UNIVERSITY OF DELAWARE
COURSE DESCRIPTIONS
2001-2002
### 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.
4. **Grade types**
   - a. When blank the course is a letter graded course.
   - b. Course for which the grade is either pass or fail.
   - d. NR - No grade required.
5. **Brief description of the course**
6. **Prequisites may be satisfied by the course or courses indicated or by equivalent preparation.**
7. **Corequisite course or courses should be taken in the same semester as the course.**
8. **Special requirements for the course**

### Interpretation of Course Numbers:

<table>
<thead>
<tr>
<th>Subject Area</th>
<th>Course Number</th>
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<tbody>
<tr>
<td>001-099</td>
<td>Below baccalaureate degree</td>
</tr>
<tr>
<td>100-199</td>
<td>Introductory-level courses</td>
</tr>
<tr>
<td>200-299</td>
<td>Introductory and intermediate courses, usually requiring some previous knowledge or experience in the discipline</td>
</tr>
<tr>
<td>300-399</td>
<td>Courses with a more concentrated focus on the subject matter in a particular discipline</td>
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<tr>
<td>400-499</td>
<td>Advanced courses for majors and other qualified students</td>
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<tr>
<td>500-599</td>
<td>Graduate-level courses for the nonspecialist</td>
</tr>
<tr>
<td>600-699</td>
<td>Graduate-level courses, also open to advanced undergraduates</td>
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<tr>
<td>700-899</td>
<td>Graduate-level courses</td>
</tr>
<tr>
<td>900-999</td>
<td>Ph. D.-level courses</td>
</tr>
<tr>
<td>X66</td>
<td>Special problems and independent study</td>
</tr>
<tr>
<td>X67</td>
<td>Experimental course (may be offered twice)</td>
</tr>
</tbody>
</table>

Courses numbered 500 to 599 may not be taken for graduate credit in a student's major. With the approval of the graduate student's major department, 500-level courses taken outside the student's major may be counted toward graduate degree requirements.

Courses numbered 600 to 699 are graduate-level courses also open to qualified advanced undergraduates with the consent of the instructor. These should be a single standard of expectation and grading for all students registered at this level.

In those 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:

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<thead>
<tr>
<th>Subject Area</th>
<th>Code</th>
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<td>Accounting</td>
<td>ACCT</td>
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<tr>
<td>Air Force Science</td>
<td>AFSC</td>
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<tr>
<td>Agriculture</td>
<td>AGR1</td>
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<tr>
<td>American Material Culture Studies</td>
<td>AMCS</td>
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<tr>
<td>Animal Science</td>
<td>ANSC</td>
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<tr>
<td>Anthropology</td>
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<tr>
<td>Arts and Science</td>
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<td>Art</td>
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<tr>
<td>Art Conservation</td>
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<td>Art History</td>
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<tr>
<td>Agricultural and Technology Education</td>
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<tr>
<td>Black American Studies</td>
<td>BAMS</td>
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<tr>
<td>Biological Sciences</td>
<td>BISC</td>
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<tr>
<td>Biomechanics and Movement Science</td>
<td>BMSC</td>
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<tr>
<td>Biosciences Engineering</td>
<td>BREG</td>
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<tr>
<td>Business Administration</td>
<td>BUAD</td>
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<tr>
<td>Business and Economics</td>
<td>BVEE</td>
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<tr>
<td>Cognitive Science</td>
<td>CGSC</td>
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<tr>
<td>Chemical Engineering</td>
<td>CHEG</td>
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<tr>
<td>Chemistry and Biochemistry</td>
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<tr>
<td>Chinese</td>
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<td>Civil and Environmental Engineering</td>
<td>CIEG</td>
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<td>Computer and Information Sciences</td>
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<td>Comparative Literature</td>
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<td>Consumer Studies</td>
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<td>Communication</td>
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<td>Computer Engineering</td>
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<td>Criminal Justice</td>
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<td>Science and Culture</td>
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<tr>
<td>Early American Culture</td>
<td>EAMC</td>
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<td>Economics</td>
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<td>EDLM</td>
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<td>Education</td>
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<tr>
<td>Engineering/Graphics and General</td>
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<td>Engineering Technology</td>
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<td>Electrical Engineering</td>
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<td>English</td>
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<td>Entomology and Applied Ecology</td>
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<td>Finance</td>
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<td>Foreign Languages and Literatures</td>
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<td>Food Science</td>
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<td>Food and Resource Economics</td>
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<td>Human Services, Education and Public Policy</td>
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<td>Health and Exercise Sciences</td>
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<tr>
<td>History</td>
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<td>Health Promotion</td>
<td>HLPD</td>
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<td>Hotel, Restaurant and Institutional Management</td>
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<td>Health Services Administration</td>
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<tr>
<td>Individual and Family Studies</td>
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<td>University Courses</td>
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<tr>
<td>Women's Studies</td>
<td>WOMS</td>
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ACCOUNTING

ACCT 160  Introduction to Business Information Systems  3
Introduction to computers: components and operations. Introduction to management information/decision support systems and the system development process. Emphasis on microcomputers and software packages used in business.

ACCT 200  Survey of Accounting  4
Survey of financial and managerial accounting concepts for the non-business major. Students learn about financial statements for merchandising, manufacturing, and service companies. Topics include: accounting cycle, budgeting, standard costing, contribution margins and cost-volume-profit analysis, and decision making.

RESTRICTIONS: No credit granted for majors within the accounting or business administration degree programs.

ACCT 207  Accounting I  3

RESTRICTIONS: Not open to Freshmen.

ACCT 208  Accounting II  3

PREREQ: ACCT 207.

RESTRICTIONS: Not open to Freshmen.

ACCT 261  Introduction to Business Information Systems II  3
Introduction to management information systems. Structured 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 processing, and the analysis, design, development, and audit of computer-based accounting systems. Includes some computer work.

PREREQ: ACCT 208, ACCT 160.

RESTRICTIONS: Requires Junior status.

ACCT 315  Intermediate Accounting I  3
In-depth coverage of financial accounting. Topics include: environment and conceptual framework of financial accounting; review of the accounting process; preparation of financial statements; recognition and measurement of current assets, property, plant and equipment and current liabilities.

PREREQ: ACCT 207, ACCT 208.

RESTRICTIONS: Requires Junior status.

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 calculation; revenue recognition; accounting for income taxes, pensions and leases; accounting changes and error analysis; financial reporting and changing prices; preparation of financial statements. Also, a review of the statement of cash flows; and disclosure requirements in financial reporting.

PREREQ: ACCT 315.

RESTRICTIONS: Requires Junior status and a grade of C or better in ACCT 315.

ACCT 327  Cost Accounting  3
Process, job order and standard costing; direct and absorption costing; budgeting, decentralization and transfer pricing; and cost analyses for managerial applications.

PREREQ: ACCT 208.

RESTRICTIONS: Requires Junior status.

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

RESTRICTIONS: Taught abroad.

ACCT 410  Theory of External Reporting  3
Covers the traditional model of accounting for information users external to the firm as well as modern descriptive research. Examines the institutional environment and the impact of the organization on the development of accounting theory and practice.

PREREQ: ACCT 316.

RESTRICTIONS: Accounting Junior or Senior status.

ACCT 413  Income Tax Accounting  3
Analysis of recent revenue acts; use of federal law and regulations to determine tax liability.

PREREQ: ACCT 315.

RESTRICTIONS: Requires Junior status and a grade of C or better in 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. Student uses 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.

RESTRICTIONS: Requires Senior status and a grade of C or better in 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.

RESTRICTIONS: Requires Senior status and a grade of C or better in 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.

RESTRICTIONS: Accounting majors only.

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.

ACCT 801  Management Control Systems  3
Critically examines traditional financial measures as management control devices in the contemporary context. Explores ways that the management control system can explicitly support strategic objectives. Includes methods of cost measurement, decision support using cost information, and how these measures of performance affect the organization.

PREREQ: ACCT 800 or equivalent.

RESTRICTIONS: Not open to M.S. in Accounting students.

ACCT 803  Systems Analysis, Design and Implementation  3
Explores the management, organizational and technical challenges of developing systems. The class will analyze business processes within a data-driven development methodology. Students will adopt requirements, weigh alternatives and design and implement solutions. Data processing and object modeling will be covered.

PREREQ: ACCT 302.

RESTRICTIONS: Open to business and accounting graduate students.
ACCT 804  DATABASE DESIGN, NETWORKS & IMPLEMENTATION  3
Covers the design and implementation of enterprise databases in a business environment. Special consideration will be placed on issues related to systems in a networked setting, including current topics related to the management and implementation of databases in such systems.
PREREQ: BUAD610 or BUAD820 or equivalent
RESTRICTIONS: Open to business and accounting graduate students only

ACCT 805  CURRENT ISSUES IN MANAGEMENT INFORMATION SYSTEMS  3
Addresses current information technology challenges facing today's corporate management. Although content will constantly change to reflect current technology and emerging issues, topics include ethics, management of the impact of new information systems on corporate environments, implementation issues, and changing systems in a global environment.
PREREQ: BUAD610 or BUAD820
RESTRICTIONS: Open to business and accounting graduate students only

ACCT 810  THEORY OF EXTERNAL REPORTING  3
Study of contemporary models of accounting for information users external to the firm. Includes an examination of the institutional environment and the impact of the institutions on the development of accounting theory and practice.
PREREQ: ACCT316.

ACCT 811  ADVANCED MANAGEMENT ACCOUNTING  3
Examination of concepts and rationale underlying managerial accounting methods. Advanced topics in decision analysis, standard costing and performance measurement.
PREREQ: ACCT327

ACCT 812  CORPORATE TAX PLANNING AND DECISION MAKING  3
Topics include gross income; business deductions and credits; taxable entities; special limitations on passive losses; tax factors in the acquisition; use of the disposition of fixed assets; non-taxable transaction; and family tax planning.
RESTRICTIONS: Not open to students with prior tax courses.

ACCT 817  ADVANCED AUDITING  3
Analysis of current and prospective developments in professional auditing. Topics include auditing computerized systems and the use of statistical sampling by the auditor.
PREREQ: ACCT417

ACCT 820  FINANCIAL STATEMENT ANALYSIS  3
Examines contemporary aspects of financial statement analysis such as the supply and demand for accounting information, statistical properties of accounting numbers and the impact of information on securities prices.
PREREQ: ACCT800.

ACCT 840  CONTEMPORARY ISSUES IN ACCOUNTING  3
Selected problems of current interest to the accounting profession.
PREREQ: ACCT316 and ACCT327.
RESTRICTIONS: Requires permission of instructor.

ACCT 868  RESEARCH  1-6

ACCT 883  INTERNATIONAL ACCOUNTING  3
Describes the functions of international accounting: foreign currency transactions, financial statement translation, inflation, auditing, and taxation. A comparative approach is stressed. Current issues are covered as appropriate.
PREREQ: ACCT800 or equivalent.

AIR FORCE SCIENCE

AFSC 110  THE FOUNDATIONS OF THE USAF I  1
Introduces the role in our society of the Department of Defense and Air Force. Emphasis is placed on air force doctrine, mission and organization, as well as U.S. strategic offensive forces. Introduces the concept of professionalism and assesses oral and written communication skills.

AFSC 111  THE FOUNDATIONS OF THE USAF II  1
Continuation of AFSC110. Emphasis on mission, organization and function of U.S. Air Force strategic, defensive, general purpose and aerospace support forces. Includes understanding the use of army, naval and reserve forces in achieving national security objectives. Assesses oral and written communication skills.

AFSC 210  THE EVOLUTION OF U.S. AIR AND SPACE POWER I  1
Focuses on development of air power from its beginning through two world wars; evaluates air power concepts, doctrine and role of technology in growth of air power; considers air power development in military and non-military operations in support of national objectives. Assesses oral and written communication skills.

AFSC 211  THE EVOLUTION OF U.S. AIR AND SPACE POWER II  1
Continuation of AFSC210. Focuses on growth and development of air power since 1945 in response to Korea, the Cold War, Southeast Asia, the Persian Gulf and the Space Age. Also includes peaceful employment of aerospace forces for relief and civic action programs. Assesses oral and written communication skills.

AFSC 310  LEADERSHIP STUDIES I  3
Focuses on applying concepts in leadership and management by comprehending leadership styles and managerial functions, concepts of individual motivation and organizational/group dynamics, and decision-making processes. Emphasizes oral and written communication skills, leadership research and behavior.

AFSC 311  LEADERSHIP STUDIES II  3
Continuation of AFSC310. Emphasis on understanding and applying management concepts, principles and functions in relation to the organization and work environment. Continued emphasis on oral and written communication skills, leadership research and behavior.

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

AFSC 411  NATIONAL SECURITY AFFAIRS II  3
Continuation of AFSC410. Focuses on role and function of the professional officer in a democratic society; the socialization processes, prevailing public attitudes and value orientations associated with military service; principal requisites for maintaining national security forces; and the military justice system. Continued emphasis on oral and written communication skills.

AGRICULTURE

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

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

AGRI 212  ORAL COMMUNICATION IN AGRICULTURE AND NATURAL RESOURCES  3
Introduces basic communication principles and provides a series of communication experiences to develop skills needed for oral presentations, using visual aids and other appropriate technology. Students will give several performances using a variety of approaches.
RESTRICTIONS: Open to majors only.

AMERICAN MATERIAL CULTURE STUDIES

AMCS 216  INTRODUCTION TO MATERIAL CULTURE STUDIES  3
See ANTH216 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.

AMCS 464  MUSEUM STUDIES INTERNSHIP  3
See MSST464 for course description.
PREREQ: MSST403

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 221 Nutrition and Feeding of Horses 2
Study of proper feeding and use of quality feedstuffs to maintain health and productivity of horses.

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 wellbeing 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 Biological Science and Socioeconomic Issues 3
Introduction to agricultural biotechnology and socioeconomic issues: integrates 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 crosslisted with PREC270 and/or PLSC270.

ANSC 300 Principles of Animal and Plant Genetics 3
Introduction to the theory and application of genetics related to the improvement of plants and animals. May be crosslisted with ENTO300 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 crosslisted with ENTO310 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 Chemistry 4
See FOSC328 for course description.

ANSC 329 Food Analysis 4
See FOSC329 for course description.
PREREQ: CHEM214/216 or CHEM252.

ANSC 332 Introduction to Animal Diseases 3
Nature and mechanisms of disease processes with emphasis on their prevention and control.
PREREQ: ANSC140.

ANSC 342 Exercise Physiology and Conditioning of Horses 2
Introduction to equine structure at rest and in motion. Includes anatomical, physiological and management factors pertinent to the development of horses into sound and fit athletes.
PREREQ: ANSC140.

ANSC 345 Comparative Physiology of Domestic Animals 4
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 systems.
PREREQ: ANSC140.
RESTRICTIONS: Offered in Fall only. Required for prevet and biotech concentrations.

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 location.
PREREQ: ANSC101 and ANSC251.
RESTRICTIONS: Offered in Fall 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 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 420 Equine Management 4
History and importance of the horse industry; anatomy, reproduction, physiology, disease and parasites, applied nutrition, marketing, buildings and facilities.
PREREQ: ANSC140 and ANSC251.

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 antigenicity of the immune system, immunoregulatory mechanisms, immunity and autoimmunity.
PREREQ: ANSC332 and BISC207.

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.

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 new management practices. Discussion and laboratory involves both classical and current state of knowledge in mammalian and avian reproduction.
PREREQ: ANSC345.

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 or PLSC300 or ENTO300.
RESTRICTIONS: 400-level section meets with a 600-level section.

ANSC 615 Vertebrate Developmental Biology 3
See BISC415 for course description.
PREREQ: BISC401 and BISC403.
RESTRICTIONS: Requires approval of instructor.

ANSC 624 Monogastric Nutrition 3
Advanced study of the digestion, absorption and metabolism of nutrition in terms of the needs of monogastrics. Application of principles to swine, poultry and equine nutrition. May be crosslisted with NIDT464.
PREREQ: ANSC452 or NIDT400, and CHEM214.
RESTRICTIONS: Offered in Spring of odd-numbered years.
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
RESTRICTIONS: Offered in Spring of even-numbered years

ANSC 633  Poultry Pathology  3
Study of poultry diseases with emphasis on their causes, prevention, treatment and control
PREREQ: ANSC332, ANSC431 and ANSC635
RESTRICTIONS: Offered in Spring of odd-numbered years

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 atrophy of the immune system, reproductive immunity, neonatal immunity, immunodeficiencies and autoimmunity.
PREREQ: ANSC332 and BISC207

ANSC 637  Avian Immunology  4
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 Fall of odd-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.

ANSC 639  Food Microbiology  4
See FOSC639 for course description

ANSC 643  Molecular Endocrinology  3
Brief overview of endocrinology covering hormone types and hormone systems. Detailed discussion of molecular aspects of hormone action including hormone-receptor interactions, second messengers and gene regulation by hormone. Presents methodologies used to approach current topics in endocrinology.
PREREQ: ANSC345 or ANSC441
RESTRICTIONS: Offered in Spring of odd-numbered years

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

ANSC 645  Avian Physiology  4
Systemic and comparative physiology of birds. Nervous, respiratory, digestive, excretory, endocrine and thermoregulatory systems.
PREREQ: ANSC345
RESTRICTIONS: Offered in Fall of odd-numbered years.

ANSC 654  Ruminant Nutrition and Metabolism  3
Basic aspects of nutrition and metabolism of ruminant animals with emphasis on rumen microbiology, lactation, physiology and growth. May be cross-listed with NTD654.
PREREQ: ANSC452 or NTD400 and CHEW214

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 or ENTO300 or BISC300.
RESTRICTIONS: 400-level section meets with a 600-level section

ANSC 682  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.

ANSC 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 230 Peoples of the World
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
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
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
General survey of ethnic arts 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
Anthropology applied to practical problems, including community development, directed change, agrarian reform and urban relocation, particularly in Third World countries.

ANTH 259 Hunting Societies
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
Cultures, institutions and ethnic groups of the Middle East. Description and analysis of major cultural traditions and social institutions. May be cross-listed with WST261.

ANTH 265 High Civilizations of the Americas
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
Early civilization in Southeast Asia, the Near East, Egypt, China and India.

ANTH 275 Delaware Prehistoric Archaeology
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
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 HIST278.

ANTH 298 Honors Topics
Weekly meetings with faculty to expand on topics treated in 200-level courses in which the student is currently enrolled.

ANTH 300 Primatology
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
Survey of the evolution of human reproduction and sex differences. Evidence derived from the human fossil record, living nonhuman primates, modern biological differences between human males and females and cross-cultural comparisons of reproductive behavior and sex roles. May be cross-listed with WOMS305.

ANTH 320 Prehistory of North America
Major cultural and social developments of prehistoric humans in North America, from the entrance of the Paleolithic to the arrival of the Europeans in the 16th century.

ANTH 322 Prehistory of South America
Survey of archaeological complexes and chronology, including lower Central America from western Costa Rica to Panama, and South America from the tropical forests to the Andean highlands. Major topics include the domestication of plants and animals and the rise of civilization.

ANTH 324 Old World Archaeology
Survey of world prehistory, excluding the Americas, from the earliest evidence of human activity until the rise of civilizations with particular emphasis on technological, economic and social change.

ANTH 325 Peoples of Europe
Cultures and subcultures of Europe, with special attention to the rural sectors and their historical development.

ANTH 330 Development and Underdevelopment
Anthropological perspectives of sociocultural change in Africa, Asia and Latin America. Emphasis on the economic and political relationships established between these areas and industrial societies.

ANTH 333 Peoples of Africa
Social institutions and cultural traditions of Africa; political, economic, legal and kinship systems, and modes of thought.

ANTH 337 South American Indians
Types of Indian cultures in contemporary South America. Cultural traditions and social institutions of Indian communities, especially the tribes of the tropical forest.

ANTH 338 Arts and Crafts of Native South America
Arts and crafts technological processes invented by or available to tribal societies of South America. Artistic and technical achievements in ceramic and textile.

ANTH 342 Issues in American Cultures: Archaeological Perspectives
Archaeological perspectives on issues of concern in contemporary American culture, including the environment, multiculturalism, war, gender, technology and production, and class.

ANTH 363 Women in Cross-Cultural Perspective
See WOMS363 for course description.

ANTH 366 Independent Study
Weekly meetings with faculty to expand on topics treated in 300-level courses in which the student is concurrently enrolled.

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

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

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

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

ANTH 390 Honors Colloquium
See ARSC390 for description.

ANTH 398 Honor Topics
Weekly meetings with faculty to expand on topics treated in 300-level courses in which the student is concurrently enrolled.

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

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

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

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

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

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

ANTH 457 Survey of African Art
Major African art styles, their interrelationships, the context of usage and the meanings of African artworks. May be cross-listed with ARTH457.

