negotiation Skills
- **BUAD 811**: Globalization and Business
- **BUAD 820**: Data Analysis and Quality Management
- **BUAD 831**: Operations Management and Management Science
- **BUAD 832**: Operations Planning and Control
- **BUAD 833**: International Operations
- **BUAD 834**: Special Topics in Operation Management
- **BUAD 835**: Managing New Product Development Projects
- **BUAD 836**: Problem Structuring and Analysis for Decision Making
- **BUAD 837**: Decision Support and Expert Systems for Business
- **BUAD 841**: Managing the Global Enterprise
- **BUAD 842**: Special Topics in Management of Technology
- **BUAD 843**: Special Topics in Global Business
- **BUAD 849**: Seminar in Business Administration
- **BUAD 851**: Creativity and Innovation for New Ventures
- **BUAD 852**: Market Research for New Ventures

**PREREQ**: Specific prerequisites are required for each course, such as BUAD 302 for BUAD 800 and BUAD 870 for other courses.
BUAD 853  PROJECT PLANNING AND MANAGEMENT  1
Focusses 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 a 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 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 re-engineering. Individual inquiry is stressed.
PREREQ: BUAD870

BUAD 875  STRATEGIC HUMAN RESOURCES  3
Examines the personnel/human resource 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 nonprofit enterprises. Introduction to the marketing management process.
PREREQ: BUAD880 and BUAD880.

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 and 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 886  ADVERTISING STRATEGY  3
For those with little or no prior experience in advertising. Intended to improve students’ skills with respect to determining advertising strategy. Features a mixture of lecture, case study analysis, class discussion, and team development and presentation of an entire advertising campaign.
PREREQ: BUAD880

BUAD 887  BUYER BEHAVIOR  3
Applied concepts from the social sciences to study factors that influence the acquisition, consumption and disposition of products, services, and ideas. Covers: 1) buyer decision processes; 2) influences on consumer decisions and consumption patterns; and 3) the relationship between buyer behavior and strategic decision making.
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 889  INDUSTRIAL MARKETING  3
Studies the marketing of goods and services to businesses, institutions, and the government. Covers organizational buying behavior, product/ market planning, sales force and distribution management, pricing and promotion from the perspective of both the buyer and the seller. 
PREREQ: BUAD880

BUAD 890  CORPORATE STRATEGY  3
Emphasizes total organization function and performance in a global environment. Examines general management responsibilities for determining objectives and future strategies and seeking commitment for their implementation, integrates functional course concepts to enhance decision making and communication skills through individual and group analyses of specific companies. 
PREREQ: FINC850, BUAD831, BUAD870, BUAD880.

BUAD 892  MARKETING STRATEGY SIMULATION  3
Uses a computer simulation to help students integrate marketing concepts learned in core and elective classes. 
PREREQ: BUAD880

BUAD 898  PROFESSIONAL PROJECT SEMINAR  3
Students are required to design and implement a professional field project, compile a portfolio or report of their project and make an oral presentation. Provides a forum for consultation, advice and support from faculty and fellow students. May be taken twice for up to 6 credits. 
PREREQ: Must have completed at least 12 credits in the MS in OEDC program or permission of instructor

BUAD 899  BUSINESS CONSULTING PROJECT  1–6
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.

BUSINESS AND ECONOMICS

BUEC 325  MODERN BUSINESS COMPUTING  3
Use of higher level contemporary computing languages to structure solutions to business problems. Prototyping applications of systems
PREREQ: ACCT160.
RESTRICTIONS: MIS minors only. Not open to CS majors in the MIS minor.

BUEC 330  DATABASE DESIGN AND IMPLEMENTATION  3
Covers the design and implementation of enterprise databases in the business environment. A networked setting and its effect on database management will be emphasized.
PREREQ: BUEC325 or CISC181
RESTRICTIONS: MIS majors and minors only. Not open to CS majors in the MIS minor.

BUEC 366  INDEPENDENT STUDY  1–6

BUEC 427  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.

BUEC 430  SYSTEMS ANALYSIS AND IMPLEMENTATION  3
Covers the challenges of developing and managing systems analysis and design projects. Students learn to determine systems requirements, analyze systems problems, model potential solutions and design and implement these solutions. Other current topics will be included to reflect the changing information systems environment.
PREREQ: BUEC325 and BUEC330, or CISC181 and CISC437
RESTRICTIONS: Open to MIS majors and minors only.

BUEC 431  TECHNOLOGICAL PROBLEM SOLVING  3
Design and implementation of behavioral and quantitative models to aid decision makers. A project designing and implementing an actual decision support system is required. Emphasis on an effective design, implementation and use of existing models of decision support.
PREREQ: BUEC430
COREQ: BUEC432
RESTRICTIONS: Open to MIS majors and minors only.

BUEC 432  PROBLEM SOLVING PROJECT MANAGEMENT  3
Capstone course in the Business and Economics MIS minor. Emphasis on applying the concepts of project management to real management information problems.
PREREQ: BUEC430
COREQ: BUEC431
RESTRICTIONS: Open to MIS majors and minors only.

BUEC 466  INDEPENDENT STUDY  1–6

BUEC 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

BUEC 811  TELECOMMUNICATIONS AND NETWORKS II  3
See CPEG811 for course description
COREQ: CPEG810. May be taken as Prerequisite
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management Program

BUEC 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.

BUEC 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.

BUEC 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.

BUEC 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.

BUEC 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.

BUEC 870  STRATEGIC IT MANAGEMENT  2
Explores how Information Technologies are used to enhance the strategic goals of the organization. Examines the relationship between broad strategic goals and organizational mission, and specific tactical IT responses. Considers the strategic importance of ERP, CRM, corporate intelligence, knowledge sharing, etc.
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management program.

BUEC 871  HIGH TECHNOLOGY SEMINAR  1
Series of guest speakers on various IT topics.
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management program.

BUEC 873  INFORMATION TECHNOLOGY AND ORGANIZATIONAL EFFECTIVENESS  3
Examines how information and communication technologies combine with work processes and organizational structures to enhance organizational performance.
Develops skills in recognizing opportunities for technology interventions and in effectively implementing technologically enhanced change.
PREREQ: BUAD870.
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 CHEG 112 or, for environmental engineering majors, in CIEG 233. A minimum grade of C- in MATH 243.
COREQ: CHEM 443.

CHEG 266  Special Problem  1-3
RESTRICTIONS: Cannot count toward graduation in chemical engineering.

CHEG 305  Applied Mathematics for Chemical Engineering  3
See MATH 305 for course description.
PREREQ: A minimum grade of C- in MATH 243 and CHEG 112.

CHEG 320  Engineering Economics and Risk Analysis  2-3
Introduction to chemical process simulation, process safety, and the principles of engineering economics, uncertainty and risk assessment within the context of chemical engineering analysis and design.
PREREQ: A minimum grade of C- in MATH 305 and CHEG 235.

CHEG 325  Chemical Engineering Thermodynamics  3
A continuation of CHEG 231. The thermodynamics of mixtures; phase and chemical equilibrium. Application to staged separation processes, particularly distillation.
PREREQ: A minimum grade of C- in CHEG 231.

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 MATH 305 and CHEG 225.

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 flows; and applications in chemical processing.
PREREQ: A minimum grade of C- in CHEG 231 and MATH 305.

CHEG 342  Heat and Mass Transfer  3-4
Theory of heat transfer and mass transfer 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 CHEG 341, or for environmental engineering majors, in CIEG 305.

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 CHEG 235, CHEG 332 and CHEG 341.
COREQ: CHEG 342.

CHEG 346  Independent Study  1-6

CHEG 401  Chemical Process Dynamics and Control  3-4
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 MATH 305, CHEG 332 and CHEG 442.
COREQ: CHEG 443.

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 course process synthesis studies.
PREREQ: A minimum grade of C- in CHEG 320, CHEG 332, CHEG 401 and CHEG 443.

CHEG 443  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 CHEG 325 and CHEG 332.

CHEG 445  Chemical Engineering Laboratory II  3
Intensive laboratory experiments illustrate the application of chemical and physical principles to industrial processes. Expands upon CHEG 332 and CHEG 443. Technical report writing emphasized.
PREREQ: A minimum grade of C- in CHEG 332, CHEG 342 and CHEG 345.
COREQ: CHEG 443.
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

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 crystallography. Topics include, effects of processing on bulk polymers and structure-property correlations for bulk polymers. First course in the polymer science sequence.

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
Principles of classical and quantum mechanics. Application of the principles of classical and quantum mechanics to the study of elementary particles. PREREQ: MATH302 or an equivalent with permission of instructor.

CHEG 605 MULTIPHASE FLUID MECHANICS 3
Principles of classical and quantum mechanics. Application of the principles of classical and quantum mechanics to the study of elementary particles. PREREQ: MATH302 or an equivalent with permission of instructor.

CHEG 608 PARTICLE DESIGN AND PROCESSING 3
Examine 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 technology to model a variety of particle design processes, such as crystallization, granulation and compaction.

CHEG 610 INDUSTRIAL AND CHEMICAL 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. PREREQ: CHEM33 and CHEG444.

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.

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. Emphasis on recent research on the effects of mixing on chemical reactions.

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 environment 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.

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.

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 analysis and risk assessment practices to understand how environmental policy evolves.

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 650 BIOMEDICAL ENGINEERING I 3
Application of engineering concepts and techniques to problems in biomedicine. PREREQ: CHEG325 and CHEG341. COREQ: CHEG342.

CHEG 656 RESEARCH TUTORIAL 1–3
Student research in biomedical engineering. PREREQ: MSEG601 or equivalent or permission of instructor.

CHEG 827 CHEMICAL ENGINEERING PROBLEMS 2–3
Advanced concepts on chemical reaction kinetics, effects of processing on bulk polymers and structure-property correlations for bulk polymers. First course in the polymer science sequence.

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.

CHEM 605 MULTIPHASE FLUID MECHANICS 3
Principles of classical and quantum mechanics. Application of the principles of classical and quantum mechanics to the study of elementary particles. PREREQ: MATH302 or an equivalent with permission of instructor.

CHEM 608 PARTICLE DESIGN AND PROCESSING 3
Examine 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 technology to model a variety of particle design processes, such as crystallization, granulation and compaction.

CHEM 610 INDUSTRIAL AND CHEMICAL 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. PREREQ: CHEM33 and CHEG444.

CHEM 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.

CHEM 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. Emphasis on recent research on the effects of mixing on chemical reactions.

CHEM 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 environment sensitive behavior. May be cross-listed with MSEG616. PREREQ: CHEG325 and CHEM444.

CHEM 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.

CHEM 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.

CHEM 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.

CHEM 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 analysis and risk assessment practices to understand how environmental policy evolves.

CHEM 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.

CHEM 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: MSEG601 or equivalent.

CHEM 656 RESEARCH TUTORIAL 1–3
Student research in biomedical engineering. PREREQ: MSEG601 or equivalent or permission of instructor.

CHEM 827 CHEMICAL ENGINEERING PROBLEMS 2–3
Advanced concepts on chemical reaction kinetics, effects of processing on bulk polymers and structure-property correlations for bulk polymers. First course in the polymer science sequence.

CHEM 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.
CHEM 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. PREQ: Graduate 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 microscopic 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. PREQ: Graduate courses on fluid mechanics, thermodynamics and diffusion operations.

CHEG 833 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. PREQ: Requires graduate study in 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 843 ADVANCED TRANSPORT PHENOMENA 4
Principles and applications of momentum, mass and energy transfer. Topics include molecular analysis of transport, continuum and macroscopic conservation and constitutive equations, scaling and dimensional analysis, and exact and approximate solutions for problems of practical importance. PREQ: 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. PREQ: CHEM444.

CHEG 866 RESEARCH 1-9
CHEG 869 MASTER'S THESIS 1-6
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 coursework. RESTRICTIONS: Not open to students who have been admitted to candidacy.

CHEG 969 DOCTORAL DISSERTATION 1-12 PF

CHEMISTRY AND BIOCHEMISTRY

CHEM 100 CHEMISTRY AND HUMAN ENVIRONMENT 3
Non-mathematical introduction to chemistry, emphasizing how chemistry can be employed to help understand phenomena in the student's environment, demonstrating relationships between chemistry and energy, food, toxic and solid waste, air and water pollution, drugs and other student-generated topics.

CHEM 101 GENERAL CHEMISTRY 4
Fundamental laws of chemical action and the properties, uses and methods of preparation of the more important elements and their compounds. Includes one three-hour laboratory per week that introduces basic experiments in general chemistry. RESTRICTIONS: One year of high school chemistry recommended; high school algebra or concurrent enrollment in MATH101 or higher mathematics course strongly recommended. Only one course among CHEM101, CHEM103, CHEM105 and CHEM111 can count toward graduation.

CHEM 102 GENERAL CHEMISTRY 4
A continuation of CHEM101. Includes one three-hour lab per week that is a continuation of the laboratory experience begun in CHEM101. PREQ: CHEM101. RESTRICTIONS: Only one course among CHEM102, CHEM104 and CHEM112 can count toward graduation.

CHEM 103 GENERAL CHEMISTRY 4
Matter, the changes that matter undergoes, and the laws governing these changes, with greater emphasis on atomic and molecular structure, chemical bonding, and energy relationships. Properties of gases, liquids, solids and solutions. Includes one three-hour laboratory per week. COREQ: MATH114 or higher. RESTRICTIONS: For majors in the physical and natural sciences, mathematics and engineering. One year of high school chemistry strongly recommended. Only one course among CHEM101, CHEM103, CHEM105 and CHEM111 can count toward graduation.

CHEM 104 GENERAL CHEMISTRY 4
Continuation and application of CHEM103 with additional emphasis on chemical spontaneity, equilibrium, rates of reactions, electrochemistry and organic chemistry. Includes one three-hour laboratory per week. PREQ: CHEM101, CHEM103 or CHEM105. RESTRICTIONS: For majors in the physical and natural sciences, mathematics and engineering. Only one course among CHEM102, CHEM104 and CHEM112 can count toward graduation.

CHEM 105 GENERAL CHEMISTRY 4
Nuclear chemistry, periodicity, structure and bonding, classes of reactions, stoichiometry, solution chemistry, chemical equilibria and electrochemistry. COREQ: MATH110. RESTRICTIONS: For nursing majors who will continue with CHEM106. High school algebra required in lieu of Corequisites; one year of high school chemistry recommended. Only one course from among CHEM101, CHEM103, CHEM105 and CHEM111 can count toward graduation.

CHEM 106 ELEMENTARY BIOCHEMISTRY 5
Survey of organic chemistry and biochemistry. Includes one three-hour laboratory per week that deals with selected concepts in biochemistry and biochemical chemistry. PREQ: CHEM105. RESTRICTIONS: For nursing majors.

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

CHEM 112 GENERAL 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. PREQ: 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 QUANTITATIVE CHEMISTRY I 2
Chemical equilibrium theory applied to basic gravimetric and volumetric analyses. Includes one three-hour laboratory per week. COREQ: 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 QUANTITATIVE CHEMISTRY II 3
The theory of analytical chemistry with introductory practice in UV-visible spectrophotometry, electrochemistry and separation science. Includes two three-hour laboratories per week. PREQ: CHEM104, or CHEM111 and CHEM119. COREQ: CHEM112. RESTRICTIONS: For biochemistry and chemistry majors.

CHEM 166 SPECIAL PROBLEM 1-3 PF

CHEM 211 ELEMENTARY ORGANIC CHEMISTRY 4
Fundamentals of organic chemistry. Includes one three-hour laboratory per week that introduces basic laboratory techniques of organic chemistry. PREQ: CHEM102 or CHEM104 or CHEM105. RESTRICTIONS: Designed for students of agriculture, human resources and medical technology.

CHEM 214 ELEMENTARY BIOCHEMISTRY 3
Principal classes of biomolecules and their structural and metabolic interrelationships. PREQ: CHEM213
CHEM 316 ELEMENARY BIOCHEMISTRY LABORATORY 1
Basic manipulations and techniques for the characterization of biomolecules.
PREREQ: CHEM 213
COREQ: CHEM 214

CHEM 320 QUANTITATIVE ANALYSIS 3
Chemical equilibria in aqueous solutions; volumetric and gravimetric analysis; and introduction to chromatography and spectrometry.
PREREQ: CHEM 102, CHEM 104 or CHEM 105
COREQ: CHEM 221

CHEM 321 QUANTITATIVE ANALYSIS LABORATORY 1
The practice and application of volumetric and gravimetric analysis, as well as basic chromatographic and spectrometric measurements.
PREREQ: CHEM 102, CHEM 104 or CHEM 105
COREQ: CHEM 220

CHEM 311 SURVEY OF ORGANIC CHEMISTRY I 3
First half of a two-semester survey of the structure, synthesis, and reactions of organic compounds.
PREREQ: CHEM 104
RESTRICTIONS: Not for credit for CHEM BS majors. Neither CHEM 311 and CHEM 321 nor CHEM 311 and CHEM 331 can both count toward graduation.

CHEM 312 SURVEY OF ORGANIC CHEMISTRY II 3
Second half of a two-semester survey of the structure, synthesis, and reactions of organic compounds.
PREREQ: CHEM 311
RESTRICTIONS: Not for credit for CHEM BS majors. Neither CHEM 312 and CHEM 322 nor CHEM 312 and CHEM 332 can both be counted toward graduation.

CHEM 321 ORGANIC 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: CHEM 104
RESTRICTIONS: Not for CHEM BS majors. CHEM 321 and CHEM 331 cannot both be counted toward graduation.

CHEM 322 ORGANIC 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: CHEM 321
RESTRICTIONS: Not for B S credit in chemistry. CHEM 322 and CHEM 332 cannot both be counted toward graduation.

CHEM 331 ORGANIC CHEMISTRY 3
Major classes and reactions of organic compounds, emphasizing stereochemistry, reaction mechanisms and synthetic methods.
PREREQ: CHEM 104, CHEM 112 or CHEM 120
COREQ: CHEM 333
RESTRICTIONS: For chemistry, biochemistry, chemical engineering and other majors desiring fuller treatment than in CHEM 321. Neither CHEM 311 and CHEM 321, nor CHEM 321 and CHEM 331 can both count toward graduation.

CHEM 332 ORGANIC CHEMISTRY 3
Major classes and reactions of organic compounds, emphasizing stereochemistry, reaction mechanisms and synthetic methods.
PREREQ: CHEM 331, CHEM 333
COREQ: CHEM 334
RESTRICTIONS: For chemistry, biochemistry, chemical engineering and other majors desiring fuller treatment than in CHEM 332. Neither CHEM 312 and CHEM 322, nor CHEM 332 and CHEM 333 can both be counted toward graduation.

CHEM 333 ORGANIC 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: CHEM 104, or preferably CHEM 112, or CHEM 120.
COREQ: CHEM 331
RESTRICTIONS: Registration for two credits involves both a lecture period and a laboratory period each week.
PREREQ: CHEM 333
COREQ: CHEM 332.

CHEM 334 ORGANIC CHEMISTRY MAJORS LABORATORY II 2
Continuation of CHEM 333. Two lab periods each week.
PREREQ: CHEM 333
COREQ: CHEM 332.

CHEM 342 INTRODUCTION 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: CHEM 331.

CHEM 366 INDEPENDENT STUDY 1-3 PF

CHEM 401 TUTORIAL 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 HISTORY 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.

CHEM 418 INTRODUCTORY PHYSICAL CHEMISTRY I 3
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. CHEM 418 and CHEM 443 cannot both be counted toward graduation.

CHEM 419 INTRODUCTORY PHYSICAL CHEMISTRY II 3
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: CHEM 418
RESTRICTIONS: Not acceptable for B S degree in chemistry. CHEM 419 and CHEM 444 cannot both be counted toward graduation.

CHEM 424 QUANTUM MECHANICS 3
See PHYS424 for course description.

CHEM 437 INSTRUMENTAL METHODS 3
Study of the principles of spectroscopic, chromatographic and electroanalytical instrumentation in chemical analysis.
PREREQ: CHEM 322 or CHEM 332
COREQ: CHEM 418 or CHEM 443.

CHEM 438 INSTRUMENTAL METHODS LABORATORY 1
Application of spectroscopic, chromatographic and electroanalytical techniques to the solution of chemical problems.
PREREQ: CHEM 322 or CHEM 334.
COREQ: CHEM 445

CHEM 443 PHYSICAL CHEMISTRY I 3
Application of the principles and methods of mathematics and physics to the quantitative study of chemistry, focusing on thermodynamics.
PREREQ: CHEM 119, or CHEM 220 and CHEM 221; MATH242 (MATH243 recommended); PHYS208 (recommended) or PHYS202
RESTRICTIONS: CHEM 418 and CHEM 443 cannot both be counted toward graduation.

CHEM 444 PHYSICAL CHEMISTRY II 3
Application of the principles and methods of mathematics and physics to the quantitative study of chemistry, focusing on kinetics and quantum mechanics.
PREREQ: CHEM 119, or CHEM 220 and CHEM 221; MATH242 (MATH243 recommended); PHYS208 (recommended) or PHYS202
RESTRICTIONS: CHEM 419 and CHEM 444 cannot both be counted toward graduation.

CHEM 445 PHYSICAL CHEMISTRY LABORATORY I 1
Physical methods for studying properties of matter.
PREREQ: CHEM 119, or CHEM 220 and CHEM 221
RESTRICTIONS: To be taken concurrently with or subsequent to CHEM 418 or CHEM 443 or CHEM 445.

CHEM 446 PHYSICAL CHEMISTRY LABORATORY II 1
Physical methods for studying properties of matter.
PREREQ: CHEM 120, or CHEM 220 and CHEM 221
RESTRICTIONS: To be taken concurrently with or subsequent to CHEM 419 or CHEM 444.

CHEM 457 INORGANIC CHEMISTRY 3
Basic theoretical concepts of inorganic chemistry with emphasis on structure, bonding and reactions.
PREREQ: CHEM 418 or CHEM 443, and CHEM 112.

397
CHEM 651 Advanced Inorganic Chemistry I
Inorganic chemistry: application of the principles of structure and reactivity, examples from compounds of both the representative elements and the transition metals. PREREQ: CHEM444 and CHEM457.

CHEM 652 Organometallic Chemistry
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. PREREQ: CHEM444 and CHEM457.

CHEM 653 Bioinorganic Chemistry
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. PREREQ: CHEM457.

CHEM 654 Advanced Inorganic Chemistry II
A group theoretical approach to structure and bonding in inorganic compounds. PREREQ: CHEM444 and CHEM457.

CHEM 671 Quantum Chemistry
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. PREREQ: CHEM444.

CHEM 672 Advanced Quantum Chemistry
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. PREREQ: CHEM671.

CHEM 674 Chemical Dynamics
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. PREREQ: CHEM444.

CHEM 677 Chemical Thermodynamics
The elements of classical and statistical thermodynamics and their application to chemical problems. PREREQ: CHEM443.

CHEM 680 Introductory Polymer Science
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. PREREQ: CHEM432 or CHEM332; and CHEM419 or CHEM444.

CHEM 810 Kinetics and Surface Chemistry of Solids
See PISC810 for course description.

CHEM 820 Special Topics in Analytical Chemistry
Advanced topics in analytical methods and techniques from the current literature. PREREQ: CHEM620, CHEM621, CHEM622 or CHEM623. RESTRICTIONS: May be repeated for credit when topics vary.

CHEM 830 Special Topics in Organic Chemistry
Topics from natural product chemistry (alkaloids, terpenes, steroids), organic nitrogen and phosphorus compounds, alicyclic and heterocyclic compounds, stereochemistry, organometallic chemistry, photochemistry and theoretical organic chemistry. PREREQ: CHEM634. RESTRICTIONS: May be repeated for credit when topics vary.

CHEM 840 Modern Topics in Biochemistry
Detailed examination of a number of problems of current research interest in biochemistry. PREREQ: CHEM641. RESTRICTIONS: May be repeated for credit when topics vary.

CHEM 850 Special Topics in Inorganic Chemistry
Advanced topics selected from the chemistry of the less common elements, metal hydrides, organometallic compounds, coordination compounds and metal ions in biology. PREREQ: CHEM651. RESTRICTIONS: May be repeated for credit when topics vary.

CHEM 855 Marine Inorganic Chemistry
See MAST850 for course description.

CHEM 865 Seminar
0 PF

CHEM 868 Research
1-9

CHEM 869 Master's Thesis
1-6

CHEM 874 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
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

CIEG 211 STATICS 3
Analysis of force systems and equilibrium of rigid bodies in two and three dimensions. Determination of centers of gravity and of centroids. Analysis of statically determinate and indeterminate structures, statically and statically indeterminate trusses, simple frames and "machines." Introduction to the analysis of beams.
COREQ: MATH243

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 3
See EGET223 for course description.
PREREQ: EGET104 or CIEG126

CIEG 233 ENVIRONMENTAL ENGINEERING PROCESSES 3
Quantitative 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 CHEM110; MATH242
RESTRICTIONS: Open to majors only.

CIEG 301 STRUCTURAL ANALYSIS 4
Introduction to matrix methods.
PREREQ: CIEG212, MATH302
COREQ: MATH302 or MATH351

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
An intermediate-level development of the kinematics and dynamics of particles, systems of particles and rigid bodies. Vibrations of machines and structures.
PREREQ: PHYS207 and MATH243

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: CIEG202 and CIEG223

CIEG 323 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
Four 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

CIEG 381 CIVIL ENGINEERING ANALYSIS 3
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 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. Introduction 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.
PREREQ: CIEG403

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 MSEC410 for course description.

CIEG 411 STRUCTURAL DYNAMICS DESIGN 3
Design of structures (buildings, bridges, dams, foundation piles and offshore platforms) for dynamic loadings (seismic 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, MATH250, MATH450 or equivalent.

CIEG 417 ADVANCED STRUCTURAL ANALYSES 3
PREREQ: CIEG212 and MATH302.

CIEG 418 CONTINUOUSLY SUPPORTED STRUCTURES 3
PREREQ: CIEG212 and MATH302.

CIEG 421 FOUNDATIONS AND SUBSTRUCTURES 3
Design of earth dams, embankments, retaining structures, caffers, foatings, caissons and piles. Numerical methods, combining soil mechanics and structural analysis.
PREREQ: CIEG230/323.

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 GEODEMOSNATIONAL 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 CIEG231 or equivalent.

CIEG 436 SOLID WASTE MANAGEMENT 3
PREREQ: CIEG233 and CIEG225.

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: CIEG 233.

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 CIEG305.

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; floodplain 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: CIEG 351.

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: CIEG 351.

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: CIEG 212.

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 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: CIEG 305.

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: CIEG 410 and MATH 302, 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: CIEG 381.

CIEG 604 PRESTRESSED CONCRETE DESIGN 3

CIEG 605 INTERMEDIATE TOPICS IN FINITE ELEMENT ANALYSIS 3
Topics include finite element analysis in linear elastostatics, linear steady state scalar “field” problems, analysis techniques for linear transient and dynamic analyses and matrix structural analysis. In each case, element formulations and solution algorithms are assessed, limitations and possible improvements presented and numerical methods examined. PREREQ: CIEG 601.

CIEG 608 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 practice are investigated. Bridges of steel, reinforced concrete, prestressed concrete, wood and composite materials are included. PREREQ: CIEG 302.

CIEG 610 EXPERIMENTAL MECHANICS OF COMPOSITE MATERIALS 3
See MSEG 610 for course description.

CIEG 611 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: CIEG 311 and MATH 302.

CIEG 612 ADVANCED MECHANICS OF MATERIALS 3
Covers unsymmetrical bending, shear center in thin-walled beams, torsion in thinwalled structures, lateral-torsional buckling, curved beams, energy methods, principal stress and strain in three dimensions. Theory and applications.

CIEG 615 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.

CIEG 617 ADVANCED STRUCTURAL ANALYSES 3

CIEG 618 CONTINUOUSLY SUPPORTED STRUCTURES 3

CIEG 619 MECHANICAL BEHAVIOR OF MATERIALS AND STRUCTURES 3
See MEEG 619 for course description. PREREQ: MEEG 610 or similar.

CIEG 620 SOIL MECHANICS II 3
Behavior of cohesionless and cohesive soils; failure theories and lateral earth pressures; stresses within earth mass; steady-state flow through porous media; consolidation and time rate settlement; shear strength of cohesive soils. PREREQ: CIEG 302/323.

CIEG 621 FOUNDRY ENGINEERING 3
Field investigation techniques; interpretation of data; theory and design of shallow and deep foundations, retaining walls, sheet pile walls, caisson braced excavations and geosynthetically reinforced soil. PREREQ: CIEG 421.

CIEG 622 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: CIEG 320/323.

CIEG 623 SOIL MECHANICS LAB 3
Enhances knowledge of soil properties and behavior. Generally, the following tests are performed: Atterberg limits, sieve and hydrometer analysis, compaction, relative density, permeability, flow-net simulation, consolidation, specific gravity, direct shear, tracial (CU, CD, UU) tests simulating various loading paths, and liquefaction. PREREQ: CIEG 320/323.

CIEG 624 SOIL DYNAMICS 3
Wave propagation in elastic media; dynamic soil properties; vibration of foundations; influence of soil type on ground motion characteristics; causes of soil failure during earthquakes; soil-structure interaction; lateral earth pressures. Discussion of numerical methods used in dynamic analyses of porous media. PREREQ: CIEG 320/323.
CISC 260  MACHINE ORGANIZATION AND ASSEMBLY LANGUAGE  3
Introduction to the basics of machine organization. Programming tools and techniques of the machine and assembly levels. Assembly language programming and computer arithmetic techniques
PREREQ: A minimum grade of C- in CISC 181
RESTRICTIONS: CISC 220 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 CISC 220
COREQ: MATH 212 or MATH 221

CISC 301  ELEMENTS OF LOGIC AND AUTOMATA THEORY  3
Propositional and predicate logic for general reasoning and advanced applications in knowledge representation in artificial intelligence and data base, logic programming, program correctness and programming semantics. Automata and formal language theory. Background for advanced applications in compilers, computer networks, operating systems and natural language processing.
PREREQ: A minimum grade of C- in both MATH 210 and CISC 220.

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 MATH 210 and CISC 220.

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: CISC 220, MATH 210 (with minimum C- grade)

CISC 330  INTRODUCTION TO ALGORITHMS  3
Design and analysis of algorithms: worst/average case analysis, proofs for correctness and performance of algorithms. Algorithmic strategies (divide and conquer, greedy methods, dynamic programming, etc.) Algorithms for searching, forming and traversal of strings, trees and graphs. Categorization of computational problems: classes P and NP. NP completeness.
PREREQ: MATH 210 and a minimum grade of C- in CISC 220.

CISC 360  COMPUTER ARCHITECTURE  3
PREREQ: CPEG 210 and CPEG 211 or CPEG 220 and a minimum grade of C- in CISC 220 and CISC 260 (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 CISC 220 and CISC 260. CPEG 222 may be substituted for CISC 260.
RESTRICTIONS: CISC 260 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: CISC 220

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: CISC 220

CISC 401  ELEMENTS OF THE THEORY OF COMPUTATION  3
General models of computation, formal languages and automata theory and algorithmic unsolvability.
PREREQ: CISC 301
RESTRICTIONS: Credit cannot be received for both CISC 401 and CISC 601

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: CISC 201
RESTRICTIONS: Credit cannot be received for both CISC 403 and CISC 603.

CISC 404  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: CISC 301
RESTRICTIONS: Credit cannot be received for both CISC 404 and CISC 604.

CISC 409  TOPICS IN THEORETICAL COMPUTER SCIENCE  3
Contents vary to coincide with the interests of students and current faculty.
PREREQ: CISC 401
RESTRICTIONS: Credit cannot be received for both CISC 409 and CISC 609.

CISC 410  INTRODUCTION TO NUMERICAL ANALYSIS AND ALGORITHMIC COMPUTATION  3
See MATH 426 for course description.

CISC 411  ALGORITHMIC AND NUMERICAL SOLUTION OF DIFFERENTIAL EQUATIONS  3
See MATH 428 for course description.

CISC 423  APPLIED SYMBOLIC COMPUTATION  3
Introduction to one or more computer algebra systems, algebraic computation applied to problems in applied mathematics, and individual student projects using symbolic computation to solve a problem from student's own discipline.
RESTRICTIONS: Credit cannot be received for both CISC 423 and CISC 623.
Offered in alternate years.

CISC 427  COMPUTER SIMULATION TECHNIQUES  3
Modeling and computer simulation of discrete and continuous systems—those characterized by stochastic discrete events and those characterized by differential equations. Study and use of simulation languages.
PREREQ: CISC 220
RESTRICTIONS: Credit cannot be received for both CISC 427 and CISC 627.

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 CISC 429 and CISC 629.

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 CISC 220
RESTRICTIONS: Credit cannot be received for both CISC 437 and CISC 637.

CISC 440  COMPUTER GRAPHICS  3
Computer graphics technology, two- and three-dimensional systems, graphics software systems, modeling and object hierarchy, and animation.
PREREQ: CISC 220 and MATH 241
RESTRICTIONS: CISC 320 recommended. Credit cannot be received for both CISC 440 and CISC 640.

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 CISC 449 and CISC 649.

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: CISC 301, CISC 300 and MATH 205
COREQ: CISC 361
RESTRICTIONS: Knowledge of probability recommended. Credit cannot be received for both CISC 450 and CISC 650. Credit cannot be received for both CISC 250 and CISC 450.

CISC 451  DATA COMPRESSION IN MULTIMEDIA  3
PREREQ: CISC 220, MATH 210, MATH 241, MATH 205

COMPUTER AND INFORMATION SCIENCES
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: CISC450 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   **COMPILED DESIGN**  3

Introduction to the design and implementation of compilers, with a focus on lexical analysis, parsing and syntax directed translation.  
PREREQ: CISC260 and CISC301.

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 setup 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.  
PREREQ: A minimum grade of C- in CISC280 and senior status. CISC361 is recommended for this class.  
RESTRICTIONS: Credit cannot be received for both CISC475 and CISC675.

CISC 477   **SYSTEMS ADMINISTRATION**  3

Introduces students to the internals of UNIX, troubleshooting 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 MATH418.  
PREREQ: CISC280 and CISC301.  
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.  
Permission of instructor required.

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: CISC301 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: CISC301 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 621   **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 623   **APPLIED SYMBOLIC COMPUTATION**  3

Introduction to one or more computer algebra systems, algebraic computation applied to problems in applied mathematics, and individual student projects using symbolic computation to solve a problem from student’s own discipline. May be crosslisted with MATH415.  
RESTRICTIONS: Offered in alternate years. Credit cannot be received for both CISC623 and CISC423.

CISC 633   **INTRODUCTION TO COMPUTER INSTRUCTION**  3

See EDUC633 for course descriptions.

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 CISC301 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 will vary to coincide with the interests of students and current faculty.  
RESTRICTIONS: Credit cannot be received for both CISC649 and CISC449.

CISC 650   **NETWORK SYSTEMS**  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.  
Knowledge of probability recommended.
CISC 651 DATA COMPRESSION IN MULTIMEDIA 3
PREREQ: CISC220, MATH210, MATH241, MATH205, or equivalent.

CISC 652 TELECOMMUNICATIONS SYSTEMS 3
Presents basic concepts in telecommunications emphasizing topics such as SONET, Corning and Frame Relay and multimedia switching. Concepts of the operation and maintenance of large communications networks are discussed.
PREREQ: CISC450 or CPEG419 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: CISC60 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 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: CISC301 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: CISC290 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++.
PREREQ: CISC301 or equivalent.
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 CISC681.
PREREQ: CISC220 and CISC301, 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.
Requires permission of instructor.

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 with emphasis on the tools underpinning research in the area. Topics include universal programming systems, complexity results, oracle computations and quantifier hierarchies, classification of algorithmically enumerable sets, machine self-reference and priority arguments.
PREREQ: CISC601.

CISC 805 COMPUTABILITY THEORETICAL 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 BIOPHARMACOLOGICALS 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
Performance analysis of local area, wide area and interconnected networks. Queueing delay models, ARQ retransmission strategies, multi-access communication, routing, flow control, congestion control, and network reliability and availability.
PREREQ: CISC650.

CISC 853 NETWORK MANAGEMENT 3
PREREQ: CISC650.

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, HTTP, DNS, Multicast, DHCP, ICN, IMAP, NNTP, ICM, SCTP.
PREREQ: CISC650.

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, GoS 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, or equivalent.

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

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: Good Java programming skills; CISC650 is recommended.
RESTRICTIONS: Preference given to CS, EE and CPEG graduate students.
CMLT 365  STUDIES IN LITERARY GENRES, TYPES AND MOVEMENTS  3
See ENGL365 for course description.
CMLT 366  INDEPENDENT STUDY  1-3
CMLT 385  STUDIES IN LITERARY CRITICISM AND THEORY  3
See ENGL385 for course description.
CMLT 390  HONORS COLLOQUIUM  3
See ARSC390 for course description.
CMLT 465  STUDIES IN LITERATURE GENRES, TYPES AND MOVEMENTS  3
See ENGL365 for course description.
CMLT 466  INDEPENDENT STUDY  1-3

COMMUNICATION

COMM 200  TOPICS: HUMAN COMMUNICATION SYSTEMS  3
Analysis of various human communication systems which may include interpersonal, organizational and/or mass
RESTRICTIONS: May be repeated up to 3 times when topics vary.
COMM 212  ORAL COMMUNICATION IN BUSINESS  3
Includes an analysis of the types and principles of the communication inherent in the business and professional setting; a concentration upon the development of presentational skills: analyzing audiences, questioning, interviewing, researching, supporting, organizing and delivering information; an opportunity to develop and present materials within dyads, small groups and public contexts
RESTRICTIONS: Not open to communication and communication interest majors. Credit not given for both COMM212 AND COMM255
COMM 245  MASS COMMUNICATION AND CULTURE  3
The relationship between media and culture; how media affect culture (i.e., socialization and role modeling); and exploration of new forms of mass communication.
COMM 250  ELECTRONIC COMMUNICATION SKILLS  1 PF
Provides a basic understanding of the Internet and various Internet tools used at the University of Delaware. Self-paced instruction on the World Wide Web
COMM 251  THE DEVELOPMENT OF VERBAL COMMUNICATION  3
Investigation of the physiological, linguistic, psychological and social bases of verbal communication. Application of these insights to communicative disorders and to educational and family settings.
COMM 255  FUNDAMENTALS OF COMMUNICATION  3
Introduction to theories in communication with applications. Developing, analyzing and critiquing communication in different settings. Includes the practice of oral communication skills.
RESTRICTIONS: Not open to seniors or communication majors. Credit not given for both COMM255 and COMM212
COMM 256  PRINCIPLES OF COMMUNICATION THEORY  3
Introduction to theories and research in communication including a survey of the areas of the field
COMM 263  INTERNATIONAL SOCIAL CONDUCT  3
Introduction to basic attitudes toward interpersonal relations and socioeconomic and political responsibilities in various cultures. An experiential course integrating foreign and U.S. students
RESTRICTIONS: Offered only in Winter. Not for major credit.
COMM 300  INTRODUCTION TO COMMUNICATION PRINCIPLES  3
A survey of communication theories as applied to practical experiences in all contexts ranging from interpersonal communication and small group processes to informative and persuasive speaking. Focuses on the same material as COMM212, but without the practice of oral communication skills.
RESTRICTIONS: Not open to communication majors. Students cannot earn credit for COMM300 and COMM212 or COMM255
COMM 301  INTRODUCTION TO COMMUNICATION RESEARCH METHODS  3
The conceptual bases of research methodology: formulating questions, designing, conducting and analyzing research
COMM 309  INTRODUCTION TO PUBLIC RELATIONS  3
Examination of the public relations process, practices and principles in various settings, including corporations, non-profit organizations, educational institutions and government. Insights are gained through case studies and interviews with public relations professionals
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. May be repeated for credit when topics vary.
COREQ: A list of co-requisites will be available to students each semester
RESTRICTIONS: Students with 3.0 or higher GPA
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 advertising 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 316  ORAL COMMUNICATION FELLOWS  3
Oral Communication Fellows training
PREREQ: COMM330.
RESTRICTIONS: Permission of Department required
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
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. May be repeated for credit when topics vary.
COREQ: A list of co-requisites will be available to students each semester
RESTRICTIONS: Students with 3.0 or higher GPA
COMM 322  INTERPERSONAL COMMUNICATION HONORS  3
Focuses on introductory and advanced study of interpersonal communication. Will enhance and expand on other communication courses offered as a co-requisite. May be repeated for credit when topics vary.
COREQ: A list of co-requisites will be available to students each semester
RESTRICTIONS: Students with 3.0 or higher GPA
COMM 325  TELEVISION MASS COMMUNICATION  3
Television as a mass communication medium. 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 NEWWRITING  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  POLITICAL 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 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: interpersonal, mass media, public relations or organizational communication.
RESTRICTIONS: Offered during 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, media 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.
PREQ: 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 promote and present a comprehensive public relations campaign plan.
PREQ: COMM309, and either ENGL307 or COMM329

COMM 410 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.
PREQ: ENGL307 and 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.

COMM 421 Intercultural Communication 3
Enhances students’ understanding of cultures, communication and intercultural communication processes. In addition, communicative strategies for improving intercultural communication is discussed.
RESTRICTIONS: Some sections offered in Madrid, Spain and Costa Rica.

COMM 424 Media Message Analysis 3
Examination of methodology used to study media content and effects. Focus on past and ongoing research in broadcast, new broadcast and print media. The method of how to conduct and assess research relating to the mass media.
PREQ: COMM370
RESTRICTIONS: Requires permission of instructor.

COMM 425 Advanced Topics in Politics and Broadcast Journalism 3
Topics vary and may include the influence of crisis news on national and international politics, the effectiveness of political documentaries and the ethical and historical underpinnings of broadcast journalism.
May be cross-listed with WOLS425
RESTRICTIONS: Open to junior and senior communication majors only. May be repeated for credit.

COMM 427 Broadcast News 4
Communication students learn the pressures and standards of broadcast news while writing and producing a scheduled studio TV program. Emphasis on writing news for broadcast, program story selection issues, video selection, interviewing techniques, professionalism. Students produce a weekly news program in the lab.
RESTRICTIONS: Open to communication majors only.

COMM 440 Topics in Interpersonal Communication 3
Topics vary and focus on significant areas of theory and research in interpersonal communication. Topics may include nonverbal communication, lifespan communication and communication in intimate relationships.
May be cross-listed with WOMS440
RESTRICTIONS: May be repeated three times for credit when topics vary.

COMM 442 Topics in Organizational Communication 3
Focuses on significant areas of theory and research in organizational communication. Topics may include gender, communication, or interpersonal relations in organizations, such as superior/subordinate relationships.
May be cross-listed with WOMS442
RESTRICTIONS: May be repeated for up to nine credits when topics vary.

COMM 444 Global Agenda 3
See WOLS444.

COMM 450 Mass Communication Effects 3
Examines the history and nature of research on the effects of the mass media, particularly television, in such areas as attitude change, socialization, role modeling and sex and violence.
PREQ: COMM370
RESTRICTIONS: Requires permission of instructor.

COMM 452 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 454 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.

COMM 456 Communication in Organizations 3
Introduction to concepts and research related to communication processes in organizational settings. Both traditional and interpretive approaches are emphasized.

COMM 466 Independent Study 1-3

COMM 485 Analysis of Face-to-Face Communication 3
An examination of methods for analyzing face-to-face interaction, message construction, and message interpretation.

COMM 486 Multimedia Literacy 3
See EDUC485 for course description.

COMM 601 Epistemology and Theory in Communication 3
General issues in the philosophy of knowledge and science critical for the understanding of theoretical conceptions and a comprehensive survey of theories in communication.
RESTRICTIONS: Open to graduate students only.
COMM 603 COMMUNICATION RESEARCH METHODS – PROCEDURES 3
Introduction to communication research methods including general research procedures, sampling, laboratory research and experimental design, survey research, field research, content analysis and longitudinal research. Includes an introduction to using the computer in research. RESTRICTIONS: Open to graduate students only.

COMM 604 COMMUNICATION RESEARCH METHODS – ANALYSIS 3
Introduction to the tools and techniques of data analysis in communication research including descriptive statistics, hypothesis testing, inferential statistics, as well as advanced statistical procedures. RESTRICTIONS: Open to graduate students only.

COMM 609 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 team adopts a community non-profit organization and work closely with Board and staff members to produce and present a comprehensive public relations campaign plan.

COMM 610 ORGANIZATIONAL COMMUNICATION THEORY 3
An examination of major theories of organizations including functionalist paradigm, interpretive paradigm, neoclassical paradigms (classical, social exchange systems theory and structural systems theory); and modern paradigms (technological systems theory, adoptive systems theory and integrative organizational theory). RESTRICTIONS: Open to graduate students only.

COMM 613 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.

COMM 617 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 618 TOPICS IN MASS COMMUNICATION 3
Current directions in mass communication theory and research, cable television, radio and TV regulations, public policy. RESTRICTIONS: May be repeated three times for credit when topics vary.

COMM 621 INTERCULTURAL COMMUNICATION: APPLICATIONS IN INTERNATIONAL CONTEXTS 3
Students critically assess current intercultural communication theory and apply that theory to practical situations in various international contexts. RESTRICTIONS: Open to graduate students only.

COMM 624 MEDIA MESSAGE ANALYSIS 3
Examination of methodology used to study media content and effects. Focus on past and ongoing research in broadcast, nonbroadcast and print media and the method of how to conduct and assess research relating to the mass media.

COMM 625 ADVANCED TOPICS IN POLITICAL AND BROADCAST JOURNALISM 3
Topics vary and focus on significant areas in politics and broadcast journalism. Topics may include crises, news, political documentaries, broadcast presentations and credibility. RESTRICTIONS: Open to graduate students only.

COMM 630 INTERPERSONAL COMMUNICATION THEORY 3
An examination of the theoretical orientations taken by scholars who study interpersonal relationships as well as a number of focused research areas. Of particular importance is the development of an understanding of the role of communication in creating and maintaining relationships. RESTRICTIONS: Open to graduate students only.

COMM 640 TOPICS IN INTERPERSONAL COMMUNICATION 3
Significant research, theories and literature in communication, research design and theory building. RESTRICTIONS: May be repeated three times for credit when topics vary.

COMM 642 TOPICS IN ORGANIZATIONAL COMMUNICATION 3
Significant areas of theory and research in organizational communication. Topics may include gender, communication, or interpersonal relations in organizations, such as superior/subordinate relationships. RESTRICTIONS: May be repeated for up to nine credits when topics vary.

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 655 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 EDUC 657.

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 EDUC 685 for course description.

COMM 868 RESEARCH 1-12
COMM 869 MASTER’S THESIS 1-6

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. PREREQ: CPEG 210.

CPEG 220 MICROPROCESSOR BASED SYSTEMS I 2
Introduction to small computing machines including the architecture, organization and programming of microprocessors. Emphasizes basic machine language and assembly language coding. PREREQ: CPEG 211 and CISC 181.

CPEG 221 MICROPROCESSOR BASED SYSTEMS II 2
Extension of CPEG 220 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: CPEG 220.

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: CPEG 202.
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 CPEG222 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 410  SIGNALS AND COMMUNICATIONS DESIGN  4
See ELEG410 for course description

CPEG 419  COMPUTER COMMUNICATION NETWORKS  3
Introduction to computer communication networks based on circuit switching and on 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, supercomputer 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: CPEG323 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. Study includes 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: CPEG221 and ELEC312.

CPEG 490  CAREER SKILLS FOR ENGINEERS  1
Covers a variety of skills engineers need in their careers, including ethics, the need for lifelong learning, societal and global impact of engineering solutions, learning 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, supercomputer 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.

CPEG 630  NEURONS AND NETWORKS  3
See PSYCH330 for course description

CPEG 660  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: CPEG221 and ELEC312.

CPEG 810  TELECOMMUNICATIONS AND NETWORKS  3
Leadership skills in information technology, telecommunications and Internet technology for technology management. Introduces concepts in data and image compression, digital audio and digital cellular telephony. Provides fundamental knowledge of transmission and storage technology and a system-level understanding of computer networks and the Internet. May be cross-listed with BUEC810. RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management program.

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 1950s 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, rehabilitative options, and modern solution to prison overcrowding are discussed. Major themes include 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 DEVIANCY  3
See SOC302 for course description.

CRJU 303  JUVENILE DELINQUENCY  3
See SOC303 for course description.

CRJU 304  CRIMINOLOGY  3
See SOC304 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
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: CRJU 110

CRJU 322 CROWDS, CULTS AND REVOLUTIONS
See SOC 322 for course description.
PREREQ: SOC 201

CRJU 324 AMERICAN CONSTITUTIONAL HISTORY
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 HIST 324

CRJU 332 CRIMINAL VIOLENCE IN AMERICA
Investigates the patterns and causes 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 335 CRIME AND JUSTICE IN FILM AND LITERATURE
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 336 THE DETECTIVE IN FILM AND FICTION
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 ENGL 330 and/or SOC 336
PREREQ: CRJU 201

CRJU 340 THE JUVENILE JUSTICE SYSTEM
An in-depth view of the juvenile justice system in the United States focusing on crime patterns, police-juveniles relations, juvenile courts and correctional practices.

CRJU 345 SOCIOLOGY OF LAW
See SOC 345 for course description.

CRJU 346 PSYCHOLOGY AND THE LAW
Seminar exploring the rapidly expanding field of psychology and the law. Reviews and discusses 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 PSYC 346.

CRJU 350 GENDER AND CRIMINAL JUSTICE
Reviews historical and contemporary explanations for women's participation in crime and evaluates these explanations in the context 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 WOMS 350.

CRJU 355 RACE, CLASS AND CRIME
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 BAM/35 and/or SOC 356.

CRJU 357 SEMINAR ON THE POLICE
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
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.
REQUIREMENTS: Requires permission of instructor.

CRJU 369 ALCOHOL, DRUGS AND CRIME
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 SOC 369
PREREQ: CRJU 110 or SOC 201

CRJU 370 PRISON AND PRISON SUBCULTURES
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. Also examines how the prison subculture contributes to racial conflict, violence and mental health crises among prisoners.

CRJU 375 CRIMINAL PROCEDURE
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
See IFST 409 for course description.
PREREQ: IFST 235 or SOC 201 or WOMS 201
REQUIREMENTS: Open to juniors and seniors only.

CRJU 414 DATA ANALYSIS
See SOC 414 for course description.

CRJU 420 CRIMINAL JUSTICE ADMINISTRATION
Aids those planning a career as an administrator in the criminal justice system. Topics typically include basic administrative policy and budgetary matters.
PREREQ: CRJU 110.

CRJU 425 CRIMINAL LAW AND SOCIAL POLICY
Examines 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
See SOC 428 for course description.

CRJU 435 PUNISHING SPEECH
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
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
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
See SOC 448 for course description.

CRJU 450 PRISONERS AND THE LAW
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 456 LAWYERS AND THE LAW
See SOC 456 for course description.

CRJU 457 CRIMINAL EVIDENCE
The study of the laws of evidence and how they are used in the criminal courts and for court reformation.

CRJU 460 CRIMINAL JUSTICE POLICY
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
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 JST 475.

CRJU 480 CIVIL LIABILITY IN CRIMINAL JUSTICE
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. Prerequisites: SOC1301.

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 SOC1495. 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.

SCIENCE AND CULTURE

CSCC 229 THE NATURE OF SCIENCE 3
Introduction to the nature of the scientific enterprise. Uses both theoretical discussion and detailed example to illuminate how science helps us to understand the world. Topics include scientific method, the role of theory, controversies in science and the relationship between science and culture. May be cross-listed with PHI1229. Prerequisites: Any two science courses or one science course and PHI1205.

CSCC 233 WOMEN, BIOLOGY AND MEDICINE 3
See WOMS233 for course description.

CSCC 241 ETHICAL ISSUES IN HEALTHCARE 3
Interdisciplinary study of basic ethical thought and its application to contemporary biomedicine in such moral and ethical issues as care for the terminally ill, abortion and experimentation with human subjects. May be cross-listed with PHI1241.

CSCC 246 PHILOSOPHICAL PERSPECTIVES OF MEDICINE 3
Ethical and epistemological foundations of medicine; medicine as a way of knowing about the world compared with other ways. May be cross-listed with PHI1246.

CSCC 250 ENGINEERING ETHICS 3
See PHI1250 for course description.

CSCC 311 SOCIOLOGY OF HEALTHCARE 3
See SOC1311 for course description.

CSCC 330 VARYING AUTHORS, THEMES AND MOVEMENTS 3
See FL1330 for course description.

CSCC 341 ETHICS OF ENGINEERING PROFESSION 1
See PHI1341 for course description.

CSCC 343 SOCIETY, POLITICS AND HEALTHCARE 3
See POSC343 for course description.

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 365 STUDIES IN LITERARY GENRES, TYPES AND MOVEMENTS 3
See ENGL365 for course description.

CSCC 366 INDEPENDENT STUDY 1-6

CSCC 368 LITERATURE AND SCIENCE 3
See ENGL368 for course description.

CSCC 369 LITERATURE AND MEDICINE 3
Critical examination of the relationship between medicine and literature; ways society has viewed the physician as reflected in literature. May be cross-listed with ENGL369.

CSCC 382 HISTORY OF WESTERN MEDICINE 3
Social and cultural forces that have influenced the development of modern medicine. May be cross-listed with HIST382.

CSCC 389 TOPICS IN WOMEN AND HEALTH ISSUES 3
See WOMS389 for course description.

CSCC 444 MEDICAL ETHICS 3
See PHI1444 for course description.

CSCC 480 ISSUES IN HEALTHCARE FOR CHILDREN AND FAMILIES 1-3
Students will come into contact with children, families, physicians, and other health professionals. Students will not only learn about particular cases, but also explore issues related to health, disease, physician-patient relationships, interactions among members of the healthcare team, etc. Restrictions: BALS and MSP majors only; at least junior standing.

CSCC 481 ISSUES IN PUBLIC HEALTH 1-3
Students will come into contact with children, families, physicians, and other health professionals. Students will not only learn about particular cases, but also explore issues related to health, disease, physician-patient relationships, interactions among members of the healthcare team, etc. Restrictions: BALS and MSP majors only; at least junior standing.

CSCC 498 TOPICS IN BIOLOGY 3
See BISC498 for course description.

CSCC 647 PHILOSOPHY OF TECHNOLOGY 3
See PHI647 for course description.

EARLY AMERICAN CULTURE

EAMC 602 MATERIAL LIFE IN EARLY AMERICA 3
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.

EAMC 604 HISTORY OF NINETEENTH CENTURY AMERICAN INTERIORS 3
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.

EAMC 605 HISTORY OF THEORIES IN MATERIAL CULTURE 3
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 archaeology, cultural geography, sociology and history. May be cross-listed with ARTH630 and/or HIST605. Restrictions: Requires permission of instructor.

EAMC 606 ISSUES IN AMERICAN MATERIAL CULTURE 3
Studies major themes in American material culture of the 17th, 18th or 19th centuries. Topics vary. May be cross-listed with HIST606 and/or MASS606. Restrictions: Requires permission of instructor.

EAMC 671 CONNOISSEURSHIP OF THE DECORATIVE ARTS IN AMERICA I 1-3
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.

EAMC 672 CONNOISSEURSHIP OF THE DECORATIVE ARTS IN AMERICA II 1-3
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.
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, where 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: ECON500 or ECON301, and MATH231.

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: ECON500 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: ECON500 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: 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: ECON515, 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: ECON500 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: ECON503.

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 econometric and applied
econometrician.
PREREQ: ECON422.
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 MATH530 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: ECON503 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: MATH211

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

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. Emphasizes applications such as labor market, supply and demand, and economic growth. Emphasizes the role of government in the economy and the effects of monetary and fiscal policies on national output.
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 railroad; 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 signaling 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 STAT271

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 ensure 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 Production 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 ECON41. Covers foreign exchange markets, balance of payments, exchange rates and international economic policy

**PREREQ:** ECON552 or ECON802 or equivalent

### ECON 844  **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 Fisheries Economics**  3
- See MAST875 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 course work

**RESTRICTIONS:** Not open to students who have been admitted to candidacy

### ECON 969  **Doctoral Dissertation**  1-12 PF

### EDUCATION LIBRARY MEDIA

#### 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 online 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

### EDUCATION

#### EDUC 011  **College Intensive Literacy**  3 RP
- A remedial course for college students with deficiencies in reading, spelling and handwriting. Also suitable for students learning to read and write in English as a second language

#### EDUC 100  **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

#### EDUC 202  **Human Development I: Grades K-4**  3
- Introduce students to the major theories of human development as well as to 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 is covered, including topics of language development and physical, cognitive and socio-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 education. 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 that require 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 literature 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 ECDE 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 developmental commonalities. Systematic observation of a cross-section of special education classes required. Emphasis on the school-age child. RESTRICTIONS: Open to ETE and ECDE 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 to 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 examination 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 303  CHILDREN’S LITERATURE IN WORDS AND IMAGES  3
Engages students in analyses 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, interdisciplinary 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. PREREQ: EDUC210.