ANTH 463 Historical Archaeology and the Public
Provides practical experience through involvement in a project at an agency, research center or museum which researches, interprets, administers and preserves historical archaeological resources for the public. For students planning careers in historical archaeology, public history, university teaching, the museum field and historic preservation. May be cross-listed with HIST463.
ARTS AND SCIENCE

ARTH 466 INDEPENDENT STUDY 1-6

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

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

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

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

ARTH 498 HONOR TOPICS 1
Weekly meetings with faculty to expand on topics treated in 400-level courses in which the student is concurrently enrolled.

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

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

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

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

ARTH 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 archeology, public history, university teaching, the museum field and historic preservation. May be cross-listed with HIST663.

ARTS AND SCIENCE

ART 110 FOUNDATION DRAWING I 3
Basic elements of visual thinking through the manipulation of various drawing media, including pencil, charcoal, ink wash and pastel; and techniques, including contour and gesture drawing. Emphasis on perspective, line, form and spatial relationships through observation.
COREQ: ART111 or ART113.

ART 111 FOUNDATION 2D DESIGN 3
Development of craftsmanship, use of media and techniques for the application of two dimensional design principles. Study includes point, line, plane and volume to indicate form and the exploration of the effect of value, saturation and hue in the perception of color.
COREQ: ART110 or ART112.

ART 112 FOUNDATION DRAWING II 3
Continuation of work in tonality and exploration of drawing media in both black and white and color. Problems include both representation and abstraction.
PREREQ: ART110.
COREQ: ART111 or ART113.

ART 113 FOUNDATION 3D DESIGN 3
Introduction to shaping space dynamically using various working styles and artistic research. Assignments stress integration of expressive content in the following: 3D elements and organizing principles, scale and impact; personal and physical interaction, form and function, methods/materials and craftsmanship of construction.
COREQ: ART110 or ART112.

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

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

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

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

ART 138 ELEMENTARY DRAWING AND PAINTING I 3
Representational drawing and painting from still lifes, landscapes and the human head in a variety of media including charcoal, pastel and oil.
RESTRICTIONS: Open to nonmajors and nonminors only.

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

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

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

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

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

ART 211 VISUAL COMMUNICATIONS IMAGEMAKING II 3
Continuation of imagemaking principles and techniques as applied to design, visual thinking and communication problem solving through both photographic and illustration techniques
COREQ: ART201.
RESTRICTIONS: Requires permission of instructor.

ART 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 246 BEGINNING SCREENPRINTING 3
Introduction to basic water-based screenprinting including blockout, drawing fluid, clay-on 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, slides, videos, 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, symbolic 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, techniques, 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 problem solving through visual design; the visualization of problems and solutions; and the correlation of forms with their content, function and context.
PREREQ: ART201 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 typographic 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 TV COMMERCIALS TO MTV 3
An introduction multimedia course involving the conceptualizing, sequencing and editing of still and video images with sound. Utilizing computer programs such as Adobe Premiere, projects can include movie trailers, television commercials, film graphics, animation and rock videos.
RESTRICTIONS: Only offered during Winter Session.

ART 307 NEW 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 for the internet and may also include games, training and educational applications.
RESTRICTIONS: Requires permission of instructor and completion of 60 credit hours.

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.

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

ART 312 ILLUSTRATION I 3
Introduction to computerized and photographic techniques utilized in the creation of original images. Projects incorporate a wide variety of subjects and media. Emphasis will be placed on the execution of techniques as related to creative expression.
PREREQ: ART211.

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

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

ART 330 ADVANCED FIGURE DRAWING 3
Continued studies in figure drawing. Emphasis on advanced media techniques, description and personal expression.
PREREQ: ART230.

ART 331 INTERMEDIATE PAINTING 3
Exploration of color, composition, and color harmonies. Emphasis on critical thinking and technical execution in oils.
PREREQ: ART231.
RESTRICTIONS: May be repeated for up to six credit hours.

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

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

ART 335 INTERMEDIATE PAINTING: THE SCULPTURE 3
A technical and conceptual guide to interpreting the human figure in sculpture, with an emphasis on the use of the figure as a vehicle for expression in contemporary sculpture.
PREREQ: ART230 and ART231.

ART 341 WOODCUT AND ETCHING 3
Introduction to basic woodcut and/or linoleum block relief processes. Introduction to intaglio processes including drypoint, line etching, soft ground and aquatint techniques.
ART 342 Introduction to Monoprinting and Papermaking Processes 3
Introduction to western and eastern papermaking and cast paper processes. Introduction to monoprinting and collage processes to produce one of a kind prints.

ART 350 Intermediate Sculpture I 3
Continues to emphasize all goals of ART 250 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: ART 250

ART 351 Intermediate Sculpture II 3
At this intermediate level, less emphasis is given to tools and techniques, and more attention is given to the student's search for personal artistic expression. Participation in student and local exhibitions is expected. For those interested in a concentration in sculpture, time will be given to portfolio preparation. Research into sculpture is intensified.
PREREQ: ART 350.

ART 366 Independent Study 1-6
Use of the medium for artistic communication. Advanced technical and aesthetic concepts as related to fine and applied art problems.
PREREQ: ART 280

ART 381 Intermediate Photography: Color 3
Shooting and processing of color slides and negatives, producing color prints from each. Examines color theory, color emulsions and contemporary ideas in color photography.
PREREQ: ART 380

ART 382 Alternative Photographic Processes 3
Nonilver photographic processes such as cyanotype, gum-bichromate, photo transfer, and vandyke brown. Using existing negatives, students will create, alter and manipulate images.
PREREQ: ART 280
RESTRICTIONS: Ability to work independently.

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

ART 390 Intermediate Ceramics I 3
Continuation of Beginning Ceramics.
PREREQ: ART 290

ART 391 Intermediate Ceramics II 3
Continuation of Intermediate Ceramics I with emphasis on the technical properties of clay and glazes.
PREREQ: ART 390

ART 402 Advanced Applied Design I 3
Mastering the advanced principles of effective conceptual design through solutions involving advertising design or graphic design problems as they would occur in advertising agencies, design studios or corporate design departments.
PREREQ: ART 303 and ART 305
COREQ: ART 403
RESTRICTIONS: May be repeated for up to six credit hours.

ART 404 Advanced Applied Design II 3
Continuation of mastering the advanced principles of effective conceptual design through solutions involving advertising design or graphic design problems as they would occur in advertising agencies, design studios or corporate design departments.
PREREQ: ART 402 and ART 403
COREQ: ART 405
RESTRICTIONS: May be repeated for up to six credit hours.

ART 405 Portfolio Preparation I 3
Continuation of the production of a portfolio which accurately and effectively defines the student's conceptual and practical skills in advertising design or graphic design situations.
PREREQ: ART 303 and ART 305
COREQ: ART 402
RESTRICTIONS: May be repeated for up to six credit hours.

ART 407 Advanced New Media Design 3
Continuation and more advanced focus on interactive design involving information architecture, interactivity, navigation, page sequencing, imagery and page design using still images, moving images and sound.
PREREQ: ART 307
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: ART 303 and ART 305, or ART 310 and ART 311, or ART 312 and ART 313
RESTRICTIONS: Requires permission of instructor. May be repeated for 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: ART 303, ART 305, ART 311, or ART 313
COREQ: ART 413
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: ART 303, ART 305, ART 311, or ART 313
COREQ: ART 412
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: ART 412.
COREQ: ART 415
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: ART 413
COREQ: ART 414
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, selling slide; 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 for up to six credit hours.

ART 424 Studio in the Materials and Techniques of Drawing in the West 3
See MSST 480 for course description.

ART 425 Seminar in Materials and Techniques of the Contemporary Painter and Draftsman 3
See ARTC 481 for course description.

ART 426 Color Mixing and Matching 3
See MSST 485 for course description.

ART 427 Studio Materials and Techniques of Painting I 3
See MSST 488 for course description.

ART 428 Studio Materials and Techniques of Painting II 3
See MSST 489 for course description.

ART 429 Studio in the Materials and Techniques of Printmaking I 3
See MSST 490 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: ART206
COREQ: 400 level Art course
RESTRICTIONS: May be repeated for 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: Six credits of ART331 or three credits of ART331 and three credits of 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 for up to nine credit hours

ART 440 Printmaking Studio 3
Advanced studio work based on agreement between student and instructor as to content and quality of work required.
PREREQ: ART241 or ART 246, and ART341 or ART342
RESTRICTIONS: May be repeated up to nine credit hours

ART 441 Advanced Printmaking 3
Advanced techniques in lithography and screenprinting or papermaking, monoprinting, etching and woodcut. Processes vary according to instructor
PREREQ: ART241 or ART 246, and ART341 or ART342
RESTRICTIONS: May be repeated for 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 ten 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 for up to nine credit hours

ART 466 Independent Study 1-6
Advanced studio and conceptual work based on agreement between student and instructor as to content and quality of work required. Students taking the course for repeating credit will be engaged in the development of a professional portfolio along with the other course requirements.
PREREQ: ART381
RESTRICTIONS: May be repeated for up to nine credit hours

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

ART 486 Photographic Electronic Imaging 3
Use of computer technology and techniques to create digital photography and imagery. Students use electronic technology to manipulate, retouch, adjust color, make multiple images and explore other creative techniques.
PREREQ: ART380
RESTRICTIONS: Previous photographic experience. May be repeated for 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 an artist photographer. The location and environment may vary. Winter and/or summer session offering
PREREQ: ART280 or equivalent
RESTRICTIONS: Requires permission of instructor

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

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

ART 600 Applied Design Tutorial 3
Studio experience for students whose principal mode of artistic expression and prior studies are in disciplines other than applied design, or where previous applied design work has been with a subject that is substantially different from what is now being studied.
PREREQ: ART411
RESTRICTIONS: May be repeated for up to twelve credit hours

ART 601 Applied Photography Tutorial 3
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than applied photography or where the work in applied photography has been with an aspect of the medium that is substantially different from what is now being studied.
PREREQ: ART411
RESTRICTIONS: May be repeated for up to twelve credit hours

ART 602 Drawing Tutorial 3
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than drawing or where the work in drawing has been with an aspect of the medium that is substantially different from what is now being studied.
PREREQ: ART411
RESTRICTIONS: May be repeated for up to twelve credit hours

ART 603 Painting Tutorial 3
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than painting or where the work in painting has been with an aspect of the medium that is substantially different from what is now being studied.
PREREQ: ART411
RESTRICTIONS: May be repeated for up to twelve credit hours

ART 604 Printmaking Tutorial 3
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than printmaking or where the work in printmaking has been with an aspect of the medium that is substantially different from what is now being studied.
PREREQ: ART411
RESTRICTIONS: May be repeated for up to twelve credit hours

ART 605 Sculpture Tutorial 3
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than sculpture or where the work in sculpture has an aspect of the medium that is substantially different from what is now being studied.
PREREQ: ART411
RESTRICTIONS: May be repeated for up to twelve credit hours

ART 608 Photography Tutorial 3
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than photography or where the work in photography has been with an aspect of the medium that is substantially different from what is now being studied.
PREREQ: ART411
RESTRICTIONS: May be repeated for up to twelve credit hours

ART 609 Ceramics Tutorial 3
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than ceramics or where the work in ceramics has been with an aspect of the medium that is substantially different from what is now being studied.
PREREQ: ART411
RESTRICTIONS: May be repeated for up to twelve credit hours

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

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

ART 630 Drawing Studio 3
Works on paper using traditional and non-traditional media. The nature of work is an extension of student's creative direction
PREREQ: ART480
RESTRICTIONS: May be repeated for up to six credit hours

ART 632 Painting 3-6
Advanced problems in the media and aesthetics of painting.
RESTRICTIONS: May be repeated for up to eighteen hours
ART 633  Painting 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 for up to eighteen credit hours.

ART 640  Printmaking Studio  3-6  
Advanced studio work based on agreement between student and instructor as to content and quantity of work required.

REstrictions: May be repeated for up to eighteen credit hours.

ART 641  Printmaking  3-6  
Provides independent work in a chosen print area. Course requirements will be determined by agreement of the student and the teacher.

REstrictions: May be repeated for up to eighteen credit hours.

ART 650  Sculpture Studio  3-6  
Concentrates on professional studio practices and the creation of individual sculptural expressions. Advanced studio work is based on agreement with the instructor regarding content and quantity of work.

REstrictions: May be repeated for up to eighteen credit hours.

ART 651  Sculpture  3-6  
Advanced level course focusing on becoming professionals. Beyond the studio and the creation of artistic expression, the student artist learns ways voices can be hard. Focuses on all the peripherals involved in the profession of sculpture.

REstrictions: May be repeated for up to eighteen credit hours.

ART 677  Seminar: The Business of Art  3  
Examination of some of the practical aspects of being a practicing studio artist, including promotion and cultural issues affecting visual art and artists; studio visits.

REstrictions: Requires permission of instructor. May be repeated for up to nine credit hours.

ART 678  Seminar: Studio Instruction Practicum  3  
Planning, instruction and evaluation of art disciplines at the college or equivalent level.

REstrictions: Requires permission of instructor. May be repeated for up to nine credit hours.

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

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

ART 683  Photography  3-6  
Individual problems in still photography applied to art education, fine arts, or applied design.

REstrictions: May be repeated for up to eighteen credit hours.

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

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

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

ART 691  Ceramics  3-6  
Problems in throwing, glazing and firing techniques.

REstrictions: May be repeated for up to eighteen credit hours.

ART 692  Ceramics Studio  3-6  
Advanced studio work based on agreement between student and instructor as to content and quantity of work required.

REstrictions: May be repeated for 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.

REq: 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 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  
Twenty-first-century artists’ materials: Topics: acrylic emulsion, acrylic solution, alkyd resin, and PVC paints; collage-assembly; solvent-photo transfer; synthetic fiber canvas, paper, panels, oil pastels, paint sticks, felt-tip markers, colored ink pencils; airbrush spray gun; and non-art materials. Potential health hazards. Conservation topics: pH, lightfastness, adhesion and storage environments. May be cross-listed with ART423 and/or ART448.

REstrictions: Requires permission of instructor.

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

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

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

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

REstrictions: Requires permission of instructor.

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

REstrictions: Full-time fellowship students only.

ARTC 616  Conservation Research Methods  3  
Introduction to the principles and methodology of scientific research in conservation. Emphasis on topics such as experimental design, data analysis preparation of research proposals, authenticity and technical studies, accelerated aging, and simple analytical methods.

REq: ARTC615.

REstrictions: Full-time fellowship students only.
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, ethics, philosophy and museum science
PREREQ: ARTC655
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, and decorative, ethnographic, and archaeological objects under the supervision of conservation faculty.
PREREQ: ARTC654
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, and 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 ART 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, and 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: 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, and decorative, ethnographic, and archaeological materials. Requirement 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 MSST685 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 coursework.
RESTRICTIONS: Not open to students who have been admitted to candidacy.

ARTC 969 DOCTORAL DISSERTATION 1-12 PF

ARTH 101 VISUAL CULTURE 3
Visual culture explores the ways we make, perceive, and experience images and artifacts. Students will hone their skills in seeing, analyze historical models and critically engage discussions of visual art and material cultures in selected epochs and civilizations around the world.

ARTH 150 MONUMENTS AND METHODS IN THE HISTORY OF ART 3
Painting, sculpture and architecture studied as artistic and cultural expressions of their times. Emphasis on selected major artists, monuments and methods of analysis.

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

ARTH 152 DESIGN AND EXPRESSION IN THE VISUAL ARTS 3
An introduction to visual analysis of painting, sculpture and architecture. Principles of two- and three-dimensional design, spatial composition, color and technical methods used by artists to create emotional and aesthetic effects. Examples chosen from a variety of periods and places.

ARTH 153 INTRODUCTION TO ART HISTORY I 3
Painting, sculpture and architecture from Prehistoric times through ancient Egypt, Greece, Rome and the Middle Ages studied in historical and cultural context. RESTRICTIONS: Usually offered in fall semester.

ARTH 154 INTRODUCTION TO ART HISTORY II 3
Painting, sculpture and architecture of Western Europe from the Renaissance to the present studied in historical and cultural context. RESTRICTIONS: Usually offered in spring semester.

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

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

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

ARTH 166 SPECIAL PROBLEM 1-3
ARTH 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 prehistoric period. Lectures focus on some characteristic aspects of each period and the stages of the Empire until the time of Constantine the Great.

ARTH 207  ORIGINS OF ART  3
Art and architecture of the Stone Age, the Near East, Egypt, Crete, Mycenaean Greece and Barbarian peoples. Includes politics and religion as factors influencing art in various cultures. Ancient literature used to clarify the meaning of the works.

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.

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 late Byzantine, Romanesque and Gothic artistic traditions in their historical and cultural contexts. Development of a distinctively European art and society.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

ARTH 242  WOMAN AS IMAGE AND IMAGEMAKER  3
Analyzes the depiction of women in art from pre-history to the present in light of recent feminist studies. Topics correspond with particular periods in history. Each class includes a brief discussion of women artists and their works. May be cross-listed with WOMS242.

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

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

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

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

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

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

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

PREREQ: ART227 or ART228 or permission of instructor.
ARTH 306 SEMINAR 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 Saint Denis and the Origins of Gothic Architecture.
PREREQ: ARTH209 or ARTH210.
RESTRICTIONS: May be repeated for credit when topics vary

ARTH 408 SEMINAR IN NORTHERN RENAISSANCE ART 3
The arts in Northern Europe from 1300 to 1600
RESTRICTIONS: May be repeated for credit when topics vary

ARTH 413 SEMINAR IN ITALIAN RENAISSANCE ART 3
Italian art from 1300 to 1600 Recent topics include Leonardo da Vinci, Michelangelo, Titian and Medici Patronage in the Golden Age
RESTRICTIONS: May be repeated for credit when topics vary

ARTH 414 SEMINAR 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
PREREQ: ARTH220.
RESTRICTIONS: May be repeated for credit when topics vary

ARTH 415 SEMINAR IN ITALIAN BAROQUE ART 3
Painting, sculpture and architecture in Italy in the 17th century. Recent topics include Bernini and Roman Baroque Sculpture, Seicento Poetics and Imagery, Caravaggio, and Origins of the Baroque: The Carracci and their Academy
RESTRICTIONS: May be repeated for credit when topics vary

ARTH 417 SEMINAR IN NORTHERN BAROQUE ART 3
Seventeenth-century art in northern Europe Recent topics include Rembrandt and Rubens, Vermeer and Dutch Genre Painting, Northern Baroque Portraiture, and Prints in the Age of Rembrandt
RESTRICTIONS: May be repeated for credit when topics vary

ARTH 421 SEMINAR IN NINETEENTH-CENTURY ART 3
Art from David to Impressionism Recent topics include Gericault, Delacroix, Cezanne, Art and Politics, The Theory and Practice of Romanticism, Historicism from David to Gerome, and Orientalism
PREREQ: ARTH227.
RESTRICTIONS: May be repeated for credit when topics vary

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

ARTH 423 SEMINAR IN TWENTIETH-CENTURY ART 3
Art in Europe, with some reference to American art, from Post-impressionism to the present. Recent topics include Symbolism, Picasso, Dada and Surrealism, Cubism and its Influence, and Post-Modernism
PREREQ: ARTH227 or ARTH228.
RESTRICTIONS: May be repeated for credit when topics vary

ARTH 424 SEMINAR IN NINETEENTH-CENTURY PHOTOGRAPHY 3
Aspects of the history and aesthetics of 19th-century photography. Topics change with each time of offering. Recent topics include Photography and Art, Documentary Photography, and "Art" Photography.
PREREQ: ARTH227 or ARTH318.
RESTRICTIONS: Usually offered in Fall semester, every other year

ARTH 427 SEMINAR IN TWENTIETH-CENTURY PHOTOGRAPHY 3
Aspects of the history and aesthetics of 20th-century photography. Topics change with each time of offering. Recent topics include Photography and Art, and Photography and Criticism.
PREREQ: ARTH227 or ARTH228 or ARTH230 or ARTH311.
RESTRICTIONS: Usually offered in the Fall semester, every other year

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

ARTH 431 SEMINAR IN AMERICAN ARCHITECTURE 3
American architecture from the Colonies to the present. Recent topics include Architecture of the Colonial and Federal Periods, Nineteenth-Century American Architecture, and Philadelphia Architecture
RESTRICTIONS: May be repeated for credit when topics vary
ARTH 435 SEMINAR IN AMERICAN ART 3
American art from the Colonies to the present. Recent topics include Eakins and American Realism, Early American Modernism, and American Painting and Sculpture after World War II.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 454 VERNACULAR ARCHITECTURE 3
See ART 454 for course description.

ARTH 457 SURVEY OF AFRICAN ART 3
See ANTH 457 for course description.

ARTH 466 INDEPENDENT STUDY 1-6

ARTH 480 STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST 3
See MSST 480 for course description.

ARTH 481 SEMINAR IN MATERIALS AND TECHNIQUES OF THE CONTEMPORARY PAINTER AND DRAFTSMAN 3
See ART 481 for course description.