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: MATH125.

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: MATH125, MATH221 and MATH120. 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 curricula 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 oriented toward community service. Emphasis upon the relation of these groups’ educational practices to their overall public service mission. May be cross-listed with IFST360.

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 (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. 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 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 ENGL429 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 exploration 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: EDUC441

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. Emphasis on classroom-developed assessment frameworks. Provides 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 452  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
Research apprenticeship with faculty mentor.

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, interagency 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 crosslisted with COMM485

EDUC 486 **Educational Technology IV: Science, Social Studies and Mathematics Lab** 1-3
Introduces prospective teachers to technology available for use in mathematics, science, and social studies courses. 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 MATH1588 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 genre, 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, exemplar 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 **Teaching Reading in the Elementary and Middle Grades** 3
Students explore the relationships between reading theory, research, and practice. Focuses on the teaching of reading in the elementary and middle school

EDUC 609 **Assessment and Instruction for Reading in the Primary Grades** 3
First in a three-course sequence on assessment and instruction of reading and writing for students with learning problems. Focuses on preventing and remedying reading and writing problems in the primary grades
PREREQ: EDUC608 or EDUC620

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. Teaches 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 **Educational Psychology – Social Aspects** 3
Focuses on adolescent social and moral development. Specific topics include: motivation and affect, teacher beliefs, biases and expectations, student attitudes toward school and teachers, adolescent values, interpersonal relations and self-concept, learning styles, psychological processes underlying classroom management, student variability and exceptional students
RESTRICTIONS: School practicum of 18 hours is required

EDUC 614 **Educational Psychology – Cognitive Aspects** 3
Focuses on adolescent cognitive development and learning and the relationship between these cognitive processes and sound instructional models, strategies and practices for diverse and exceptional learners. Assessment and measurement of instructional outcomes are stressed
PREREQ: EDUC413

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 also are examined.

EDUC 619 DIVERSITY IN THE CLASSROOM 3
Examines type and implications of student diversity in classrooms (cultural, gender, class, language, and handicapping condition), cross-cultural processes, and foundations of special education. Explores best practices in multicultural education, classroom management and inclusion of secondary students with special learning needs.
RESTRICTIONS: Field placement of 18 hours is required.

EDUC 620 FOUNDATIONS OF READING INSTRUCTION 3
Reviews the cognitive processes involved in reading and writing, and examines the relationship between assessment and educational planning.

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 acquirement of domain knowledge and suggests various frameworks for supporting this linkage.
PREREQ: EDUC620.

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 IPST623.
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 prerequisite.

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 645 TOPICS: SOCIAL EDUCATION ISSUES 3
Analyzes selected topics and practices in social education. Reviews research findings, theoretical bases, resources 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 ESL and EFL 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 work 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: EDUC654
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, or severe physical and/or 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 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 personal 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
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 672 GRADES 3
Examines legislation, research and practices relating to school-to-adult life transition for youth with mild/moderate/severe disabilities. Emphasis on early intervention and transition programs and instructional practices, family involvement, interagency collaboration and adult service systems.

EDUC 673 TRANSITIONS FROM 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 is having 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 for 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 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 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: MATESI or MI Literacy

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 practice skills in teaching English as a Second Language to non-native English speakers.
PREREQ: EDUC647 and EDUC698
RESTRICTIONS: Requires permission of instructor

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  INTRNSHIP 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: EDUC856

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: EDUC830

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, structures, evaluation and instruction in elementary and middle grades.
RESTRICTIONS: Open only to Ph.D. and advanced 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  3
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  3
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  3
In depth examination of select topics that reflect the expertise of the instructor, and build on the themes introduced in EDUC875, Introduction to Educational Policy.

EDUC 812  REGRESSION AND MULTIVARIATE MODELS IN EDUCATION  3
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, and discriminant analysis
PREREQ: EDUC856 or equivalent

EDUC 813  CHILDHOOD PSYCHOPATHOLOGY  3
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 PSY834.
RESTRICTIONS: Requires permission of instructor

EDUC 814  PSYCHOLOGICAL ASSESSMENT OF CHILDREN  3
Integrates and personality assessment of children. Offers extensive experience in administering, interpreting and integrating psychological tests, training in report writing and the development of treatment prescriptions.
RESTRICTIONS: Requires permission of instructor

EDUC 816  SEMINAR: LITERACY PROBLEMS  3
Addresses the complex process of literacy development and explores the range of problems that can occur. Special attention is 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  3
Administration and interpretation of major individually administered intelligence tests used in school and child clinical psychology. Five tests will be highlighted: the Stanford Binet, EISC-R, WPPSI, WAIS-R and K-ABC.
RESTRICTIONS: May be cross-listed with PSYC817
RESTRICTIONS: Requires permission of instructor

EDUC 818  EDUCATIONAL TECHNOLOGY FOUNDATIONS  3
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  3
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  3
Current approaches to the analysis of instruction and schooling. Topics include teacher decision making and effectiveness, classroom processes, instructional methods and designs, models for schooling and theories of school-based learning.
RESTRICTIONS: Open only to Ph.D. students in education. Requires permission of instructor.

EDUC 822  SOCIAL FOUNDATIONS OF LITERACY  3
Explores social and cultural factors which influence children’s acquisition and use of literacy. Issues relating to variations in expectations for literacy behavior in community and school contexts are considered. Relations between discourse patterns and literacy learning will be addressed.
RESTRICTIONS: Open only to Ph.D. and advanced master’s students
EDUC 823 LEARNING AND DEVELOPMENT 3
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 3
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 PROSEMINARI SOCIAL AND URBAN POLICY 3
See UAPP823 for course description.

EDUC 827 DATA ANALYSIS FOR PK-12 SCHOOL IMPROVEMENT 3
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 3
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.
RESTRICTIONS: May be repeated for credit when topics vary.

EDUC 830 CONSULTATION AND INTERVENTION 3
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.
RESTRICTIONS: Open only to Ed D majors.

EDUC 831 ADVANCED COUNSELING TECHNIQUES WITH CHILDREN AND ADOLESCENTS 3
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.
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/THEORY OF MATH LEARNING 3
Examines research and theories of mathematics learning. Traces development of mathematical thinking from grades K to 12. Examines factors that influence the nature of what and how mathematics is learned.

EDUC 834 RESEARCH/THEORY OF MATH TEACHING 3
Examines research and theories of mathematics teaching in grades K-12. Examines components of classroom teaching, relationships between methods of teaching and students' learning, and the factors that influence the selection of teaching methods.
RESTRICTIONS: Open only to Ed D majors.

EDUC 835 RESEARCH/THEORY OF MATH CURRICULUM 3
Examines research and theories of mathematics curriculum, grades K-12. Analyzes features of traditional and reform curricula, and issues of curriculum design and implementation.

EDUC 836 RESEARCH/THEORY OF MATH TEACHER EDUCATION AND SCHOOL IMPROVEMENT 3
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.
RESTRICTIONS: Open only to Ed D majors.

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, GOVERNANCE, 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/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 COLOQUIUM 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 PROSEMINARI 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 international world.
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.
RESTRICTIONS: May be cross-listed with UNG848.

EDUC 849 GOVERNANCE, PLANNING, AND FINANCE IN HIGHER EDUCATION 3
Program development, planning, budgeting, and management in higher education settings; resource acquisition; alumni/college 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 short-term 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.
RESTRICTIONS: Open only to Ed D majors.

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 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.
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: EDUC 65 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 only or by 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: EDUC 65 or equivalent.

EDUC 869  Master's Thesis  1-6

EDUC 870  Child Neuropsychology  3  Examines approaches to neuropsychological assessment and application to childhood learning and neurodevelopmental disorders.  RESTRICTIONS: Requires permission of instructor.

EDUC 872  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: EDUC 65 and EDUC 865.

EDUC 873  Multilevel Models in Education  3  Introduction to multilevel modeling. Considers the analysis of growth and change as a special case of multilevel modeling.  PREREQ: EDUC 812 and EDUC 865, or equivalent.

EDUC 874  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: EDUC 812 or equivalent.

EDUC 876  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 variable models 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: EDUC 812 or equivalent.

EDUC 877  Practicum in Special Education  3-6  Demonstration, directed observation and practice teaching with consultation and an accompanying seminar to discuss experiences and problems under faculty supervision.  PREREQ: EDUC 879, EDUC 680 and EDUC 868.

EDUC 879  Internship in Education  3-9  Supervised, on-the-job experience in one specific area of education (e.g., 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. 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 changing education reform initiatives and to engage students in academic and work-related projects documenting leadership knowledge and competencies in their study of 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 103  Land and Water Management  3  Topics covered are land application of wastes, hazardous waste management, acid rain, nonpoint source pollution, water treatment, wetlands, rainfall, runoff, ground water, erosion control, irrigation and drainage.  RESTRICTIONS: Open to non-majors only.

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 will be 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: MATH117 or higher

EGTE 125 Introduction to Engineering Technology 1
Career exploration in engineering technology, campus resources, engineering methods. Intended for first-year students in the Department of Bioresources Engineering

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: EGTE115, MATH221/241 and PHYS201/207.

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 CIEG223
PREREQ: EGTE104 or CIEG126
RESTRICTIONS: Requires competency in trigonometry

EGTE 231 Fundamentals of Statics 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: MATH221/241, PHYS201/207

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, oscillators, filters and introduction to frequency analysis
PREREQ: EGTE244

EGTE 306 Cost Estimating 3
Building components, bill of materials and cost estimating using cost of materials plus labor system
PREREQ: EGTE112, EGTE209

EGTE 311 Fundamentals of Thermodynamics 3
Basic properties and concepts Zerohth, first and second laws. Closed and open systems. Gas cycles, vapor cycles, mixtures of gasses and vapors, psychrometry and transfer of heat and energy
PREREQ: EGTE215.
COREQ: MATH222 or MATH242

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: EGTE223

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 waste. 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 416 Project Economic Analysis 3
Fundamentals of engineering economic analysis. Topics include cash flow, time value of money, equivalence, compound interest formulas, annual cost, present worth, capitalized cost, rate of return, future worth, break even analysis, depreciation and income taxes. Use of computer applications and differential calculus in economic analysis
PREREQ: MATH221 or equivalent, EGTE115

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 420 Safety and Health in the Workplace 3
Managing safety and health issues, including laws (OSHAct 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 433 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 project with a customer, a design-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: PHYS202 or 208, EGTE244 or equivalent EGTE344 suggested

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, EGTE244 or equivalent

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, EGTE244 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
PREREQ: EGTE115, EGTE245, CPEC202 and MATH222/242
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: Requires 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 bioresources 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
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
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
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
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
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

ELEG 306 Signal Processing II
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.

ELEG 309 Electronic Circuit Analysis I
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

ELEG 310 Random Signals and Noise
Introduction to probability and estimation as applied to random signals and noise. Includes random variables, densities, distributions, random processes, spectral representations and statistics.
PREREQ: ELEG305

ELEG 312 Electronic Circuit Analysis II
Low-frequency and high-frequency response of RC-coupled amplifiers, Class A and B amplifiers, tuned power amplifiers, frequency response and stability of feedback amplifiers, oscillators, modulation and demodulation circuits.
PREREQ: ELEG309

ELEG 314 Electronics and Instrumentation
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

ELEG 320 Field Theory I
Study of theory and problems in electrostatic and magnetostatic fields. Maxwell's equations.
PREREQ: PHYS208, MATH342 and ELEG205

ELEG 340 Solid State Electronics
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

ELEG 366 Independent Study
1-6

ELEG 370 Engineering Electromagnetics
Electromagnetic fields and waves. Static and dynamic solutions of Maxwell's equations, transmission lines, waves and radiating systems. Associated computational methods.
PREREQ: MATH342, ELEG240

ELEG 403 Communication Systems Engineering
Review of signal theory, Fourier transforms, linear and time-invariant systems; review of probability and random signals; information theory, source entropy, channel capacity; basedband data transmission, modulafion, noise in analog systems and digital carrier modulation.
PREREQ: ELEG305

ELEG 410 Signals and Communications Design
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: ELEG306 or ELEG403 or ELEG413

ELEG 413 Field Theory II
PREREQ: ELEG320

ELEG 418 Digital Control Systems
Study of closed-loop digital control systems. Emphasis is on simulation methods and pole placement techniques for controller development. Both rootlocus and input/output pole placement using the Diphantine equation are used to generate designs. MATLAB is used for computer aided design.

ELEG 419 Multimedia Communications
The theory and principles of multimedia communications, including data compression, CD-ROMs, multimedia networking and standards (JPEG, MPEG, H261, H263, RTP, etc.)

ELEG 420 Electronic Circuit Design
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. Experimental studies involve extensive use of analog and digital computers.
PREREQ: ELEG312

ELEG 421 Solid State Nanotechnology
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.
PREREQ: Senior standing

ELEG 422 Semiconductor Materials Processing
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.

ELEG 423 Electrical Properties of Matter
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; electronic conduction in metals, semiconductors and insulators; metal-semiconductor contacts and metalization.
PREREQ: ELEG320 and ELEG340

ELEG 424 Quantum Mechanics
See PHYS424 for course description

ELEG 426 Photonic Crystal Devices
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.

ELEG 428 Systems Analysis and Control
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.

ELEG 430 Microwave Circuit Design Principles
Provides a comprehensive introduction to time and frequency domain integrated circuit design in the gigahertz/THz regime. Major design project to complete course.
PREREQ: ELEG312 and ELEG320

ELEG 438 Theory and Design of Diffraactive Optics
Applications of Fourier analysis to diffraction, imaging optical data processing and holography. Major design project required.
PREREQ: ELEG305, ELEG306 and ELEG320.
ELEG 440  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.
PREREQ: Senior standing with completion of all core physics and math courses required or permission of instructor.

ELEG 441  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.

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, UGA, 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  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 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 nanostructures, 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 471  Introduction to Biomedical Engineering  3
Introduction to human physiology at all hierarchical levels including molecular, biochemical, cellular, tissue, organ, and integrated systems.
RESTRICTIONS: Seniors only.

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 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, encoding, 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 neural 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, transforms, enhancement, restoration, coding, and reconstruction from projections. Attention will be 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 PHYS616 for course description.

ELEG 619  Multimeda 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 ultrathin 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 MIS 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 will be demonstrated such as lithographic and self-assembly methods.
PREREQ: ELEG648.

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 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 will be 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 809 Electromagnetic Theory 3
See PHYS809 for course description.

ELEG 810 Electromagnetic Theory 3
See PHYS810 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, modern 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 RIP, 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, CISC450, CISC650, or ELEG651.

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, CISC450, CISC650, or ELEG651.

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 833 Nonlinear Signal Processing 3
Fundamental theory and applications of nonlinear signal processing. Topics include stable random processes, order statistics, fractional lower order statistics, maximum likelihood estimation and the filtering problem, weighted order-statistic filters, medianization of linear FIR filters, myriad filters and adaptive optimization of nonlinear filters. Applications of nonlinear signal processing include digital imaging and video, digital communications and time-frequency analysis. PREREQ: Statistical digital signal processing.

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. PREREQ: ELEG648.

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 will be explained. Examples of applications to wireless and lightwave systems will be discussed. RESTRICTIONS: Undergraduates require permission from the instructor.

ELEG 843 Fourier Optics 3
Provides an understanding of the basic principles underlying the field of optical information processing. Emphasis will be on coherent optical image processing based on Fourier optics, holography, and acousto-optics. PREREQ: ELEG640 and ELEG648 or permission of 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, nano-electromagnetics, 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. Also, 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

ELEG 949 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.

ELEG 969 Doctoral Dissertation 1-12 PF

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 ENGL110 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
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
<th>Description</th>
<th>Prerequisites</th>
<th>Restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 200</td>
<td>Approaches to Literature</td>
<td>3</td>
<td>Dual emphasis on reading and writing. Offers an introduction to poetry, fiction, and drama, and provides for extensive practice in writing about literary subjects.</td>
<td>PREREQ: ENGL 110</td>
<td>RESTR: Any two of the three prerequisites acceptable.</td>
</tr>
<tr>
<td>ENGL 202</td>
<td>Biblical and Classical Literature</td>
<td>3</td>
<td>Study of Greek, Roman, and Biblical literatures, set in their mythical, historical and cultural contexts, introducing appropriate critical concepts. May be cross-listed with CMIT 202, FLIT 202, and/or JWST 202.</td>
<td>PREREQ: ENGL 110</td>
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<tr>
<td>ENGL 204</td>
<td>American Literature</td>
<td>3</td>
<td>Study of representative nineteenth and twentieth century works, set in their historical and cultural contexts, introducing appropriate critical concepts.</td>
<td>PREREQ: ENGL 110</td>
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</tr>
<tr>
<td>ENGL 205</td>
<td>British Literature I</td>
<td>3</td>
<td>Study of representative Medieval and Renaissance British works, set in their historical and cultural contexts, introducing appropriate critical concepts.</td>
<td>PREREQ: ENGL 110</td>
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</tr>
<tr>
<td>ENGL 206</td>
<td>British Literature II</td>
<td>3</td>
<td>Study of representative eighteenth through twentieth century British works, set in their historical and cultural contexts and introducing appropriate critical concepts.</td>
<td>PREREQ: ENGL 110</td>
<td></td>
</tr>
<tr>
<td>ENGL 207</td>
<td>Introduction to Poetry</td>
<td>3</td>
<td>Representative masterworks of English, American and world verse.</td>
<td>PREREQ: ENGL 110</td>
<td></td>
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<tr>
<td>ENGL 208</td>
<td>Introduction to Drama</td>
<td>3</td>
<td>Representative masterworks from the classical era to the present.</td>
<td>PREREQ: ENGL 110</td>
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<tr>
<td>ENGL 209</td>
<td>Introduction to the Novel</td>
<td>3</td>
<td>Representative masterworks of fiction, emphasizing those of Europe and America.</td>
<td>PREREQ: ENGL 110</td>
<td></td>
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<tr>
<td>ENGL 210</td>
<td>Short Story</td>
<td>3</td>
<td>Study of the short story as a narrative form, with readings from American and foreign short story traditions.</td>
<td>PREREQ: ENGL 110</td>
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<tr>
<td>ENGL 211</td>
<td>Great Writers of the Western World I: 1100–1700</td>
<td>3</td>
<td>See CMIT 207 for course description.</td>
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<tr>
<td>ENGL 212</td>
<td>Great Writers of the Western World II: 1650–1950</td>
<td>3</td>
<td>See CMIT 208 for course description.</td>
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<tr>
<td>ENGL 214</td>
<td>Literature and Gender</td>
<td>3</td>
<td>Specific concepts of gender in society, as manifested in the literature of writers of both sexes.</td>
<td>PREREQ: ENGL 110</td>
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<tr>
<td>ENGL 217</td>
<td>Introduction to Film</td>
<td>3</td>
<td>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.</td>
<td>PREREQ: ENGL 110</td>
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<tr>
<td>ENGL 260</td>
<td>Humanities Colloquium</td>
<td>3</td>
<td>See ARSC 260 for description.</td>
<td>PREREQ: ENGL 110</td>
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<tr>
<td>ENGL 266</td>
<td>Special Problem</td>
<td>1–3</td>
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<tr>
<td>ENGL 300</td>
<td>Texts and Contexts</td>
<td>3</td>
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<td>PREREQ: ENGL 202, ENGL 203 and ENGL 206</td>
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<tr>
<td>ENGL 301</td>
<td>Expository Writing</td>
<td>3</td>
<td>Expository writing, with related studies in grammar, diction and rhetoric.</td>
<td>PREREQ: ENGL 110</td>
<td>RESTR: Does not count toward English major.</td>
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<tr>
<td>ENGL 302</td>
<td>Advanced Composition</td>
<td>3</td>
<td>Expository writing in a variety of forms, with emphasis on literary analysis.</td>
<td>PREREQ: ENGL 110</td>
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<tr>
<td>ENGL 303</td>
<td>Script Writing</td>
<td>3</td>
<td>Instruction in script writing and preparation of a script</td>
<td>PREREQ: ENGL 110</td>
<td>RESTR: Final enrollment set after first class and submission of a script.</td>
</tr>
<tr>
<td>ENGL 304</td>
<td>Poetry Writing</td>
<td>3</td>
<td>Practice in writing a variety of verse forms.</td>
<td>PREREQ: ENGL 110</td>
<td>RESTR: Final enrollment set after first class and submission of five poems.</td>
</tr>
<tr>
<td>ENGL 305</td>
<td>Fiction Writing</td>
<td>3</td>
<td>Practice in writing the short story.</td>
<td>PREREQ: ENGL 110</td>
<td>RESTR: Final enrollment set after first class and submission of a short story.</td>
</tr>
<tr>
<td>ENGL 306</td>
<td>Topics in Writing</td>
<td>3</td>
<td>Special topics in writing (for example, autobiography). Variable content.</td>
<td>PREREQ: ENGL 110</td>
<td></td>
</tr>
<tr>
<td>ENGL 307</td>
<td>News Writing and Editing</td>
<td>3</td>
<td>News judgment, news gathering, feature writing, libel problems, and ethics.</td>
<td>PREREQ: ENGL 110</td>
<td>RESTR: Minimum grade of B required in ENGL 110. Counts toward English major only as part of journalism concentration.</td>
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<tr>
<td>ENGL 308</td>
<td>Reporter’s Practicum</td>
<td>3</td>
<td>Builds on ENGL 307 with extensive reporting and writing for the campus newspaper. Attention to libel and privacy issues.</td>
<td>PREREQ: ENGL 307</td>
<td>RESTR: Counts toward English major only as part of journalism concentration.</td>
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<tr>
<td>ENGL 309</td>
<td>Feature and Magazine Writing</td>
<td>3</td>
<td>All aspects of the newspaper and feature article. Developing ideas, researching, interviewing, writing, and marketing.</td>
<td>PREREQ: ENGL 307</td>
<td>RESTR: Counts toward English major only as part of journalism concentration.</td>
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<tr>
<td>ENGL 310</td>
<td>Copy Editing and Layout</td>
<td>3</td>
<td>Newspaper copy editing, headline writing and layout, with emphasis on practical experience. Explores improvement or updating of news stories by rewriting.</td>
<td>PREREQ: ENGL 307</td>
<td>RESTR: Counts toward English major only as part of journalism concentration.</td>
</tr>
<tr>
<td>ENGL 312</td>
<td>Written Communications in Business</td>
<td>3</td>
<td>Examines the role of written communication in corporate decision making.</td>
<td>PREREQ: ENGL 110</td>
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<tr>
<td>ENGL 314</td>
<td>Introduction to Folklore and Folklore</td>
<td>3</td>
<td>Traditional forms of folklore with emphasis on modern folklore as it functions in contemporary societies. May be cross-listed with CMIT 314.</td>
<td>PREREQ: ENGL 110</td>
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<tr>
<td>ENGL 315</td>
<td>Ballad and Folksong</td>
<td>3</td>
<td>English-language ballad and folksong tradition in America. Consideration of oral, literary, historical and sociocultural aspects of the Anglo-Scots-Irish and African-American heritages.</td>
<td>PREREQ: ENGL 110</td>
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<tr>
<td>ENGL 316</td>
<td>Peer Tutoring/Advanced Composition</td>
<td>3</td>
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<td>See ARSC 316 for course description.</td>
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<td>Course Code</td>
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<td>ENGL 317</td>
<td>FILM HISTORY</td>
<td>3</td>
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<tr>
<td>ENGL 318</td>
<td>STUDIES IN FILM</td>
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<tr>
<td>ENGL 320</td>
<td>THE BIBLE AS LITERATURE</td>
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<tr>
<td>ENGL 321</td>
<td>MEDIEVAL LITERATURE AND CULTURE</td>
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<tr>
<td>ENGL 322</td>
<td>CHAUCER</td>
<td>3</td>
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<tr>
<td>ENGL 324</td>
<td>SHAKESPEARE</td>
<td>3</td>
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<td>ENGL 325</td>
<td>RENAISSANCE LITERATURE</td>
<td>3</td>
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<tr>
<td>ENGL 328</td>
<td>MILTON</td>
<td>3</td>
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<tr>
<td>ENGL 330</td>
<td>THE DETECTIVE IN FILM AND FICTION</td>
<td>3</td>
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<tr>
<td>ENGL 331</td>
<td>THE AGE OF SATIRE</td>
<td>3</td>
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<td>ENGL 332</td>
<td>STUDIES IN RESTORATION AND EIGHTEENTH CENTURY LITERATURE</td>
<td>3</td>
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<tr>
<td>ENGL 333</td>
<td>BRITISH ROMANTICISM</td>
<td>3</td>
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<tr>
<td>ENGL 336</td>
<td>VICTORIAN POETRY</td>
<td>3</td>
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<tr>
<td>ENGL 337</td>
<td>VICTORIAN PROSE</td>
<td>3</td>
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<tr>
<td>ENGL 338</td>
<td>VICTORIAN FICTION</td>
<td>3</td>
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<tr>
<td>ENGL 340</td>
<td>AMERICAN LITERATURE TO THE CIVIL WAR</td>
<td>3</td>
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<tr>
<td>ENGL 341</td>
<td>AMERICAN LITERATURE: CIVIL WAR TO WORLD WAR II</td>
<td>3</td>
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<tr>
<td>ENGL 342</td>
<td>AMERICAN LITERATURE SINCE WORLD WAR II</td>
<td>3</td>
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<tr>
<td>ENGL 344</td>
<td>AFRICAN AMERICAN LITERATURE I</td>
<td>3</td>
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<tr>
<td>ENGL 345</td>
<td>AFRICAN AMERICAN LITERATURE II</td>
<td>3</td>
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<tr>
<td>ENGL 347</td>
<td>STUDIES IN AMERICAN LITERATURE</td>
<td>3</td>
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<tr>
<td>ENGL 348</td>
<td>CONTEMPORARY JEWISH-AMERICAN LITERATURE</td>
<td>3</td>
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<tr>
<td>ENGL 349</td>
<td>INTRODUCTION TO JEWISH SOURCES: TEXT AND INTERPRETATION</td>
<td>3</td>
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<tr>
<td>ENGL 351</td>
<td>INTRODUCTION TO IRISH LITERATURE</td>
<td>3</td>
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<tr>
<td>ENGL 352</td>
<td>STUDIES IN NINETEENTH CENTURY LITERATURE</td>
<td>3</td>
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<tr>
<td>ENGL 353</td>
<td>TWENTIETH CENTURY BRITISH LITERATURE</td>
<td>3</td>
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<tr>
<td>ENGL 354</td>
<td>AFRICAN AMERICAN LITERATURE I</td>
<td>3</td>
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<tr>
<td>ENGL 355</td>
<td>KING ARTHUR IN LITERATURE</td>
<td>3</td>
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<tr>
<td>ENGL 356</td>
<td>STUDIES IN MODERN/CONTEMPORARY LITERATURE</td>
<td>3</td>
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<tr>
<td>ENGL 357</td>
<td>LITERATURE OF LONDON</td>
<td>3</td>
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<tr>
<td>ENGL 358</td>
<td>LINGUISTICS AND LANGUAGE ARTS</td>
<td>3</td>
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<tr>
<td>ENGL 359</td>
<td>GRAMMAR AND USAGE</td>
<td>3</td>
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<tr>
<td>ENGL 361</td>
<td>LITERARY CRITICISM AND THEORY</td>
<td>3</td>
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</tr>
</tbody>
</table>
ENGL 365 STUDIES IN LITERARY GENRES, TYPES AND MOVEMENTS 3
Particular areas or writers to be announced
May be cross listed with CMAT 365, CSCC 365, and/or JWST 365
PREREQ: ENGL 110

ENGL 366 INDEPENDENT STUDY 1–6

ENGL 368 LITERATURE 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.
May be cross listed with CSCC 368
PREREQ: ENGL 110

ENGL 369 LITERATURE AND MEDICINE 3
See CSCC 369 for course description

ENGL 371 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
PREREQ: ENGL 110
RESTRICTIONS: May be repeated for credit when topics vary

ENGL 372 STUDIES IN DRAMA 3
Special topics in an author or authors, a type or types of drama, a period or theme
PREREQ: ENGL 110
RESTRICTIONS: May be repeated for credit when topics vary

ENGL 373 STUDIES IN POETRY 3
Special topics in a poet or poets, a type or movement, a period or theme
PREREQ: ENGL 110
RESTRICTIONS: May be repeated for credit when topics vary

ENGL 379 INTRODUCTION 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: ENGL 202, ENGL 205, ENGL 206, ENGL 324.
RESTRICTIONS: Required for concentrations in ethnic and cultural studies

ENGL 380 WOMEN WRITERS 3
Study of a variable set of women writers. Addresses such topics as the idea of a women's tradition, formation of the canon, use of genre, language and form.
May be cross listed with WOMS 380
PREREQ: ENGL 110

ENGL 381 WOMEN 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 WOMS 381
PREREQ: ENGL 110

ENGL 382 STUDIES 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 BAMS 382, JWST 382, and/or WOMS 382
PREREQ: ENGL 110
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 385 STUDIES IN LITERARY CRITICISM AND THEORY 3
Studies in selected topics in literary criticism and critical theory
May be cross listed with CMAT 385
PREREQ: ENGL 110
RESTRICTIONS: May be repeated for credit when topics vary

ENGL 390 ENGLISH LINGUISTICS 3
General introduction to the study of the English language, with emphasis on modern linguistic approaches.
May be cross listed with LING 390
PREREQ: ENGL 110

ENGL 391 HONORS COLLOQUIUM 3
See ARSC 390 for description.
May be cross listed with JWST 390 and/or MUSC 390
PREREQ: ENGL 110

ENGL 403 LITERATURE FOR ADOLESCENTS 3
See EDUC 403 for course description

ENGL 404 ADVANCED 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 free forms.
PREREQ: ENGL 304
RESTRICTIONS: Final enrollment set after first class and submission of five poems.
May be repeated once for credit

ENGL 405 ADVANCED FICTION WRITING 3
PREREQ: ENGL 305.
RESTRICTIONS: Final enrollment set after first class and submission of a short story.
May be repeated once for credit.