ARTH 488 STUDIO MATERIALS AND TECHNIQUES OF PAINTING I 3
See MSST 488 for course description.

ARTH 489 STUDIO MATERIALS AND TECHNIQUES OF PAINTING II 3
See MSST 489 for course description.

ARTH 490 STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I 3
See MSST 490 for course description.

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 Archic Greek Vase Painting, Hellenistic Greek Sculpture, Late Roman Portraiture, and Roman Architecture.
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 ivory sculptures.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 611 STUDIES IN ITALIAN RENAISSANCE ART 3
Italian art from 1300 to 1600. Recent topics include Leonardo da Vinci, Michelangelo, Titian, Tintoretto, Veronese, and Medici Patronage in the Golden Age.
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, Sacristy Poetics and Imagery, Caravaggio, and Origins of the Baroque: The Carracci and their Academy.
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 Rembrandt and Rubens, Vermeer and Dutch Genre Painting, Northern Baroque Portraiture, and Prints in the Age of Rembrandt.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 621 STUDIES IN NINETEENTH-CENTURY ART 3
Art from David to Impressionism. Recent topics include Gericaud, Delacroix, Courbet, Art and Politics (1780-1880), The Theory and Practice of Romanticism, Historicalism from David to Gericault, and Orientalism.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 622 RESEARCH TOPICS IN HISTORIC PRESERVATION 3
See UAPP 622 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 Culture 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 text 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 627 STUDIES IN THE HISTORY OF PHOTOGRAPHY 3
RESTRICTIONS: Usually offered in Fall semester, every other year. May be repeated for credit when topics vary.

ARTH 628 SEMINAR IN HISTORIC PRESERVATION 3
See UAPP 628 for course description.

ARTH 629 STUDIES IN MODERN ARCHITECTURE 3
Architecture in Europe and/or Americas 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 630 HISTORY OF THEORIES IN MATERIAL CULTURE 3
See EAMC 630 for course description.

ARTH 631 STUDIES IN AMERICAN ARCHITECTURE OF THE COLONIAL AND FEDERAL PERIODS 3
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 632 MAKING THE AMERICAN CITY 3
See UAPP 632 for course description.

ARTH 633 STUDIES IN NINETEENTH-CENTURY AMERICAN ARCHITECTURE 3
The Greek, Gothic, Egyptian and Oriental Revivals; High Victorian Style and its culmination in the Age of Elegance; and Late Nineteenth-Century American Architecture. Includes field trips.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 634 METHODS IN HISTORIC PRESERVATION 3
See UAPP 634 for course description.

ARTH 636 STUDIES IN AMERICAN ART: 1875-PRESENT 3
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.

ARTH 637 STUDIES IN ENGLISH ART AND ARCHITECTURE 3
The art of England, emphasizing the period from the 16th century through the end of the 19th century. Recent topics include the English Country House, British Painting, English Architecture, and Collecting in England.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 657 SURVEY OF AFRICAN ART 3
See ANTH 657 for course description.

ARTH 680 STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST 3
See MSST 680 for course description.

ARTH 681 MATERIALS AND TECHNIQUES OF THE CONTEMPORARY PAINTER AND DRAFTSMAN 3
See MSST 681 for course description.

ARTH 688 STUDIO MATERIALS AND TECHNIQUES OF PAINTING I 3
See MSST 688 for course description.

ARTH 689 STUDIO MATERIALS AND TECHNIQUES OF PAINTING II 3
See MSST 689 for course description.

ARTH 690 STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I 3
See MSST 690 for course description.

ARTH 801 INTRODUCTION TO DECORATIVE ARTS IN AMERICA TO 1860 3
See EAMC 801 for course description.

ARTH 810 STUDIES IN NINETEENTH- AND TWENTIETH-CENTURY EUROPEAN AND AMERICAN SCULPTURE 3
Academic and non-academic traditions of European and American sculpture of the 19th century and the several phases of modernism. Among the artists treated are Canova, Carpeaux, Rodin,0, Powers, Saint-Gaudens, Calder and Smith.
RESTRICTIONS: Open to graduate students only.
**ART HISTORY**

**ARTH 812 STUDIES IN AMERICAN PAINTING: 1800-1875** 3
Recent topics include Neoclassicism, Romanticism and the Grand Manner in the Art of West, Trumbull, Allston and Vanderlyn, Landscape and Genre Painting in the Work of Cole, Durand, Mount and the Hudson River School.

**PREREQ:** ARTH250

**RESTRICTIONS:** Open to graduate students only. May be repeated for credit when topics vary.

**ARTH 850 RESOURCES IN ART HISTORY** 0-0 PF
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

**ARTH 860 READING AND RESEARCH** 1-9 PF
Readings and conferences on an approved subject under faculty direction

**RESTRICTIONS:** Requires permission of Department Chair. Open to art history Ph.D. students only.

**ARTH 869 MASTER’S THESIS** 1-6

**ARTH 964 PRE-CANDIDACY STUDY** 3-12 PF
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.

**ARTH 969 DOCTORAL DISSERTATION** 1-12 PF

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**AGRICULTURAL AND TECHNOLOGY EDUCATION**

**ATED 166 SPECIAL PROBLEM** 1-3

**ATED 266 SPECIAL PROBLEM** 1-3

**ATED 366 INDEPENDENT STUDY** 1-6

**ATED 466 INDEPENDENT STUDY** 1-6

**ATED 480 CAREER AND TECHNICAL EDUCATION MATERIALS AND APPROACHES I** 3
Teaching methods, treatment of aims, materials, unit organization, evaluation and teaching techniques. Participation in career and technical student organization activities required.

**RESTRICTIONS:** School practicum of 12 hours required.

**ATED 481 CAREER AND TECHNICAL EDUCATION MATERIALS AND APPROACHES II** 3
Methods of teaching and organization in supervised career and technical programs, applied technical skills and adult education and community activities. Participation in career and technical student organization activities required.

**RESTRICTIONS:** School practicum of 12 hours required.

**ATED 600 INTERNSHIP IN TEACHING** 3
Full-time full-year extended student teaching 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

**ATED 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 21 graduate credits toward master’s degree

**ATED 680 CAREER AND TECHNICAL EDUCATION MATERIALS AND APPROACHES I** 3
Teaching methods, treatment of aims, materials, unit organization, evaluation and teaching techniques. Participation in career and technical student organization activities required.

**RESTRICTIONS:** School practicum of 12 hours required.

**ATED 681 CAREER AND TECHNICAL EDUCATION MATERIALS AND APPROACHES II** 3
Methods of teaching and organization in supervised career and technical programs, applied technical skills and adult education and community activities. Participation in student career and technical activities required.

**RESTRICTIONS:** School practicum of 12 hours required

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**BLACK AMERICAN STUDIES**

**BAMS 110 INTRODUCTION TO BLACK AMERICAN STUDIES** 3
Assesses the status of Black America in the modern technological order through an examination of the major spheres of institutional life, including employment, education politics, criminal justice and the military.

**BAMS 134 HISTORY OF AFRICA** 3
See HIST314 for course description.

**BAMS 204 URBAN COMMUNITIES** 3
See SOC204 for course description.

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

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

**BAMS 220 THE AMERICAN CIVIL RIGHTS MOVEMENT** 3-4
See HIST220 for course description.

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

**BAMS 296 HONORS FORUM** 1
See ARSC296 for course description.

**BAMS 298 RESEARCH ON RACE, ETHNICITY AND CULTURE** 1 PF
See WMS298 for course description.

**BAMS 304 HISTORY OF BLACK AMERICA TO THE CIVIL WAR** 3
Black historical impact on American life and culture to the Civil War. May be cross-listed with HIST225.

**PREREQ:** BAMS210

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

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

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

**PREREQ:** PHIL201

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

**PREREQ:** HIST205

**BAMS 313 AFRICAN AMERICAN LITERATURE I** 3
See ENGL244 for course description.

**BAMS 322 RACE AND POLITICS** 3
See POIS222 for course description.

**BAMS 327 RACE, GENDER, SCIENCE** 3
See PHIL227 for course description.

**BAMS 330 RHETORIC OF BLACK AMERICA** 3
Rhetoric of Black Americans from early orators to contemporary figures. Oral interpretation and analysis of methods and techniques.

**PREREQ:** Introductory class in communication.

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

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

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

**BAMS 361 RACIAL INEQUALITY** 3
See SOC361 for course description.

**BAMS 395 PAN AFRICANISM** 3
See HIST395 for course description.
BAMS 415 Race, Class and Gender 3
See SOCI415 for course description

BAMS 418 Race, Gender and Poverty 3
See SOCI418 for course description
PREREQ: SOCI501

BAMS 432 Psychological Perspectives on the Black American 3
See PSY416 for course description

BAMS 439 Problems in African Politics 3
See POSC439 for course description.

BAMS 440 Topics in Black American Studies 3
Analysis of important themes in the study of Afro-American life and history. Themes may vary each time the course is offered.
RESTRICTIONS: Open to Juniors and Seniors only

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

BAMS 660 Research and Black American Studies 1-6

BIOLOGICAL SCIENCES

BISC 100 Freshman Seminar 1 PF
Five to seven carefully selected primary journal articles analyzed in discussion format. Emphasis on development of a sophisticated appreciation of the experimental frontier in an important area of modern biological research by examination of both classical and current papers.
RESTRICTIONS: Open to Freshman majors by faculty invitation only

BISC 103 General Biology 3
The nature of science and biology as a science, origin of life, and structure and function of cells and multicellular organisms.
RESTRICTIONS: Open to non-majors only

BISC 104 Principles in Biology 4
The study of biological principles at molecular, cellular, organismal and ecological levels. Focuses biological literacy through the exploration of concepts, theories and methods in relation to topics, developments and controversies in biology that impact citizens’ lives and require informed decision making.
RESTRICTIONS: 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; heredity 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 and molecular mechanisms of tumorigenesis, cancer progression and the role of viruses in cancer biology.
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.

BISC 115 Human Heredity and Development Laboratory 1
Laboratory exercises dealing with probability, selection, karyotyping and pedigrees of humans.
COREQ: BISC105.

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.
BISC 312 General Ecology Laboratory 1
Laboratory and field exercises demonstrating basic ecological principles and quantitative techniques. Emphasis on population and community phenomena. Natural habitats studied include local fields, forests and streams.
COREQ: BISC302.

BISC 315 Experimental Cell Biology 2
A series of inquiry-based, multisection laboratory experiences in cell biology. Major techniques include quantitative and fluorescent microscopy, cell culture and gene expression assays. Students will learn to keep careful laboratory records, 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, multisection laboratory experiences in physiology. Experiments will be performed on various organ systems, using computerized 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, Turtles, 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 330 Biology of Vision 3
An integrative approach to the study of vision. Topics are the physics of light, the biochemistry of visual pigments, the electrophysiology of the visual pathway, the psychophysics of visual perception and robotic vision. Emphasis on an interdisciplinary approach.
PREREQ: BISC208

BISC 366 Independent Study 1-6

BISC 390 Honors Colloquium 3
See ARSC390 for course description

BISC 401 Molecular Biology of the Cell 3
Introduction to the molecular biology of eukaryotes and prokaryotes. Topics include structure and function of RNA and proteins; membranes, transport, composition and function of the eukaryotic cell, chromosomes, viruses, the immune system and recombinant DNA.
PREREQ: BISC207 and one semester of organic chemistry

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

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

BISC 411 Molecular Biology of the Cell Laboratory 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, 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.
PREREQ: BISC401 and BISC403
RESTRICTIONS: Requires approval of instructor.

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 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 Cooperative Education: Work Experience 1-9 PF
Supervised off-campus work experience that integrates academic learning with practical experience. Co-op placements range from research and laboratory positions to actual field work.
RESTRICTIONS: Not for major credit. Faculty sponsorship and application to Co-op Program required.

BISC 450 Proseminar in Environmental Science 3
See GEOG450 for course description

BISC 466 Independent Study 1-6

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

BISC 480 Vertebrate Natural History 4
Biology of vertebrate organisms dealing specifically with adaptations to the environment, morphology, physiology and taxonomy.
PREREQ: BISC208

BISC 492 Human and Mammalian Cyto genetics 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
COREQ: BISC493
RESTRICTIONS: BISC403 recommended in addition to Prerequisites. Offered in Spring of odd-numbered years.

BISC 493 Human and Mammalian Cytogenetics Laboratory 3
Teaching chromosome analyses in both clinical and research labs using modern techniques. Trains students to obtain preparations from human and experimental animals by culture methods and direct processing. Current banding techniques, microscopic analysis, karyotyping, tissue culture, microphotography and special cytogenetical procedures.
COREQ: BISC492

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

BISC 498 Topics in Biology 3
Topics may vary from section to section. Information about each section is available in the Biology Office prior to registration. May be cross-listed with CSCS498.
PREREQ: BISC208 (or two BISC100-level courses)
RESTRICTIONS: Requires Junior or Senior status. May be taken more than once but only three credits can count towards the major.

BISC 601 Immunoc hemistry 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.
PREREQ: BISC401 or Biochemistry.
RESTRICTIONS: Requires permission of instructor

BISC 602 Molecular Biology of Animal Cells 3
Examination of eukaryotic genes, synthesis and processing of messenger RNA and control of protein synthesis with emphasis on regulation of normal cellular growth and differentiation and the process of cancer cell transformation. Emphasis on recombinant DNA technology, monoclonal antibody production and tissue culture.
PREREQ: BISC401 and BISC403
BISC 604 NUCLEIC ACIDS LABORATORY 4 PF
Introduces techniques of gene cloning, amplification, manipulation and expression
PREREQ: BISC401 and BISC653
RESTRICTIONS: Biochemistry recommended. Senior or graduate status required. Offered in Winter Session

BISC 605 ADVANCED MAMMALIAN PHYSIOLOGY 4
Systemic mammalian physiology: neuromuscular, nervous and cardiovascular systems
PREREQ: BISC306

BISC 606 ADVANCED MAMMALIAN PHYSIOLOGY 4
Continuation of BISC605. Systemic mammalian physiology: respiratory, renal, gastrointestinal, and reproductive systems and metabolism
PREREQ: BISC605

BISC 608 GENETIC TOXICOLOGY 2
Chemical carcinogenesis and teratogenesis at the cellular and molecular level. Human genetic monitoring for chemical exposure. Mutagenic risk assessment
PREREQ: BISC403 or Biochemistry

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

BISC 615 VERTEBRATE DEVELOPMENTAL BIOLOGY 3
Introduces the basic principles of vertebrate development including formation of the basic body plan and the molecular control of tissue morphogenesis. The importance of each developmental milestone will be illustrated by discussing the underlying causes of birth defects. May be crosslisted with ANSC615.
PREREQ: BISC601 and BISC603
RESTRICTIONS: Requires instructor approval.

BISC 617 LABORATORY TECHNIQUES FOR ELECTRON MICROSCOPY 3
Techniques of electron microscopic study of mammalian tissues, including fixation, embedding, ultrathin sectioning, staining, observation and interpretation.
RESTRICTIONS: Requires permission of instructor.

BISC 618 COMPUTER IMAGING IN BIOLOGY 3
Principles and methods of computer image processing as they apply to biological images. Laboratory provides hands-on experience prompted by prepared tutorials. Students develop their own projects and present them as posters or other formats.
RESTRICTIONS: Limited by number of computer workstations in McKinley 051 (currently 15).

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

BISC 626 NEUROSCIENCE I 4
Structure and function of the sense organs, nervous system and motor systems in relation to integrated behavior. May be crosslisted with PSYC626.
PREREQ: BISC306, PSYC314, and PSYC310 or PSYC312.

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 crosslisted with PSYC627.
PREREQ: BISC306, PSYC310 or PSYC312, and PSYC314.

BISC 630 ICHTHYOLGY 4
Biology of fishes including structure and function, reproduction, development, behavior, geographic distribution and systematics
PREREQ: Physiology course.

BISC 637 POPULATION ECOLOGY 3
Theoretical and experimental aspects of single species growth and multispecies interactions
PREREQ: BISC302.

BISC 641 MICROBIAL ECOLOGY 3
Principles of microbial interactions in natural environments, including applications to industrial microbiology and certain types of pollution
PREREQ: BISC300.

BISC 642 ADVANCED VERTEBRATE ANATOMY 4
An in-depth investigation of a specific aspect of vertebrate anatomy using dissection and other laboratory techniques. Each student will carry out an independent project.
PREREQ: BISC442
RESTRICTIONS: Requires permission of instructor.

BISC 648 BIOREMEDIATION: LABORATORY AND FIELD CONSIDERATION 2
Provides students with an understanding of bioremediation as it is carried out in a field situation. The physical, chemical and microbiological factors and regulations that must be considered when carrying out this process will be covered.
RESTRICTIONS: Requires permission of instructor.

BISC 653 RECENT ADVANCES IN MOLECULAR BIOLOGY 2
Focuses on technical and conceptual advances in gene identification, cloning, manipulation, amplification, characterization and expression.
PREREQ: BISC401 or equivalent one-semester survey course in biochemistry.

BISC 654 BIOCHEMICAL GENETICS 3
Emphasis on operon theory, feedback mechanisms, control of cell division, mutagenesis, isolation of RNA, somatic cell genetics, gene amplification, lysogeny, restriction and modification, and ribosome structure and function
PREREQ: BISC403 or biochemistry.

BISC 656 EVOLUTIONARY GENETICS 3
Exploration of the theory, methods and experiments underlying current research in evolution and determining genetic variation within and between species; estimation of population structure from genetic data, and the genetics of speciation
PREREQ: BISC403.

BISC 658 DEVELOPMENTAL GENETICS 3
How genes control the development of organisms. Emphasis on the regulation of developmental genes and on applications of recombinant DNA techniques (gene cloning, etc.) to this problem. Examples include genes in sprouting bacteria, Drosophila, chick, mouse and man.
PREREQ: BISC403.

BISC 660 ENVIRONMENTAL PHYSIOLOGY 3
Biochemical and morphological adaptive responses of animals to environmental factors; adjustments to changes in salinity, temperature, oxygen, etc. at the level of the whole organism, organ system and cell.
PREREQ: BISC306.

BISC 661 BIOLOGY OF STRIATED MUSCLE 3
Structure and function of striated muscle studied through a review of the literature. Major topics include the organization of the contractile apparatus, the molecular basis of contraction, muscle fiber types, motor units and their relationship to muscle activity, and changes that occur in muscles associated with growth, aging, training and/or injury.
PREREQ: BISC442, and BISC306 or BISC276.

BISC 665 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 team taught and requires a solid background in biochemistry, cell biology and introductory molecular biology.
RESTRICTIONS: Requires permission of instructor.

BISC 672 NEUROIMMUNOLOGY 3
Examines reciprocal communication between the nervous and immune systems. Analyzes the influence of humoral (neurotransmitters and neuromodulators) and neural (neu- roanatomical pathways) factors on components comprising the immune system; and the influence of humoral factors (immunoregulators, released by immune system cells) on the central nervous system.
PREREQ: BISC471, BISC670, or BISC671; and BISC306.

BISC 673 TOPICS IN IMMUNOGENETICS 3
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, T-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 CARDIOPULMONARY PHYSIOLOGY 3
The physiology and biophysics of the mammalian heart, lungs and circulation including gaseous exchange and transport between the circulating medium and the external environment.
PREREQ: A physiology course at or above the 300 level.
RESTRICTIONS: Corequisite applies to Biology majors only.

BISC 679 VIROLOGY 3
Molecular biology of animal viruses. Virus structure and organization; mechanisms of penetration, replication, maturation and transformation.
PREREQ: BISC401 or biochemistry.

BISC 693 HUMAN GENETICS 3
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 cytogenetics and cell genetics, biochemical genetics, developmental genetics and human genetics, principles of genetic counseling, multifactorial inheritance and the genetics of cancer.
PREREQ: BISC403.

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BIOLOGICAL SCIENCES

BISC 801 Seminar in Ecology 2
Critical examination of selected topics in ecology, through evaluation of relevant literature. Students prepare seminars on topics provided each semester.
REQUIREMENTS: Requires permission of instructor.

BISC 806 Advances in Cell and Organ Systems 2
Literature-based current topics in cell and organ systems.
REQUIREMENTS: Requires permission of instructor.

BISC 864 Research Tutorial 2
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 BISC 864 in a single semester. Students gain breadth of research training and are better able to identify appropriate dissertation advisors.
REQUIREMENTS: Requires approval of instructor.

BISC 868 Research 1-12

BISC 869 Master's Thesis 1-6

BISC 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.
REQUIREMENTS: Not open to students who have been admitted to candidacy.

BISC 969 Doctoral Dissertation 1-12 PF

BIOMECHANICS & MOVEMENT SCIENCE

BMSC 865 Seminar 0 PF

BMSC 866 Special Problem 1-12

BMSC 868 Research 3

BMSC 869 Master's Thesis 1-6

BMSC 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.
REQUIREMENTS: Not open to students who have been admitted to candidacy.

BMSC 969 Doctoral Dissertation 1-12 PF

BIORESOURCES ENGINEERING

BREG 603 Soil Physics 3
Relationship of soil moisture, soil temperature, soil structure, shear strength and compaction to irrigation, drainage, plant growth, tillage and erosion. May be crosslisted with PLSC 603.
REQUIREMENTS: PLS C204.

BREG 621 Bioresources Management Systems 4
Water movement in soil-plant-atmosphere continuum, heat flow in soils, radiant energy in plant environment, groundwater, soil erosion and design of irrigation, drainage and soil erosion control systems.
REQUIREMENTS: EGTE 321, PLSC 204, BISC 103.

BREG 628 Natural Wastewater Treatment Systems 3
Land treatment systems for wastewater, biosolids and septage land application, constructed wetlands and aquatic treatment systems, lagoons and decentralized wastewater management.
REQUIREMENTS: EGTE 328 or CIEG 233.

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 C-approx. students must enroll for one credit hour of BUAD 030 during their Coop work term.

BUAD 100 Introduction to Business 3
A survey of basic business concepts designed for the non-business major. Topics covered will include business organization, management, marketing, operations research and finance.
REQUIREMENTS: No majors within the Business Administration or Accounting degree programs may receive credit for this course.

BUAD 301 Introduction to Marketing 3
Management of the marketing functions, marketing research, product planning, distribution channels, pricing, personal selling and advertising. Emphasis on consumer and industrial markets.
REQUIREMENTS: ECON 100 or ECON 152.

BUAD 302 Marketing Research 3
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.
REQUIREMENTS: MAT H202, BUAD 301 and ACCT 160.

BUAD 306 Operations Management 3
Analysis of major problems faced by operations managers at different levels of management. Topics include scheduling, forecasting, process design, inventory management, and quality management.
REQUIREMENTS: MAT H202 and ACCT 160.

BUAD 309 Management and Organizational Behavior 3
The processes and procedures used to manage performance effectively, including behavioral implications and an awareness of the individual’s impact on others.

BUAD 341 Environment of Multinational Corporations 3
Interdisciplinary approach explores the multinational corporation: its political and economic environment; current attitude of policy makers; and techniques used to earn profits. Material supplemented by practicing economists, financial experts, business executives and political analysts. May be crosslisted with ECON 341 and/or PSOC 341.
REQUIREMENTS: ECON 341.

BUAD 346 Analysis of Operations Problems 3
Intensive treatment of topics covered in BUAD 306 to include the investigation and development of the decision making process in an operations environment. Emphasis on practical applications.
REQUIREMENTS: BUAD 306.

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.
REQUIREMENTS: Taught abroad.

BUAD 385 Administrative Theory 3
Concepts of administration at the individual, group and organizational level of analysis. Emphasis on organizational level of analysis with topics including job design, organization structure and design, and inter- and intra-organizational processes.
REQUIREMENTS: BUAD 309.

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.
REQUIREMENTS: BUAD 309.

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.
REQUIREMENTS: TAUGHT ABROAD. Counts as BUAD elective for BSBA 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.
REQUIREMENTS: TAUGHT ABROAD. Counts as BUAD elective for BSBA candidates.
BUAD 420 Industrial 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 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.

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 Seminar on Organizations 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, BUAD305, BUAD309 and FINC311.
RESTRICTIONS: Requires Senior standing in business administration or accounting.

BUAD 444 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: BUAD305.
COREQ: BUAD446.

BUAD 448 Decision Support Systems for Operations 3
Effective design and implementation of decision support for operations. Selection of appropriate models for decision support. Emphasis on project work in which an actual decision support system is designed and implemented.
PREREQ: BUAD306, ACCT160.
RESTRICTIONS: Open only to operations management majors with Senior status.

BUAD 449 Managing Decision Support Systems Projects 3
Application of the principles of project management to the development and implementation of decision support systems for operations. Students conduct actual projects for local businesses and organizations.
PREREQ: BUAD446 and BUAD447.
COREQ: BUAD448.
RESTRICTIONS: Not open to students who have taken or are taking BUCEC432. Senior operations majors only.

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

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

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

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

BUAD 479 Marketing Strategy for the Firm 3
The application of management decision processes and strategies to the integration of the firm's total marketing mix. Multifaceted problems are studied in large, medium and small firms. Students analyze cases and other real marketing problems.
PREREQ: Twelve credit hours of marketing courses.

BUAD 810 Titans, Teams and Technology 3
Focus on understanding team management within different organizational contexts. Effective communication, including the use of electronic communication technologies for team development and maintenance, is emphasized. Students have the opportunity to practice team work and leadership skills.

BUAD 820 Data Analysis and Quality Management 3
Emphasizes quality management primarily via statistical process control. Focuses on data analysis for the purpose of measurement, inference, quality and productivity improvement. Descriptive statistics, graphical analysis, exploratory data analysis, applications of common distributions and models such as regression are covered.
PREREQ: BUAD301.

BUAD 831 Design and Management of Operations 3
Overviews major concerns in the design and management of operations within a business. Focuses on topics such as product design, layout and process design, job design and measurement forecasting, project production and staff scheduling, inventory control, and materials management in both manufacturing and service industries.
PREREQ: BUAD820.

BUAD 832 Operations Planning and Control 3
Analyzes problems and advanced decision techniques for effective management of operating resources. Topics include forecasting, capacity requirements determination, operations planning and scheduling, and inventory management. Applications in both manufacturing and service settings are emphasized.
PREREQ: BUAD831.

BUAD 833 International Operations 3
Focuses on issues concerning the management of international operations. Topics include international sourcing for materials and services, location decisions for non-domestic production activities, worldwide logistical systems, and managing non-domestic operations and projects.
PREREQ: BUAD831.

BUAD 834 Special Topics in Operations Management 1-3
Covers various topics in operations management at all levels of the firm. Individual inquiry stressed.
PREREQ: BUAD831.

BUAD 835 Managing New Product Development Projects 3
Examines techniques and issues in project management, with special emphasis on new product development projects. Topics include models for cost estimation, process selection, competitive benchmarking, concurrent engineering, and successful project management. Teams prepare proposal for developing and introducing a new product into the marketplace.
PREREQ: BUAD831, BUAD880, FINC850.
BUSINESS ADMINISTRATION

BUAD 836 PROBLEM STRUCTURING AND ANALYSIS FOR DECISION MAKING 1-3
Introduces problem structuring and analysis for decision making under risk. Emphasizes both applications and methodology. Examines the effects of creativity and problem definition on decision making. Uses various problems involving uncertainty to enhance decision making skills and expand students' awareness and understanding of business problems.
PREREQ: BUAD831.

BUAD 837 DECISION SUPPORT AND EXPERT SYSTEMS FOR BUSINESS 3
Focuses on using decision support systems (DSS) and expert systems (ES) to enhance decision making in business. Critically examines the literature on the development of information systems. Discusses technical and behavioral issues related to the design and implementation of effective DSS and ES.
PREREQ: BUAD831.

BUAD 840 SOCIAL, ETHICAL, LEGAL AND POLITICAL ENVIRONMENT OF THE FIRM 3
Examines the social, legal and ethical rights and obligations of the firm, employers and employees, with respect to product safety, sales, advertising, hiring and firing, company loyalty, the environment and the community.
PREREQ: BUAD810.

BUAD 841 INTERNATIONAL BUSINESS MANAGEMENT 3
Development of business strategies for the multinational business organization Emphasis on dealing with international governmental constraints and organization structures. Projects focusing on the assessment of the business environment in specific countries.
PREREQ: BUAD810.

BUAD 842 SPECIAL TOPICS IN MANAGEMENT OF TECHNOLOGY 1-3
Examines selected topics in the management of technology. Individual inquiry stressed.
PREREQ: BUAD870.

BUAD 843 SPECIAL TOPICS IN GLOBAL BUSINESS 3
Examines selected topics in global business, that may focus on one or more areas of the world (e.g. the European Union, Latin America, Pacific Basin, etc.). Course may be offered overseas.

BUAD 849 SEMINAR IN BUSINESS ADMINISTRATION 3
With an emphasis on research methodology, individual inquiry, and communication of results, students will pursue areas of interest and prepare formal presentations of their findings.
PREREQ: Requires 24 MBA credits.

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 870 ORGANIZATIONAL BEHAVIOR AND ADMINISTRATION 3
Develops a knowledge base and requisite skills for managing individual, group, and organizational processes through the use of diagnostic models, cases, and/or experiential exercises. Individual and organizational level topics are emphasized. Some group level topics are also included.
PREREQ: BUAD810.

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 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.

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

BUAD 876 LABOR MANAGEMENT RELATIONS 3
Labor-management relationships. Primary focus on contract negotiations and administration as well as inspection of the various environmental factors (history, philosophy, law and structure) that underpin collective bargaining.
PREREQ: BUAD870.

BUAD 878 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. Following Negotiation is broadly defined to include many varieties of bargaining, third party dispute intervention and organizational justice.
PREREQ: BUAD870.

BUAD 880 COMPETITIVE MARKETING STRATEGY 3
Focuses on developing customer focused plans and strategies for projects and business units in an increasingly competitive global environment. Emphasizes managerial practices relating to project/service offering, pricing, promotion, and physical distribution and how these are integrated to satisfy industrial and ultimate consumers.
PREREQ: ACC7800 and ECON551.

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 in product and price decisions. The concepts and methods are applied to real-world case studies.
PREREQ: BUAD880.

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

BUAD 885 MARKETING CHANNELS 3
Analyzes marketing channels as social, economic and political systems. Strong emphasis placed on understanding the behavioral dimension of the channel relationship after focusing on the economic and structural aspects of retailing, wholesaling, and physical distribution. Governmental and other constraints on channel activities are also studied.
PREREQ: BUAD880.

BUAD 886 ADVERTISING STRATEGY 3
Intended 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 buying 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.
BUSAD 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: BUAD680.

BUSAD 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, BUAD821, BUAD870, BUAD880.

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: ACC1160.
RESTRICTIONS: MIS/ Business students only.

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.
RESTRICTIONS: MIS minors only.

BUEC 366  INDEPENDENT STUDY  1-6

BUEC 430  SYSTEMS ANALYSIS 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: BUEC330 and BUEC325 or CISC437.
RESTRICTIONS: MIS 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.
RESTRICTIONS: MIS minors must take BUEC432 as a corequisite.

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.
RESTRICTIONS: MIS minors must take BUEC431 as a corequisite.

BUEC 466  INDEPENDENT STUDY  1-6

COGNITIVE SCIENCE

CGSC 266  SPECIAL PROBLEM  1-3

CGSC 270  INTRODUCTION TO COGNITIVE SCIENCE  3
Introduces the symbolic view of mind embodied in Cognitive Science. Concentrates on the domains of language and visual perception and role of representation and algorithm in theories of processing and development. Includes alternatives posed by connectionist models of cognition.
See PSYC314 for course description.

CGSC 314  BRAIN AND BEHAVIOR  3
See PHIL330 for course description.

CGSC 330  PHILOSOPHY OF MIND  3
See PSYC340 for course description.

CGSC 340  COGNITION  3
See PSYC411 for course description.

CGSC 366  INDEPENDENT STUDY  1-3

CGSC 411  BRAIN AND COMPUTER  3
See PSYC411 for course description.

CGSC 441  COMPUTERS AND COGNITION  3
See PSYC441 for course description.

CGSC 480  COMPUTERS AND THE MIND  3
See CISC082 for course description.

CGSC 481  ARTIFICIAL INTELLIGENCE  3
See CISC481 for course description.

CGSC 485  SEMINAR IN COGNITIVE SCIENCE  3
Intensive study of topics in Cognitive Science, such as mental representation, vision, computational modeling, disorders.
RESTRICTIONS: May be repeated for credit as topic changes.

CGSC 496  PSYCHOLINGUISTICS  3
Linguistic approaches to cognition. Issues in the relation of language to thought, universals, language acquisition, and theories of syntactic and semantic processing.
PREREQ: LING101 or equivalent.

CGSC 615  HISTORY OF COGNITIVE PSYCHOLOGY  3
See PSYC615 for course description.

CGSC 616  COMPUTER MODELS OF COGNITION  3
See PSYC616 for course description.

CGSC 630  NEURONS AND NETWORKS  3
See PSYC630 for course description.

CGSC 642  MENTAL REPRESENTATION AND MEMORY  3
See PSYC642 for course description.

CGSC 666  SPECIAL PROBLEM  1-12

CGSC 681  ARTIFICIAL INTELLIGENCE  3
See CISC681 for course description.

CGSC 685  SEMINAR IN COGNITIVE SCIENCE  3
Intensive study of topics in Cognitive Science, such as mental representation, vision, computational modeling, disorders.
RESTRICTIONS: May be repeated for credit as topic changes.

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

CGSC 866  INDEPENDENT STUDY  1-12

CGSC 890  STUDIES IN COGNITIVE SCIENCE  3
Varying topics in Cognitive Science, such as mental models, philosophical problems in the study of mind, computational modeling, and development.
RESTRICTIONS: May be repeated for credit as topic changes.

CHEMICAL ENGINEERING

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

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

CHEG 166  SPECIAL PROBLEM  1-3
RESTRICTIONS: Course will not count toward graduation in Chemical Engineering.

CHEG 231  CHEMICAL ENGINEERING THERMODYNAMICS  3
The first law: energy balance; the entropy balance; thermodynamic constitutive equations for gases and liquids; thermodynamic cycles and energy conversion; and stability.
PREREQ: A minimum grade of C- in CHEG112 or, for environmental engineering majors, in CHEG233. A minimum grade of C- in MATH243.
PREREQ: CHEM243.

CHEG 266  SPECIAL PROBLEM  1-3
RESTRICTIONS: Course will not count toward graduation in Chemical Engineering.

CHEG 305  APPLIED MATHEMATICS FOR CHEMICAL ENGINEERING  3
See MATH305 for course description.

CHEG 320  ENGINEERING ECONOMICS AND RISK ANALYSIS  2
Principles of engineering economics, risk assessment and analysis, and environmental and safety issues within the context of chemical engineering design.
PREREQ: MATH302, CHEG112
CHEG 325 CHEMICAL ENGINEERING THERMODYNAMICS 4
A continuation of CHEG231. The thermodynamics of mixtures, phase and chemical equilibrium. Applications to staged separation processes, particularly distillation.
PREREQ: CHEG231

CHEG 332 CHEMICAL ENGINEERING KINETICS 3
Systematic description of rates of homogeneous and heterogeneous chemical reactions of industrial importance. Application of these principles to analysis and design of chemical reactors.
PREREQ: CHEG325, CHEM444 and MATH302.

CHEG 341 FLUID MECHANICS 3
Theory of flow of incompressible viscous and non-viscous fluids; flow of non-Newtonian fluids; empirical correlations for laminar and turbulent flow; and applications in chemical processing.
PREREQ: A minimum grade of C in CHEG231 or, for environmental engineering majors, in CHEG305 or CHEG306. A minimum grade of C in MATH302.

CHEG 342 HEAT AND MASS TRANSFER 4
Theory of heat transfer in flow and nonflow systems. Fundamentals of mass transfer. Empirical correlations for laminar and turbulent flow; and application to process engineering problems.
PREREQ: CHEG341.

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

CHEG 366 INDEPENDENT STUDY 1-6
CHEG 401 CHEMICAL PROCESS DYNAMICS AND CONTROL 4
Analysis of transients in chemical processing equipment and chemical reactors. Frequency response analysis, state variable, representation and design of linear control systems. Laboratory demonstrations and exercises.
PREREQ: MATH302 and CHEG332.
COREQ: CHEG443.

CHEG 432 CHEMICAL PROCESS ANALYSIS 3
A study of the principles and techniques used to develop a process design. Skills are developed by considering process synthesis case studies.
PREREQ: CHEG320, CHEG332, CHEG401 and CHEG443.

CHEG 443 MASS TRANSFER OPERATIONS 3
Applications of chemical engineering fundamentals to the design of mass transfer processes for separation and purification. Examples in design of distillation, absorption and extraction equipment.
PREREQ: CHEG325 and CHEG342.

CHEG 445 CHEMICAL ENGINEERING LABORATORY II 3
Intensive laboratory experiments illustrating the application of chemical and physical principles to industrial processes. Expands upon CHEG332 and CHEG443. Technical report writing emphasized.
PREREQ: CHEG332, CHEG342 and CHEG345.
COREQ: CHEG443.

CHEG 466 INDEPENDENT STUDY 1-6

CHEG 468 RESEARCH 1-9

CHEG 473 CHEMICAL ENGINEERING PROJECTS 3
Experimental, theoretical and literature studies of chemical engineering problems.

CHEG 474 CHEMICAL ENGINEERING PROJECTS 3
A continuation of CHEG473.

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

CHEG 600 INTRODUCTION TO POLYMER SCIENCE AND ENGINEERING I 3
Introduction to polymer physics with emphasis on structure-property models for bulk polymers, viscoelasticity, polymer morphology, crystallization and crystallization kinetics, effects of processing on bulk polymers and structure-property correlations for bulk polymers. First course in the polymer science sequence. May be cross-listed with MSEG600.

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 equilibrium and phase diagram 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.

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

CHEG 606 INTRODUCTION TO CATALYSIS 3
Industrial catalytic reactions, mechanisms, kinetics and phase behavior. Theory of catalysis from solutions to nonuniform surfaces.
PREREQ: CHEM331, CHEM443 and CHEM444.

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

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

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

CHEG 616 CHEMISTRY AND PHYSICS OF SURFACES AND INTERFACES 3
Fundamental and engineering aspects of metal, inorganic and polymer surfaces; their structure and defects, characterization, thermodynamics, adsorption and electronic properties. Applications to catalysis, microelectronics, mechanical properties and environment sensitive behavior. May be cross-listed with MSEG616.

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, powder dispersions and supramolecular structures.
PREREQ: CHEG325 and CHEM444.

CHEG 620 BIOCHEMICAL ENGINEERING 3
Application of chemical engineering principles to design and analysis of biological reactors and product recovery processes. Includes introduction to microbiology, biochemistry and molecular biology with emphasis on recombinant cells.
PREREQ: CHEG392 and CHEG342.

CHEG 622 RISKS, HAZARDS, AND THE ENVIRONMENT 3
Topics include: Risk-reliability engineering, failure analysis, design and operation of hazardous processes; hazards—toxicology and risk assessment, pharmacokinetics, fate and transport of chemicals in the environment; environment—disposition of chemicals and particulates, source models, chemical and biological treatment of wastes.
PREREQ: CHEG325 and CHEG341.
COREQ: CHEG342.

CHEG 650 BIOMEDICAL ENGINEERING 1 3
Application of chemical engineering principles and techniques to problems in biomedicine. Mass transfer and chemical reactions in the body, drug distribution, kidney and other organ physiology, and artificial organs.
PREREQ: Upper division or graduate standing in engineering or equivalent.

CHEG 651 PROCESS CONTROL AND DYNAMICS 3
The topic of SISO control concepts to MIMO systems appropriate to the chemical industry. Direct synthesis methods, internal model reference control, robust control and control in stochastic systems.
PREREQ: Undergraduate control course.

CHEG 725 CHEMICAL ENGINEERING THERMODYNAMICS 3
Applications of classical and molecular thermodynamics to industrial problems in chemical and phase equilibrium. Topics include nonideal solutions, high pressure systems, complex reaction equilibria, generalized correlations and equations of state.
PREREQ: CHEG325 and CHEM444.
CHEM 827 CHEMICAL ENGINEERING PROBLEMS 2-3
The application of mathematical methods to the solution of chemical engineering problems. The use of ordinary and partial differential equations and of difference equations in fluid flow, heat transfer, diffusion and other unit operations.
PREREQ: CHEG443 and MATH302.

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.

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

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

CHEG 835 APPLIED CHEMICAL KINETICS 3
The application of modern methods and recent experimental data to the design of chemical reaction equipment.
PREREQ: Requires undergraduate reaction engineering and physical chemistry.

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

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

CHEG 868 RESEARCH 1-9

CHEG 869 MASTER’S THESIS 1-6
Laboratory study of some phase of chemical engineering on which information is lacking, with the goals of contributing new data and theory. Although supervised, work will be independent in nature to encourage the development of initiative.

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

CHEG 969 DOCTORAL DISSERTATION 1-12 PF

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.
PREREQ: 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.
PREREQ: 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: MATH101.
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 biobiochemistry.
PREREQ: 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.
PREREQ: 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.
PREREQ: CHEM103 or CHEM111.
COREQ: CHEM120.
RESTRICTIONS: For biochemistry, chemistry, chemical engineering and environmental engineering majors. Only one course among CHEM102, CHEM104 and CHEM112 can count toward graduation.

CHEM 119 QUANTITATIVE CHEMISTRY I 2
Chemical equilibrium theory applied to basic gravimetric and volumetric analyses. Includes one three-hour laboratory per week.
PREREQ: One semester of college chemistry.
COREQ: CHEM111 and MATH115.
RESTRICTIONS: One year of high school chemistry accepted in lieu of prerequisite.