ENGL 407 ADVANCED REPORTING 3
In-depth reporting, research methods, ethics, and other topics
PREREQ: ENGL 307.
RESTRICTIONS: Maximum of three credits for any registration with no more than six credits toward graduation. Counts toward English major only as part of the journalism concentration.

ENGL 408 SPORTS 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: ENGL 307.

ENGL 409 TOPICS 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: ENGL 110
RESTRICTIONS: May be repeated once for credit when topics vary. Counts toward English major only as part of the journalism concentration.

ENGL 410 TECHNICAL WRITING 3
Selected problems in technical communications, the preparation of reports and technical editing
PREREQ: ENGL 110
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: ENGL 415 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: ENGL 415 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 profession (e.g., ethics of business and technical communication).
PREREQ: ENGL 312, ENGL 410, or ENGL 415
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: ENGL 110.

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: ENGL 217
ENGL 464  INTERNSHIP IN BUSINESS/TECHNICAL WRITING  3 PF
Students work on writing projects at local corporations, government divisions, or public agencies, under joint supervision of the Department of English and the sponsoring organization. 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 CMTA465 and/or WOMS465
PREREQ: ENGL110

ENGL 466  INDEPENDENT STUDY  1-9

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). Stressses 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: ENGL482/482
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 freer forms.
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 emphasis on 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 writers 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 LING477 for course description.

ENGL 680  SEMINAR  3

ENGL 682  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.
COREQ: ENGL682
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.
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>ENGL 685</td>
<td>Cultural Theory and Criticism</td>
<td>3</td>
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<tr>
<td>ENGL 688</td>
<td>Teaching Composition</td>
<td>3</td>
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<tr>
<td>ENGL 694</td>
<td>History of the English Language</td>
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<td>ENGL 802</td>
<td>Studies in Old and Middle English</td>
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<td>ENGL 804</td>
<td>Studies in Medieval Literature and Culture</td>
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<td>ENGL 806</td>
<td>Studies in Renaissance Literature</td>
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<td>ENGL 815</td>
<td>Studies in Seventeenth Century Literature</td>
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<td>ENGL 820</td>
<td>Studies in Eighteenth Century Literature</td>
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<td>ENGL 830</td>
<td>Studies in Nineteenth Century Literature</td>
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<td>ENGL 840</td>
<td>Studies in Twentieth Century Literature</td>
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<tr>
<td>ENGL 844</td>
<td>Seminars: Special Topics in American Literature</td>
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<td>ENGL 846</td>
<td>Seminars: Special Topics in English Literature</td>
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<td>ENGL 848</td>
<td>Special Topics in Comparative Literature</td>
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<td>ENGL 850</td>
<td>Studies in Colonial American Literature</td>
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<td>ENGL 852</td>
<td>Seminar: American Realism and Naturalism</td>
<td>3</td>
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<td>ENGL 853</td>
<td>Modern/Postmodern American Literature</td>
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<td>ENGL 868</td>
<td>Research</td>
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<td>ENGL 869</td>
<td>Master's Thesis</td>
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<tr>
<td>ENGL 884</td>
<td>Studies in Literary and Cultural Theory</td>
<td>3</td>
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<td>ENGL 890</td>
<td>Studies in Linguistics</td>
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<tr>
<td>ENGL 964</td>
<td>Pre-Candidacy Study</td>
<td>3-12 PF</td>
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<tr>
<td>ENGL 969</td>
<td>Doctoral Dissertation</td>
<td>1-12 PF</td>
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<td>ENSC 366</td>
<td>Independent Study</td>
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<td>ENSC 425</td>
<td>Environmental Field Methods</td>
<td>3</td>
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<td>ENSC 427</td>
<td>Applied Environmental Science</td>
<td>3</td>
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<tr>
<td>ENSC 450</td>
<td>Prosseminar in Environmental Science</td>
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<td>ENSC 464</td>
<td>Internship in Environmental Science</td>
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<tr>
<td>ENSC 466</td>
<td>Independent Study</td>
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<tr>
<td>ENSC 475</td>
<td>Statistics for Environmental Science</td>
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<tr>
<td>ENWC 105</td>
<td>Insects in Our World</td>
<td>3</td>
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<tr>
<td>ENWC 165</td>
<td>New Student Seminar</td>
<td>1</td>
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<tr>
<td>ENWC 201</td>
<td>Wildlife Conservation</td>
<td>3</td>
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</tbody>
</table>
ENWC 205  **Elements of Entomology**  3
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  **Apiculture**  2
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 224  **Apiculture Laboratory**  1
Laboratory and field components to complement topics in ENWC214. Bee identification and culture; hive management. Work with bees in an apiary to develop confidence in keeping bee colonies. COREQ: ENWC214

ENWC 300  **Principles of Animal and Plant Genetics**  3
See ANSC300 for course description

ENWC 305  **Entomology Laboratory**  2
Insect structure, physiology, behavior, taxonomy, evolution and ecology studied through field trips,dissection and experiments. Insect collection (with identification to orders) required. COREQ: ENWC205

ENWC 310  **Animal and Plant Genetics Laboratory**  1
See ANSC310 for course description

ENWC 314  **Comparative Terrestrial and Marine Ecology**  3
Comparative overview of similarities and dissimilarities of life in terrestrial and marine environments. Topics include geological history, substrate, growth and development, life history, reproduction, dispersal, population regulation, and impact of humans. May be cross-listed with MAST314. PREREQ: BISC208

ENWC 315  **Insect Conservation Ecology**  3
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: ENWC201 and ENWC305

ENWC 318  **Taxonomy of Birds**  2
Classification of birds. Identification by sight and sound. Emphasis on orders of the world, North American families and species of the region. Field trips

ENWC 325  **Wildlife Management**  3
Introduction to solving wildlife management problems. Development of management plans with consideration of habitat, human and animal population components. PREREQ: ENWC201; BISC302
COREQ: BISC302. RESTRICTIONS: Requires junior status

ENWC 344  **Forest Ecology**  2
Dendrology, measurement techniques, tree biology, forest ecology, and concepts of forest management. Field work, demonstrations and guest lectures in major forest types of the mid-Atlantic region. May be cross-listed with PLSC344. PREREQ: BISC208

ENWC 351  **Nature and Wildlife Photography**  3
Basic principles and techniques of nature and wildlife photography. Students execute projects that demonstrate their technical skill and knowledge of exposure, composition and concept. 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**  1-6
ENWC 405  **Insect Structure and Function**  4
Comparative functional anatomy and evolution of arthropods, especially the Insects. Emphasis on structures and their functions as adaptive responses to selective pressures. Laboratory dissections emphasize anatomical variation within external and internal systems. PREREQ: ENWC305

ENWC 406  **Insect Identification - Taxonomy**  3
Lecture and laboratory; the collection, preservation and classification of common insect families. PREREQ: ENWC205

ENWC 408  **Insect Field Taxonomy**  3
Collection, classification, preservation and curation of insects. An insect collection is required. COREQ: ENWC406.

ENWC 410  **Medical and Veterinary Entomology**  3
Transmission dynamics, ecology, and control of vector-borne diseases, especially global diseases shared by humans and other animals. Regionally transmitted diseases, parasitism, and biting/stinging insects. Lab emphasizes field assessment techniques for, and lab identification of, vectors and pathogens. PREREQ: BISC208

ENWC 411  **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 populations. Diagnostic recognition, control and habits of major pest species. PREREQ: ENWC205

ENWC 413  **Human Dimensions in Wildlife Conservation**  3
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: ENWC201

ENWC 415  **Wildlife Research Techniques**  3
Research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts. PREREQ: ENWC325; PRIC408 or STAT200; and two courses from ENWC318, ENWC418, ENWC424 or ENWC425
COREQ: PLSC212 or PLSC402 or ENWC344

ENWC 418  **Avian Biology**  3
Birds as adaptive complexes. Anatomy, physiology and behavior associated with feeding, thermoregulation, flight, migration, communication and reproduction. 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. RESTRICTIONS: Requires junior or senior status

ENWC 424  **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. RESTRICTIONS: Requires junior status

ENWC 425  **Mammalogy**  3
Mammal biology: evolution, feeding, homeostasis, communication and reproduction. Natural history and identification of taxa. Occasional field trips. PREREQ: BISC208

ENWC 426  **Aquatic Insects**  3
Biological and systematicatics of aquatic insects with emphasis on the fauna of North America. Collection of immature aquatic insects required. PREREQ: ENWC305

ENWC 430  **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 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 444  **Conservation of Tropical Biodiversity**  3
A 3-week intensive, field-based experience in the mechanics of conserving tropical biodiversity. Focuses on group projects quantifying and comparing the diversity of montane cloud forests, lowland rainforests and tropical dry forests. May be cross-listed with BISC440. RESTRICTIONS: Winter or Summer Session only. Taught in Costa Rica or Peru.

ENWC 450  **Debates in Conservation Biology**  3
Global debate about anthropocentric use and misuse of earth’s biological and physical resources.
**ENTOMOLOGY AND WILDLIFE CONSERVATION**

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tr>
<td>ENWC 451</td>
<td>ADVANCED NATURE AND WILDLIFE PHOTOGRAPHY</td>
<td>3</td>
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<tr>
<td></td>
<td>Builds on basic principles and skills learned in ENWC351. Students develop a</td>
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<td>journal of technical aspects and intended outcome of each image and complete</td>
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<td>projects to demonstrate increased technical skill and knowledge of exposure,</td>
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<td>composition, content</td>
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<td><strong>PREREQ:</strong> ENWC351</td>
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<td><strong>RESTRICTIONS:</strong> Students must have own camera equipment. Usually offered as</td>
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<td></td>
<td>part of international and domestic trips in Winter and Summer Sessions.</td>
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<tr>
<td>ENWC 452</td>
<td>CONSERVATION OF AFRICAN WILDLIFE</td>
<td>3</td>
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<tr>
<td></td>
<td>Unique challenges facing African wildlife. Identifying and surveying terrestrial</td>
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<td>vertebrates, human-wildlife interactions, ecotourism, and development of African</td>
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<td>wildlife conservation. Firsthand experience in wildlife conservation by visiting</td>
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<td>various ecosystems, living with aboriginal people, and seeing the effects of</td>
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<td>ecotourism and development</td>
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<td><strong>RESTRICTIONS:</strong> Offered only during Winter Session in Tanzania</td>
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<tr>
<td>ENWC 453</td>
<td>COMMUNITY-BASED CONSERVATION</td>
<td>3</td>
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<tr>
<td></td>
<td>Basic philosophical, economic, and ecological aspects of the bottom-up approach</td>
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<td>to conservation. Students experience this form of conservation firsthand by living</td>
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<td>with aboriginal people and seeing how they conserve natural resources.</td>
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<td><strong>RESTRICTIONS:</strong> Offered only during Winter Session in Tanzania</td>
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<tr>
<td>ENWC 455</td>
<td>CONSERVATION GENETICS</td>
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<tr>
<td></td>
<td>Principles of genetics applied to the conservation of animal and plant populations</td>
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<td></td>
<td>Fundamentals of basic and population genetics. Examination of case studies of</td>
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<td>species from a variety of taxonomic groups.</td>
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<td><strong>PREREQ:</strong> BISC208</td>
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<tr>
<td>ENWC 464</td>
<td>FIELD EXPERIENCE</td>
<td>1-3 PF</td>
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<td></td>
<td>Faculty-supervised employment (usually part-time) or volunteer service at an</td>
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<td>entomology, ecology, or wildlife conservation-related site such as a research</td>
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<td>laboratory, pest control firm, museum, government agency or nature center. A</td>
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<td>signed agreement with faculty sponsor prior to placement and a journal or written</td>
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<td>report are required</td>
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<td><strong>RESTRICTIONS:</strong> Maximum of six credits may count toward degree. Only three</td>
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<td></td>
<td>credits among Independent Study, Research, ENWC464 and UNIV401 count</td>
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<td>toward entomology or wildlife conservation major requirements</td>
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<tr>
<td>ENWC 465</td>
<td>CAPSTONE SENIOR SEMINAR</td>
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<tr>
<td></td>
<td>Written and oral presentation of a specific research topic in entomology,</td>
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<td>wildlife conservation, or ecology to a science-oriented audience Professional</td>
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<td>scientific communication and familiarization with published research on the</td>
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<td>topic. <strong>RESTRICTIONS:</strong> Must be taken as senior in last fall term.</td>
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<tr>
<td>ENWC 466</td>
<td>INDEPENDENT STUDY</td>
<td>1-6</td>
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<tr>
<td>ENWC 468</td>
<td>RESEARCH</td>
<td>1-6</td>
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<tr>
<td>ENWC 501</td>
<td>NATURAL HISTORY FOR TEACHERS</td>
<td>3</td>
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<tr>
<td></td>
<td>Background knowledge, methods and materials for teaching basic concepts of</td>
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<td></td>
<td>ecology, environmental problems and field natural history, particularly as</td>
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<td>applicable to Delaware. Includes outdoor studies in field, forest, stream and</td>
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<td>estuarine environments</td>
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<td>ENWC 601</td>
<td>INSECT PHYSIOLOGY</td>
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<tr>
<td></td>
<td>Physiology and biochemistry of major organs and tissues of insects. Laboratory</td>
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<td></td>
<td>demonstrates basic tools of insect physiology through original and classical</td>
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<td>experiment. <strong>PREREQ:</strong> ENWC305</td>
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<td>ENWC 602</td>
<td>LARVAL TAXONOMY</td>
<td>3</td>
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<td>Lecture-laboratory treating the collection, preservation and classification of</td>
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<td>immature stages of insects. Emphasis on holometabolous orders, with special</td>
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<td>attention to aquatic immature. <strong>PREREQ:</strong> ENWC305 and ENWC406.</td>
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<tr>
<td>ENWC 605</td>
<td>INSECT STRUCTURE AND FUNCTION</td>
<td>4</td>
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<tr>
<td></td>
<td>Comparative anatomical and evolutionary of arthropods, especially Insects.</td>
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<td></td>
<td>Emphasis on structures and their functions as adaptive responses to selective</td>
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<td></td>
<td>pressures. Laboratory dissections emphasizing anatomical variation within</td>
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<td></td>
<td>external and internal systems. <strong>PREREQ:</strong> ENWC305</td>
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<tr>
<td>ENWC 606</td>
<td>INSECT IDENTIFICATION – TAXONOMY</td>
<td>3</td>
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<tr>
<td></td>
<td>Lecture and laboratory; the collection, preservation and classification of</td>
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<td></td>
<td>common insect families. <strong>PREREQ:</strong> ENWC205</td>
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<tr>
<td>ENWC 608</td>
<td>INSECT FIELD TAXONOMY</td>
<td>3</td>
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<tr>
<td></td>
<td>The collection, classification, preservation and curation of insects. An insect</td>
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<tr>
<td></td>
<td>collection is required. <strong>PREREQ:</strong> ENWC606</td>
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<tr>
<td>ENWC 610</td>
<td>MEDICAL AND VETERINARY Entomology</td>
<td>3</td>
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<tr>
<td></td>
<td>Transmission dynamics, ecology, and control of vector-borne diseases, especially</td>
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<td></td>
<td>global diseases caused by humans and other animals. Regionally transmitted</td>
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<td></td>
<td>diseases, parasites, and biting/stinging insects. Lab emphasizes field assessment</td>
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<td></td>
<td>techniques for, and lab identification of, vectors and pathogens. <strong>PREREQ:</strong></td>
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<td>BISC208</td>
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<tr>
<td>ENWC 611</td>
<td>INSECT PEST MANAGEMENT</td>
<td>3</td>
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<tr>
<td></td>
<td>Principles of managing insect populations in an environmentally compatible</td>
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<td>manner to reduce losses caused by insects attacking our food, fiber, buildings,</td>
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<td></td>
<td>domestic animals, and human population. Diagnostic recognition, control and</td>
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<td></td>
<td>habits of major pest species. <strong>PREREQ:</strong> ENWC205</td>
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<tr>
<td>ENWC 615</td>
<td>WILDLIFE RESEARCH TECHNIQUES</td>
<td>3</td>
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<tr>
<td></td>
<td>Research design, field sampling techniques, data analysis, and interpretation,</td>
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<td>and preparation of publication quality manuscripts. Classes and individually</td>
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<td></td>
<td>designed field projects focus on regional wildlife and their habitats.</td>
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<td><strong>PREREQ:</strong> ENWC325, FREC408 or STAT200; and two courses from ENWC318,</td>
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<td>ENWC418, ENWC424, or ENWC425. <strong>COREQ:</strong> PLSC212 or PLSC402 or ENWC344.</td>
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<td><strong>RESTRICTIONS:</strong> Open to graduate students only or by permission of instructor.</td>
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<td>ENWC 617</td>
<td>FIELD NATURAL HISTORY</td>
<td>1-3</td>
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<tr>
<td></td>
<td>An extended field trip or several shorter trips to natural and managed areas</td>
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<td></td>
<td>Emphasis on identification and observation of biota, field notes, knowledge of</td>
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<td></td>
<td>natural habitats, ecological processes and wildlife conservation issues and</td>
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<td></td>
<td>practices. Individual projects. <strong>RESTRICTIONS:</strong> Requires junior status and</td>
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<td>consent of instructor. Credit depends on extent of travel; maximum of three</td>
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<td>credits allowed toward major.</td>
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<tr>
<td>ENWC 618</td>
<td>AVIAN BIOLOGY</td>
<td>3</td>
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<tr>
<td></td>
<td>Birds as adaptive complexes. Anatomy, physiology and behavior associated with</td>
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<td>feeding, thermoregulation, flight, migration, communication and reproduction.</td>
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<td><strong>PREREQ:</strong> BISC208</td>
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<tr>
<td>ENWC 619</td>
<td>BIOLOGICAL CONTROL</td>
<td>3</td>
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<td></td>
<td>Use of beneficial organisms to manage and control populations of other</td>
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<td>organisms. Theory, practices, and case histories for manipulation of natural</td>
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<td>enemies to minimize the impact of pests. <strong>PREREQ:</strong> ENWC305</td>
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<td>ENWC 620</td>
<td>BEHAVIORAL ECOLOGY</td>
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<td></td>
<td>Theoretical treatment of the factors that have dominated the evolution of</td>
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<td>animal behavior; hypothesis testing emphasized. <strong>PREREQ:</strong> BISC302</td>
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<td>ENWC 622</td>
<td>TOXICOLOGY OF INSECTICIDES</td>
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<td></td>
<td>Principles of insecticide toxicology. Classification, biochemical and</td>
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<td></td>
<td>physiological bases of toxic action, animal and plant metabolism, and</td>
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<td>environmental dynamics of insecticides. <strong>PREREQ:</strong> CHEM213</td>
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<td>ENWC 624</td>
<td>HERPETOLOGY INTRODUCTION</td>
<td>3</td>
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<tr>
<td></td>
<td>Biology and ecology of reptiles and amphibians. Evolution, feeding behavior,</td>
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<td>life history, reproduction, physiology, population structure and dynamics,</td>
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<td>migration and movements, and conservation. <strong>PREREQ:</strong> BISC302</td>
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<td>ENWC 625</td>
<td>MAMMALOGY</td>
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<td>Mammal biology: evolution, feeding, homeostasis, communication and</td>
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<td>reproduction. Natural history and identification of taxa. Occasional field</td>
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<td>trips <strong>PREREQ:</strong> BISC208</td>
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<td><strong>RESTRICTIONS:</strong> Open to graduate students only or by permission of</td>
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<td>instructor.</td>
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<td>ENWC 626</td>
<td>AQUATIC INSECTS</td>
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<td></td>
<td>Biology and systematics of aquatic insects with emphasis on the fauna of North</td>
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<td>America. Collection of immature aquatic insects required.</td>
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<td><strong>PREREQ:</strong> ENWC305</td>
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<td><strong>RESTRICTIONS:</strong> Requires junior status.</td>
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<td>ENWC 630</td>
<td>CLOSE-UP NATURE PHOTOGRAPHY</td>
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<td>Introduction to the principles of close-up and ultra close-up photography of</td>
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<td>natural history subjects. Lens and electronic flash systems for biological</td>
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<td>photography, plus field and indoor techniques. In-class analysis of assigned</td>
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<td>student slides. <strong>RESTRICTIONS:</strong> Requires permission of instructor.</td>
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<td>ENWC 640</td>
<td>INTEGRATED PEST AND DISEASE MANAGEMENT</td>
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<tr>
<td></td>
<td>Introduction to the theory and practice of integrated pest management (IPM),</td>
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<td>especially as it applies to insects and plant pathogens. Integration of cultural,</td>
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<td>biological, host resistance and other management strategies to achieve control</td>
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<td>in an economically and environmentally sound manner. May be cross-listed with</td>
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<td>PLSC640. <strong>PREREQ:</strong> ENWC205 and PLSC303</td>
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ENWC 652 CONSERVATION OF AFRICAN WILDLIFE 3
RESTRICTIONS: Offered only during Winter Session in Tanzania.

ENWC 653 COMMUNITY-BASED CONSERVATION 3
Basic philosophical, economic, and ecological aspects of the bottom-up approach to conservation. Students experience this form of conservation first-hand by living with indigenous 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 result in the natural chemicals produced by plants and insects. Presentation-discussion format.
May be cross-listed with BISC805

ENWC 814 ADVANCED ECOLOGY 3
Interactions 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 868 RESEARCH 1-9

ENWC 887 MASTER'S THESIS 1-6

ENWC 888 TOPICS IN ENTOMOLOGY AND APPLIED ECOLOGY 0 PF
A seminar with lectures on a variety of topics related to entomology and wildlife biology.

ENWC 964 PRE-CANDIDACY STUDY 1-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students. Admission to candidacy depends on completion of all required coursework.
RESTRICTIONS: Not open to students who have been admitted to candidacy

ENWC 969 DOCTORAL DISSERTATION 1-12 PF

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, UFO, FIFO, development of gross margin statement and the effects of cash/trade discounts and cumulative mark-up 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
The second textile course presenting 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 APPLIQUE 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 226 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 DRESS 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 may 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  
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 HRIM 322.

FASH 324  APPAREL DESIGN BY DRAPING  

FASH 325  PRESENTATION TECHNIQUES  
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  
An introduction to advertising and promotion in the fashion industry. Emphasis on the role of advertising and other promotional mix elements that support an integrated marketing communications (IMC) program in the textiles and apparel industry. PREQ: FASH 116, FASH 118, BUAD 310.

FASH 332  FASHION FORECASTING AND DESIGN  
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. PREQ: FASH 233.

FASH 365  FASHION MERCHANDISING AND APPAREL DESIGN SEMINAR  
CP: FASH 328, 332 or 314. Prepares students for a career in fashion retailing. Includes study of visual merchandising, buying, and store planning. May be repeated for credit for different topics. PREQ: FASH 233 or 328 or 332 or 314.

FASH 415  TOPICS IN TEXTILES  
One topic is covered each semester; either fiber science, textile analysis, or textile dyeing and finishing.

FASH 416  MULTI-CHANNEL MERCHANDISING  
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. PREQ: FASH 218, FASH 318.

FASH 418  MERCHANDISE PLANNING  
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. PREQ: FASH 218, BUAD 301, ACCT 207 or FASH 217, and ACCT 160.

FASH 419  SOCIAL PSYCHOLOGICAL ASPECTS OF CLOTHING  
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. PREQ: FASH 114, PSYC 100 and SOCI 201.

FASH 420  ASSORTMENT PLANNING AND BUYING  
Explores how merchandise budgets translate into buying decisions. Emphasis on assortment planning and purchasing. Computer applications are involved. PREQ: FASH 418.

FASH 421  PROFESSIONAL PORTFOLIO DEVELOPMENT  
Conceptualization and development of a professional portfolio of design work. Design conceptualization, fashion illustration, and photo documentation techniques emphasized. PREQ: FASH 424. RESTRICTIONS: Open to apparel design seniors only.

FASH 424  APPAREL COLLECTION DEVELOPMENT  
Conceptualization, design and execution of a coordinated apparel collection. Advances and expands knowledge and skills from previous courses. PREQ: FASH 324.

FASH 426  FUNDAMENTALS OF TEXTILE CONSERVATION  
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  
Topics related to aspects of marketing and promotional activities in the fashion industry. Current practices and trends within the industry are explored. Topics vary. PREQ: FASH 218, BUAD 301.

FASH 433  PRODUCT DEVELOPMENT AND MANAGEMENT  
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 trip. PREQ: FASH 314, FASH 333.

FASH 455  TEXTILES AND APPAREL IN THE GLOBAL ECONOMY  
Overview of the global textile and apparel industries. Examines the United States textile complex and the United States market within an international context. PREQ: FASH 218, ECON 315 or ECON 312.

FASH 465  SEMINAR  
RESTRICTIONS: May be repeated to a maximum of three credits. 1–3 PF.

FASH 466  INDEPENDENT STUDY  
1–6.

FINANCE

FINC 200  FUNDAMENTALS OF FINANCE  
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. RESTRICTIONS: Not open to business administration, finance or accounting degree candidates.

FINC 201  INTRODUCTION TO INVESTMENTS  
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. RESTRICTIONS: Not open to business administration, finance or accounting degree candidates.

FINC 311  PRINCIPLES OF FINANCE  
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. PREQ: ACCT 208. RESTRICTIONS: Requires a grade of C- or better in ACCT 208.

FINC 312  INTERMEDIATE FINANCIAL MANAGEMENT  
Focuses on the role of the corporate financial manager in shareholder wealth maximization. Examines the understanding of material covered in FINC 311 through the application of analytical methods, cases and the effective use of information technology in a contemporary financial environment. PREQ: FINC 311. RESTRICTIONS: Requires a grade of C- or better in FINC 311.

FINC 313  FINANCIAL MARKETS  
Analyzes domestic and international financial markets, and examines the characteristics of market makers such as investment bankers, brokers, and dealers. Describes the financial instruments used in money and capital markets and their relevant risk, liquidity, and risk-return trade-offs. PREQ: FINC 311. RESTRICTIONS: Requires a grade of C- or better in FINC 311.

FINC 392  SEMINAR ON INTERNATIONAL FINANCIAL MANAGEMENT  
Seminar at an overseas location on selected topics in international financial management. Combines lectures and visits to local organizations. Research paper required. PREQ: FINC 311. RESTRICTIONS: Used only as a professional elective for finance majors.

FINC 407  SECURITIES ANALYSIS  
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 and commission, and applications using real-time data. PREQ: FINC 313.
### FINANCE

**FINC 412** **FINANCIAL INSTITUTIONS**
Examines various types of financial institutions. Topics include structure, performance, asset/liability management, regulation and current issues that impact operational structures.
PREREQ: FINC313 and ECON302

**FINC 413** **ADVANCED CORPORATE FINANCE**
Examines such areas as financial theory and practice, financial analysis, financial benchmarking, and small business finance. Topics vary by semester.
PREREQ: FINC312

**FINC 414** **BANK MANAGEMENT**
Examines the management of commercial banks and similar institutions. Topics include funds and capital management, liquidity and credit standards, and lending and trust operations.
PREREQ: FINC412

**FINC 415** **INTERNATIONAL FINANCE**
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.
PREREQ: ECON302 and FINC313

**FINC 416** **ADVANCED INVESTMENTS**
Examines such areas as portfolio theory, stock and bond valuation and management of portfolios, market efficiency, and derivative security pricing. Topics vary by semester.
PREREQ: FINC407

**FINC 417** **REAL ESTATE FINANCE**
Introduces real estate theory and management. Topics include financing, evaluation and property management, housing policy, and governmental regulation and participation.
PREREQ: FINC313

**FINC 418** **SEMINAR IN CORPORATE GOVERNANCE**
Examines current issues in corporate governance. Topics include executive compensation, shareholder resolutions and board of director ownership and accountability.
PREREQ: FINC311.

**FINC 450** **FINANCIAL MANAGEMENT**
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.
PREREQ: ACC3100.

**FINC 451** **CORPORATE FINANCIAL ANALYSIS**
Examines major policymaking 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.
PREREQ: FINC850

**FINC 452** **INVESTMENT ANALYSIS AND PORTFOLIO MANAGEMENT**
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.
PREREQ: FINC850

**FINC 453** **INTERNATIONAL FINANCIAL MANAGEMENT**
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 trade and investments, risk management and working capital management.
PREREQ: FINC850

**FINC 454** **SPECIAL TOPICS IN FINANCE**
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.
PREREQ: FINC850.

**FINC 455** **FINANCIAL INSTITUTIONS AND MARKETS**
Examines the nature, purpose, and management of financial institutions and markets.
PREREQ: FINC850.

**FINC 856** **FINANCIAL ENGINEERING AND RISK MANAGEMENT**
Introduce 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**
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**
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**
Explores issues associated with financing new ventures, focusing on the economics explaining the returns to and characteristics of private equity and bank financing deals involving private companies. Designed for those planning to manage startup 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 Concentration.

### FOREIGN LANGUAGES AND LITERATURES

**FLT 100** **ESSENTIAL FOREIGN LANGUAGE: LANGUAGE**
Basic, practical vocabulary and idiomatic expressions for beginners in the Foreign Language (e.g., French, Spanish, Chinese, Japanese, 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

**FLT 101** **ESSENTIAL FOREIGN LANGUAGE: LANGUAGE**
Basic, practical vocabulary and idiomatic expressions for beginners in the Foreign Language (e.g., French, Spanish, Chinese, Hungarian, Swedish, etc.), and 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.

**FLT 105** **MODERN LANGUAGE I – ELEMENTARY**
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.

**FLT 106** **MODERN LANGUAGE II – ELEMENTARY/INTERMEDIATE**
Completion of the basic modern language. Increasing mastery of the basic skills (speaking, listening, reading and writing). PREREQ: FLT105.

**FLT 107** **MODERN LANGUAGE III – INTERMEDIATE**
Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty.
PREREQ: FLT106.
RESTRICTIONS: Satisfies Arts and Sciences foreign language requirement.

**FLT 202** **BIBLICAL AND CLASSICAL LITERATURE**
See ENGL202 for course description.

**FLT 203** **LANGUAGES OF THE WORLD**
See LING203 for course description.

**FLT 309** **POLITICAL CULTURE BY COUNTRY**
See POSC309 for course description.
RESTRICTIONS: Offered only in conjunction with travel abroad programs. May be repeated for credit when topics vary.

**FLT 316** **CLASSICAL MYTHOLOGY**
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 CMST316.
RESTRICTIONS: Open to first-year students.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>FLIT 320</td>
<td>Varying Authors and Genres</td>
<td>3</td>
<td>Study of the works of one or more outstanding authors or of a special theme</td>
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<td>Taught in English. Topics vary and are announced in registration booklet.</td>
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<tr>
<td>FLIT 321</td>
<td>Topics: Chinese Literature in Translation</td>
<td>3</td>
<td>Study of the works of one or more outstanding authors or of a special theme</td>
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<tr>
<td>FLIT 322</td>
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<tr>
<td>FLIT 324</td>
<td>Topics: French Literature in Translation</td>
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<td>Study of the works of one or more outstanding authors or of a special theme</td>
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<td>FLIT 326</td>
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<td>FLIT 327</td>
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<tr>
<td>FLIT 330</td>
<td>Varying Authors, Themes and Movements</td>
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<tr>
<td>FLIT 331</td>
<td>Introduction to Chinese Films</td>
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<tr>
<td>FLIT 333</td>
<td>Light and Shadow—Japanese Films</td>
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<tr>
<td>FLIT 360</td>
<td>Humanities Colloquium</td>
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<td>FLIT 365</td>
<td>Independent Study</td>
<td>1-6</td>
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<tr>
<td>FLIT 375</td>
<td>Topics: Russian and Soviet Culture in Translation</td>
<td>3</td>
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FLLT 624  SECOND LANGUAGE TESTING  3
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 crosslisted with UNIC624

FLLT 629  METHODS OF TEACHING FOREIGN/SECOND LANGUAGES IN ELEMENTARY SCHOOLS  3
Appropriate teaching methods and techniques for the elementary foreign language classroom. Includes demonstrations by experienced FLES teachers, peer-analysis of videotaped model lessons prepared by participants, and an introduction to testing, materials and course design. May be crosslisted with EDUC606

FLLT 675  VARYING TOPICS: LITERARY CRITICISM IN A FOREIGN LANGUAGE CONTEXT  3
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

FLLT 801  PROFESSIONAL ORIENTATION  3
Provides students in foreign languages and literature with a general introduction to three topics relevant to their graduate career and subsequent employment: 1) research methods and tools; 2) approaches to the literary text; and 3) professional practices.

FLLT 868  RESEARCH  1-12

FOOD SCIENCE

FOSC 102  FOOD FOR THOUGHT  3
Overview of the popular aspects of foods and beverages, including food composition, safety, processing and chemistry. The effect of cultural and social influences on food choice, factors directing marketing and development of new food products, and different food professions will be discussed. Some group work is expected.

FOSC 166  SPECIAL PROBLEM  1-3
FOSC 265  SEMINAR ON FOOD SCIENCE  1
Overview of world supplies, sources of raw materials, broad compositional components of foods, overview of food safety and food processing methods. Introduction to career opportunities and orientation to the profession.

FOSC 266  SPECIAL PROBLEM  1-3
RESTRICTIONS: Contract must have department chair signature. Independent study to involve library or lab research.

FOSC 305  FOOD SCIENCE  3
Composition, structure and functional properties of food and the fundamentals of commercial food processing. Discussion and video demonstrations of various food processing and preservation methods and the effects of ingredient manipulation. May be crosslisted with ANSC305
PREREQ: NTDT201, NTDT211 and CHEM213.

FOSC 328  FOOD CHEMISTRY  4
Composition of food materials, reaction mechanisms leading to deterioration; and 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. May be crosslisted with ANSC328
PREREQ: CHEM214 or CHEM257.

FOSC 329  FOOD ANALYSIS  4
Theory and practice of food analysis. Determine the chemical composition and characteristics of food. Introduction to instrumentation: spectrophotometry, chromatography, electrochemistry, mass spectrometry 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 crosslisted with ANSC329
PREREQ: CHEM214 or CHEM257 and CHEM220.

FOSC 359  TOPICS IN FOOD SCIENCE  1
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.

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

FOSC 399  TEACHING ASSISTANT  1-2 PF
Practical teaching experience. Students participate and assist in instruction of undergraduate course.

FOSC 409  FOOD PROCESSING  4
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 crosslisted with ANSC409.

FOSC 411  FOOD SCIENCE CAPSTONE  4
A team-taught capstone course 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: FOSC328, FOSC329, FOSC409 and FOSC439

FOSC 439  FOOD MICROBIOLOGY  4
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: BISC300

FOSC 445  FOOD ENGINEERING TECHNOLOGY  4
Engineering fundamentals for processing of food materials, including applied thermodynamics and heat transfer principles and operations. May be crosslisted with EGET445
PREREQ: MATH222, and PHYS104 or PHYS201
RESTRICTIONS: Not open to majors in mechanical or chemical engineering.

FOSC 449  FOOD BIOTECHNOLOGY  4
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: BISC300, CHEM214 or CHEM257, or FOSC439

FOSC 464  PRACTICUM IN THE FOOD INDUSTRY  1-3
Provides hands-on supervised field experience 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 industry (off campus) or campus course.

FOSC 466  INDEPENDENT STUDY  1-6
RESTRICTIONS: Contract must have department chair signature. Independent study to involve library or lab research.

FOSC 609  FOOD PROCESSING  4
Rationale 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

FOSC 611  FOOD SCIENCE CAPSTONE  4
A team-taught capstone course 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

FOSC 628  FOOD CHEMISTRY  4
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

FOSC 629  FOOD ANALYSIS  4
Theory and practice of food analysis. Determine the chemical composition and characteristics of food. Introduction to spectroscopy, chromatography, electrochemistry, 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 crosslisted with ANSC629
FOOD AND RESOURCE ECONOMICS

FOSC 639 Food Microbiology 4
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: BISC300

FOSC 645 Food Engineering Technology 4
Engineering fundamentals for processing of food materials, including applied thermodynamics and heat transfer principles and operations. PREREQ: MATH222 and PHYS201.
RESTRICTIONS: Not open to majors in mechanical or chemical engineering.

FOSC 649 Food Biotechnology 4
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.

FOSC 665 Seminar 1-3
FOSC 668 Research 1-6
FOSC 868 Research 1-6
FOSC 869 Master's Thesis 1-6

FOOD AND RESOURCE ECONOMICS

FREC 100 Issues in Natural Resources and the Environment 3
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: Not open to students in the College of Agriculture and Natural Resources.

FREC 110 Introduction to Food and Agribusiness Industry 1
Designed to introduce students to the food and agribusiness industry. The economic structure and importance of the industry will be discussed.

FREC 135 Introduction to Data Analysis 3
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.

FREC 150 Economics of Agriculture and Natural Resources 3
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.

FREC 201 Records and Accounts 3
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.

FREC 212 Food Retailing and Consumer Behavior 3
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.

FREC 240 Quantitative Methods in Agricultural Economics 3
Basic quantitative applications of agricultural economics principles and theory. PREREQ: MATH115; and FREC150 or ECON151

FREC 270 Biotech: Science and Socioeconomic Issues 3
See ANSC270 for course description.

FREC 302 Management of Agribusiness Firms 3
Principles and practical problems of firm management (decision-making) and planning. PREREQ: FREC150 or ECON151.
RESTRICTIONS: Not open to freshmen or sophomores except by permission of instructor.

FREC 305 Management and Leadership Development 3
Exposes students to food and agribusiness human resource management and employee development. Emphasis on the functions of management, leadership principles, effective supervision, training programs, employee and management appraisal systems, role of minorities in management and ethics in management.

FREC 316 Economics of Biotechnology and New Technologies 3
Introduction to the economic explorations for new technologies, innovation and adoption. Biotechnology issues include consumer acceptance, labeling, risk assessment, market structure, trade, patents and the environment. Other current technologies and the future are examined.

FREC 335 Advanced Data Management 3
Advanced use of microcomputer systems and application software used in agricultural sciences. PREREQ: FREC135

FREC 345 Strategic Selling and Buyer Communication 3
Application of strategic selling techniques to actual selling situations. Focus on technical and personal sales. Involves extensive use of videos, case problems, sales presentations and traveling with sales professionals.

FREC 350 Farm Management 3
Basis and conditions for agricultural production, farm planning and analysis, management of crop and production, investments and financial problems and management of labor. PREREQ: FREC150 and FREC201 or ACCT207.
RESTRICTIONS: Designed for students without farm background.

FREC 366 Independent Study 1-6

FREC 404 Food and Fiber Marketing 3
System approach to food and fiber marketing analysis: consumer, retail, processor, wholesale and farm level. Domestic and foreign demand and supply and analysis, pricing, marketing costs, food safety, market power and its sources. Physical distribution, and structure of the food and fiber marketing system.

FREC 406 Agricultural and Natural Resource Policy 3
Agricultural and natural resource policy formation, effects of policy on resource allocation and economics of alternative programs. Analysis of effects of various programs on producers, consumers and taxpayers, especially contemporary issues and market failures. PREREQ: FREC150 or ECON151.

FREC 408 Statistical Research Methods I 3
Descriptive and inferential statistics in agribusiness and biological applications focusing on hypothesis testing, multiple regression, and analysis of variance techniques.

FREC 409 Research Methods II 3
Quantitative methodologies focusing on market survey research techniques; forecasting methods including exponential smoothing, trend analysis and regression analysis; aggregate production planning; just-in-time inventory management and materials requirement planning.

FREC 410 International Agricultural Trade and Marketing 3
Trade theories and market analysis techniques necessary for implementing international agribusiness marketing operations. Various trade intervention schemes, export readiness, market entry sources of market intelligence and market analysis techniques will be emphasized. Case studies are used to reinforce concepts and integrate major topics presented. PREREQ: FREC150 or ECON151.

FREC 412 Strategic Marketing Competition 1-3
Strategic marketing of a new food or fiber product/service. Development of a marketing plan and communicating the plan effectively in local and national competition. PREREQ: FREC312.
RESTRICTIONS: Requires permission of instructor.

FREC 420 Agriculture in Economic Development 3
Process of increasing agricultural productivity and food supply in developing nations. Rural resource adjustment problems at various stages of industrialization. Role of foreign trade in development process.

FREC 424 Resource Economics 3
Theoretical allocation of exhaustible and renewable resources over time, concepts of social welfare and depletion, and review of market failures and contemporary resource management issues. PREREQ: FREC150 or ECON151.
FREC 427  **AGRICULTURAL FINANCIAL MANAGEMENT**  3
Study of the principles and tools of finance to identify and solve agricultural financial management problems through the application of quantitative analytical methods and problem-solving techniques.
PREREQ: FREC201 or ACCT107 and a statistics course.

FREC 429  **COMMUNITY ECONOMIC DEVELOPMENT**  3
Community economic development in the United States; application of economic principles regarding industrial location, land use, environmental protection, and economic growth and public service provision; and economic development policies.
PREREQ: FREC150 or ECON151.

FREC 430  **ESTABLISHING AND MANAGING A FOOD AND AGRIBUSINESS ENTERPRISE**  3
Analysis of the necessary factors to consider in initiating a food and agribusiness enterprise. Including strategic marketing concepts, competitive, communication, site, and financial strategies, management structure and legal forms of small businesses, etc. Involves case studies and writing a business plan.
RESTRICTIONS: Requires permission of instructor.

FREC 444  **ECONOMICS OF ENVIRONMENTAL MANAGEMENT**  3
Review of benefit-cost analysis and welfare theory; techniques for evaluating environmental amenities; the evolution of environmental legislation; and review of case studies of environmental conflicts.
PREREQ: FREC150 or ECON151.

FREC 450  **TOPICS IN ENVIRONMENTAL LAW**  3
Overview of the legal process and environmental laws in order to understand policy issues and learn action processes in the environmental field.
May be cross-listed with LEST450.

FREC 464  **AGRICULTURAL INTERNET**  1-3
Practical experience acquired by working with corporate and government institutions. Internship sponsor, performance evaluation, and written reports are required.
RESTRICTIONS: A maximum of three credits may be applied to the B.S. in Agriculture with a major in Food and Agribusiness Management.

FREC 465  **SEMINAR**  1
Oral and written reports in the subdisciplines of food and resource economics.

FREC 466  **INDEPENDENT STUDY**  1-6

FREC 471  **FUTURES AND OPTION MARKETS**  4
Analysis of futures and option markets of agricultural and nonagricultural commodities. Hedging and speculative theory and techniques, cash and futures price relationships. Students trade commodities via a satellite information system.
May be cross-listed with ECON471.
PREREQ: FREC404 or ECON300 or ECON301.

FREC 480  **GEODETIC INFORMATION SYSTEMS IN NATURAL RESOURCE MANAGEMENT**  4
Introductory hands-on training in geographic information systems for environmental and natural resource management.

FREC 484  **STATISTICAL RESEARCH METHODS**  3
Experimental design and plot plans, collection, analysis and presentation of data in agricultural and biological research.
May be cross-listed with STAT608.

FREC 611  **REGIONAL WATERSHED MANAGEMENT**  3
See UAPP611 for course description.

FREC 615  **ADVANCED PRICES AND STATISTICS**  3
Statistical tools used in agricultural economics research and operations research. Introduction to econometric specifications, estimation and interpretation.
May be cross-listed with ORES615.

FREC 674  **APPLIED DATA MANAGEMENT**  3
Provides an in-depth understanding of using computers to manage data using programs such as SAS and Microsoft Access.
May be cross-listed with STAT674.
RESTRICTIONS: Requires permission of instructor.

FREC 682  **SPECIALIZED ANALYSIS OF NATURAL RESOURCES**  3
Advanced hands-on training in geographic information systems and spatial statistics for environmental and natural resource management.
PREREQ: FREC480.

FREC 801  **APPLIED DEMAND AND MARKETING ANALYSIS**  3
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.

FREC 806  **RESEARCH TECHNIQUES AND PROCEDURES**  3
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.

FREC 810  **INTERNATIONAL AGRICULTURAL TRADE SPECIAL TOPICS**  3
Advanced theory, issues and policies in international agricultural trade emphasizing international finance and agriculture, agricultural trade and development, empirical and methodological issues and international marketing.
May be cross-listed with ORES810.

FREC 826  **ISSUES IN DOMESTIC AND FOREIGN RURAL DEVELOPMENT**  3
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.

FREC 827  **ADVANCED PRODUCTION ECONOMICS**  3
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.

FREC 834  **SEMINAR IN RESOURCE ECONOMICS**  3
Quantitative analyses of natural resource markets, resource depletion and the design of optimal management strategies.
May be cross-listed with ORES834.

FREC 868  **RESEARCH**  1-9

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

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**FRENCH**

FREN 101  **ELEMENTARY FRENCH I**  3
Introduction to the French language and development of speaking, listening, reading and writing skills through the use of basic texts.

FREN 102  **ELEMENTARY FRENCH II**  3
Completion of basic French.
PREREQ: FREN101 or FREN105.

FREN 105  **FRENCH I — ELEMENTARY**  4
Introduction to the French language and development of speaking, listening, reading and writing skills through the use of basic texts.

FREN 106  **FRENCH II — ELEMENTARY/INTERMEDIATE**  4
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.

FREN 107  **FRENCH III — INTERMEDIATE**  4
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.

FREN 111  **INTERMEDIATE FRENCH I**  3
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 Prereq.

FREN 112  **INTERMEDIATE FRENCH II**  3
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 Prereq. Satisfies Arts and Sciences foreign language requirement.

FREN 200  **GRAMMAR AND COMPOSITION**  3
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.
FREN 205 FRENCH CONVERSATION 3
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: FREN 117 or any other 200-level course
RESTRICTIONS: Not intended for native speakers of French

FREN 206 CULTURE THROUGH CONVERSATION 3
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: FREN 117 or any other 200-level course
RESTRICTIONS: Taught in France

FREN 207 THE CONTEMPORARY CARIBBEAN WORLD 3
Introduction to the contemporary Caribbean world, the culture, its people, their way of life, and the issues confronting them. The specific focus of the course will be Martinique.
RESTRICTIONS: Taught in English during Winter Session abroad Not for major credit

FREN 208 CONTEMPORARY FRANCE I 3
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

FREN 209 FRENCH CONVERSATION THROUGH FILM 3
Development of oral proficiency in French through discussion and analysis of major French films. Some written work and grammar review where appropriate.
PREREQ: FREN 117 or any other 200-level course
RESTRICTIONS: Minimum grade of B required for prerequisites

FREN 211 FRENCH READING AND COMPOSITION 3
Reading and discussion of French literature. Frequent compositions. Grammar review where appropriate.
PREREQ: FREN 200 with a minimum grade of C or FREN 117 with a minimum grade of A- or FREN 112 with a minimum grade of A-

FREN 250 INTRODUCTION TO BUSINESS FRENCH 3
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

FREN 255 FRANCE IN THE NEWS 3
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 FREN 117 or FREN 112 with a minimum grade of A

FREN 301 INTRODUCTION TO FRENCH LITERATURE: PROSE 3
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: FREN 211 and any 200-level course taught in the French language

FREN 302 INTRODUCTION TO FRENCH LITERATURE: POETRY AND THEATRE 3
Selected readings, with discussion and analysis, of the various genres of poetry (lyric, epic, narrative) and theatre (comedy, tragedy, drama) from the middle ages to the present.
PREREQ: FREN 211 and any 200-level course taught in the French language

FREN 305 FRENCH CONVERSATION AND COMPOSITION 3
Discussion of cultural, social and political topics in French-speaking countries. Vocabulary building, grammar exercises and compositions.
PREREQ: FREN 205 and any other 200-level course in French
RESTRICTIONS: Not intended for native speakers of French

FREN 306 PRACTICAL ORAL/WRITTEN EXPRESSION 3
Strengthens grammar and vocabulary skills in preparation for advanced courses. Class exercises include oral exercises, discussion of articles and videos, textual analysis and compositions.
PREREQ: Any two 200-level French courses conducted in French
RESTRICTIONS: Taught abroad only

FREN 308 CONTEMPORARY FRANCE II 3
Discussion and study of issues related to contemporary cultural, political and social developments in France, including its place in today's European community.
PREREQ: Any two 200-level French courses taught in the French language
RESTRICTIONS: 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 FREN 250

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 discourse 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 FREN 114

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: Course 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, Montesquieu, Voltaire, Corneille, Mme 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 Prévost, Rousseau, Hugo, Flaubert, Baudelaire, Gide, Proust, Camus, Sarre, Jousset, 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 Molière.
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, Mme. 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, Voltaire and others.
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 Cherrier.
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, Sarratue, Perec, Tourner, Duras, Ponge, Bonnefoi, Jacottet 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 lens of such masters as Vigo, Gance, Pagnol, Kienor, 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 emphasis on staging and performance. Class activities include dramatic readings, improvisation, and exercises to improve diction. Course may culminate in a public presentation of the students' work.
PREREQ: Any two 300-level French literature courses.

FREN 457 THE FRANCOPHONE WORLD 3
Study of the social, cultural, political aspects of the francophone world (Maghreb, West Sub-Saharan Africa, the Caribbean, Quebec, regions of the Indian and Pacific Oceans) as well as the Ber or Maghrebi immigrants' phenomenon in the French suburbs, through theoretical texts, films, music.
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, CREOLITE 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
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.

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, Molieres, Corneille, Mme de Lafayette, Montesquieu, Voltaire and others.

FREN 612 GREAT FRENCH AUTHORS II: 1750-PRESENT 3
Selected readings of master authors and works from the dawn of Romanticism to the present. Authors may include Proust, Rousseau, Hugo, Flaubert, Baudelaire, Gide, Proust, Camus, Sartre, Ionesco, Beckett, Duras and others.

FREN 623 FRENCH MEDIEVAL LITERATURE 3
Survey of French literature to 1500.

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 Moliere.

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 Voltaire, Rousseau, Beaumarchais and Cherrier.

FREN 642 THE EIGHTEENTH CENTURY: THE AGE OF ROUSSEAU 3
Novels, plays, essays and poetry of such authors as Diderot, Rousseau, Beaumarchais and Cherrier.

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, Sarratue, Perec, Tourner, Duras, Ponge, Bonnefoi, Jacottet and Barthes.
PREREQ: Any two 300-level French literature courses.

FREN 653 CONTEMPORARY FRENCH CIVILIZATION 3
Culture, customs and political and economic life in France since 1958.
PREREQ: Any two 300-level French courses.

FREN 655 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, ANTILLANITE, CREOLITE 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: GEOG 101

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 exchange of energy and mass between the atmosphere and both vegetation and built environments; and the influence of climate on humans and human on climate.

GEOG 166 Special Problem 1-3

GEOG 203 Introduction to Cultural Geography 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 210 Economic 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 220 Meteorology 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 in Geography 4
Introduces and describes methods of practical digital computing for use in geographic research. Main topics include elementary FORTRAN programming and the utilization of library programs, particularly mapping packages.

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 Map Communication and Design 3
History, design and use of maps as tools for effective communication of geographic ideas.

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
The environment is defined, arranged and experienced differently by different social groups. 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. RESTRICTIONS: Not intended for freshmen.

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 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 POSC 329 for course description.

GEOG 330 Biogeography 3
Interactions among environmental, biological and cultural processes that have led to present landscapes. Field trip required.

GEOG 342 Bioclimatology 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. PREREQ: GEOG 330 and GEOG 250.

GEOG 343 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. PREREQ: GEOG 100 or GEOG 105/115 or GEOG 107.

GEOG 345 Cultural Geography 3
Broad principles of the field. Human mobility and status. Material and symbolic landscapes. Individual and group values in landscape formation and change.

GEOG 346 Urban Cultural Geography 3
City landscapes as expressions of attitudes and ideals. Oriental and Western; classical, modern and future. Humanizing the urban landscape.

GEOG 357 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. PREREQ: GEOG 101 or GEOG 152 or GEOG 220.

GEOG 366 Independent Study 1-6

GEOG 372 Geographic Information Systems 3
Geographic Information Systems (GIS) are a rapidly growing computer-based technology for storage and analysis of spatial information. GIS technology has been used in a variety of municipal, utility and natural resource applications. Course considers the history, uses, technology and implementation issues associated with GIS.

GEOG 385 Geomorphology 4
See GEOG 385 for course description.

GEOG 390 Honors Colloquium 3
See ARSC 315 for description. May be cross-listed with POSC 390.

GEOG 411 Fluvial Geomorphology 3
See GEOG 411 for course description.

GEOG 412 Physical Climatology 4
Energy and moisture exchange between the atmosphere and land surface for characteristic natural and human-modified environments. PREREQ: MATH 241 and GEOG 250.

GEOG 417 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: GEOG 101 or GEOG 152 or GEOG 220 or equivalent.
evapotranspiration, runoff and streamflow will be examined. The development of the climatic water budget and its use in understanding the relationship to economic development and the global environment. The main objective is to engage students in discussion and debate on sustainable development policies. May be cross-listed with UAPP622.

GEOG 623 ATMOSPHERIC DYNAMICS
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
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 need to conserve and enhance environmental and cultural resources. May be cross-listed with UAPP628.

GEOG 635 THE EVOLUTION OF THE AMERICAN URBAN LANDSCAPE
See UAPP635 for course description.

GEOG 636 RESEARCH TOPICS IN HISTORIC PRESERVATION
See UAPP636 for course description.

GEOG 638 WORLD CITIES IN COMPARATIVE PERSPECTIVE
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
The nature of geography, its history, methodology and applications in research and societal problems. A preprofessional course.

GEOG 649 ENVIRONMENT AND SOCIETY
Considers the relationships between environmental and social processes from a theoretical, philosophical, and methodological perspective of geography. Explores the ethical and contextual implications implied in framing environmental questions and posting solutions. Examines approaches to the geographical analysis of environmental problems.

GEOG 651 MICROCLIMATOLOGY
Introduction to instrumentation and techniques involved in microclimatic monitoring and sampling. Field observation carried out in varying environmental situations. PREREQ: GEOG412 or GEOG612.

GEOG 652 SEMINAR IN CLIMATOLOGY
General theoretical and practical considerations of research in climatology. RESTRICTIONS: Requires permission of instructor.

GEOG 653 SYNOPTIC CLIMATOLOGY
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 synoptic techniques for environmental analysis. PREREQ: GEOG220.

GEOG 654 NEW EUROPE: CULTURE, GEOPOLITICS, MILIEU
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 655 WATER BUDGET IN ENVIRONMENTAL ANALYSIS
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
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
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
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
Commerical geographic 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
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
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 radiance 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
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. Fourier programs developed and used. PREREQ: GEOG250.