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

CHEM 166 SPECIAL PROBLEM 1-3 PF

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

CHEM 214 ELEMENTARY BIOCHEMISTRY 3
Basic manipulations and techniques for the characterization of biomolecules.
PREREQ: CHEM213.
COREQ: CHEM214.
CHEM 220 QUANTITATIVE ANALYSIS 3
Chemical equilibria in aqueous solutions; volumetric and gravimetric analysis; and intro-
duction to chromatography and spectrometry.
PREREQ: CHEM102, CHEM104 or CHEM105.
COREQ: CHEM221.

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

CHEM 311 SURVEY OF ORGANIC CHEMISTRY I 3
First half of a two-semester survey of the structure, synthesis, and reactions of organic com-
pounds.
PREREQ: CHEM104.
RESTRICTIONS: Not for credit for CHEM BS majors. Neither CHEM311 and CHEM321
nor CHEM311 and CHEM332 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 com-
pounds.
PREREQ: CHEM311.
RESTRICTIONS: Not for credit for CHEM BS majors. Neither CHEM312 and CHEM322
nor CHEM312 and CHEM332 can both count toward graduation.

CHEM 321 ORGANIC CHEMISTRY 4
First half of a two-semester survey of the structure, synthesis, and reactions of organic compo-
unds. Includes one three-hour laboratory per week that introduces the basic labora-
atory techniques of organic chemistry.
PREREQ: CHEM104.
RESTRICTIONS: Not for CHEM BS majors. CHEM321 and CHEM331 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 compo-
unds. Includes one three-hour laboratory per week that introduces the basic labora-
atory techniques of organic chemistry.
PREREQ: CHEM321.
RESTRICTIONS: Not for BS credit in chemistry. CHEM322 and CHEM332 cannot both be
counted toward graduation.

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

CHEM 332 ORGANIC CHEMISTRY 3
Major classes and reactions of organic compounds, emphasizing stereochemistry, reac-
tion mechanisms, and synthetic methods.
PREREQ: CHEM331, CHEM333.
COREQ: CHEM334.
RESTRICTIONS: For chemistry, biochemistry, chemical engineering and other students
desiring fuller treatment than in CHEM322. Neither CHEM312 and CHEM322, nor
CHEM322 and CHEM332 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: CHEM104, or preferably CHEM112, or CHEM120.
COREQ: CHEM331.
RESTRICTIONS: Registration for two credits involves both a lecture period and a labora-
tory period each week.

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

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

CHEM 365 SEMINAR 1 PF

CHEM 366 INDEPENDENT STUDY 1-3 PF
CHEM 410 HISTORY OF CHEMISTRY 3
A survey of the development of chemistry's fields of study emphasizing the nature of indi-
vidual contributions to the subfields of chemistry.

CHEM 418 INTRODUCTORY PHYSICAL CHEMISTRY I 3
Introduction to the principles of physical chemistry with a principal focus on thermody-
namics, using minimal calculus, for B A chemistry and B S biochemistry majors.
PREREQ: General chemistry; MATH241; PHYS202 or PHYS207.
RESTRICTIONS: Not acceptable for B S degrees in chemistry CHEM418 and CHEM443
cannot both be counted toward graduation.

CHEM 419 INTRODUCTORY PHYSICAL CHEMISTRY 3
Introduction to the principles of physical chemistry with a principal focus on kinetics and
spectroscopy, using minimal calculus, for B A chemistry and B S biochemistry majors.
PREREQ: CHEM418.
RESTRICTIONS: Not acceptable for B S degrees in chemistry CHEM419 and CHEM444
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 design and application of spectroscopic, chromatographic and
electroanalytical instrumentation in chemical analysis.
PREREQ: CHEM322 or CHEM332.
COREQ: CHEM418 or CHEM443.

CHEM 438 INSTRUMENTAL METHODS LABORATORY 1
Application of spectroscopic, chromatographic and electroanalytical techniques to the
solution of chemical problems.
PREREQ: CHEM322 or CHEM334.
COREQ: CHEM445.

CHEM 443 PHYSICAL CHEMISTRY I 3
Application of the principles and methods of mathematics and physics to the quantitative
study of chemistry, principally focusing on thermodynamics.
PREREQ: CHEM119, or CHEM220 and CHEM221; MATH242 (MATH243 recom-
mended); PHYS208 (recommended) or PHYS202.
RESTRICTIONS: CHEM418 and CHEM443 cannot both be counted toward graduation.

CHEM 444 PHYSICAL CHEMISTRY II 3
Application of the principles and methods of physics and mathematics to the quantitative
study of chemistry, focusing on kinetics and quantum mechanics.
PREREQ: CHEM119, or CHEM220 and CHEM221; MATH242 (MATH243 recom-
mended); PHYS208 (recommended) or PHYS202.
RESTRICTIONS: CHEM419 and CHEM444 cannot both be counted toward graduation.

CHEM 445 PHYSICAL CHEMISTRY LABORATORY I 1
Physical methods for studying properties of matter.
PREREQ: CHEM119, or CHEM220 and CHEM221.
RESTRICTIONS: To be taken concurrently with or subsequent to CHEM418 or CHEM443
or CHEG231.

CHEM 446 PHYSICAL CHEMISTRY LABORATORY II 1
Physical methods for studying properties of matter.
PREREQ: CHEM120, or CHEM220 and CHEM221.
RESTRICTIONS: To be taken concurrently with or subsequent to CHEM419 or CHEM444.

CHEM 457 INORGANIC CHEMISTRY 3
Basic theoretical concepts of inorganic chemistry with emphasis on structure, bonding and
reactions.
PREREQ: CHEM418 or CHEM443, and CHEM112.

CHEM 458 INORGANIC CHEMISTRY LABORATORY 1
Laboratory synthesis and characterization of inorganic and organometallic compounds
and independent study.
COREQ: CHEM457.

CHEM 465 SENIOR SEMINAR 1 PF
RESTRICTIONS: Requires Senior status.

CHEM 466 INDEPENDENT STUDY 1-3 PF
CHEM 468 UNDERGRADUATE RESEARCH 1-6 PF
Chemistry research on an assigned subject under the supervision of a member of the staff.
RESTRICTIONS: Requires permission of instructor. (Letter grade upon completion of writ-
ten thesis).
CHEM 527 INTRODUCTORY BIOCHEMISTRY 3
A one-semester survey of the fundamentals of biochemistry
PREREQ: CHEM322 or CHEM332
RESTRICTIONS: For undergraduate majors in biology and chemistry, graduate students in agriculture, biology, nutrition, marine sciences and engineering not using biochemistry professionally BISC103 or BISC207 strongly recommended
CHEM 608 ENVIRONMENTAL SOIL CHEMISTRY 3
See PLSC608 for course description
CHEM 620 ANALYTICAL SPECTROSCOPY 3
Experimental aspects of electronic and vibrational spectroscopy; linear and nonlinear optics; photon counting; Fourier transformation; and topics from the current literature PREREQ: CHEM437 and CHEM443
CHEM 621 CHEMICAL SEPARATIONS 2
Fundamental description of chemical separations: Zone broadening and separation efficiency; and chemistry of separations: Application of fundamental principles to chromatography, electrophoresis, field-flow fractionation and newly emerging techniques PREREQ: CHEM437 and CHEM443
CHEM 622 ELECTROANALYTICAL CHEMISTRY 3
Analytical applications of electrochemistry: dynamic and steady-state methods of potentiometry, coulometry, voltammetry, and ancillary techniques
RESTRICTIONS: Requires Senior or graduate status in chemistry. Offered in Fall of even-numbered years
CHEM 623 CHEMOMETRICS 3
An introduction to modern methods of reducing and analyzing chemical data using computers. Covers probability and simple statistics, optimization methods, pattern recognition, factor analysis, chemical calibration, regression, time series analysis of chemical data and data transformation methods
PREREQ: CHEM437
CHEM 624 INTERPRETATION OF MASS SPECTRA 1
Molecular ions and elemental composition from precise mass and isotopic ratios; Fragmentation mechanisms and the correlations of electron ionization mass spectra with molecular structure
RESTRICTIONS: Requires Junior, Senior or graduate status in chemistry/biochemistry
CHEM 625 CHEMICAL IONIZATION MASS SPECTROMETRY 1
Analytical applications of ion/molecule reactions: Mechanisms and thermochemical kinetics of gaseous ionic reactions; Correlations of spectra with molecular structure
RESTRICTIONS: Requires Junior, Senior or graduate status in chemistry/biochemistry.
CHEM 626 INSTRUMENTAL METHODS IN MASS SPECTROMETRY 2
Experimental techniques in analytical mass spectrometry: Ionization methods; mass analyzers, tandem mass spectrometry, coupled chromatographic methods and applications.
RESTRICTIONS: Requires Senior or graduate status in chemistry.
CHEM 627 PRACTICAL MASS SPECTROMETRY 1
Instrumentation and experiments in gas chromatography/mass spectrometry
RESTRICTIONS: Requires permission of instructor; CHEM624 recommended as Coreq. or Prereq.
CHEM 633 ADVANCED ORGANIC CHEMISTRY: PHYSICAL 3
Stereochemistry and reactivity of organic compounds; and reaction mechanisms, structure and bonding
PREREQ: CHEM332
CHEM 634 ADVANCED ORGANIC CHEMISTRY: SYNTHESIS AND REACTIVITY 3
Reactions of organic compounds with emphasis on synthetic methods
PREREQ: CHEM633
CHEM 641 BIOCHEMISTRY 3
Structure and function of proteins, enzymes and coenzymes; kinetics and mechanisms; carbohydrate metabolism and its regulation; and citric acid cycle
PREREQ: CHEM322 or CHEM332
CHEM 642 BIOCHEMISTRY 3
PREREQ: CHEM641
CHEM 643 INTERMEDIARY METABOLISM 3
General principles of intermediary metabolism with emphasis on biosynthetic pathways of amino acids, nucleotides, coenzymes, antibiotics and toxic secondary metabolites
PREREQ: CHEM642
CHEM 644 MECHANISMS OF ENZYME CATALYSIS 3
Detailed chemical mechanization of enzyme catalysis for several representatives. Emphasis on kinetic and physical organic methods.
PREREQ: CHEM641 or CHEM527
CHEM 645 BIOCHEMICAL EVOLUTION 3
The origins and evolution of life as reconstructed from geochemical, biochemical and genetic evidence.
PREREQ: CHEM642 or CHEM527
CHEM 648 MEMBRANE BIOCHEMISTRY 3
Recent advances in the structure and function of biomembranes and related model systems, with particular reference to molecular and physicochemical mechanisms.
PREREQ: CHEM527 or CHEM641
CHEM 651 ADVANCED INORGANIC CHEMISTRY I 3
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 3
Chemistry of carbon to transition metals 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 3
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: CHEM447
CHEM 654 ADVANCED INORGANIC CHEMISTRY II 3
A group-theoretical approach to structure and bonding in inorganic compounds
PREREQ: CHEM444 and CHEM457
CHEM 671 QUANTUM CHEMISTRY 3
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 3
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: CHEM447
CHEM 673 PRACTICAL NMR SPECTROSCOPY 1
Elements of NMR spectroscopic techniques, the practical operation of NMR spectrometers, spectral acquisition and special analysis techniques.
RESTRICTIONS: Requires permission of instructor; CHEM444 recommended as corequisite
CHEM 674 CHEMICAL DYNAMICS 3
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 3
The elements of classical and statistical thermodynamics and their application to chemical problems
PREREQ: CHEM443
CHEM 680 INTRODUCTORY POLYMER SCIENCE 3
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: CHEM322 or CHEM332, and CHEM419 or CHEM444
CHEM 810 KINETICS AND SURFACE CHEMISTRY OF SOLIDS 3
See PLSC810 for course description
CHEM 820 SPECIAL TOPICS IN ANALYTICAL CHEMISTRY 1-3
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
CIEG 121 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 trusses, simple frames and "machines." Introduction to the analysis of beams.
COREQ: MATH 243.

CIEG 122 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 simple structures. Mohr's circle for stresses. Failure theories. Design of structural members using strength of materials.
COREQ: CIEG 211.
COREQ: MATH 302 or MATH 351.

CIEG 123 Solid Mechanics Laboratory 1
Experiments in mechanics of materials, complementing the content of CIEG 212. Emphasis on behavior of steel, aluminum, concrete and timber in civil engineering systems.
COREQ: CIEG 212.

CIEG 223 Surveying 3
Surveying instruments and their use, differential leveling, traverses, route surveying, triangulation and field astronomy. Also includes computer methods for area, cut/fill, grade elevations and other processing of survey data. May be cross-listed with EGE 223.
PREQ: MATH 115, MATH 221 or MATH 241.

CIEG 301 Structural Analysis 4
Design procedures and criteria. Moment, shear and axial force diagrams of statically determinate structures such as beams, frames and arches. Displacement, stress and stability analyses of statically determinate and indeterminate structures, using differential equations and the slope deflection method. Energy methods. Introduction to matrix methods.
PREQ: CIEG 212, MATH 302.
COREQ: MATH 302 or MATH 351.

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.
PREQ: CIEG 301.

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.
PREQ: MATH 302 or MATH 351, and CIEG 311 or MEEG 211.

CIEG 306 Fluid Mechanics Laboratory 1
Experiments in fluid mechanics.
COREQ: CIEG 305.

CIEG 311 Dynamics 3
Applications to the dynamics of machines, structures and vehicles.
PREQ: PHYS 207 and MATH 243.

CIEG 320 Soil Mechanics 3
Soil properties, soil-water interaction, soil stresses, two-dimensional flow, soil compressibility, shear strength and lateral earth pressures.
PREQ: CIEG 212 and CIEG 305.
COREQ: CIEG 323.

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.
PREQ: CIEG 320 and CIEG 323.

CIEG 322 Soil Mechanics Laboratory 1
Demonstrates soil properties, soil-water interaction, soil stresses, two-dimensional flow, soil compressibility, shear strength and lateral earth pressures.
PREQ: CIEG 212 and CIEG 305.
COREQ: CIEG 320.
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 1-3
Introduction to standard techniques for physical, chemical, microbiological analyses of pollution and pollution control processes. Microbial characterization and enumeration; physical and aggregate properties; selected specific chemical analyses such as pH, salinity, hardness. Quality assessment and quality control
PREREQ: CIEG233
COREQ: CIEG432
RESTRICTIONS: Open to majors only

CIEG 351 TRANSPORTATION ENGINEERING 3
Four components of transportation: vehicle, way, terminal and control; design and dynam- ic 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 numerical analysis; the calculus of finite differences, matrices; iterative, numerical and relaxation procedures; and special applications to civil engineering problems
PREREQ: MATH302

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

CIEG 404 Prestressed Concrete Design 3
Behavior, analysis and design of prestressed concrete structures. Covers flexure, shear, axial load, bond anchorage design and construction considerations for pretensioned and post-tensioned concrete
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, elements 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 loads; load paths; and gravity and lateral load resisting systems. Approximate analysis of frame buildings and frames 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; infamously catastrophic collapses to little known examples of design criteria being violated to the structures detriment. The main objective is to learn sound engineering practices through the study of failures
PREREQ: CIEG301 and CIEG302

CIEG 410 EXPERIMENTAL MECHANICS OF COMPOSITE MATERIALS 3
See MSEG410 for course description

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

CIEG 417 ADVANCED STRUCTURAL ANALYSES 3
PREREQ: CIEG212 and MATH302

CIEG 418 CONTINUOUSLY SUPPORTED STRUCTURES 3
Analytical properties of various elastic, viscoelastic and elastoplastic foundation models for describing the base response. Embedded rods subjected to axial forces, torsion and temperature changes. Gilded lap joints, long riveted joints and threaded connections. Continuously supported beams and plates. Analysis of mat foundations, concrete pavers for highways and airports, and railroad tracks. Problems in geophysics and composite materials
PREREQ: CIEG212 and MATH302

CIEG 421 FOUNDATIONS AND SUBSTRUCTURES 3
Design of earth dams, embankments, retaining structures, caissons, footings, caissons and piles. Numerical methods, combining soil mechanics and structural analysis
PREREQ: CIEG320/323

CIEG 422 EARTH STRUCTURES ENGINEERING 3
Properties of soils and methods to determine them: water flow through inhomogeneous and anisotropic earth mass; predictions of porewater pressures; stresses and settlement predictions; slope stability; type and causes of slope failures, effective and total stress 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 GEOSYSTEMS ENGINEERING 3
Geotechnical aspects of waste disposal facilities including landfills, clay liners, and geosynthetic liners. Engineering properties of liner materials, geotechnical characterization of wastes. Cover systems, leachate collection and removal systems. Contaminant transport, stability and deformation analysis
RESTRICTIONS: Engineering or science background required

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 CIEG305

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, economic and regulatory aspects
PREREQ: CIEG233

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

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

CIEG 435 INDUSTRIAL WASTES MANAGEMENT 3
Covers industrial survey and treatment technologies for liquid, solid and gaseous wastes. Emphasis on the applications and design of physical-chemical and biological treatment processes. Particulate removal from industrial emission sources. Resource recovery and reuse presented as an important option for the management of industrial wastes
PREREQ: CIEG233 and CHEG235

CIEG 436 SOLID WASTE MANAGEMENT 3
Regulatory aspects of solid and hazardous wastes management. Characteristics, generation and collection of solid wastes from an engineering perspective. Landfill regulations; siting, design, operation, closure, leachate control. Separation processes; composting; incineration. Financing and cost accounting. Resource conservation and recovery
PREREQ: CIEG233 and CHEG235

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

CIVIL AND ENVIRONMENTAL ENGINEERING
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 resource systems, rainfall analysis and flood routing, pipe flow and hydraulic machinery, open channel flow and computer models.  PREREQ: CIEG 305 and CIEG 306

CIEG 441  HYDROLOGY 3  The fundamentals of climatology, meteorology and hydrologic cycle; their relation to surface water and groundwater; rainfall runoff characteristics, frequency analysis, flood routing; flood plain hydrology; and groundwater flow. COREQ: CIEG 305

CIEG 442  HYDRAULIC ENGINEERING 3  Application of the principles of fluid mechanics to flow in pipelines, open channels, settlement, transport, drainage, hydraulic structure and hydraulic models.  PREREQ: CIEG 305

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 roadways, airports, and ports and harbors. Engineering, social and economic evaluation of alternative design schemes for specific 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.  PREREQ: CIEG 305

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.  PREREQ: CIEG 381

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  Behavior, analysis and design of prestressed concrete structures. Covers flexure, shear, axial load, bond anchorage design and construction considerations for pretensioned and posttensioned concrete.  PREREQ: CIEG 302

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 evaluation 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 thin-walled structures, lateral-torsional buckling, curved beams, energy methods, principal stress and strain in three dimensions. Theory and applications.


CIEG 618  CONTINUOUSLY SUPPORTED STRUCTURES 3  Analytical properties of various elastic, viscoelastic and plastic-plastic foundation models for describing the base response. Embedded rods subjected to axial forces, torsion and temperature changes. Gvedd top joints, long riveted joints and threaded connections. Continuously supported beams and plates. Analysis of mat foundations, concrete pavements for highways and airports, and railroad tracks. Problems in geophysics and composite materials.  PREREQ: CIEG 212 and MATH 302

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

CIEG 622  EARTH STRUCTURES ENGINEERING 3  Principles 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, triaxial (CU), CD, UU) tests simulating various loading path, 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 earthquake; soil-structure interaction; lateral earth pressures. Discussion of numerical methods used in dynamic analyses of porous media.  PREREQ: CIEG 320/323.
CISC 817  STABILITY OF STRUCTURES  3
Structural instability phenomena caused by static and dynamic loads. Stability analyses of
structures by equilibrium, energy and dynamic methods. Conservative and non-conserv-
ative problems. Elastic and non-elastic buckling of beams, frames and arches caused by
mechanical and thermal loads. Buckling of continuously supported beams, plates, and
shells. Delamination buckling in composites
PREREQ: CIEG12 and MATH302.

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

CISC 831  THEORY OF WATER TREATMENT  3
Application of physical, chemical and engineering techniques to water treatment pro-
cesses: coagulation, sedimentation, filtration and disinfection. Advanced purifi-
cation methods including adsorption and demineralization processes.
PREREQ: CIEG632 and CIEG634

CISC 832  THEORY OF WASTEWATER TREATMENT  3
Composition of wastes; physical, chemical and biological methods of wastewater treat-
ment; treatment and disposal of sludges produced at wastewater treatment plants
PREREQ: CIEG636.

CISC 833  FATE OF POLLUTANTS IN THE ENVIRONMENT  3
Study of processes affecting the distribution of inorganic and organic pollutants in the environment. Equilibrium and kinetics of exchange among soil, water, sediment, air and
biota. Photolysis, hydrolysis, oxidation, reduction and complexation of chemicals. Models used to describe fates of chemicals.
PREREQ: CIEG632 and CIEG634

CISC 865  CIVIL ENGINEERING SEMINAR  1
CISC 868  RESEARCH  1-6
CISC 869  MASTER’S THESIS  1-6
An independent investigation under supervision of a member of the civil engineering grad-
uate faculty.

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

CISC 871  COASTAL STRUCTURES  3
Advanced design procedures of coastal structures. Includes statistics and spectra of ran-
don sea waves, random sea transformation in the nearshore, design of vertical and rub-
ble mound breakwaters, harbor clearances and tranquility, and hydraulic model tests

CISC 872  ADVANCED WATER WAVE MECHANICS  3
Development of linear and non-linear wave theories such as solitary, cnoidal, Stokes and
stream function. Application to coastal and ocean engineering problems.
PREREQ: CIEG639, CIEG672.

CISC 964  PRE-CANDIDACY STUDY  3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examina-
tions 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.

CISC 969  DOCTORAL DISSERTATION  1-12 PF

COMPUTER & INFORMATION SCIENCE

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

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

CISC 106  GENERAL COMPUTER SCIENCE FOR ENGINEERS  3
Principles of computer science illustrated and applied through programming in the high-
level language, Fortran. Programming projects illustrate computational problems, styles,
and issues that arise in numeric computational science and engineering
PREREQ: CISC105

CISC 120  OBJECT ORIENTED PROGRAMMING IN C++  2
A bridging course for students who already know C programming (e.g. CISC105) to
move into CISC220 without taking CISC181.
PREREQ: CISC105
RESTRICTIONS: Recommended only for strong students. Others should take CISC181
Normally only offered in Winter and Summer Sessions

CISC 135  TOPICS IN PROGRAMMING LANGUAGE  2
Learning and using a second programming language, with an emphasis on style. Each
section will deal with one language: possibilities include ADA, C, COBOL, FORTRAN,
LISP or MODULA-2
PREREQ: Computer programming course
RESTRICTIONS: Credit for CISC135 in a given language is not allowed toward degree
when another course in which that language is taught is also taken

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

CISC 220  DATA STRUCTURES  3
Review of data type abstraction, recursion, arrays, stacks, queues, multiple stacks and
linked lists. Emphasis on dynamic storage management, garbage collection, trees,
graphs, tables, sorting and searching.
PREREQ: A minimum grade of C- in CISC181 or CISC120
COREQ: MATH210 or MATH242.

CISC 260  MACHINE ORGANIZATION AND ASSEMBLY LANGUAGE  3
Introduction to the basics of machine organization. Programming tools and techniques at
the machine and assembly levels. Assembly language programming and computer arith-
etic techniques
PREREQ: A minimum grade of C- in CISC181 or CISC120.
RESTRICTIONS: CISC220 recommended as a prerequisite

CISC 301  ELEMENTS OF LOGIC AND AUTOMATA THEORY  3
Propositional and predicate logic syntax, semantics; proof methods based on unification
and resolution; applications involving reasoning and logic programming.
PREREQ: CISC280 and MATH135

CISC 320  INTRODUCTION TO ALGORITHMS  3
Design and analysis of algorithms: worst/case average case analysis, proofs for correctness
and performance of algorithms. Algorithmic strategies (divide and conquer, greedy meth-
ods, dynamic programming, etc.). Algorithms for searching, sorting and traversal of
strings, trees and graphs. Categorization of computational problems: classes P and NP
NP completeness.
PREREQ: MATH210 and a minimum grade of C- in CISC220.

CISC 350  COMPUTER ARCHITECTURE  3
Principles and techniques used in the architecture of digital computers. Machine elements
and their interaction. Instruction set, bus vs unix, registers, busses and switches
PREREQ: CPCS210 and CPCS211 and a minimum grade of C- in both CISC220 and
CISC260 (or equivalent course)

CISC 361  OPERATING SYSTEMS  3
Principles and techniques employed in the development of operating systems and their
control programs. Includes management of memory, processors, I/O devices.
PREREQ: A minimum grade of C- in both CISC220 and CISC260 (or equivalent course)
RESTRICTIONS: CISC360 recommended as a prerequisite
CISC 366  Independent Study 1-6
CISC 370  Object-Oriented Programming, Java and the World Wide Web 3
Study of object-oriented programming through use of the Java programming language.
Applications for the World Wide Web (WWW) will be carried out.
PREREQ: CISC181 and CISC220
CISC 372  Parallel Programming 3
Introduction to parallel programming concepts, methodologies, and tools. Programming
techniques for programs that contain code segments which will run simultaneously on
multiple processors. Topics include: concurrency, program decomposition, data distribution,
communication, load balancing, scalability, locality, granularity, debugging, performance
evaluation.
PREREQ: CISC220.
CISC 401  Elements of the Theory of Computation 3
General models of computation, formal languages and automata theory and algorithmic
unsolvability.
PREREQ: CISC301 or CISC310
RESTRICTIONS: Credit cannot be received for both CISC401 and CISC601.
CISC 403  Program Verification 3
Specification and verification of programs. Through the use of formal and informal verifica-
tion techniques, program design is made more effective and product quality (meeting
specifications) is enhanced.
PREREQ: CISC301 or CISC310
RESTRICTIONS: Credit cannot be received for both CISC403 and CISC603.
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, comple-
teness, compactness and undecidability. Automated theorem proving also covered
PREREQ: CISC301 or CISC310
RESTRICTIONS: Credit cannot be received for both CISC404 and CISC604.
CISC 409  Topics in Theoretical Computer Science 3
Contents vary to coincide with the interests of students and current faculty.
PREREQ: CISC401/401
RESTRICTIONS: Credit cannot be received for both CISC409 and CISC609.
CISC 410  Introduction to Numerical Analysis and Algorithmic Computation 3
See MATH426 for course description
CISC 411  Algorithmic and Numerical Solution of Differential Equations 3
See MATH426 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 compu-
tation to solve a problem from student's own discipline
RESTRICTIONS: Credit cannot be received for both CISC423 and CISC623. Offered in
alternate years.
CISC 427  Computer Simulation Techniques 3
Modeling and computer simulation of discrete and continuous systems - those character-
ized by stochastic discrete events and those characterized by differential equations. Study
and use of simulation languages.
PREREQ: CISC220
RESTRICTIONS: Credit cannot be received for both CISC427 and CISC627.
CISC 429  Topics in Algorithms and Complexity Theory 3
Contents vary to coincide with the interests of students and current faculty
RESTRICTIONS: Credit cannot be received for both CISC429 and CISC629.
CISC 437  Database Systems 3
Physical and logical organization of databases. Data retrieval languages, relational
database languages, security and integrity, concurrency, distributed databases.
PREREQ: CISC220 and either CISC301 or CISC310
RESTRICTIONS: Credit cannot be received for both CISC437 and CISC637
CISC 440  Computer Graphics 3
Computer graphics technology, two- and three-dimensional systems, graphics software
systems, modelling and object hierarchy, and animation.
PREREQ: CISC220 and MATH241
RESTRICTIONS: CISC320 recommended. Credit cannot be received for both CISC440
and CISC640.
CISC 449  Topics in Computer Applications 3
Contents will vary to coincide with the interests of students and current faculty
RESTRICTIONS: Credit cannot be received for both CISC449 and CISC649.
CISC 450  Computer Networks 3
Computer Networks: LANs, MANs, and WANs. Analysis, design, and implementation of
network communication protocols ISO and TCP/IP protocol suites
PREREQ: CISC301, CISC360 and MATH205
COREQ: CISC361
RESTRICTIONS: Knowledge of probability recommended. Credit cannot be received for
both CISC450 and CISC650.
CISC 451  Data Compression and Reliability in Multimedia 3
Important approaches to data and multimedia compression. Lossless techniques: Huffman,
dictionary, arithmetic, run length. Lossless applications: GIF, lossless JPEG, Unix com-
pres, gzip. Lossy techniques: scalar/vector quantization, differential/subband/transform
encoding, lossy applications: JPEG, MPEG
PREREQ: MATH242, MATH201 and CISC450
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: CISC450 and CPEG419
RESTRICTIONS: Restricted to CISC and ELEG/CPEG majors and minors.
CISC 458  Applied Computer Networks 3
Principles of communications as they apply to computer networks. Includes advanced con-
ccepts of network design, construction and management.
PREREQ: CISC450
CISC 459  Topics in Communications, Distributed Computing and Networks 3
Contents vary to coincide with the interests of students and current faculty.
PREREQ: CISC450/650
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: CISC301 or CISC310
RESTRICTIONS: Credit cannot be received for both CISC470 and CISC670.
CISC 471  Compiler Design 3
Introduction to the design and implementation of compilers, with a focus on lexical anal-
ysis, parsing and syntax directed translation.
PREREQ: CISC260 and either CISC301 or CISC310
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 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 soft-
ware 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
RESTRICTIONS: Credit cannot be received for both CISC475 and CISC675. CISC361 is
recommended
CISC 479  Topics in Architecture and Software 3
Contents will vary to coincide with the interests of students and faculty
PREREQ: CISC361 and CISC642
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 for-
mulation, search strategies, state spaces, applications of logic, knowledge representation,
planning and application areas. May be cross-listed with CISC481
PREREQ: CISC280 and either CISC301 or CISC310
RESTRICTIONS: Credit cannot be received for both CISC481 and CISC681.

COMPUTER AND INFORMATION SCIENCE
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 VERIFICATION 3
Specification and verification of programs. Through the use of formal and informal verification techniques, program design is made more effective and product quality (meaning spec) is enhanced.
PREREQ: CISC310
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: CISC310
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: CISC601
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. Equally important 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: CISC320 and MATH315

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 cross-listed with MATH612.
RESTRICTIONS: Offered in alternate years. Credit cannot be received for both CISC623 and CISC423.

CISC 627 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: CISC220
RESTRICTIONS: Credit cannot be received for both CISC627 and CISC427

CISC 629 TOPICS IN ALGORITHMS AND COMPLEXITY THEORY 3
Contents vary to coincide with the interests of students and faculty.
RESTRICTIONS: Credit cannot be received for both CISC629 and CISC429

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 CISC310.
RESTRICTIONS: Credit cannot be received for both CISC637 and CISC437.

CISC 640 COMPUTER GRAPhICS 3
Computer graphics technology, two- and threes-dimensional systems, graphics software systems, modeling and object hierarchy, and animation.
PREREQ: CISC220
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 COMPUTER NETWORKS 3
Computer Networks: LANs, MANs, WANs. Analysis, design, and implementation of network communication protocols. ISO and TCP/IP protocol suites.
PREREQ: CISC360, CISC361 or CISC663.
RESTRICTIONS: Credit cannot be received for both CISC650 and CISC450.

CISC 651 DATA COMPRESSION IN MULTIMEDIA 3
PREREQ: MATH242, MATH201 and CISC450/650

CISC 652 TELECOMMUNICATIONS SYSTEMS 3
Present basic concepts in telecommunications, emphasizing topics such as SONET, cell and frame relay and multimedia switching. Concepts of the operation and maintenance of large communications networks are discussed.
PREREQ: CISC450 or CPEG419
RESTRICTIONS: Open to CISC, ELEG, and CPEG majors and minors only.

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

CISC 662 COMPUTER SYSTEMS: ARCHITECTURE 3
Recent advances in computer architecture and their impact on architectural design. Multicomputer and multiprocessor architectures. Parallel machines.
PREREQ: CISC360
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
RESTRICTIONS: Not open to students with credit for CISC361.

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: CISC310
RESTRICTIONS: Credit cannot be received for both CISC670 and CISC470.

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

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

CISC 679 TOPICS IN ARCHITECTURE AND SOFTWARE SYSTEMS 3
Contents will vary to coincide with the interests of students and faculty.
PREREQ: CISC662 and CISC663
RESTRICTIONS: Credit cannot be received for both CISC679 and CISC479.

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 CISC310.
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 IN 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
On-the-job experience performing technical computer science related work
RESTRICTIONS: Requires permission of the instructor.

CISC 801 RECURSIVE FUNCTION THEORY 3
Advanced abstract computability (or recursive function) theory with emphasis on the tools
underpinning research in the area. Topics include universal programming systems, com-
plexity results, oracle computations and quantifier hierarchies, classification of algorithm-
ically enumerable sets, machine self-reference and priority arguments.
PREREQ: CISC601

CISC 805 THEORY OF MACHINE 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 recur-
sion-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 821 PARALLEL ALGORITHMS 3
Study of design and analysis techniques for parallel algorithms is conducted. Topics
include: basic concepts of parallel algorithm design; searching and sorting in parallel;
parallel tree and graph algorithms and complexity issues, including the relationships
among PRAM models, the class NC, and P-Completeness.
PREREQ: CISC621

CISC 822 ALGEBRAIC ALGORITHMS 3
Algorithms for exact symbolic computation with integers of arbitrary size, polynomials,
matrixes, Fields of quotients and modular domains. Key algorithmic problems: GCD, fac-
torization and solution of equations. Key issues: correctness, cost analysis and system
design. Key techniques: Chinese remaindering, Hensel lifting and Transforms (FFT).
PREREQ: CISC621 or CISC623 (preferably both).
RESTRICTIONS: Offered in alternate years MATH450 or MATH650 recommended as
prerequisites.

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

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
Introduction to network management concepts. Network management architectures and
protocols: the Internet and OSI frameworks, management functionalities, management
domains and objects, protocols and services (SNMP, CMS/P). Design of management
agents and clients. Concepts of performance management, fault management, configura-
tion management and other management applications
PREREQ: CISC650.

CISC 855 DISTRIBUTED OBJECT COMPUTING WITH CORBA 3
Introduction to distributed object computing and the Common Object Request Broker
Architecture (CORBA) Topics: Object Management Architecture, Object Service,
Common Facilities, Models of Distributed Computation, Distributed Algorithms and their
implementation in CORBA.
PREREQ: CISC663 and CISC450/650.

CISC 856 TCP/IP UPPER LAYER PROTOCOLS 3
Principles and techniques employed in the TCP/IP protocol suite with an emphasis on the
network transport and application layers. Examples: ARP, RARP, IP, ICMP, TCP,
UDP, FTP, telnet, SMTP, NNTP, HTTP, DNS, Multicast and T/TCP
PREREQ: CISC650.

CISC 857 INTERCONNECTION OF NETWORKS 3
Overview of WAN, LAN and MAN technologies; interworking technologies: design of
bridges, routers and gateways; internetworking protocols (e.g., TCP/IP); routing in inter-
networks; internetwork performance issues; interoperation; issues, solutions and limita-
tions; and review of applications supported across the internetworked environments.
PREREQ: CISC650.

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

CISC 868 RESEARCH 1-6
Upper-level graduate research oriented toward a student's potential master's thesis or a
Ph.D. dissertation.

CISC 869 MASTER'S THESIS 1-6

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

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

CISC 874 PARALLEL PROGRAMMING 3
Overview of high performance computing architectures, parallel program performance
analysis, different paradigms for achieving parallelism including automatic paralleliza-
tion, message passing, shared memory, data parallel programming, task and loop
scheduling, debugging parallel programs and issues in getting good performance on par-
allel architectures.
RESTRICTIONS: CISC662 is recommended.

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

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

CISC 881 KNOWLEDGE-BASED SYSTEMS 3
Architecture of knowledge-based systems, development and application of knowledge
bases in systems for expert performance in specialized domains. Knowledge sources, rule-
based inference, uncertainty of facts and explanation of reasoning.
PREREQ: CISC681.

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

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

CISC 884 KNOWLEDGE REPRESENTATION 3
Representation of knowledge in computers, common-sense knowledge, implementation
methods: semantic nets, structured objects, logic, and production systems; specialized
problems: representation of beliefs, temporal events and noise-physics concepts
PREREQ: CISC681.

CISC 885 DISCOURSE AND DIALOGUE 3
Principles and issues involved in developing intelligent discourse and dialogue systems.
Topics: speech acts, characteristics of a coherent dialogue, explicit versus implicit com-
munication, discourse models, planning and plan recognition, illformed input, coopera-
tive responses, user models and default reasoning.
PREREQ: CISC681.

CISC 889 ADVANCED TOPICS IN ARTIFICIAL INTELLIGENCE 3
Contents vary to coincide with the interests of students and faculty.
PREREQ: CISC681.

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**CONSUMER STUDIES**

**CNST 233 FASHION DRAWING AND RENDERING 3**
Drawing from the fashion model; emphasis on rendering clothing character, fabrics and fashion details using various media; translation of drawings to finished fashion illustrations
PREREQ: ART129 or ART130

**CNST 235 FAMILY RESOURCE MANAGEMENT 3**
The study of effective assessment and allocation of human and material resources by individuals and families at different stages in the life cycle

**CNST 242 THE CONSUMER MOVEMENT 3**
Examines the evolution of the consumer movement over time and the impact of leadership upon the movement's effectiveness

**CNST 304 LEADERSHIP AND POWER 3**
Models of interactions between leadership and power are explored through a combination of speakers, videos, readings and simulations
PREREQ: CNST100

**CNST 305 CUSTOMER SERVICE AND CONSUMER VOICE 3**
Explores incentives for seller to respond to consumer requests, comments, and complaints and to encourage customer feedback after purchase and investigates incentives for consumers to request, to comment, and to complain after purchase. Identifies alternative models of consumer satisfaction and dissatisfaction and complaining behaviors. Students design, develop, and evaluate a consumer response system

**CNST 310 HOUSING 3**
Selection of housing as related to varying income levels and stages in the life cycle; types of housing, government agencies, and design considerations for special groups

**CNST 312 AMERICAN RESIDENTIAL STYLE 3**
Historic survey of residential architectural styles from 1700 to present. Emphasis on exterior design elements as they relate to interior layouts, details, ornamentation and furnishings. Field trips.

**CNST 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 will be emphasized. Students will produce accessories inspired by self-conducted research.
PREREQ: CNST211

**CNST 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: CNST221

**CNST 318 FASHION MERCHANDISE PRODUCTS 3**
Examines various types of fashion merchandise including the range of characteristics, sources and manufacturing processes. Emphasis on leather, fur, jewelry, kitchen and home furnishings, and allied merchandise areas.

**CNST 319 DRESS AND CLOTHING 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: PSYC201 and SOCI201

**CNST 320 FASHION MERCHANDISING INTERNSHIP 6**
An off-campus supervised and coordinated field study program in selected retail stores.
Restrictions: Requires permission of instructor

**CNST 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 CNST faculty approval through an application process. Offered at regular intervals

**CNST 322 RETAIL DESIGN AND CONSUMER BEHAVIOR 3**
Exploration of the effects of retail design on consumer behavior. Logos, packaging, point-of-purchase display, signage, personnel and store layout shall be examined. May be cross-listed with REM322

**CNST 324 APPAREL DESIGN BY DRAPING 3**
Exploration of three dimensional methods of apparel design. Design and execution of draped garment structures required
PREREQ: CNST314

**CNST 325 PRESENTATION TECHNIQUES 3**
Development of oral, written, graphic, problem-solving and personal skills for professional presentations. Techniques include computer graphics, photography, as well as audio and video applications as they relate to professional presentations

**CNST 328 FASHION SALES PROMOTION 3**
Fashion advertising, fashion promotion and other special purpose media utilized uniquely in the world of fashion. Emphasis not only on various components of fashion promotion media and their interrelationship, but also on interdependency of promotional strategy and fashion merchandising

**CNST 330 APPAREL DESIGN INTERNSHIP 4**
An off-campus, supervised field study program in selected business concerns dealing with apparel design and/or manufacture.
Restrictions: Requires permission of instructor.

**CNST 332 CONSUMERS, HEALTH AND MEDICAL CARE 3**
Economic perspective on consumer interests in health, medical insurance and medical care. Emphasis on unusual aspects of health care and health insurance markets and relationships between the markets. Includes important effects of uncertainty on decision making, market institutions and public policy.
PREREQ: ECON151 or ECON100

**CNST 333 CAD: FASHION DESIGN AND FORECASTING 3**
Introduction to computer graphics for fashion design, emphasizing concept development, visualization, storyboard layout, and design presentation. Focuses on trend research and presentation, and collection design for targeted markets.
PREREQ: CNST233

**CNST 335 CONSUMER FINANCIAL MANAGEMENT 3**
Analysis of financial models utilized in planning, organizing and initiating a strategy for generating and allocating earned and unearned income. Emphasis on studying consumer financial decision making during various stages of an individual's life cycle (e.g., single, newly-married, single parent, etc.).

**CNST 340 CONSUMER AFFAIRS INTERNSHIP 3-6**
An off-campus supervised and coordinated field study in selected agencies and organizations.
Restrictions: May be repeated once for credit. Requires permission of instructor

**CNST 342 CONSUMER LAWS AND REGULATIONS 3**
In-depth examination of consumer legislation and regulation policies at the federal and state level. Major pieces of consumer legislation, as well as the agencies responsible for implementing and enforcing these policies, examined in terms of efficiency and effectiveness.
PREREQ: CNST200, ECON151 or ECON152

**CNST 365 FASHION MERCHANDISING AND APPAREL DESIGN SEMINAR 1 PF**
Introduces awareness of career opportunities and develops techniques for success in apparel design and textile clothing career options.
Restrictions: APD and FM majors only.