GEOG 681 REMOTE SENSING OF ENVIRONMENT
See MAST681 for course description.

GEOG 682 PHYSICAL GEOGRAPHY OF COLD ENVIRONMENTS
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 GEOG682.

GEOG 803 TOPICS IN GEOFORPHOLOGY
See GEOG803 for course description.

GEOG 855 CLIMATOLOGICAL RESEARCH
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 946 PRE-CANDIDACY STUDY
3-12 PF

Research and readings in preparation of a 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 999 DOCTORAL DISSERTATION
1-12 PF
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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>GEOL 108</td>
<td>Volcanoes and Earthquakes</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 109</td>
<td>Planets, Asteroids and Impacts</td>
<td>3</td>
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<tr>
<td>GEOL 110</td>
<td>Earth History; Evolution, Extinction and the Geological Record</td>
<td>3</td>
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<tr>
<td>GEOL 111</td>
<td>Geology of Delaware and Its Neighbors</td>
<td>3</td>
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<tr>
<td>GEOL 112</td>
<td>Earth Resources and Public Policy</td>
<td>3</td>
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<tr>
<td>GEOL 113</td>
<td>Earth Surface</td>
<td>4</td>
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<tr>
<td>GEOL 300</td>
<td>The Earth's Materials in Minerals</td>
<td>4</td>
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<tr>
<td>GEOL 301</td>
<td>Systematic and Evolutionary Paleontology</td>
<td>3</td>
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<td>GEOL 302</td>
<td>The Earth's Materials II: Rocks</td>
<td>4</td>
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<td>GEOL 303</td>
<td>The Earth's Surface II: Surficial Processes</td>
<td>4</td>
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<td>GEOL 304</td>
<td>The Earth's Surface II: Stratigraphy</td>
<td>4</td>
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<tr>
<td>GEOL 305</td>
<td>The Earth's Lithosphere I: Structural Geology and Plate Tectonics</td>
<td>4</td>
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<td>GEOL 306</td>
<td>The Earth's Lithosphere II: Field Geology</td>
<td>4</td>
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<tr>
<td>GEOL 307</td>
<td>The Earth's History I: Paleobiology</td>
<td>4</td>
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<tr>
<td>GEOL 308</td>
<td>The Earth's History II: Earth System Science</td>
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<td>GEOL 366</td>
<td>Independent Study</td>
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<td>GEOL 385</td>
<td>Geomorphology</td>
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<td>GEOL 401</td>
<td>Senior Seminar: Topics in Geoscience</td>
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<td>Introduction to Research</td>
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<td>GEOL 411</td>
<td>Fluvial Geomorphology</td>
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<td>GEOL 412</td>
<td>Geological Approaches to Archaeology and History</td>
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<td>GEOL 416</td>
<td>Paleocology</td>
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<td>Environmental and Applied Geology</td>
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<td>GEOL 422</td>
<td>OSHA 40-Hour Hazardous Materials Safety Training</td>
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<td>Hydrogeology</td>
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<td>Marine Geology</td>
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<td>GEOL 434</td>
<td>Geology of Coasts</td>
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<td>General Geochemistry</td>
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<td>GEOL 454</td>
<td>Elementary Geophysics II</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>Topics in Middle School Geology Education: Earth History</td>
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<td>GEOL 601</td>
<td>Geological Sciences at Delaware</td>
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<td>GEOL 602</td>
<td>Case Studies of Near Surface Geologic Systems</td>
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<td>Numerical Modeling of Near Surface Geologic Systems</td>
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<td>Field Methods - Near Surface Geologic Systems</td>
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<td>GEOL 605</td>
<td>Stratigraphy</td>
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<td>GEOL 607</td>
<td>Petrology</td>
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<td>GEOL 611</td>
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<td>Environmental and Applied Geography</td>
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<td>GEOL 646</td>
<td>General Geochemistry</td>
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<td>GEOL 650</td>
<td>Clay Mineralogy</td>
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<td>GEOL 653</td>
<td>Elementary Geophysics I</td>
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<td>GEOL 654</td>
<td>Elementary Geophysics II</td>
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<tr>
<td></td>
<td>Gravity and the shape of the earth, theories of</td>
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<tr>
<td></td>
<td>isostasy. Geomagnetism, magnetization of rocks</td>
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<tr>
<td></td>
<td>and paleomagnetism. Gravity and magnetic surveys</td>
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<td></td>
<td>and interpretations. Electrical and radioactive</td>
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<td></td>
<td>surveying and well logging.</td>
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<td>GEOL 657</td>
<td>Statistics for Earth Sciences</td>
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<td>See STAT 657 for course description.</td>
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<td>GEOL 682</td>
<td>Physical Geography of Cold Environments</td>
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<td>See GEOG 682 for course description.</td>
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<td>GEOL 801</td>
<td>Topics in Planetaryastrology</td>
<td>1-3</td>
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<tr>
<td></td>
<td>Selected topics in planetology. Topics vary</td>
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<td></td>
<td>according to instructor’s preference. RESTRICTIONS:</td>
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<td></td>
<td>May be taken more than once for graduate credit.</td>
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<tr>
<td>GEOL 802</td>
<td>Topics in Geophysics</td>
<td>1-3</td>
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<td></td>
<td>Selected topics in geophysics. Topics vary</td>
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<td>according to instructor’s preference. RESTRICTIONS:</td>
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<td>May be taken more than once for graduate credit.</td>
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<tr>
<td>GEOL 803</td>
<td>Topics in Geomorphology</td>
<td>1-3</td>
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<td></td>
<td>Selected topics in geomorphology. Topics vary</td>
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<td>according to instructor’s preference. RESTRICTIONS:</td>
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<td>May be taken more than once for graduate credit.</td>
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<tr>
<td>GEOL 804</td>
<td>Topics in Geochemistry</td>
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<td></td>
<td>Selected topics in geochemistry. Topics vary</td>
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<td>according to instructor’s preference. RESTRICTIONS:</td>
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<td></td>
<td>May be taken more than once for graduate credit.</td>
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<tr>
<td>GEOL 807</td>
<td>Topics in Mineralogy and Petrology</td>
<td>1-3</td>
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<tr>
<td></td>
<td>Selected topics in mineralogy and petrology.</td>
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<td>Topics vary according to instructor’s preference.</td>
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<td>RESTRICTIONS: May be taken more than once for</td>
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<td>graduate credit.</td>
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<td>GEOL 808</td>
<td>Topics in Structural Geology</td>
<td>1-3</td>
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<td></td>
<td>Selected topics in structural geology. Topics</td>
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<td>vary according to instructor’s preference.</td>
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<td>RESTRICTIONS: May be taken more than once for</td>
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<td>graduate credit.</td>
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<tr>
<td>GEOL 809</td>
<td>Topics in Sedimentology and Stratigraphy</td>
<td>1-3</td>
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<tr>
<td></td>
<td>Selected topics in sedimentology and stratigraphy</td>
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<td></td>
<td>Topics vary according to instructor’s preference.</td>
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<td>RESTRICTIONS: May be taken more than once for</td>
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<td>graduate credit.</td>
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<tr>
<td>GEOL 818</td>
<td>Topics in Paleobiology</td>
<td>1-3</td>
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<td></td>
<td>Selected topics in paleobiology. Topics vary</td>
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<td>according to instructor’s preference. RESTRICTIONS:</td>
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<td>May be taken more than once for graduate credit.</td>
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<tr>
<td>GEOL 857</td>
<td>Paleogeochronology</td>
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<td></td>
<td>See MAST 857 for course description.</td>
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<td>RESTRICTIONS: Requires permission of instructor.</td>
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<tr>
<td>GEOL 868</td>
<td>Research</td>
<td>1-9</td>
</tr>
<tr>
<td></td>
<td>Enables students to begin planning work and</td>
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<td></td>
<td>research before admission to dissertation</td>
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<td></td>
<td>candidacy and GEOG 699.</td>
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<tr>
<td>GEOL 869</td>
<td>Master's Thesis</td>
<td>1-6</td>
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<td>GEOL 964</td>
<td>Pre-Candidacy Study</td>
<td>3-12 PF</td>
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<tr>
<td></td>
<td>Research and readings in preparation of</td>
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<td></td>
<td>dissertation topic and/or qualifying</td>
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<td>examinations for doctoral students before</td>
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<td>admission to candidacy but after</td>
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<td></td>
<td>completion of all required course work.</td>
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<td>RESTRICTIONS: Not open to students who have</td>
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<td></td>
<td>been admitted to candidacy.</td>
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<tr>
<td>GEOL 969</td>
<td>Doctoral Dissertation</td>
<td>1-12 PF</td>
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<tr>
<td>GREK 104</td>
<td>Elementary Ancient Greek I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Prepares students to read ancient Greek literary</td>
<td></td>
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<tr>
<td></td>
<td>works in the original language.</td>
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<tr>
<td></td>
<td>Emphasizes building a basic vocabulary and</td>
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<td></td>
<td>acquiring essential grammar.</td>
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<td></td>
<td>Includes discussion of ancient Greek culture</td>
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<td></td>
<td>and civilization.</td>
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<tr>
<td>GREK 105</td>
<td>Elementary Ancient Greek II</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Completion of elementary Greek.</td>
<td></td>
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<tr>
<td></td>
<td>PREREQ: GREK 101 or equivalent.</td>
<td></td>
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<tr>
<td>GREK 213</td>
<td>Plato</td>
<td>3</td>
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<tr>
<td></td>
<td>Introduction to reading ancient Greek literature</td>
<td></td>
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<tr>
<td></td>
<td>in the original language, focusing on the</td>
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<tr>
<td></td>
<td>philosophical works of Plato.</td>
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<td>PREREQ: GREK 102.</td>
<td></td>
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<tr>
<td>GREK 214</td>
<td>Homer</td>
<td>3</td>
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<tr>
<td></td>
<td>Readings from the epic of Homer in the original</td>
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<tr>
<td></td>
<td>language with review of grammar and syntax.</td>
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<td>PREREQ: GREK 213.</td>
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<td>RESTRICTIONS: Satisfies College of Arts and</td>
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<td></td>
<td>Sciences language requirement.</td>
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<tr>
<td>GREK 366</td>
<td>Independent Study</td>
<td>1-3</td>
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<tr>
<td>GREK 368</td>
<td>Independent Study</td>
<td>1-3</td>
</tr>
<tr>
<td>German</td>
<td></td>
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</tr>
<tr>
<td>GRMN 101</td>
<td>Elementary German I</td>
<td>3</td>
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<tr>
<td></td>
<td>Introduction to the German language and a</td>
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<td></td>
<td>development of speaking, listening, reading</td>
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<td></td>
<td>and writing skills through the use of basic</td>
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<td></td>
<td>texts.</td>
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<tr>
<td>GRMN 102</td>
<td>Elementary German II</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Completion of basic German.</td>
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<tr>
<td></td>
<td>PREREQ: GRMN 101 or GRMN 105.</td>
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<tr>
<td>GRMN 105</td>
<td>German I - Elementary</td>
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<td>Introduction to the German language and</td>
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<td>development of speaking, listening, reading</td>
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<td>and writing skills through the use of basic</td>
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<td>texts.</td>
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<tr>
<td>GRMN 106</td>
<td>German II - Elementary/Intermediate</td>
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<tr>
<td></td>
<td>Completion of basic German.</td>
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<td>PREREQ: GRMN 105.</td>
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<tr>
<td></td>
<td>RESTRICTIONS: Two to three years of high school</td>
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<td>German acceptable in lieu of prerequisite.</td>
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<td>GRMN 107</td>
<td>German III - Intermediate</td>
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<tr>
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<td>Review of grammar.</td>
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<td></td>
<td>Continued practice in speaking and writing,</td>
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<td></td>
<td>reading texts of average difficulty. PREREQ:</td>
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<td>GRMN 106.</td>
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<td>RESTRICTIONS: Four years of high school</td>
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<td>German acceptable in lieu of prerequisite.</td>
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<td>Satisfies College of Arts and Sciences language</td>
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<tr>
<td>GRMN 111</td>
<td>Intermediate German I</td>
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<tr>
<td></td>
<td>Review of grammar.</td>
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<td></td>
<td>Increasing mastery of the basic skills of</td>
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<td>speaking, listening, reading and writing.</td>
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<td>PREREQ: GRMN 102 or GRMN 106.</td>
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<td>RESTRICTIONS: Three years of high school</td>
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<td>German acceptable in lieu of Prereq.</td>
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<tr>
<td>GRMN 112</td>
<td>Intermediate German II</td>
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<tr>
<td></td>
<td>Continued practice in speaking and writing,</td>
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<td></td>
<td>reading texts of average difficulty, grammar</td>
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<td>review as needed.</td>
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<td>PREREQ: GRMN 111.</td>
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<td></td>
<td>RESTRICTIONS: Four years of high school</td>
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<td>German acceptable in lieu of Prereq. Satisfies</td>
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<tr>
<td>GRMN 200</td>
<td>German Grammar Review</td>
<td>3</td>
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<tr>
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<td>Systematic review of elementary and</td>
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<td>intermediate German grammar.</td>
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<td>Emphasis on grammar.</td>
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<td>Conversational practice.</td>
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<td>PREREQ: GRMN 107.</td>
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<td>RESTRICTIONS: Not intended for students who</td>
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<td>have already taken a 300 or 400-level course</td>
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<td></td>
<td>in German.</td>
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<tr>
<td>GRMN 205</td>
<td>German Conversation</td>
<td>3</td>
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<tr>
<td></td>
<td>Practical use of German by means of oral</td>
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<td>reports and discussions.</td>
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<td>Emphasis on improvement of basic</td>
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<td></td>
<td>conversational skills.</td>
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<td></td>
<td>Grammar review where appropriate, and/or some</td>
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<td>written work.</td>
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<td>PREREQ: GRMN 107 or one 200-level German course</td>
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<td>RESTRICTIONS: Prerequisites require minimum</td>
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<td>grade of B. Not intended for students who</td>
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<td>have already taken a 300 or 400-level course</td>
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<td>GRMN 206</td>
<td>Culture Through Conversation</td>
<td>3</td>
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<td>Discussion of topics drawn from contemporary</td>
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<td>German life. Designed for students who</td>
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<td>wish to broaden their knowledge of German</td>
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<td>culture while improving their oral and aural</td>
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<td>language skills.</td>
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<td>PREREQ: GRMN 107.</td>
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<td>RESTRICTIONS: Taught abroad only.</td>
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<tr>
<td>GRMN 208</td>
<td>Contemporary Germany I</td>
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<td>An introduction to contemporary Germany, its</td>
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<td>culture, its people, their way of life and the</td>
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<td>issues confronting them.</td>
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<td>RESTRICTIONS: Taught abroad only, in both</td>
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<td>English and German. Not for major</td>
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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: GRMN 107
RESTRICTIONS: Not intended for students who have already taken a 300 or 400-level course in German.

GRMN 235 GERMAN POPULAR CULTURE 3
Examines aspects of German popular culture, especially youth culture: customs, attitudes, pastimes, audio, print and visual media preferred by German young adults. Students exposed to colloquial German used within everyday contexts. PREREQ: GRMN 107

GRMN 255 GERMANY IN THE NEWS 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 exercises, 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. Taught in German.

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: Taught abroad only. Taught in German.

GRMN 340 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
1-3

GRMN 406 ADVANCED GERMAN LANGUAGE 3
Grammatical structure and stylistics with special attention given to technical vocabulary and discourse. 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 "chivalry," "bourgeoisie" vs "peasantry," during the Reformation. PREREQ: Two of GRMN 311, GRMN 355 and any 300-level German course.

GRMN 422 AGE OF GOTEHE 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 GRMN 311, GRMN 355 and any 300-level German course.

GRMN 433 NINETEENTH-CENTURY GERMAN LITERATURE 3
Studies major literary trends and figures (Heine, Buechner, Drose-Huelshoff, Grillparzer, Hebbel, Keller, Stifter, Storm and Nietzsche) from the end of the Enlightenment to Naturalism. PREREQ: Two of GRMN 311, GRMN 355 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 Hofmannsthals, Rilke, Lasker-Schuler, and others; narrative prose including Thomas Mann and Kafka. PREREQ: Two of GRMN 311, GRMN 355 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, Gross, Frisch, Duerrenmatt, Bachmann, 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 GRMN 311, GRMN 355 and any 300-level German course. RESTRICTIONS: May be repeated for credit when topics vary.

GRMN 465 POSTWALL GERMAN 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. PREREQ: Two of GRMN 311, GRMN 355 and any 300-level German course.

GRMN 466 INDEPENDENT STUDY 1-3
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 "chivalry," "bourgeoisie" vs "peasantry," during the Reformation. PREREQ: Two of GRMN 311, GRMN 355 and any 300-level German course. RESTRICTIONS: May be repeated for credit when topics vary.

GRMN 633 NINETEENTH-CENTURY GERMAN LITERATURE 3
A study of major literary trends and figures (Heine, Buechner, Drose-Huelshoff, Grillparzer, Hebbel, Keller, Stifter, Storm and Nietzsche) from the end of the Enlightenment 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 Hofmannsthals, Rilke, Lasker-Schuler 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, Gross, Frisch, Duerrenmatt, Bachmann, Handke and Christa Wolf.

GRMN 655 SELECTED AUTHORS, WORKS AND THEMES 3
Works of one or more outstanding authors or a special theme. PREREQ: Two of GRMN 311, GRMN 355 and any 300-level German course. RESTRICTIONS: May be repeated for credit when topics vary.

GRMN 665 POSTWALL GERMAN 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
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.
HEBREW

HEBR 103 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 JWST 103.

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 JWST 106. PREREQ: HEBR 103. Those with background other than HEBR 103 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 JWST 107. PREREQ: HEBR 106. Those with background other than HEBR 106 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 competence 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 JWST 205. PREREQ: HEBR 107 or equivalent.

HEBR 366 INDEPENDENT STUDY  1-3

HEBR 466 INDEPENDENT STUDY  1-6

HUMAN SERVICES, EDUCATION AND PUBLIC POLICY

HEPP 100 INTRODUCTORY SEMINAR  3
Introduces students to the academic disciplines represented in the College of Human Services, Education and Public Policy. Possible opportunities for service learning and career opportunities are also explored.

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 examines methods that allow these subjects to be taught effectively. May be cross-listed with ECON 102 and/or POSC 102.

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 non-profit setting as part of the Human Services, Education and Public Policy major. Course credit 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: IPS 270 and EDUC 230.

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.

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 Automatic 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 only.

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 will be 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, Tumbling and Gymnastics** 1
Provides future physical education teachers with the ability to teach a unit in gymnastics, covering skills, techniques and knowledge in gymnastics activities including the balance beam, uneven bars, vaulting horse, tumbling, parallel bars and rings.

HESC 133 **Personal Health Management: An Approach for a Lifetime** 3
Utilizing group problem solving techniques and online resources, students will 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 Management** 3
Issues surrounding health behavior management, with emphasis on the role of the professional in promoting individual and community behavior change
RESTRICTIONS: Open to health behavior management 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 206 **Educational Games/Activities** 3
Introduction to the development, analysis and modification of games/activities for elementary and middle school. Special emphasis on utilizing critical thinking, principles of transfer and basic movement education. Students learn to adapt games/activities for a varied population

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** 3
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 HESC155.

HESC 215 **Observation and Assisting in Schools** 2 PF
Observation of classes in both the elementary and secondary schools. Primary emphasis on opportunity to assist the regular teacher in classroom and gymnasium activities
RESTRICTIONS: Requires permission of department

HESC 216 **Practicum in Teaching** 1 PF
Practical teaching experience. Student is assigned to lifetime sports activity course and assists in conducting the course
RESTRICTIONS: Requires permission of department

HESC 220 **Anatomy and Physiology** 3
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 **Offering Recreational Sports** 1
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** 3
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 235 **Professional Transitions** 3
Focuses on requirements for successful transition from college student to workplace professional. Examines career planning, managing transition from college to career or graduate school, personal life changes and workplace issues. Through self-assessment, exploration, and classroom activities, students select, clarify and prepare for professional career choices
RESTRICTIONS: Open to students who have taken HESC365

HESC 240 **Introduction to Athletic Training** 3
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: HESC220
RESTRICTIONS: Restricted to Athletic Training Interest (ATI) students only. Not open to students who have taken HESC365

HESC 250 **Motor Development** 3
RESTRICTIONS: Open to HPE majors only

HESC 251 **Skills, Techniques and Knowledge of Rhythmic and Dance** 1
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** 1
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 to HPE majors only

HESC 255 **Skills, Technique and Knowledge of Racquet Sports** 1
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 256 **Taping Techniques** 1
Learn accepted and approved taping/wrapping and splintive techniques which are NATA certified and accepted as standard measures by First Aid and CPR requirements

HESC 257 **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: HESC240
RESTRICTIONS: Open to athletic training majors only

HESC 258 **Advanced Taping and Bracing Techniques** 1
Laboratory experience in advanced taping, wrapping, bracing and splinting: variations for upper and lower extremity, orthopedic injuries; emergency and non-emergency off-field transportation techniques; and equipment fitting and modification techniques
RESTRICTIONS: Open to athletic training majors only

HESC 261 **Leadership in Leisure and Sport Management** 3
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: HESC207
RESTRICTIONS: Open to health behavior management majors and sport management majors

HESC 263 **Leadership Practicum** 1 PF
Students work under the auspices of an appointed professional to develop leadership skills in fitness activities

HEALTH AND EXERCISE SCIENCES
HESC 268  Sophomore Special Topics  1-3
   Sophomore level independent study
HESC 275  Tactical Approach to Teaching Sports  3
   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  2
   Focuses on future educators incorporating 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  3
   Compares professional issues and social forces to various philosophic systems.
   Examines personal beliefs, 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/Recreation II  1 PF
   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 HBM majors with a concentration in recreation and park
   administration
HESC 303  Practicum in Sport Management/Recreation III  1 PF
   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 junior and senior HPE majors with a concentration in
   sport management
HESC 305  Fundamentals of Athletic Training  3
   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
HESC 306  Advanced Seminar in Sports Orthopedics I  1 PF
   Provides student with an understanding of diagnostic and decision making
   processes for common orthopedic sports injuries. Rationale for the use of
   diagnostic tests and principles of consultation and referral will be emphasized.
   PREREQ:  HESC 220 and HESC 305.
   RESTRICTIONS:  Open to athletic training majors only or with permission of
   instructor
HESC 307  Advanced Seminar in Sports Orthopedics II  1 PF
   Provides student with an understanding of special tests used in the diagnosis of
   common orthopedic sports injuries and their anatomic and pathomechanical basis.
   PREREQ:  HESC 220, HESC 305
   RESTRICTIONS:  Open to athletic training majors only or with permission of
   instructor
HESC 310  Pre-Clinical Anatomy and Physiology  4
   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. Not open to students who
   have taken HESC 220
HESC 315  Instructional Strategies for Drug Education  3
   Presents methods and materials to be used in school drug education programs
   Emphasis on basic information related to the drug problem. Outside resource
   people including former drug users will be involved in classroom presentations.
   PREREQ:  HESC 214 and HESC 230
HESC 318  Inclusive Recreation  3
   Emphasis on the delivery and value of special recreation participation
   opportunities for members of special population groups and particularly by
   persons with disabilities
HESC 319  Health Related Fitness  3
   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:  NPTD 200
   RESTRICTIONS:  Open to HPE majors only
HESC 320  Principles of Strength/Conditioning  3
   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, pyrometries, ergogenic aids and effects of strength training
   on the cardiovascular system.
   PREREQ:  HESC 220
   RESTRICTIONS:  Open to HSC majors only
HESC 324  Measurement and Evaluation  3
   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  3
   Develops content knowledge and present teaching methodologies relative to all
   facets of human sexuality. Emphasis will be on the process of integrating
   information into effective age specific educational strategies
   PREREQ:  HESC 315
   RESTRICTIONS:  HPE majors or permission of instructor
HESC 326  Research Methods and Statistics for Behavioral Science  3
   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  3
   Development of learning 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  3
   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:  HESC 214
   RESTRICTIONS:  Open to HPE majors only
HESC 332  Health Behavior Theory and Assessment  3
   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:  HESC 306
   RESTRICTIONS:  Open to students in health behavior science majors only
HESC 333  Health Behavior Theory and Program Planning  3
   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  3
   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 management majors only
HESC 340  Management of Sport Information  3
   An analysis of the information management process in the sport industry. The
   relationship between sport organizations and their publics and the media will be
   explored
   PREREQ:  HESC 200 and HESC 207
   RESTRICTIONS:  Open to HBM majors with a concentration in sport management.
HESC 341  Principles of Outdoor Recreation  3
   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 Labortory
   section involves participation and skill development in a variety of outdoor
   recreation activities
HESC 342  Survey in Adaptive Physical Education and Recreation  3
   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  3  
Analysis of economic and societal variables impacting the financial viability of professional, intercollegiate and Olympic sport organizations.  
PREREQ: HESC 200, HESC 207, ECON 100 and FINC 200.  
RESTRICTIONS: Open to HBM majors with sport management concentration.  

HESC 347  Legal Aspects of Sports Management  3  
An introduction to the legal system and liability issues of tort law, agency law, antitrust law and constitutional law as they apply to professional and amateur sports.  
RESTRICTIONS: Open to junior and senior health behavior management majors with a concentration in sport management.  

HESC 350  Basic Concepts in Kinesiology  3  
A review of musculoskeletal anatomy and lever systems will provide the foundation for analyzing human movement. Practical kinesiological evaluation will focus on common fitness and health related exercises. Movement analysis and proper techniques will be discussed for cardiovascular machines, abdominal work, stretching, etc.  
PREREQ: HESC 220.  
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 International Skating Association and U.S.F.S.A. Extensive study and work in the basic badge programs of the I.S.A. and U.S.F.S.A.  
RESTRICTIONS: Open to figure skating science majors 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 science majors only.  

HESC 357  Athletic Training Practicum II  3 PF  
Practical 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 257.  
RESTRICTIONS: Open to athletic training majors only.  

HESC 358  Athletic Training Practicum III  3 PF  
Practical 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 257.  
RESTRICTIONS: Open to athletic training majors only.  

HESC 368  Junior Special Topics  1–3  
Junior level Independent study.  

HESC 370  Methods and Materials in Elementary Physical Education  3  
Introduction to teaching physical education in elementary school settings. Includes classroom management, instructional materials and teaching strategies, lesson planning, implementation and performance-based assessment of pupil achievement and self-assessment of teaching effectiveness.  
PREREQ: HESC 139, HESC 140, HESC 210, HESC 250, HESC 275, HESC 276 and HESC 319. Satisfactory completion of Praxis I.  
COREQ: HESC 380.  
RESTRICTIONS: Junior status, upper division clearance, minimum gpa of 2.50, major index of 2.75 and completion of all skills requirements.  

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: HESC 220 or 310, and PHYS 201 or 207.  
RESTRICTIONS: Restricted to exercise science majors.  

HESC 380  Methods and Materials in Secondary Physical Education  3  
Introduction to teaching physical education in secondary school settings. Includes classroom management, instructional materials and teaching strategies, lesson planning, implementation and performance-based assessment of pupil achievement and self-assessment of teaching effectiveness.  
PREREQ: HESC 139, HESC 140, HESC 210, HESC 250, HESC 275, HESC 276 and HESC 319. Satisfactory completion of Praxis I.  
COREQ: HESC 370.  
RESTRICTIONS: Junior status, upper division clearance, minimum gpa of 2.50, major index of 2.75 and completion of all skills courses.  

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, technical 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 athletic training majors with 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, pharmophobia, 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 STAT 200 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 #410 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) or several different groups 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: HESC 342.  
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: HESC 480 and HESC 481 or HESC 420.  

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: HESC 210, HESC 241, HESC 276, HESC 315, HESC 325 and HESC 330. 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 dissected human specimens, models, x-rays, dry biological materials and other aids.
PREREQ: HESC220

HESC 422  ORGANIZATION AND ADMINISTRATION OF LEISURE SERVICES  3
Study of the operation and management of sport, recreation and fitness facilities. Emphasis will be 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 management majors.

HESC 425  BIOMECHANICS OF HUMAN MOTION  4
Study of the fundamental mechanical principles governing the human body in motion at rest, including application of statics and dynamics in the quantitative analysis of sport and exercise.
PREREQ: PHYS201 or 207, HESC310, and HESC375
RESTRICTIONS: Open only to students in the athletic training major, health and physical education major, figure skating coaching minor, and strength and conditioning minor.

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 430  PHYSIOLOGY OF ACTIVITY  3
Study of the body systems in performance of exercise, work and sports activities. Performance of exercise activities by the human body under environment, stress situations.
PREREQ: HESC220
COREQ: HESC431

HESC 431  PHYSIOLOGY OF ACTIVITY LABORATORY  1
Laboratory experience includes the measurement of physiological parameters under exercise conditions.
COREQ: HESC430.

HESC 432  EXERCISE TESTING AND PRESCRIPTION  4
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.
PREREQ: HESC220 or 310, and HESC430
RESTRICTIONS: Open only to majors within the Department of Health, Nutrition and Exercise Sciences.

HESC 434  EXERCISE TEST TECHNOLOGY  3
Emphasizes American College of Sports Medicine objectives for cardiac rehabilitation exercise technologist certificate. Basic electrocardiography, exercise physiology, stress test administration, medications, report preparations, program considerations and facilities development.
RESTRICTIONS: Open to EXSS/EXSC majors only.

HESC 437  SPORT MARKETING  3
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.
PREREQ: BUAD100
RESTRICTIONS: Open to junior and senior health behavior management majors with a concentration in sport management.

HESC 438  SPORT EVENT AND FACILITY MANAGEMENT  3
Management of sport events and facilities, including sponsorship acquisition, marketing and promotions, volunteer management, budgeting, participation registration, facility design, and event and facility operations.
PREREQ: HESC261, HESC437
RESTRICTIONS: Open only to junior and senior sport management majors.

HESC 439  ETHICS AND ISSUES IN SPORT MANAGEMENT  3
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.
PREREQ: HESC438
RESTRICTIONS: Open only to junior or senior sport management majors.

HESC 440  STRATEGIES FOR ATHLETIC PEAK PERFORMANCE  3
Presentation of methods and techniques for the mental preparation necessary to attain athletic peak performance. Provides experiential activities in the areas of relaxation, visualization, motor behavior rehearsal, hypnosis stress reduction and concentration techniques.

HESC 447  ADVANCED TOPICS IN STRENGTH AND CONDITIONING  3
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.
PREREQ: Junior or senior standing. Completion of HESC320, HESC350 and HESC425 or HESC426 with at least a C.
RESTRICTIONS: Restricted to majors in the Department of Health, Nutrition and Exercise Sciences.

HESC 448  ORGANIZATION AND ADMINISTRATION  3
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.
RESTRICTIONS: Open to athletic training majors only.

HESC 449  ADVANCED TOPICS IN SPORTS MEDICINE  3
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.
RESTRICTIONS: Open to athletic training majors only.

HESC 450  FACILITY AND PARK MANAGEMENT  3
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.

HESC 451  EXERCISE TESTING/PRESCRIPTION  3
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.

HESC 453  AQUATIC MANAGEMENT  3
Equips individuals with the knowledge, techniques and skills required to operate an aquatic facility as manager or director.

HESC 455  FIGURE SKATING PRACTICUM III  3 PF
Concentration on advanced teaching/coaching techniques related to the skill required in ISU.I.A. and U.S.F.A. Levels with an analysis of progression and sequencing. Seminar sessions to include professional responsibilities, business practices, skating pedagogy, special programs and precision skating.
RESTRICTIONS: Open only to majors in the figure skating science degree program.

HESC 456  FIGURE SKATING PRACTICUM IV  3 PF
Direct involvement in the teaching/coaching of beginner elite national and world competitors under the supervision of Ice Skating Development Center professional staff.
RESTRICTIONS: Open only to majors in the figure skating science degree program.

HESC 457  ATHLETIC TRAINING PRACTICUM IV  3 PF
Supervised clinical experience in athletic training. Development of competencies and proficiency in content areas comprising the role of an athletic trainer, as specified in the NATA's Athletic Training Educational Competencies.
PREREQ: HESC358
RESTRICTIONS: Open to athletic training majors only.

HESC 458  ATHLETIC TRAINING PRACTICUM V  3 PF
Supervised clinical experience in athletic training. Development of competencies and proficiency in content areas comprising the role of an athletic trainer, as specified in the NATA's Athletic Training Educational Competencies.
PREREQ: HESC457
RESTRICTIONS: Open to athletic training majors only.
HESC 459  ATHLETIC TRAINING PRACTICUM VI  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: HESC458
RESTRICTIONS: Open to athletic training majors only

HESC 460  COACHING/PERFORMANCE PRACTICUM  1–3 PF
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.
PREREQ: HESC210, HESC220, HESC320 and HESC390
RESTRICTIONS: Junior status or higher

HESC 462  PRACTICUM IN STRENGTH AND CONDITIONING  3 PF
Directed practical experience in a strength and conditioning environment.
PREREQ: Admission to the strength and conditioning minor and completion of HESC220, HESC432 and HESC447 with at least a C-

HESC 463  PRACTICUM IN EXERCISE SCIENCE  1–6 PF
Directed practical experiences in clinical aspects of exercise science.
PREREQ: Admission to the exercise physiology or biomechanics concentration.
RESTRICTIONS: Junior status or higher

HESC 464  INTERNSHIP  9 PF

HESC 465  TEACHING SEMINAR IN HEALTH AND PHYSICAL EDUCATION  3
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.
COREQ: EDUC400
RESTRICTIONS: Open to HPE majors only

HESC 468  SENIOR SPECIAL TOPICS  1–3
Senior level independent study

HESC 470  BASEBALL AND SOCIETY  3
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

HESC 475  TEACHING HEALTH IN THE ELEMENTARY SCHOOL  3
Examines the importance of teaching health in the elementary school. Presents content and teaching strategies proven effective for teaching health at the elementary level. Also discusses how to incorporate health into other subjects.
RESTRICTIONS: Open to elementary education majors only

HESC 480  UPPER EXTREMITY AND SPINE EVALUATION  3
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 stress tests will be discussed.
PREREQ: HESC220 and HESC240
RESTRICTIONS: Open to athletic training majors only

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 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 WOM484

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 486  TENSION CONTROL AND RELAXATION  3
Focuses on the phenomenon of stress and includes application of various techniques in a laboratory setting with emphasis on individual measurement, awareness and improvement of relaxation. Students learn tension reduction, relaxation techniques or the refinement of relaxation techniques.

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: HESC432 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 605  PATHOLOGY 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 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 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 634  OUTDOOR EXPERIMENTAL 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 behavior. Participants will have an opportunity to develop new skills utilizing physically challenging activities to expand their curriculum in the area of adventure education

HESC 650  LIFT SPAN MOTOR DEVELOPMENT  3
Theoretical and empirical inquiry into developmental changes in movement patterns across the life span. Focus will be placed on changes in behavioral aspects of human motor behavior and the underlying mechanisms to which these changes relate. Students will design and complete research project

HESC 651  NEUROPHYSIOLOGICAL BASIS OF HUMAN MOVEMENT  3
Neural control of human movement, including graduation of muscular force, motor unit control principles, neuromuscular aspects of strength, segmental motor control, the organization of ballistic movements, adaptations in the control of movement, and aging. Students will learn related research techniques through hands-on demonstrations.
PREREQ: HESC220 or equivalent
HEALTH AND EXERCISE SCIENCES

HESC 657  Seminar in Motor Behavior  3
Introduction to contemporary and classical research literature on the motor behavior of human movement emphasizing motor control, learning and development. Lecture/discussion format.

HESC 665  Cardiovascular Assessment I  3
Designed to teach the 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, hypotension and infarction.

HESC 675  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 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.

HESC 688  Electromyographic Kinesiology  3
Introduction to the theoretical basis and practical application of electromyography. Topics include the electromyological basis of muscle actions, mechanical properties of muscle, EMG recording and processing methods and applications of EMG to the study of human motion.

HESC 690  Biomechanical Methods  3
Introduces students to fundamental methods of two- and three-dimensional analysis in sports biomechanics. Topics will include creation of local coordinate systems, coordinate system transformations, joint center predictions, vector manipulation, linear and angular kinematics, joint forces and moments.
PREREQ: Calculus.
RESTRICTIONS: Requires permission of instructor.

HESC 691  Gait Laboratory Internship  3
Provides hands-on experience in all patient-related phases of a full service gait analysis laboratory. Designed to enable students to apply skills learned in HESC690 and HESC803.
PREREQ: HESC690 and HESC803.
RESTRICTIONS: Requires permission of instructor.

HESC 800  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 802  Human Cardiovascular Control  3
Focuses on human cardiovascular control as it pertains to orthostasis, exercise and heat stress. The role of mechanical, neural, and hormonal factors is emphasized, as well as factors that control oxygen transfer from lungs to cells.
PREREQ: Undergraduate human or exercise physiology at the 200-level or higher.

HESC 803  Introduction to Laboratory Instruments  3
Introduction to the principles of operation of laboratory equipment common to the areas of exercise physiology and biomechanics. Includes theory of operation, environmental considerations and area of application of instruments. Laboratory involves hands-on use of equipment to collect data for faculty and student research projects.

HESC 804  Clinical Measures in Exercise Physiology  3
Assessment techniques and research protocols used in exercise physiology. Resting energy expenditure, body composition, bone mineral density, cardiopulmonary evaluation and selected histochemical analyses will be addressed.
PREREQ: Undergraduate background in exercise physiology.
RESTRICTIONS: Class size limited to 15.

HESC 807  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 808  Seminar in Motor Control  3
Introduction to research literature on contemporary theories and models of motor control. Topics include problems of controlled variables and reference systems, movement variability, motor redundancy, interactions of the locomotor apparatus and the central nervous system, and movement optimization criteria.
PREREQ: Undergraduate biomechanics and motor control behavior at the 200-level or higher.

HESC 840  Advanced Human Anatomy  3
Laboratory course requiring detailed gross dissection of the extremities and their girdles. Specific emphasis is placed upon neuromuscular, skeletal, cardiovascular and mechanical factors dictating functional capabilities of the human body. Understanding the relationship between structure and function must be demonstrated frequently.

HESC 869  Master’s Thesis  1-6

HESC 964  Pre-Candidacy Study  3-12 PF

HISTORY

HIST 101  Western Civilization to 1648  3
The principal political, social, economic and cultural developments in Western civilization from late antiquity (3rd century A.D.) to the middle of the 17th century.

HIST 102  Western Civilization: 1648 to the Present  3
The principal political, social, economic and cultural developments in Western civilization since the middle of the 17th century.

HIST 103  World History I  3
Principal political, economic, cultural and social developments in world history through the sixteenth century, relating the past to the present. Equal weight given to the history of Asia, Africa, the Americas and Europe.

HIST 104  World History II  3
Principal political, economic, cultural and social developments in world history from the sixteenth century to the present, relating the past to the present. Equal weight given to the history of Asia, Africa, the Americas and Europe.

HIST 130  Islamic Near East: 600-1500  3
Introduces the student to the origins of Islam, its development as a religion and a culture, and the broad trends in Middle Eastern history until 1500.

HIST 131  Islamic Near East: 1500-Present  3
Considers the traditional makeup of the Middle East and charts the emergence of the region in its present form through the nineteenth and twentieth centuries.

HIST 134  History of Africa  3
Introductory course on African history south of the Sahara, from the earliest times to 1914. Introduces major themes in African history: pre-colonial African political, social and economic institutions; diversity in African political organizations; slave trade and colonization. May be cross-listed with BAMS134.

HIST 135  Introduction to Latin American History  3
Introduction to Latin American history from the preconquest period to the present.

HIST 136  Topics: East Asia in Film  1
See ARSC136 for course description.
RESTRICTIONS: May be repeated for credit when topics vary.

HIST 137  East Asian Civilization: China  3
A survey of major aspects of Chinese civilization, relating the past to the present.

HIST 138  East Asian Civilization: Japan  3
A survey of major aspects of Japanese civilization, relating the past to the present.

HIST 200  History and Government of Delaware  3
A survey of the history of Delaware and its present government, with special attention to the needs of social studies teachers.

HIST 205  United States History  3
An introductory survey of 17th, 18th, and 19th-century American history. Themes and approach vary with the instructor.
HIST 206 UNITED STATES HISTORY 3
An introductory survey of American history since 1865. Themes and approach vary with the instructor.

HIST 210 INTRODUCTION TO MILITARY HISTORY 3
Survey of the history of warfare from the ancient Greeks through World War II, with emphasis upon tactics, weapons, armor, strategy and the human factors that contributed to success or failure in war.

HIST 216 INTRODUCTION TO MATERIAL CULTURE STUDIES 3
See ANTH316 for course description.

HIST 220 AMERICAN CIVIL RIGHTS MOVEMENT 3-4
Team-taught, interdisciplinary, history of the American Civil Rights Movement. Deals with the crucial years from 1954 to 1970 and examines the larger history of American race relations. May be cross-listed with BAM220.

HIST 230 WOMEN IN AMERICAN HISTORY 3
See WONS230 for course description.

HIST 270 HISTORY OF MODERN ASIA 3
Comparative survey of the modern histories of several Asian countries, for example China, Japan and Vietnam, emphasizing their responses to the modern world. Topics include traditional societies, impact of imperialism, nationalist and communist movements, Pacific War, cultural revolution in China, Vietnam Conflict and emergence of the Japanese economic powerhouse.

HIST 287 HISPANIC HISTORY 3
See CRJU287 for course description.

HIST 291 WOMEN'S HISTORY THROUGH FILM 1
See WOMS291 for course description.

HIST 307 THE UNITED STATES IN THE EARLY NATIONAL PERIOD 3
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.

HIST 308 THE UNITED STATES IN THE ANTEBELLUM PERIOD 3
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.

HIST 309 UNITED STATES BUSINESS AND POLITICAL ECONOMY 3
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.

HIST 310 POSTWAR AMERICA I: 1945-1963 3
Social, political and diplomatic history of the United States from 1945 to 1963.

HIST 311 POSTWAR AMERICA II: 1963-PRESENT 3
Social, political and diplomatic history of the United States from 1963 to the present.

HIST 312 CRIME AND PUNISHMENT IN AMERICAN HISTORY 3
See CRJU312 for course description.

HIST 313 EARLY TWENTIETH CENTURY AMERICA 3
The rise of big business and the ways that farmers, labor leaders, socialists and middle-class reformers responded to the new industrialism.

HIST 314 TWENTIETH CENTURY AMERICA 3
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.

HIST 316 FIRST ENCOUNTERS: INDIANS AND EUROPEANS IN EARLY AMERICA 3
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.

HIST 318 COLONIAL AMERICA 3
The transit of culture from England to America and its modification there during the seventeenth century. The development of mature colonial societies to 1760.

HIST 319 REVOLUTIONARY AMERICA 3
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.

HIST 321 CIVIL WAR AND RECONSTRUCTION 3
Sectional conflict and the struggle between rival nationalism in mid-19th century United States.

HIST 322 THE OLD SOUTH 3
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.

HIST 324 AMERICAN CONSTITUTIONAL HISTORY 3
See CRJU324 for course description.

HIST 325 HISTORY OF BLACK AMERICA TO THE CIVIL WAR 3
See BAM325 for course description.

HIST 326 HISTORY OF BLACK AMERICA SINCE THE CIVIL WAR 3
See BAM326 for course description.

HIST 328 AMERICAN INDUSTRIAL SOCIETY FROM 1815 TO THE PRESENT 3
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.

HIST 329 INTERNATIONAL MIGRATION 3
See POS329 for course description.

HIST 330 PEASANTS AND REVOLUTION IN AFRICA 3
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?
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 370</td>
<td>History of Modern Japan</td>
<td>3</td>
<td>History of Japan from 1600 to 1932 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.</td>
</tr>
<tr>
<td>HIST 371</td>
<td>Postwar Japan</td>
<td>3</td>
<td>Traces the emergence of contemporary Japan in its cultural and social spheres. Emphasis is on an analysis of the historical significance of postwar Japanese culture. Investigations explore every day life as depicted in literature, film, journalism, memoirs and historical writings.</td>
</tr>
<tr>
<td>HIST 372</td>
<td>Popular Culture in Urban Japan</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>HIST 373</td>
<td>Modern Ireland: 1534-Present</td>
<td>3</td>
<td>Anglo-Irish relations, the emergence and victory of Irish nationalism and the historical roots and subsequent development of the Ulster problem.</td>
</tr>
<tr>
<td>HIST 374</td>
<td>History of England to 1715</td>
<td>3</td>
<td>Political, constitutional, social and economic development to 1715.</td>
</tr>
<tr>
<td>HIST 375</td>
<td>Britain Since 1714</td>
<td>3</td>
<td>British politics, society, and culture in modern times. The rise of parliamentary democracy, industry, liberalism, empire, feminism, social democracy and mass culture.</td>
</tr>
<tr>
<td>HIST 377</td>
<td>Radicalism and Revolution: Islamic Movement/Modern Middle East</td>
<td>3</td>
<td>Addresses the background, historical development and present state of Islamic fundamentalist movements.</td>
</tr>
<tr>
<td>HIST 378</td>
<td>Nationalism in the Modern Middle East</td>
<td>3</td>
<td>Focuses on the ideology of nationalism in an attempt to explain the emergence of the modern countries in the Middle East.</td>
</tr>
<tr>
<td>HIST 379</td>
<td>Historical Archaeology of the Eastern United States</td>
<td>3</td>
<td>See ANTH379 for course description.</td>
</tr>
<tr>
<td>HIST 380</td>
<td>History of the Arab-Israeli Conflict</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>HIST 381</td>
<td>Islam and the West: The History of Mutual Perceptions</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>HIST 382</td>
<td>History of Western Medicine</td>
<td>3</td>
<td>See CSCS382 for course description.</td>
</tr>
<tr>
<td>HIST 389</td>
<td>The American West</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>HIST 390</td>
<td>American Indians: The Southwest</td>
<td>3</td>
<td>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 &quot;Pueblo,&quot; Hopi, Apache and Navajo people.</td>
</tr>
<tr>
<td>HIST 391</td>
<td>History of World War II in Asia and the Pacific</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>HIST 392</td>
<td>Buddhism and Politics in Asia</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>HIST 393</td>
<td>History of Modern Vietnam</td>
<td>3</td>
<td>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 &quot;Vietnam Conflict&quot;), the Cambodian Crisis, and life under the Socialist Republic of Vietnam since 1976. May be cross-listed with WAMS395.</td>
</tr>
<tr>
<td>HIST 394</td>
<td>Africa Since 1960</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>HIST 395</td>
<td>Pan Africanism</td>
<td>3</td>
<td>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. Liberation struggles in Africa and the Civil Rights movement in the United States. May be cross-listed with WAMS395.</td>
</tr>
<tr>
<td>HIST 397</td>
<td>History of South Africa</td>
<td>3</td>
<td>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, Afrikaners in power since 1948, and African struggles for freedom.</td>
</tr>
<tr>
<td>HIST 403</td>
<td>History, Philosophy, Functions and Future of Museums</td>
<td>3</td>
<td>See MUSA403 for course description.</td>
</tr>
<tr>
<td>HIST 408</td>
<td>Public History: Resources, Research and Practice</td>
<td>3</td>
<td>Team-taught seminar that acquaints students with the function and resources of American Historical organizations and how to use these resources in non-academic settings for productive historical research. Addressed to those pursuing careers in public history and teaching and scholarship. May be cross-listed with MUSA408.</td>
</tr>
<tr>
<td>HIST 430</td>
<td>Seminar in Twentieth Century Latin American Revolutions</td>
<td>3</td>
<td>Focuses on four 20th century Latin American revolutions, concentrating on the historical background and events of the Mexican, Guatemalan, Cuban and Nicaraguan revolutions.</td>
</tr>
<tr>
<td>HIST 439</td>
<td>Women and Revolution in Africa</td>
<td>3</td>
<td>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 WAMS439.</td>
</tr>
<tr>
<td>HIST 440</td>
<td>Seminar in Africa Under Colonial Rule</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>HIST 444</td>
<td>Seminar: Women in the Islamic Middle East</td>
<td>3</td>
<td>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 WAMS444.</td>
</tr>
</tbody>
</table>

465
HIST 449 Seminar: Science, Technology and Medicine  3
Topics vary and may include The American System, History of Chemistry, or History of Engineering.
PREREQ: HIST 268
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: HIST 268
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 ARTH 454.

HIST 459 Seminar in United States Urban History  3
The process of urbanization in America with special emphasis on the Philadelphia-Wilmington area.
PREREQ: HIST 268
RESTRICTIONS: Majors only, or permission of instructor.

HIST 463 Historical Archaeology and the Public  3
See ANTH 463 for course description.

HIST 466 Independent Study  1-6

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: HIST 268
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 WOMS 472.
PREREQ: HIST 268
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: HIST 268
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: HIST 268
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 WOMS 475.
PREREQ: HIST 268
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: HIST 268
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: HIST 268
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: HIST 268.
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.

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 EAMC 605 for course description.

HIST 606 Issues in American Material Culture  3
See EAMC 606 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 MSST 608.

HIST 611 Seminar in American History  3

HIST 614 The American Suburb  3
See UAPP 614 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 624 Age of the American Revolution  3
Reading seminar on political and constitutional changes from 1760 to 1790 but also 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 covered 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.

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 SOC1637 for course description.

HIST 638  Documentation of Historical Structures  1
See UAPP638 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 646  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  Seminar in Historic Preservation  3
See UAPP652 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 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. Topics 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. Topics may include such topics as Renaissance Humanism; Women in Europe, 1100-1600; or Rome and Religion.

HIST 674  Studies in English History  3

HIST 675  Seminar in Modern European History  3
Topics vary. May include topics such as The Holocaust, The Cold War or Hitler's Germany.

HIST 677  Studies in Latin American History  3
Topics may include history of Mexico, history of the Caribbean or slavery in the New World. Topics will vary.

HIST 679  Studies in Asian History  3
Topics vary. May include topics such as 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: 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 Museum 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 for dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.

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 will be 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 is placed on the behavioral, epidemiological and socio-ecological issues that impact programming and the skills required to evaluate a program.

HPR 807  Topics and Issues in Health Promotion  3
Uses a 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.

STUCTIONS: Open to graduate students only.
HRIM 212  Club Management
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
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
Development of management strategies applicable to meeting and conference management including the methodologies unique to each property and group served by one operation

HRIM 217  Catering Management
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
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
Examines the quality revolution in the hospitality industry. Control charts, Pareto charts, scatter diagrams, and other tools used in reengineering, and continuous quality improvement are explored. Integrates principles of customer quality focus and organizational behavior as they apply to the hospitality industry

HRIM 220  Decision-Making Skills and Techniques
Examines the decision-making process, tasks and styles as well as factors that can complicate decision-making. Considers decision-making techniques and offers suggestions for building decision-making confidence

HRIM 238  Assessment and Evaluation in Service Delivery Systems
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 280  Property Management
Introduction to problems of cost and operational control of security, safety, parking, preventive maintenance, laundry, HVAC, electrical, refrigeration, plumbing, fire prevention, care of guest rooms and public space. Emphasis on equipment, personnel and technology

HRIM 313  Principles of Gaming Management
An overview of gaming management and how it relates to hospitality management. Topics include a history of gaming in the U.S., social and legal aspects, licensing, organization, credit issues, marketing and Title 31 of the Bank Security Act

HRIM 314  Hospitality Entrepreneurship and Venture Creation
Provides an overview of venture creation in hospitality enterprises from concept development to capital creation. Examines various business structures used in hospitality businesses including franchising and management contracts

HRIM 316  Cross Cultural Etiquette and Protocol
Introduces students to a range of mores and decorum required to effectively work with and offer services to international visitors and associates. Various levels of treatment accorded domestic and international dignitaries within specific types of events and accommodations in the hospitality industry are also discussed

HRIM 320  Hotel, Restaurant and General Food Service Purchasing
Principles of purchasing food and beverage supplies for hotels, restaurants and general food service; and marketing selection principles, buying procedures, choice of supplier and receiving

HRIM 321  Quantity Food Service Management
Principles of quantity food service management with an emphasis on quality and cost control. Topics include menu planning, safety, sanitation and technical operations, as well as labor, food and energy cost containment

HLPR 909  Health Behavior
Health and behavioral science theory and research provide a framework for the analysis of health-related behaviors across the lifespan. Emphasis is placed 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 819  Social Marketing
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
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
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
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

HEALTH STUDIES

HLTH 495  Health Studies Practicum
Directed service learning experience in a health services setting

RESTRICTIONS: Open to senior health studies majors only

HOTEL, RESTAURANT AND INSTITUTIONAL MANAGEMENT

HRIM 140  Information Technology and Services Management
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 many new technologies affecting them

HRIM 144  Hospitality Information Management, Networks and Systems
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
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
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
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: HRIM 211

HRIM 211  Food Principles Laboratory
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: HRIM 201
Applications in safety, sanitation, technical operations and quality and cost controls in a discussed as they relate to travel and tourism food and full service restaurants, roadside attractions and development throughout this automobile based century. Hotels, motels, diners, fast decision making

PREREQ: an up-to-date and accurate source of management information for analysis

environmental parameters that affect hospitality construction as it relates to hospitality venues such as restaurants, hotels, commercial operations Analysis of centers of responsibility. Cost management approach to

takes a life

HRlM

Management tools available to control sales and expenses in food and beverage operations

HRlM 366 INDEPENDENT STUDY

3

1-6

HRIM 380 Management of Lodging Operations

HRIM 381 Management of Food and Beverage Operations

Management tools available to control sales and expenses in food and beverage operations. Analysis of centers of responsibility. Cost management approach to development of control systems

PREREQ: HRIM 321

HRIM 382 Managerial Accounting and Finance in the Hospitality Industry

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

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 will be discussed as they relate to travel and tourism

HRIM 442 Hospitality Computer-Based Education

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

Focuses on the collection of data in hospitality systems environments into an accessible warehouse, and mining (or organizing) the data into a management 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

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: HRIM 187 or ACCT160

HRIM 466 INDEPENDENT STUDY

1-6

HRIM 480 Human Resources Management in the Hospitality Industry

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

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

Introduction to the laws relating to hotel, restaurant and institutional operations

HRIM 487 Management Systems in the Hospitality Industry

Principles of systems analysis applied to the hospitality industry. Organization of the operation and subsystems of a property. Case studies and simulations applied economic and management principles.

HRIM 488 Hotel, Restaurant and Institutional Management Practicum I

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

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: HRIM 321, HRIM 325 and HRIM 488

HRIM 601 Advanced Hospitality and Tourism Product Management

Reviews different types, styles and quality of hospitality and tourism products. Examines product management including branding, product lifecycles, positioning and packaging. Discusses the latest trends in product development and theoretical and practical issues related to multi-unit operations

HRIM 602 International Hospitality and Service Management

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: HRIM 601

HRIM 603 Strategic Hospitality Management

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

HRIM 604 Hospitality Financial Management Issues

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: HRIM 382, its equivalent, or permission of instructor

HRIM 605 Issues in Hospitality Information Technology

Examines issues related to information technology in the hospitality industry, including systems, networking, databases, telecommunications, the Internet and e-commerce.

PREREQ: HRIM 601

HRIM 642 Hospitality Computer-Based Training

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: HRIM 601

HRIM 648 Data-Mining Analysis in the Hospitality Industry

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

PREREQ: HRIM 602

HRIM 664 Hospitality Technology Internship

Supervised technology-related work experience with a hospitality business or related organization

HRIM 668 Industry Project

Provides the opportunity to research, design and/or develop the solution to a real-world hospitality technology-related problem or issue.
The study of social/emotional, cognitive and occurs in the family context Directed observation in the University's Laboratory lFS?

See

development of the individual from infancy through old age in the context of the HSAD637, race, ethnicity, class, and gender Emphasis on the effects of multiculturalism and behavior; developmental curriculum; family issues; health, safety, and nutrition; Examination of diverse families in the United States with an emphasis on issues of on-site experience, which can be taken in one semester or divided over three personnel management, public policy or education, resulting in completion of a Investigation

HSAD 635 HEALTH ADMINISTRATION THEORIES
See NURS635 for course description
RESTRICTIONS: NURS604 required as prerequisite or corequisite.

HSAD 637 HEALTH PLANNING STRATEGIES
See NURS637 for course description
RESTRICTIONS: NURS604 required as prerequisite or corequisite.

HSAD 638 HEALTH SERVICES EVALUATION
See NURS638 for course description
RESTRICTIONS: NURS604 required as prerequisite or corequisite

HSAD 664 HEALTH SERVICES ADMINISTRATION PRACTICUM
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 868 RESEARCH: SCHOLARLY PROJECT
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, HSAD638.