**CNST 366 INDEPENDENT STUDY 1-6**

**CNST 401 CONSUMER POLICY ANALYSIS 3**
Analysis of consumer welfare related market practice issues. Issue may change. Use of management problem-solving tools to understand the issue and develop policies.
PREREQ: ECON151

**CNST 404 LEADERSHIP IN ORGANIZATIONS 3**
Understanding the process of change and positively affecting change in organizations through the exercise of leadership knowledge.

**CNST 405 CONTROVERSIAL ISSUES: CONSUMER AND FAMILY BEHAVIOR 3**
Uses an economic approach to consumer and family behavior to examine how various economic, social, legal and corporate policies impact family investment in human capital issues vary by term.

**CNST 415 TOPICS IN TEXTILES 3**
One topic is covered each semester; either fiber science, textile analysis, or textile dyeing and finishing.

**CNST 416 FASHION DIRECT MARKETING 3**
Examines the scope and application of direct marketing including mail-order, customer lists, catalogues, telemarketing, inserts, magazines and package goods applied to the clothing and textile industries.

**CNST 418 ADVANCED FASHION MERCHANDISING 4**
Focuses on computer application related to mathematical concepts and calculations used in merchandising soft goods at the retail level. Markdowns, retail method inventory, open-to-buy and vendor negotiations are emphasized.
PREREQ: CNST218, BIAD301, ACCT207 or CNST217, and ACCT160

**CNST 419 SOCIAL PSYCHOLOGICAL ASPECTS OF CLOTHING 3**
Study of clothing and appearance as contributors to human interactions; consideration of the importance of clothing in individual and collective behavior. Analysis of how dress reflects selffeelings, establishes social identities and affects interpersonal encounters.
PREREQ: CNST114, PSYC201 and SOC201
CONSUMER STUDIES

CNST 421  PROFESSIONAL PORTFOLIO DEVELOPMENT  1
Conceptualization and development of a professional portfolio of design work. Design
conceptualization, fashion illustration, and photo documentation techniques will be
emphasized.
PREREQ: CNST424
RESTRICTIONS: Open to apparel design seniors only.

CNST 422  FAMILY FINANCIAL MANAGEMENT  3
Problem-solving approach for resolving family financial problems using a variety of finan-
cial management techniques. Primary focus oriented toward financial counseling, finan-
cial planning or a combination of the two.
PREREQ: CNST335

CNST 424  APPAREL COLLECTION DEVELOPMENT  3
Conceptualization, design and execution of a coordinated apparel collection. Advances
and expands knowledge and skills from previous courses.
PREREQ: CNST324

CNST 426  FUNDAMENTALS OF TEXTILE CONSERVATION  3
Introduces scientific principles relevant to the cleaning, repair, storage and exhibition of
antique textiles. Evaluates treatment procedures that eliminate damaging agents, retard
their effects, or shield textiles from them.

CNST 433  CAD: MASS MARKET APPAREL  3
Focuses on all phases of apparel product development for a targeted market from con-
ceptualization through execution of sample garments for mass production. Further devel-
op skills in computer-aided pattern designing, grading, marker making and data man-
agement (e.g., sizing, specifications, operations and costing) Includes field trip.
PREREQ: CNST314

CNST 435  CONSUMER AND THE ENVIRONMENT  3
Analysis of dwindling energy resources and their effect upon consumer alternatives in the
marketplace; sociocultural, family and income aspects of consumer behavior in a high
energy consuming society.
PREREQ: CNST200, ECON151 or ECON152

CNST 440  DECISION-MAKING AND LEADERSHIP  3
Uses systems thinking for decision-making relating to consumer issues. Considerations of
leadership in bringing decisions and plans to fruition. Deals with problems arising from
economic aspects of systems.
PREREQ: CNST100 or CNST304, CNST200 or ECON100, ECON151 or ECON152
RESTRICTIONS: Open to juniors and seniors only

CNST 442  CONSUMER WELFARE AND EMPLOYEE BENEFITS  3
A critical analysis and evaluation of employee benefits, emphasizing the employee's
needs, rights and alternatives. Benefits to be analyzed include social insurance; group,
life, health, dental and disability insurance; qualified retirement plans; and other direct
and indirect benefits.

CNST 450  THE HISTORIC INTERIOR  3
Survey of the design and function of interior spaces and furnishings in the context of the
cultures and the times from which they evolved. Primary emphasis on Western Europe and
America. Primitive cultures, early civilizations and the Orient also explored. Field trips.

CNST 451  CONTEMPORARY FURNISHINGS  3
A survey of modern design evolution in furniture, textiles and the minor arts from the late
19th century to the present. Emphasis on styling and technological forces shaping 20th-
century design of interior furnishings. Field trips.

CNST 455  TRENDS IN THE GLOBAL ECONOMY  3
Global interdependencies that influence production, distribution, and consumption of
goods and services. The diverse roles of government, industry, and consumers in the glob-
al economy.
PREREQ: ECON151 or ECON152

CNST 465  SEMINAR  1-3  PF
May be repeated to a maximum of three credits.

CNST 466  INDEPENDENT STUDY  1-6

CNST 665  SEMINAR  1-3

CNST 668  RESEARCH  1-6

CNST 868  RESEARCH  1-6

CNST 869  MASTER'S THESIS  1-6

COMMUNICATION

COMM 200  TOPICS: HUMAN COMMUNICATION SYSTEMS  3
Analysis of various human communication systems which may include interpersonal, orga-
nizational, and/or mass.

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 students with a basic understanding of the Internet and various Internet tools as
they are used at the University of Delaware. Course is self-paced and all instruction is 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 educa-
tional and family settings.

COMM 255  FUNDAMENTALS OF COMMUNICATION  3
Introduction to theories in communication with applications. Developing, analyzing and
critiquing communication in different settings.
RESTRICTIONS: Not open to seniors. Not open to communication majors.

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 polit-
ical responsibilities in various cultures. An experiential course integrating foreign and U.S.
students.
RESTRICTIONS: Offered only in Winter. Not for major credit.

COMM 301  INTRODUCTION TO COMMUNICATION RESEARCH METHODS  3
The conceptual bases of research methodology: formulating questions, designing, con-
doncting, and analyzing research.
PREREQ: COMM256

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 profession-
als.
PREREQ: ENGL307

COMM 310  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 311  PUBLIC RELATIONS WRITING  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 profession-
als.
PREREQ: COMM309 and ENGL307

COMM 313  COMMUNICATION PRINCIPLES IN ADVERTISING  3
Provides students with the basic concepts of advertising, including an exploration of the
role of advertising in marketing, the use of various advertising media and the processes
and features of advertising campaigns.

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 POLICS AND BROADCAST JOURNALISM  3
Topics vary and may include the influence of the media on foreign policy, the responsi-
bility of the media on foreign policy or for policy failures or successes. May be cross-list-
ed with POSC319
RESTRICTIONS: For majors only.

COMM 325  STUDIO TELEVISION PRODUCTION  3
Television as a mass communication medium. Background, programming, production and
studio procedures in educational television, broadcasting and closed circuit Laboratory
observation and practices.
RESTRICTIONS: For majors only.

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.
PREREQ: COMM325

COMM 330  COMMUNICATION AND INTERPERSONAL BEHAVIOR  3
Introduces key principles of interpersonal communication and discusses their application
across diverse contexts.

COMM 340  POLICS AND THE MEDIA  3
See POSC340 for course description.
RESTRICTIONS: For majors only.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 341</td>
<td>Theories of Interpersonal Communication</td>
<td>3</td>
<td>Survey of concepts and theories in interpersonal communication. Focuses on dyadic interaction and relationships as created, maintained, and modified through verbal and non- verbal behavior.</td>
</tr>
<tr>
<td>COMM 342</td>
<td>Topics in Organizational Communication</td>
<td>3</td>
<td>Focus on introductory areas of study in organizational communication. Restriction: May be repeated three times for credit when topics vary.</td>
</tr>
<tr>
<td>COMM 343</td>
<td>Topics in Interpersonal Communication</td>
<td>3</td>
<td>Focuses on introductory areas of study in interpersonal communication. Restriction: May be repeated three times for credit when topics vary.</td>
</tr>
<tr>
<td>COMM 345</td>
<td>Legal Issues of the Mass Media</td>
<td>3</td>
<td>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 LEST 345.</td>
</tr>
<tr>
<td>COMM 350</td>
<td>Public Speaking</td>
<td>3</td>
<td>Analyzes and applies theory and research in public speaking. Develops skills in preparation, presentation and evaluation of speeches. Includes classroom performances.</td>
</tr>
<tr>
<td>COMM 356</td>
<td>Small Group Communication</td>
<td>3</td>
<td>Examines basic group processes, structures and functions. Emphasizes both theory and practical applications. Restriction: Requires permission of instructor.</td>
</tr>
<tr>
<td>COMM 364</td>
<td>Internship</td>
<td>1-3 PF</td>
<td>Practical, on-the-job training in the student’s field of interest: interpersonal, mass media, public relations or organizational communication. Restriction: Offered in spring and fall semesters only. Open to Junior and Senior communication majors only.</td>
</tr>
<tr>
<td>COMM 366</td>
<td>Independent Study</td>
<td>1-3</td>
<td></td>
</tr>
<tr>
<td>COMM 370</td>
<td>Theories of Mass Communication</td>
<td>3</td>
<td>An examination of the foundations and development of theories of mass communication. Specific areas of study include media, society and the individual, media violence, cultivation theory, personal influence, social learning theory, diffusion theory and general media effects.</td>
</tr>
<tr>
<td>COMM 388</td>
<td>Television Production Practicum</td>
<td></td>
<td>A special topics video/audio course that as the production arm of an interdisciplinary project intensive work on specific projects such as producing promotional or sales campaigns, video documentaries and radio drama. PREREQ: COMM 325.</td>
</tr>
<tr>
<td>COMM 401</td>
<td>Careers in Communication</td>
<td>1 PF</td>
<td>Offers insights into the many careers open to those with communication degrees and includes guest lectures from successful alums. Provides strategies for career development. Restriction: Open to Junior and Senior communication majors only.</td>
</tr>
<tr>
<td>COMM 409</td>
<td>Public Relations Campaign Planning</td>
<td>3</td>
<td>Application of the public relations process in designing a public relations plan for a nonprofit client includes conducting research, setting objectives, developing strategies, designing special events and making recommendations for implementation and evaluation. PREREQ: COMM 309 and ENGL 307.</td>
</tr>
<tr>
<td>COMM 413</td>
<td>Public Relations Management</td>
<td>3</td>
<td>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 nonprofit client and several writing projects geared to specific audiences. PREREQ: ENGL 307 and COMM 309.</td>
</tr>
<tr>
<td>COMM 418</td>
<td>Topics in Mass Communication</td>
<td>3</td>
<td>Current directions in mass communication theory and practice including new technologies, politics, broadcast programming and research, advertising and audience responses to media content. Restriction: May be repeated three times for credit when topics vary.</td>
</tr>
<tr>
<td>COMM 421</td>
<td>Intercultural Communication: Applications in International Contexts</td>
<td>3</td>
<td>Students critically assess current intercultural communication theory and apply that theory to practical situations in various international contexts. Restriction: Requires permission of instructor. Course offered in Madrid, Spain and Costa Rica only.</td>
</tr>
<tr>
<td>COMM 424</td>
<td>Media Message Analysis</td>
<td>3</td>
<td>Examination of methodology used to study media content and effects. Focus on past and ongoing research in broadcast, nonbroadcast and print media. The method of how to conduct and assess research relating to the mass media. PREREQ: COMM 370. Restriction: Requires permission of instructor.</td>
</tr>
<tr>
<td>COMM 425</td>
<td>Advanced Topics in Politics and Broadcast Journalism</td>
<td>3</td>
<td>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 POSC 425. Restriction: Open to Junior and Senior communications majors only. May be repeated for credit.</td>
</tr>
<tr>
<td>COMM 438</td>
<td>Speech, Language and Communication</td>
<td>3</td>
<td>Analysis of theories of meaning, models of language use and acquisition, and the relationship between language and cognition.</td>
</tr>
<tr>
<td>COMM 440</td>
<td>Topics in Interpersonal Communication</td>
<td>3</td>
<td>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 WOMS 440. Restriction: May be repeated three times for credit when topics vary.</td>
</tr>
<tr>
<td>COMM 442</td>
<td>Topics in Organizational Communication</td>
<td>3</td>
<td>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 PSYC 443 and/or WOMS 442. Restriction: May be repeated for up to nine credits when topics vary.</td>
</tr>
<tr>
<td>COMM 444</td>
<td>Global Agenda</td>
<td>3</td>
<td>See PSYC 444.</td>
</tr>
<tr>
<td>COMM 450</td>
<td>Mass Communication Effects</td>
<td>3</td>
<td>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. PREREQ: COMM 370. Restriction: Requires permission of instructor.</td>
</tr>
<tr>
<td>COMM 452</td>
<td>Communication and Persuasion</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>COMM 454</td>
<td>Children and the Mass Media</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>COMM 456</td>
<td>Communication in Organizations</td>
<td>3</td>
<td>Introduction to concepts and research related to communication processes in organizational settings. Both traditional and interpretive approaches are emphasized.</td>
</tr>
<tr>
<td>COMM 466</td>
<td>Independent Study</td>
<td>1-3</td>
<td></td>
</tr>
<tr>
<td>COMM 485</td>
<td>Analysis of Face-to-Face Communication</td>
<td>3</td>
<td>An examination of methods for analyzing face-to-face interaction, message construction, and message interpretation.</td>
</tr>
<tr>
<td>COMM 486</td>
<td>Multimedia Literacy</td>
<td>3</td>
<td>See EDUC 485 for course description</td>
</tr>
<tr>
<td>COMM 601</td>
<td>Epistemology and Theory in Communication</td>
<td>3</td>
<td>General issues in the philosophy of knowledge and science critical for the understanding of theoretical conceptions and a comprehensive survey of theories in communication Restriction: Open to graduate students only.</td>
</tr>
<tr>
<td>COMM 603</td>
<td>Communication Research Methods - Procedures</td>
<td>3</td>
<td>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. Restriction: Open to graduate students only.</td>
</tr>
<tr>
<td>COMM 604</td>
<td>Communication Research Methods - Analysis</td>
<td>3</td>
<td>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. Restriction: Open to graduate students only.</td>
</tr>
</tbody>
</table>
COMM 609 Public Relations Campaign Planning 3
Application of the public relations process in designing a public relations plan for a non-profit client. Includes conducting research, setting objectives, developing strategies, designing special events and making recommendations for implementation and evaluation.

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, adaptive 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 624 Media Message Analysis 3
Examination of methodologies used to study media content and effects. Focus on past and ongoing research in broadcast, non-broadcast and print media. Method of how to conduct and assess research relating to the mass media.

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 638 Speech, Language and Communication 3
Analysis of theories of meaning, models of language use and acquisition, and the relationship between language and cognition.

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 656 Communication in Organizations 3
An introduction to concepts and research related to communication processes in organizational settings. Both traditional and interpretive approaches are emphasized.

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

COMM 664 Internship 1-6
Provides the student with practical, on-the-job training in the field of his or her interest, i.e., interpersonal, mass media, public relations or organizational communication. Restrictions: Open to graduate students only.

COMM 670 Mass Communication Theory 3
Examination of theories of mass communication focusing upon media, society and the individual; sociocultural influences; the social context of the broadcast media; theories relating to effects of media violence; personal influence; social learning theory; diffusion theory; and media effects. May be cross-listed with EDDV667.

Restrictions: Open to graduate students only.

COMM 685 Analysis of Face-to-Face Communication 3
An examination of methods for analyzing face-to-face interaction, message construction, and message interpretation.

COMM 686 Multimedia Literacy 3
See EDUC685 for course description.

COMM 868 Research 1-12

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. Prerequisite: CPEG210.

CPEG 220 Microprocessor Based Systems I 2
Introduction to small computing machines including the architecture, organization and programming of microprocessors. Emphasizes basic machines language and assembly language coding. Prerequisite: CPEG211 and CISC181.

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

CPEG 222 Microprocessor Systems 4
Introduction to microprocessors as embedded devices. Emphasizes Input/Output techniques, interrupts, real-time operation, high-level code debugging and interfacing to various types of sensors and actuators. Projects that address various embedded applications are a major part of the course. Prerequisite: CPEG202.

CPEG 323 Introduction to Computer Systems Engineering 3
General purpose, special purpose and embedded computer architecture are studies. Principles of digital system design are introduced including an introduction to tools for automated design and the use of programmable devices. Prerequisite: ELEG309 and CPEG221 or CPEG222.

CPEG 324 Computer Systems Design I 3
Principles of computer system design are studied emphasizing tradeoffs involving cost, performance, testability, reliability and manufacturability. Topics include timing analysis, computer and subsystem interconnection, noise effects debugging techniques, boundary scan testing and printed circuit board layout. Laboratory work involves design and implementation of a computer subsystem. Prerequisite: CPEG323.

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. Prerequisite: 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, superscalar computers and computers embedded in other systems. Prerequisite: 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. Prerequisites: CPEG324 and CISC361.
CPEG 460 INTRODUCTION TO VLSI SYSTEMS 4
Study of CMOS VLSI devices, circuits and systems implemented in VLSI. CAD tools for the
design and simulation of VLSI. Topics include the performance and limitations of VLSI sys-
tems, low level circuit design and system design with an emphasis on digital systems.
Major chip design project required
PREREQ: CPEG221 and ELEG312

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 compi-
erals as an integral unit. Software/hardware tradeoffs in pipelined computers, super-
compiler computers and computers embedded in other systems
PREREQ: CPEG 323 and CSC 361

CPEG 622 COMPUTER SYSTEM DESIGN II 3
Examines modern computer design methods using industry standard electronic CAD
synthesis tools. Includes hardware design using VHDL, logic synthesis tools, simul-
tation methods for synthesis, and efficient coding techniques for synthesis. Includes experi-
mental laboratory work to design and evaluate FPGA-based digital computer hardware.
PREREQ: CPEG324 and CSC361

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 sys-
tems, low level circuit design and system design with an emphasis on digital systems.
Major chip design project required
PREREQ: CPEG221 and ELEG312

CRIMINAL JUSTICE

CRJU 110 INTRODUCTION TO CRIMINAL JUSTICE 3
Responses in American society to the problems of crime. Examines criminal behavior, crim-
inal 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 of the 1950s
through the 1990s that contributed to the increased use of illicit drugs.

CRJU 134 GREAT CRIMES 3
Examines the realities of securing justice in light of crimes that have generated intense
interest and critical analysis. (Lindbergh kidnapping, Rosenberg spy case, etc.)
Using the case study method, contrasts made and comparisons drawn among changing legal
norms, investigative techniques and public attitudes toward crime.

CRJU 201 PROBLEMS OF LAW ENFORCEMENT 3
Introduction to a range of historical, political, philosophical and sociological problems in
institutions vested with the responsibility to enforce laws and/or preserve order.

CRJU 202 PROBLEMS OF CRIMINAL JUDICIARY 3
Focuses on problems and issues found in the American criminal court system. Includes
judicial procedure, organization, judicial personnel and basic criminal law

CRJU 203 PROBLEMS OF CORRECTIONS 3
General overview of the American corrections system and a survey of the most pressing
problems of the 1990s. Philosophy of punishment extensively discussed. Major
emphasis on the nature of the prison experience, alternatives to incarceration, judi-
cial intervention in correctional affairs and the controversy over the efficacy of rehabilita-
tion programs.

CRJU 301 INTRODUCTION TO LEGAL STUDIES 3
See LEST301 for course description.

CRJU 303 JUVENILE DELINQUENCY 3
See SOCI303 for course description.

CRJU 304 CRIMINOLOGY 3
See SOCI304 for course description.

CRJU 311 CAPITAL PUNISHMENT AND THE LAW 3
Overview of the law of capital punishment. Emphasizes the U. S. Supreme Court's major
death-penalty decisions and the effects of these decisions
PREREQ: CRJU110 or CRJU203

CRJU 312 CRIME AND PUNISHMENT IN AMERICAN HISTORY 3
Examines changes in the criminalization of deviant behavior and the social, institutional,
and legal development of criminal justice administration in the United States from colonial
times to the present. May be cross-listed with HIST312.

CRJU 313 THE STUDY OF MURDER 3
An historical and contemporary analysis of criminal homicide, examining the nature and
extent of murder, including those related to assassination and war

CRJU 320 INTRODUCTION TO CRIMINAL LAW 3
An analysis of the evolution of criminal law within the larger societal context, and an
overview of the basic structure and administration of criminal law in the United States.
PREREQ: CRJU110

CRJU 322 CROWDS, CULTS AND REVOLUTIONS 3
See SOCI322 for course description.