HSAD 890 COLLOQUIUM
See NURS890 for course description.

INDIVIDUAL AND FAMILY STUDIES

IFST 101 HUMAN SERVICES AND CULTURAL COMPETENCE
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
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
Examination of diverse families in the United States with an emphasis on issues of race, ethnicity, class, and gender. Emphasis on the effects of multiculturalism and social change.

IFST 210 INTRODUCTION TO CARING FOR YOUNG CHILDREN
Introduction of the core competencies needed in early care and education. Topics include a basic orientation to child development; understanding children's behavior; developmental curriculum; family issues; health, safety, and nutrition; and professional issues.

IFST 221 CHILD DEVELOPMENT
The study of socio-emotional, cognitive and psycho-biological development in infancy, early and middle childhood. Emphasis on the child's development as it occurs in the family context. Directed observation in the University's Laboratory Preschool.

IFST 222 EARLY CHILDHOOD CURRICULUM I
Principles underlying values in and guidance of young children's play, creative activities and curriculum content. Selection and use of appropriate materials, with emphasis on preschool and kindergarten settings. PREREQ: IFST221
COREQ: IFST224

IFST 224 EARLY CHILDHOOD CURRICULUM II: PRACTICUM
Three-hour weekly practicum experience with a one-hour weekly discussion section. Gives students a realistic exposure to working with young children, with emphasis on preschool and kindergarten settings. PREREQ: IFST221
COREQ: IFST222

IFST 230 FAMILIES AND THEIR COMMUNITIES
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
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
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
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
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 293 HONORS SHORT COURSE
See ARSC293 for course description.

IFST 306 READING AND WRITING IN EARLY CHILDHOOD
Focuses on the nature, acquisition and development of literacy from birth through age eight. Explores developmentally appropriate early literacy practice and information on language arts development (reading, writing, listening, and speaking). Includes a field experience. PREREQ: PSYC101, IFST222 and IFST224.

IFST 310 PARENTING THROUGH THE LIFESPAN
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 PSYC350.

IFST 328 INTRODUCTION TO THE RESEARCH PROCESS
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
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 IFST201.

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
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: IFST201
RESTRICTIONS: LCS 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 in Early Childhood 3
Developmentally appropriate uses of technology in early childhood and early childhood special education. Operation of computers and adaptive devices, evaluation of software and curriculum development. Includes a practicum using technology in appropriate environments. PREREQ: IFST222 and IFST224

IFST 355 Professional Issues in Early Childhood Development and Education 3
Overview and analysis of issues for professionals serving children birth to age eight 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: IFST340

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. May be cross-listed with WOMS390

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 explicitly sexual 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. PREREQ: IFST235 and IFST202

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. 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 CRU409 and/or WOMS409. PREREQ: IFST235 or SOC201 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, premedical students and others working with the pediatric population are studied. PREREQ: IFST21 or PSYC325

IFST 422 Family Relationships 3
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

IFST 435 Early Childhood Programs for Children with Exceptionalities 4
Philosophy, organization and operation of programs for young children with exceptionalities, development and adaptation of curriculum, materials, facilities and equipment. Clinical experience with children and programs. PREREQ: EDUC230 and IFST340

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 2
Emphasis on techniques in working and communicating with families, understanding parent-child relationships and effectively utilizing parent, teacher, home, school and community resources. PREREQ: IFST101
COREQ: IFST459 or EDUC400

471
INDIVIDUAL AND FAMILY STUDIES

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 Young Children 3
Focuses upon the issues in, and techniques of the assessment of physical, socio-emotional, behavioral and cognitive/intellectual development in children
Secondary emphasis on evaluation of test results, written reports, research in assessment and an analysis of remediation/teaching strategies
May be cross-listed with PSYC460
PREREQ: IFST221 or PSYC325

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 SOC4460 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
Deals with social-emotional considerations of disabilities and risk factors upon the development of children and families over the life course. Includes information on family assessment and systems, changing demographics and at-risk families. Includes some clinical counseling skills
PREREQ: IFST201 or IFST221 or PSYC325

IFST 475 Topics in Individual 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 Individual and Family Studies Senior Seminar 1-3
Discussion-oriented and problem-centered with emphasis on the role and contributions of the individual to the profession and society

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 practice 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 practice 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 provision 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 UAPP507 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 performance 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 I: 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

IFST 630 Family Life Education 3
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

IFST 637 Program Planning, Assessment and Evaluation 3
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

IFST 638 Adolescence and Youth Theories 3
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

IFST 639 Curriculum Methods and Assessment 3
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

IFST 640 Early Childhood Administration, Leadership and Advocacy 3
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

IFST 641 Infants, Toddlers and Families: Development and Programming 3
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

IFST 642 Leadership in Human Services 3
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

IFST 645 Programming for Young Children with Special Needs 3
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
IFST 650  COMPUTERS IN EARLY CHILDHOOD 3
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.

IFST 651  ADVANCED CHILD DEVELOPMENT 3
Theoretical approaches in psychosocial development in children; and influences on development of self-concept, sex-role behavior, moral development and prejudice.

IFST 655  MEASUREMENT TECHNIQUES FOR CHILDREN AND FAMILIES 3
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.

IFST 656  SUPERVISION FUNCTIONS AND TECHNIQUES 3
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.

IFST 658  READINGS IN INDIVIDUAL AND FAMILY STUDIES 3
Emphasis on either infancy, early and/or middle childhood, adolescence, adulthood, gerontology and/or specialized topics in family studies. Emphasis may vary by semester.

IFST 660  TEACHING OF LIFE SPAN DEVELOPMENT 3
Strategies and techniques for effective teaching of life span development at the post-secondary level, including observation, teaching opportunities and mentorships with faculty.

IFST 662  CURRICULUM ANALYSIS IN EARLY CHILDHOOD 3
Examination and evaluation of curriculum in early childhood including theoretical analysis of pedagogy, curriculum content and child outcomes.

IFST 663  ATYPICAL INFANT AND TODDLER DEVELOPMENT 3
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.

IFST 665  SEMINAR 1-6

IFST 668  RESEARCH 1-6

IFST 669  SUPERVISED FIELD EXPERIENCE AND STUDY 1-12
Supervised work with children, adults and/or families in educational and/or community settings.
RESTRICTIONS: Credit may be distributed over more than one semester.

IFST 670  FAMILY RISK AND RESILIENCE 3
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.

IFST 679  DEVELOPMENT OF COUNSELING SKILLS 3
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.

IFST 680  PROFESSIONAL SEMINAR IN COUNSELING AND STUDENT AFFAIRS 3
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.

IFST 681  CAREER DEVELOPMENT: THEORIES AND PRACTICE 3
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.

IFST 682  STUDENT DEVELOPMENT IN HIGHER EDUCATION 3
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.

IFST 683  SEMINAR IN HIGHER EDUCATION ADMINISTRATION 3
Overview of administrative and management issues faced by leaders in higher education.

IFST 684  THEORIES OF COUNSELING 3
Theories and techniques used in counseling individuals with personal, social, vocational and educational problems.
RESTRICTIONS: Open only to majors in counselor education.

IFST 685  MULTICULTURAL ISSUES IN COUNSELING 3
Examines the influence of cultural background, including ethnicity, gender, sexual orientation, socioeconomic 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.

IFST 686  ASSESSMENT IN COUNSELING 3
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.

IFST 687  PRACTICUM IN COLLEGE COUNSELING 3
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.

IFST 688  THE LAW AND STUDENT AFFAIRS 3
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.

IFST 689  THE AMERICAN COLLEGE STUDENT 3
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.

IFST 690  SPECIAL ISSUES IN COUNSELING WOMEN 3
Examines traditional, non-sexist and feminist approaches used to counsel women. Through readings, discussions, presentations and films, students learn about issues particularly relevant to women. Topics may include women and depression, self-esteem, anger, eating disorders, abuse, careers and dependency.
RESTRICTIONS: Open to graduate students only.

IFST 691  GROUP COUNSELING 3
Examination of group work and group counseling in higher education as well as primary and secondary school settings. Emphasis on theoretical foundation of group work and group skills training.
RESTRICTIONS: Open only to majors in counselor education and school counseling.

IFST 692  STUDENT PERSONNEL MANAGEMENT 3
Study of the theories and principles of management in student affairs practice in higher education. Managerial, leadership, program development, supervising and organizational issues involved in professional practice.

IFST 693  GROUP DYNAMICS 3
Theory, strategies and skills needed to work effectively with groups. Emphasis on understanding and managing the factors that affect group facilitation and leadership.

IFST 694  INTERNSHIP 3
Supervised experiences in counseling or student affairs practice in higher education. Minimum of 240 clock hours of direct service time.
RESTRICTIONS: Open only to majors in counselor education.

IFST 803  HUMAN DEVELOPMENT IN LIFE SPAN PERSPECTIVE 3
Systematic survey of developmental domains across the life span. Topical emphasis on multidisciplinary research findings chronicling continuities and discontinuities in individuals' status and functioning in physical growth, perception, cognition, language, attachment, personality development, gender and sexuality.
PREREQ: IFST 601 or permission of instructor.

IFST 815  RESEARCH ISSUES AND DESIGNS 3
Examination of issues in design, sampling, measurement and analysis techniques applicable to research in family studies.
PREREQ: One graduate-level method and design course.

IFST 823  PROSEMINAR: SOCIAL AND URBAN POLICY 3
See UAPP 823 for course description.

INDIVIDUAL AND FAMILY STUDIES
INTRODUCTION TO BUSINESS ITALIAN
This course introduces business Italian vocabulary, grammar, and culture. Students will learn to write and speak in a business context, including topics such as introductions, negotiations, and customer service.

ITALIAN LANGUAGE AND CULTURE
This course covers the history and culture of Italy, including its regional variations and linguistic influences. Students will also practice writing and speaking in Italian.

ITALIAN CONVERSATION
This course focuses on improving conversation skills in Italian. Students will engage in discussions and role-plays to enhance their fluency.

ITALIAN GRAMMAR AND COMPOSITION
This course covers the grammar and composition skills necessary for effective written communication in Italian. Students will learn how to construct coherent and grammatically correct sentences.

ITALIAN LITERATURE
This course explores the rich literary tradition of Italy, from its classical roots to modern authors. Students will read and analyze key works in Italian literature.

ITALIAN PHILOSOPHY
This course examines the philosophical thought of Italy, including its historical and contemporary contributions. Students will read and discuss key philosophers and their ideas.

ITALIAN HISTORY
This course covers the historical development of Italy, from ancient times to the present day. Students will explore significant events and their impact on Italian society.

ITALIAN SOCIETY
This course examines the social structure and dynamics of modern Italy. Students will analyze topics such as gender roles, education, and the role of the family.

ITALIAN CULINARY ARTS
This course introduces the art of Italian cuisine, including regional specialties and traditional recipes. Students will learn to cook and appreciate Italian food.

ITALIAN CULTURAL HERITAGE
This course explores the cultural heritage of Italy, including its architectural, artistic, and linguistic legacies. Students will visit museums and historical sites to gain a deeper understanding of Italian culture.

ITALIAN MUSIC
This course covers the rich tradition of Italian music, from classical composers to modern musicians. Students will learn about key figures and their contributions.

ITALIAN ART
This course examines the visual arts of Italy, from medieval frescoes to contemporary installations. Students will analyze key works and their impact on the art world.

ITALIAN THEATER
This course explores the history and development of Italian theater, including significant playwrights and their works. Students will attend live productions and engage in critical analysis.

ITALIAN FILM
This course covers the film industry in Italy, including its historical development and contemporary trends. Students will watch and discuss key films.

ITALIAN DANCE
This course introduces the art of Italian dance, including classical ballet and contemporary forms. Students will learn and perform traditional dances.

ITALIAN PHOTOGRAPHY
This course examines the role of photography in Italy, from its early days to modern experimental techniques. Students will analyze key photographers and their works.
ITAL 311 Survey of Italian Literature 3
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 3
A survey of the major cultural, social and political developments in Italy from the 15th century to the present.
PREREQ: ITAL211 or ITAL212.

ITAL 355 Special Topics 3
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 3
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 403 History of the Italian Language 3
Development of the Italian language from its Latin origins. Explication 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 3
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 3
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 601 Advanced Italian Grammar and Stylistics 3
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.

ITAL 603 History of the Italian Language 3
Development of the Italian language from its Latin origins. Explication 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 3
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 101 JAPANESE I – ELEMENTARY 4
Introduction to the contemporary Japanese language through developing listening comprehension, speaking, reading, and writing skills. The subject matter varies and will be announced in the registration booklet.
PREREQ: Three of the following: JAPN200, JAPN205, JAPN206, JAPN209, or instructor’s permission.

JAPN 105 JAPANESE I – ELEMENTARY 4
Introduction to the contemporary Japanese language through developing listening comprehension, speaking, reading, and writing skills. The subject matter varies and will be announced in the registration booklet.
PREREQ: Two of the following: JAPN200, JAPN205, JAPN206.

JAPN 106 JAPANESE II – ELEMENTARY/INTERMEDIATE 4
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 4
Development of aural, oral, reading, and writing skills at the intermediate 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 3
Further study of Japanese grammar, kanji characters and reading and writing skills for communication. Emphasis on grammar, kanji and essay writing.
PREREQ: JAPN107
Students encouraged to take JAPN200 before JAPN205.

JAPN 204 THE ART OF JAPANESE CALLIGRAPHY 3
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 3
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 3
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: JAPN106
RESTRICTIONS: Taught abroad only.

JAPN 208 CONTEMPORARY JAPAN I 3
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 3
Practical training in Japanese for formal situations. Students will develop all four language skills in such contexts as job interviews, telephone etiquette, correspondence and relationship with supervisors. Skills and role-playing featured.
PREREQ: JAPN107

JAPN 220 JAPANESE CONVERSATION AND COMPOSITION 3
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.

JAPN 305 JAPANESE CONVERSATION AND COMPOSITION 3
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.
RESTRICTIONS: May be repeated for credit when topics vary.

JAPN 306 INDEPENDENT STUDY 1–3
PREREQ: Two of the following: JAPN200, JAPN205, JAPN206.

JAPN 440 TECHNICAL JAPANESE II 3
Further study in the reading and writing of technical Japanese, including the translation of technical writings.
PREREQ: JAPN340

JAPN 455 SELECTED AUTHORS, WORKS, AND THEMES 3
Works of one or more outstanding authors or on a special theme.
PREREQ: Two 300-level Japanese courses.
RESTRICTIONS: May be repeated for credit when topics vary.

JAPN 466 INDEPENDENT STUDY 1–3
PREREQ: One 300-level Japanese course.

JEWISH STUDIES

JWST 105 JEWISH STUDIES I – ELEMENTARY 4
See HEBR105 for course description.

JWST 106 JEWISH STUDIES II – ELEMENTARY/INTERMEDIATE 4
See HEBR106 for course description.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>JWST 107</td>
<td>Hebrew III - Intermediate</td>
<td>4</td>
<td>See HEBR107 for course description</td>
</tr>
<tr>
<td>JWST 201</td>
<td>Issues and Ideas in Jewish Studies</td>
<td>1</td>
<td>A forum for scholars to share their thoughts and research on the culture, literature and history of the Jewish people. Topics range from historical reviews to contemporary issues.</td>
</tr>
<tr>
<td>JWST 202</td>
<td>Biblical and Classical Literature</td>
<td>3</td>
<td>See ENGL202 for course description</td>
</tr>
<tr>
<td>JWST 205</td>
<td>Hebrew Conversation</td>
<td>3</td>
<td>See HEBR205 for course description PREREQ: HEBR107 or equivalent.</td>
</tr>
<tr>
<td>JWST 208</td>
<td>Introduction to Jewish Philosophy</td>
<td>3</td>
<td>See PHIL208 for course description</td>
</tr>
<tr>
<td>JWST 254</td>
<td>Jewish Holocaust: 1933-1945</td>
<td>3</td>
<td>See HIST254 for course description</td>
</tr>
<tr>
<td>JWST 261</td>
<td>Peoples and Cultures of the Middle East</td>
<td>3</td>
<td>See ANTH261 for course description</td>
</tr>
<tr>
<td>JWST 308</td>
<td>Topics in Jewish Theology</td>
<td>3</td>
<td>See PHIL308 for course description PREREQ: PHIL208/JWST208 recommended.</td>
</tr>
<tr>
<td>JWST 318</td>
<td>Studies in Film</td>
<td>3</td>
<td>See ENGL318 for course description</td>
</tr>
<tr>
<td>JWST 348</td>
<td>Contemporary Jewish-American Literature</td>
<td>3</td>
<td>See ENGL348 for course description</td>
</tr>
<tr>
<td>JWST 349</td>
<td>Introduction to Jewish Sources: Text and</td>
<td>3</td>
<td>See ENGL349 for course description</td>
</tr>
<tr>
<td></td>
<td>Interpretation</td>
<td></td>
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</tr>
<tr>
<td>JWST 360</td>
<td>Sociology of Religion</td>
<td>3</td>
<td>See SOC1260 for course description</td>
</tr>
<tr>
<td>JWST 365</td>
<td>Studies in Literary Genres, Types and Movements</td>
<td>3</td>
<td>See ENGL365 for course description</td>
</tr>
<tr>
<td>JWST 377</td>
<td>Arab-Israeli Politics</td>
<td>3</td>
<td>See POSC377 for course description</td>
</tr>
<tr>
<td>JWST 381</td>
<td>History of Arab-Israeli Conflict</td>
<td>3</td>
<td>See HIST380 for course description</td>
</tr>
<tr>
<td>JWST 382</td>
<td>Studies in Multicultural Literature in English</td>
<td>3</td>
<td>See ENGL382 for course description</td>
</tr>
<tr>
<td>JWST 409</td>
<td>Contemporary Problems of World Politics</td>
<td>3-6</td>
<td>See POSC409 for course description RESTRICTIONS: Only offered in Israel.</td>
</tr>
<tr>
<td>JWST 430</td>
<td>Comparative Sociology</td>
<td>3</td>
<td>See SOC1430 for course description</td>
</tr>
<tr>
<td>JWST 435</td>
<td>Sociology of American Jewry</td>
<td>3</td>
<td>See SOC1435 for course description</td>
</tr>
<tr>
<td>JWST 452</td>
<td>Problems in Urban Politics</td>
<td>3</td>
<td>See POSC452 for course description</td>
</tr>
<tr>
<td>LATN 101</td>
<td>Elementary Latin I</td>
<td>3</td>
<td>Prepares students to read ancient Roman literary works in the original language. Emphasizes building a basic vocabulary and acquiring essential grammar. Discussion of Roman culture and civilization.</td>
</tr>
<tr>
<td>LATN 102</td>
<td>Elementary Latin II</td>
<td>3</td>
<td>Completion of elementary Latin PREREQ: LATN101 or equivalent RESTRICTIONS: One year of high school Latin acceptable in lieu of prerequisite.</td>
</tr>
<tr>
<td>LATN 213</td>
<td>Cicero</td>
<td>3</td>
<td>Introduction to reading Latin literature in the original language, focusing on the philosophical and forensic works of Cicero, the historical writings of Livy and the poetry of Ovid. PREREQ: LATN101 and LATN102 or equivalent</td>
</tr>
<tr>
<td>LATN 214</td>
<td>Vergil</td>
<td>3</td>
<td>Vergil's Aeneid or Ovid select works Review of grammar and readings in the poetry of Vergil. PREREQ: LATN213 RESTRICTIONS: Satisfies College of Arts and Sciences language requirement</td>
</tr>
<tr>
<td>LATN 221</td>
<td>Roman Letters</td>
<td>3</td>
<td>Explores the letter as a literary form in the Roman world. Readings from the letters of Cicero and Pliny. PREREQ: LATN214</td>
</tr>
<tr>
<td>LATN 222</td>
<td>Historians of the Republic</td>
<td>3</td>
<td>Selected readings from the works of Livy, Sallust and Cornelius Nepos. PREREQ: LATN214</td>
</tr>
<tr>
<td>LATN 366</td>
<td>Independent Study</td>
<td>1-3</td>
<td></td>
</tr>
<tr>
<td>LATN 403</td>
<td>Roman Lyric Poetry</td>
<td>3</td>
<td>Readings in the lyric poetry of Catullus and Horace. PREREQ: LATN214</td>
</tr>
<tr>
<td>LATN 466</td>
<td>Independent Study</td>
<td>1-3</td>
<td></td>
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</tbody>
</table>

### Leadership

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEAD 100</td>
<td>Leadership, Integrity and Change</td>
<td>3</td>
<td>Introduces students to concepts and theories of leadership to help them develop the skills essential to becoming leaders in the workplace, community and society.</td>
</tr>
<tr>
<td>LEAD 104</td>
<td>Leadership, Power and Social Responsibility</td>
<td>3</td>
<td>Explores general models of how consumer policies come into being and examines how the relationships between consumers, government and business impact the formulation of these consumer policies.</td>
</tr>
<tr>
<td>LEAD 105</td>
<td>Leadership in Consumer Voice and Customer Service</td>
<td>3</td>
<td>Explores how consumers can use voice to obtain more satisfactory service and how organizations can encourage and use consumer voice for mutual benefit.</td>
</tr>
<tr>
<td>LEAD 109</td>
<td>Presentation Strategies</td>
<td>3</td>
<td>Methods for delivering leadership messages and for developing strategic presentations, with an emphasis on purpose, vision, audience and formats.</td>
</tr>
<tr>
<td>LEAD 111</td>
<td>Topics in Consumer Resource Management</td>
<td>3</td>
<td>Examines power as a set of internal and external resources that leaders can use to promote social responsibility to and by consumers. PREREQ: LEAD100</td>
</tr>
<tr>
<td>LEAD 113</td>
<td>Consumer Affairs Internship</td>
<td>3-6</td>
<td>Topics relating to the development of human and economic resources and productive capacity to meet consumer needs over the life span. Topics will vary. PREREQ: POSC410</td>
</tr>
<tr>
<td>LEAD 116</td>
<td>Decision-Making and Leadership</td>
<td>3</td>
<td>Explores the skills essential to becoming leaders in the workplace, community and society. PREREQ: LEAD104</td>
</tr>
<tr>
<td>LEAD 117</td>
<td>Consumer Laws and Regulations</td>
<td>3</td>
<td>PREREQ: LEAD201</td>
</tr>
<tr>
<td>LEAD 118</td>
<td>Independent Study</td>
<td>1-6</td>
<td></td>
</tr>
<tr>
<td>LEAD 401</td>
<td>Topics in Consumer Policy Analysis</td>
<td>3</td>
<td>PREREQ: LEAD201</td>
</tr>
<tr>
<td>LEAD 404</td>
<td>Leadership in Organizations</td>
<td>3</td>
<td>PREREQ: LEAD100</td>
</tr>
</tbody>
</table>
LEAD 411 TOPICS IN LEADERSHIP DYNAMICS 3
Topics relating to aspects of leadership. Themes in leadership dynamics will be explored.
PREREQ: LEAD100.

LEAD 490 SENIOR CAPSTONE 3
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.

LEGAL STUDIES

LEST 210 THE LAW AND YOU 1 PF
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.

LEST 301 INTRODUCTION TO LEGAL STUDIES 3
Introduces legal studies as a multidisciplinary field. May be cross-listed with CRJU301.

LEST 345 LEGAL ISSUES OF THE MASS MEDIA 3
See COMM345 for course description.

LEST 380 INTRODUCTION TO LAW 3
See POSC380 for course description.

LEST 383 LANGUAGE, POWER AND THE LAW 3
See LING383 for course description.

LEST 385 LANGUAGE AND LAW: COURT INTERPRETATION 3
See LING385 for course description.

LEST 401 SENIOR SEMINAR 3
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.

LEST 408 ECONOMICS OF LAW 3
See ECON408 for course description.
PREREQ: ECON300 or ECON301.

LEST 450 TOPICS IN ENVIRONMENTAL LAW 3
See FREC450 for course description.

LEST 466 INDEPENDENT STUDY 1–6

LEST 475 SOCIAL SCIENCE AND THE LAW 3
See CRJU475 for course description.

LEST 646 ADMINISTRATIVE LAW 3
See UAPP646 for course description.

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

LEST 673 INTERNATIONAL LAW 3
See MAST673 for course description.
RESTRICTIONS: Requires permission of instructor.

LINGUISTICS

LING 101 INTRODUCTION TO LINGUISTICS I 3
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.

LING 102 LANGUAGE, MIND AND SOCIETY 3
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.

LING 130 AMERICAN SIGN LANGUAGE I 3
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.

LING 131 AMERICAN SIGN LANGUAGE II 3
Continuation of LING130.
PREREQ: LING130.
RESTRICTIONS: Requires interview with instructor if Sign Language has been studied elsewhere.

LING 203 LANGUAGES OF THE WORLD 3
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 relation between language and thought).
May be cross-listed with FLIT203.

LING 222 LANGUAGE AND GENDER 3
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.

LING 253 LABORATORY PHONETICS 3
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.

LING 265 STUDIES IN LANGUAGE 3
Topics vary and will be announced in registration booklet.
RESTRICTIONS: May be repeated for credit when topics vary.

LING 301 DICTIONARIES 3
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.

LING 358 LINGUISTICS AND LANGUAGE ARTS 3
See EDUC358 for course description.

LING 366 INDEPENDENT STUDY 1–6

LING 376 INTRODUCTION TO COMMUNICATION DISORDERS 3
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.

LING 377 CLINICAL PRINCIPLES AND PROCEDURES IN SPEECH PATHOLOGY 3
Focuses on clinical principles and procedures in assessment, planning and
intervention in speech pathology. Assessment issues related to measurement
concepts and descriptive statistics including the use of norm-referenced tests,
defining target behaviors and developing observation skills are covered.
Treatment planning and intervention include developing a treatment program,
target behavior baselines and documenting treatment effectiveness.
PREREQ: LING376.

LING 378 ANATOMY AND PHYSIOLOGY OF SPEAKING 3
Introduction to structures and processes underlying human speech production.
Anatomical, physiological and neurological bases of speech-related processes,
including breathing, phonation and articulation Primary emphasis is to learn
names and functions of various structures involved in speech production and to
gain understanding of how they serve to support speaking in normally functioning
humans.

LING 383 LANGUAGE, POWER AND THE LAW 3
Examines a variety of topics which demonstrate the power of language in the
legal arena, including the language of mediation, the role of forensic linguistics in
misdemeanor and product liability cases, gender and power, the Plain English
movement, and attorneys' questioning styles.
May be cross-listed with LEST383.

LING 385 LANGUAGE AND LAW: COURT INTERPRETATION 3
Examines court interpretation from various perspectives and includes an historical
overview of policy development, linguistic challenges (for both spoken and signed
languages), ethics and responsibilities, testing and certification of court
interpreters (at state and federal levels), and comparative data about other
countries. Numerous guest speakers supplement coursework.
May be cross-listed with LEST385.
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 implication. Selected linguistic
phenomena (e.g., tense, aspect, predication and thematic roles). Some elements of
formal semantics.
PREQ: LING101 or equivalent.

LING 697  SOCIOLOGY 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.
PREQ: 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.
PREQ: 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.
PREQ: 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.
PREQ: 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 statements.

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.
PREQ: 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.
PREQ: 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 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  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 aesthetic 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.

MALS 610  FORCE, CONFLICT AND CHANGE  3
From antiquity to the present, the use of force and the resolution of conflict have
been among humanity's enduring preoccupations. Examines ideas about these
issues, and associated questions such as the meaning of "heroism" and "just
war."
RESTRICTIONS: Open to majors only.

MALS 611  DOCUMENTARY JOURNALISM AND FILM  3
Explores non-fiction narratives, both in print and on film. Focuses on visual
reporting from the Victorian Era to the present, drawing analogies between the
techniques of literature and cinema.
RESTRICTIONS: Open to majors only.

MALS 613  LATIN AMERICAN EXPERIENCES  3
Examines recurring issues and problems in Latin America. The conflict between
church and state, nationalism and a place in world affairs, tensions between the
individual and society and the influence of the United States.
RESTRICTIONS: Open to majors only.

MALS 617  AMERICAN ART IN CONTEXT  3
Designed to give the non-specialist in art history an understanding of how social,
economic, religious, and cultural attitudes in America are reflected in its art,
architecture, and decorative arts from the colonial period to the present. Discussion
covering such subjects as patronage, regionalism, ethnic identity, and gender.
RESTRICTIONS: Open to majors only.