CRJU 324 AMERICAN CONSTITUTIONAL HISTORY 3
A survey of the development of judicial review since Reconstruction, emphasizing the
Supreme Court's response to urbanization and industrialization, the growth of executive
authority, and the extension of civil rights and civil liberties in the twentieth century.
May be cross-listed with HIST324

CRJU 332 CRIMINAL VIOLENCE IN AMERICA 3
General overview of various aspects of criminal violence. In-depth analysis of child abuse,
race, domestic violence and black-on-black homicide

CRJU 336 THE DETECTIVE IN FILM AND FICTION 3
Study of detective fiction and film has applications to a liberal arts approach to crime and
justice. Blends literary analysis with the insights of social science research on the work of
private and police detectives. May be cross-listed with ENGL330 and/or SOCI336
PREREQ: CRJU201

CRJU 340 THE JUVENILE JUSTICE SYSTEM 3
An in-depth view of the juvenile justice system in the United States focusing on crime pat-
terns, police-juvenile relations, juvenile courts and correctional practices

CRJU 345 SOCIETY OF LAW 3
See SOCI345 for course description

CRJU 346 PSYCHOLOGY AND THE LAW 3
Seminar exploring the rapidly expanding field of psychology and the law. Review and
discussion of psychological research on such topics as the adversary system, jury selec-
tion, eyewitness testimony, the insanity defense, perceptions of crime and the death penal-
ity. May be cross-listed with PSYC346

CRJU 350 GENRE AND CRIMINAL JUSTICE 3
Reviews historical and contemporary explanations for women's participation in crime and
evaluates these explanations in light of current research on gender. Other topics include
treatment of women offenders by judicial and correctional systems, women as victims of
crime and women as criminal justice personnel. May be cross-listed with WOMS355

CRJU 355 RACE, CLASS AND CRIME 3
Examines contemporary patterns of race, class and crime through historical interconnec-
tions 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 BAMS355
and/or SOCI356.

CRJU 357 SEMINAR ON THE POLICE 3
Teaches students to criticize and analyze research and theory in the scholarly literature
on policing.

CRJU 366 INDEPENDENT STUDY 1-6

CRJU 368 INDEPENDENT RESEARCH 1-6
Independent research under the supervision of a faculty member. Requirements include
preparation of a research report consistent with the professional literature in the field.
Student and faculty member will file a learning contract describing the research and a
report with the department chair.

CRJU 369 ALCOHOL, DRUGS AND CRIME 3
Examines the relationship between alcohol, drugs and crime, including societal response
to offenders who commit alcohol/drug related offenses and offenders who engage in
crime over drug markets.
PREREQ: CRJU110 or SOCI201

CRJU 370 PRISON AND PRISON SUBCULTURES 3
Provides an intensive examination of the culture and lifestyles of prisoners. Special empha-
sis on how gender and race contribute to differential patterns of adjustment to incarce-
ration. Mainly examines how the prisoner subculture contributes to racial conflict, violence
and mental health crises among prisoners.

CRJU 375 CRIMINAL PROCEDURE 3
Intensive analysis of criminal court procedures that occur once a case is actually brought
against an accused. Emphasis on trial tactics and procedures

CRJU 414 DATA ANALYSIS 3
See SOCI414 for course description.

CRJU 420 CRIMINAL JUSTICE ADMINISTRATION 3
Aids those planning a career as an administrator in the criminal justice system. Topics typ-
ically include basic administrative policy and budgetary matters
PREREQ: CRJU110.
CRJU 425 Criminai Law and Social Policy 3
Analyzes the role of the American judiciary in making social policy and examines the
manner in which the courts have adjudicated controversial sociolegal issues. Topics typ-
ically include capital punishment, abortion, the right to privacy, search and seizure, the
Miranda rule, and freedom of speech and press.

CRJU 428 Corporate Crime 3
See SOCI428 for course description.

CRJU 437 Seminar on Corrections 3
An in-depth examination of actual topics in corrections including philosophy of punish-
ment, history of punishment; structure and change of correctional settings and programs;
and prison reform.

CRJU 446 Judging the Jury 3
Examines and evaluates the institution of the jury. Explores contemporary contes-
troversies over the jury by review and analysis of research studies on jury decision making.

CRJU 448 Community-Based Treatment 3
See SOCI448 for course description.

CRJU 450 Prisoners and the Law 3
An examination of the legal rights available to prisoners seeking to challenge their con-
victions 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 454 Lawyer's Ethics 3
See SOCI454 for course description.

CRJU 456 Lawyers and Society 3
See SOCI456 for course description.

CRJU 457 Criminal Evidence 3
The study of the laws of evidence and how they are used in the criminal courts and their
impact on the administration of justice.

CRJU 460 Criminal Justice Policy 3
A critical examination of criminal justice policy in the United States over the past thirty
years, with emphasis on the two major theoretical positions that have dominated criminal
justice policy making during that period.

CRJU 466 Independent Study 1-6

CRJU 489 Crime Victims and Victims' Rights 3
Examines victim-offender relationships, interactions between victims and the criminal jus-
tice system, and the connections between victims and other social groups and institutions
(such as the media, social movements, advocacy groups, legislatures and the state).
Examines 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 legisla-
tion, enforcement and research, and how these combine to influence prevention, treatment
and control strategies.
PREREQ: SOC/401.

CRJU 495 Field Experience in Criminal Justice 4 PF
Practicum involving actual field experience in a criminal justice agency; e.g., law enforce-
ment, courts or correctional agencies. Emphasis on relating the field experience to aca-
demic work. May be cross-listed with SOC/495.
RESTRICTIONS: Requires permission of instructor.

CRJU 496 Practicum in Teaching 1-3 PF
Practical exposure to undergraduate education gained by assisting a member of the fac-
ulty in carefully supervised experiences such as discussion leader, crafting questions, con-
sulting with students. Students may not be involved in the grading of student work or the
assignment of grades. May be repeated for up to three credit hours.
RESTRICTIONS: Requires permission of instructor. Not for major credit.

CSCC 229 The Nature of Science 3
Introduction to the nature of the scientific enterprise. Uses both theoretical discussion
and detailed example to illustrate 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 PHIL229.
PREREQ: Any two science courses or one science course and PHIL205.

CSCC 233 Women, Biology and Medicine 3
See WOMS233 for course description.

CSCC 241 Ethical Issues in Health Care 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 PHIL241.

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 PHIL246.

CSCC 250 Engineering Ethics 3
See PHIL250 for course description.

CSCC 311 Sociology of Health Care 3
See SOCI311 for course description.

CSCC 330 Varying Authors, Themes and Movements 3
See FLT/330 for course description.

CSCC 341 Ethics of Engineering Profession 1
See PHIL341 for course description.

CSCC 343 Society, Politics and Health Care 3
See POLS343 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 com-
puter 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 relationships 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 PHIL444 for course description.

CSCC 480 Issues in Health Care for Children and Families 1-3
Students will come into contact with children, families, physicians, and other health pro-
fessionals. Students will not only learn about particular cases, but also use these cases to
explore issues of health, disease, physician-patient relationships, interactions among mem-
bers of the health care 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 pro-
fessionals. Students will not only learn about particular cases, but also use these cases to
explore issues of health, disease, physician-patient relationships, interactions among mem-
bers of the health care team.
RESTRICTIONS: BALS and MSP majors only and Junior status or above.

CSCC 482 Issues in Public Health - Economics 1-3
Students will come into contact with children, families, physicians, and other health pro-
fessionals. Students will not only learn about particular cases, but also use these cases to
explore issues of health, disease, physician-patient relationships, interactions among mem-
bers of the health care team.
RESTRICTIONS: BALS and MSP majors only and Junior status or above.

CSCC 498 Topics in Biology 3
See BISC498 for course description.

CSCC 647 Philosophy of Technology 3
See PHIL647 for course description.

CSCC 650 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 every-
day life in colonial America.
RESTRICTIONS: Requires permission of instructor.
ECON 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.

ECON 605 History of Theories in Material Culture 3
Landmark works and recent theoretical approaches to the understanding and interpretation of the material culture. Readings drawn from a variety of disciplines and approaches, including art history, anthropology, historical archaeology, cultural geography, sociology and history. May be cross-listed with ARTH630, HIST605, and/or MST605.
RESTRICTIONS: Requires permission of instructor.

ECON 606 Issues in American Material Culture 3
Studies major themes in American material culture of the 18th, 19th and 20th centuries. Topics will vary from year to year. May be cross-listed with HIST605 and/or MST605.
RESTRICTIONS: Requires permission of instructor.

ECON 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.

EAMC 673 Connoisseurship of the Decorative Arts in America III 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.

EAMC 801 Introduction to Decorative Arts in America to 1860 3
Development of decorative arts, painting and architecture in America. Principles of connoisseurship and studies of American and imported objects of art. Collections of the Winterthur Museum. May be cross-listed with ARTH801.
RESTRICTIONS: Requires permission of instructor.

EAMC 869 Master's Thesis 3
ECON 100 Economic Issues and Policies 3
Takes a nontechnical approach to basic economics. Applies economic concepts to contemporary issues, problems and policies. Covers both macro and micro topics.
RESTRICTIONS: Not for major credit. May not be substituted for ECON151 or ECON152.

ECON 141 Swedish Economics: A Survey 2
Introduction to the Swedish economy focusing on its unique features. The role of Sweden in Euroland is examined.
RESTRICTIONS: Offered only in Sweden.

ECON 151 Introduction to Microeconomics: Prices and Markets 3
Introduces supply and demand concepts with basic economic graphs. Examines models of perfect and imperfect competition and the determination of product price and quantities. Covers current microeconomic issues such as the effect of government regulation and environmental problems.
COREQ: MATH114 or MATH115.

ECON 152 Introduction to Macroeconomics: The National Economy 3
Analyzes the determinants of unemployment, inflation, national income, and policy issues relating to how the government alters unemployment and inflation through control of government spending, taxes and the money supply.
PREREQ: ECON151.

ECON 251 Managerial Economics 3
Applies economic theory to business and managerial decision making. Includes analysis of consumer demand, theory of production and supply and the effects of different market structures and pricing strategies.
PREREQ: ECON151 and MATH201.
RESTRICTIONS: Credit can be earned for only one among ECON251, ECON300 or ECON301.

ECON 300 Intermediate Microeconomic Theory 3
Price determination and income distribution in a market economy; the behavior of firms and industry under conditions of pure and imperfect competition.
PREREQ: ECON151.
RESTRICTIONS: Credit can be earned for only one among ECON251, ECON300 and ECON301. BS majors must take ECON301. ECON300 cannot be used to satisfy Economics BS major requirements.

ECON 301 Quantitative Microeconomic Theory 3
Uses calculus to study price determination and income distribution in a market economy; and the behavior of firms and industry under conditions of pure and imperfect competition.
PREREQ: ECON151 and MATH221.
RESTRICTIONS: Credit can be earned for only one among ECON251, ECON300 or ECON301.

ECON 302 Banking and Monetary Policy 3
Nature and economic significance of money, credit and the banking system; the origin and management of the money supply; and effects of monetary changes on price levels, output and employment.
PREREQ: ECON152.

ECON 303 Intermediate Macroeconomic Theory 3
Determinants of national income and employment and inflation; theoretical problem of short-run fluctuations and secular growth; relative merits of monetary and fiscal policy.
PREREQ: ECON302 or permission of instructor.

ECON 305 Comparative Economic Systems 3
Theoretical and empirical comparison of economic systems' use of the market mechanism to allocate resources. Emphasis on the consequences of industrial democracy and governmental efforts to improve the decisions of corporations in Western and Eastern Europe, Russia, and Japan.
PREREQ: ECON151.

ECON 306 Economic Theory of Politics 3
Uses rational choice principles of maximization and competition to analyze political behavior. Covers candidates' competition for votes, the "public good" problem, paradoxes of voting, the political business cycle, legislative decision making and vote trading and theories of bureaucracy. May be cross-listed with POSC306.
PREREQ: ECON151 and POSC150.

ECON 311 Economics of Developing Countries 3
Surveys policy issues related to economic growth and development. Special emphasis on problems facing contemporary third world countries.
PREREQ: ECON151 and ECON152.
RESTRICTIONS: ECON311 and ECON441 cannot both count for degree credit.

ECON 315 Economic History of Colonial America 3
Simple economic models and quantitative evidence used to explain colonial American history. Includes migration, servant and slave markets, government financing and the creation of paper money, causes of the Revolution, colonial growth, foreign trade, education and witchcraft.
PREREQ: ECON151 and ECON152.

ECON 316 Economic History of the United States 3
Examines the record of economic change in the United States from the colonial period to the present. Emphasis on using economic theory and measurement for interpreting the past.
PREREQ: ECON151 and ECON152.

ECON 332 Economics of Government Spending and Taxation 3
Microeconomic and macroeconomic analysis of public expenditure, borrowing and taxation. Introduction to stabilization, efficiency and distributional features of public finance.
PREREQ: ECON151.
RESTRICTIONS: ECON332 and ECON433 cannot both count for degree credit.

ECON 333 Current Readings in Economics 3
Books on controversial economic topics such as the Asian financial crisis, income distribution in America, environmental regulation, economic aid to developing countries, healthcare reform, privatizing Social Security and education vouchers are studied. Student papers and discussion form the essence of class sessions.
PREREQ: ECON151.

ECON 340 International Economics 3
Theory, problems and policy in international trade and finance with emphasis on developments since World War II.
PREREQ: ECON151 and ECON152.
RESTRICTIONS: ECON 340 cannot be taken for credit after ECON441 and/or ECON443.

ECON 341 Environment of Multinational Corporations 3
See BUAD341 for course description.

ECONOMICS

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ECON 344 THE MAKING OF THE EUROPEAN ECONOMY  3
Theory and policy of trade integration, resource mobility, exchange mechanisms, policy coordination, and progress toward monetary union. Visits may be made to business and government agencies where course material is supplemented by presentations of business executives, practicing economists, and financial experts.
PREREQ: ECON151 and ECON152
RESTRICTIONS: Credit toward degree may not be earned in both ECON344 and ECON444

ECON 345 ECONOMIES IN TRANSITION  3
Analyzes the economic transition taking place in twenty eight countries in Europe and Asia. Provides a general picture of the historical development of these economies under central planning and analyzes the successes and failures of the transition programs in these countries.
PREREQ: ECON151

ECON 360 GOVERNMENT REGULATION OF BUSINESS  3
Normative, economic and legal foundations of government intervention in business, particularly antitrust and regulation; and the process and the effects of government policies.
PREREQ: ECON151

ECON 366 INDEPENDENT STUDY  1-6

ECON 381 ECONOMICS OF HUMAN RESOURCES  3
Analysis of labor markets and of the family. Topics include labor supply and demand, human capital, labor market discrimination, the distribution of income and fortunes of fertility and family structure. Public policy applications stressed.
PREREQ: ECON151
RESTRICTIONS: ECON 381 and ECON 483 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 WOMS 385. May be crosslisted with WOMS 385.
PREREQ: ECON151

ECON 390 ECONOMICS OF HEALTH CARE  3
Introduction to the U.S. Healthcare system. Analysis of existing policies and proposals. The roles of markets and government are examined. Topics covered 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 403 HISTORY OF ECONOMIC THOUGHT  3
Development of economic analysis as a systematic discipline from mercantilist writers forward. Theories of resource allocation emphasized, with selected reference to topics in trade, money and welfare.
PREREQ: ECON300 or ECON301

ECON 405 THE PLANNED ECONOMIES  3
Theoretical and empirical comparison of market and centrally planned economic systems. The United States and the Soviet Union are studied.
PREREQ: ECON300 or ECON301, and MATH230

ECON 406 MARKETS: INFORMATION AND UNCERTAINTY  3
Investigates impact of costly information on the behavior of individuals and markets. Topics include decision making under risk and uncertainty, insurance, consumer-employer search behavior, product liability, industrial safety, futures markets and problems of contract enforcement.
PREREQ: ECON300 or ECON301, and MATH221 and MATH202

ECON 408 ECONOMICS OF LAW  3
Effect of legal rules on resource allocation both in and between the public and private sectors. Considered common law, regulation and constitutional rules.
PREREQ: ECON300 or ECON301.

ECON 411 ECONOMIC THEORY OF DEVELOPING COUNTRIES  3
Theoretical and empirical analysis of models of growth and development. Emphasizes the use of economic analysis to evaluate public policies in underdeveloped countries.
PREREQ: ECON300 or ECON301, and ECON303
RESTRICTIONS: ECON 311 and ECON 411 cannot both count for degree credit

ECON 415 ECONOMIC FORECASTING  3
A practically oriented introduction to the art of managerial forecasting. Includes an integration of microeconomic and macroeconomic theory with statistical and econometric techniques to provide meaningful forecasts of the future values of series such as prices, sales, inventory levels and costs.
PREREQ: ECON151, ECON152 and MATH202

ECON 418 ECONOMIC HISTORY OF AMERICAN LABOR MARKETS  3
Economic models will be used to explain the evolution of various American labor markets, including: immigrant labor, female labor markets, slavery, labor unions, internal labor migration, southern labor institutions, and the impact of human capital on industrial expansion and productivity.
PREREQ: ECON300 or 301

ECON 419 ECONOMICS OF THE GREAT DEPRESSION  3
Analysis of modern theoretical explanations of the economic downturn of 1929-1933, with implications for understanding current economic problems. Theories considered include those based on monetary contractions, consumption and investment instability and international imbalances.
PREREQ: ECON303

ECON 422 ECONOMETRIC METHODS AND MODELS I  3
Uses statistical methods, especially multiple regression, to quantify economic models, including situations when the assumptions of classical statistics do not hold.
PREREQ: MATH221, MATH202 and ECON151

ECON 423 ECONOMETRIC METHODS AND MODELS II  3
Class discussion and research in advanced econometric techniques. ECON422

ECON 426 MATHEMATICAL ECONOMIC ANALYSIS  3
Uses mathematical tools to formulate and analyze economic propositions. Topics include the use of calculus to analyze comparative statics, optimization and constrained optimization, interest and growth and dynamic models.
PREREQ: ECON300 or ECON301, and MATH221

ECON 430 ADVANCED MACROECONOMIC THEORY  3
Continuation of intermediate macroeconomic theory. Recent developments in macroeconomic theory explored in the context of the ongoing debate between the classical equilibrium and Keynesian disequilibrium theories.
PREREQ: ECON303

ECON 433 ECONOMICS OF THE PUBLIC SECTOR  3
Role of government in the economy. Effects of taxation, spending and borrowing on resource allocation and income distribution. Special emphasis on cost-benefit analysis and current issues such as the energy environmental problems, the negative income tax, urban finances and the national debt.
PREREQ: ECON300 or ECON301
RESTRICTIONS: ECON352 and ECON433 cannot both count for degree credit

ECON 441 ADVANCED INTERNATIONAL MICROECONOMICS  3
Focuses on international trade theory and policy, and exchange rates. Topics include trade based on competitive advantage and economies of scale and imperfect competition, international factor movements, tariffs, quotas, export subsidies, customs unions, current account deficits, purchasing power parity, and fixed versus flexible exchange rates.
PREREQ: ECON300 or ECON301

ECON 443 INTERNATIONAL MONETARY ECONOMICS  3
Applies macroeconomic theory in an international context. Uses historical cases to analyze policy making under fixed and flexible exchange rates. Develops alternative models of exchange rate dynamics. Discusses problems and proposed reforms of the international monetary system.
PREREQ: ECON300 or ECON301, and ECON303

ECON 444 ANALYSIS OF ELECTRONIC ECONOMIC PERFORMANCE  3
Theory and policy of trade integration, resource mobility, exchange mechanisms, policy coordination, and progress toward monetary union. Visits may be made to business and government agencies where course material is supplemented by presentations of business executives, practicing economists, and financial experts. Project required.
PREREQ: ECON303 and one of ECON291, ECON300, ECON301
RESTRICTIONS: Credit toward degree may not be earned in both ECON344 and ECON444.

ECON 461 INDUSTRIAL ORGANIZATION AND ANTITRUST POLICY  3
Describes and analyses markets in terms of structure, methods of competition and social performance, particularly oligopolistic and differential competition. Stresses entrepreneurship, innovation and government competition policy, particularly antitrust.
PREREQ: ECON300 or ECON301, and MATH202 and MATH221.

ECON 463 THE ECONOMICS OF REGULATION  3
Analyzes government regulation of industry and its economic rationale, pricing issues, regulation and industry studies, with emphasis on efficiency and regulatory reform.
PREREQ: ECON300 or ECON301, and MATH221
RESTRICTIONS: ECON360 and ECON463 cannot both count for degree credit

ECON 466 INDEPENDENT STUDY  1-6

ECON 471 FUTURES AND OPTION MARKETS  4
See FREC471 for course description

ECON 483 ECONOMICS OF LABOR MARKETS  3
Analyzes economic models of labor market topics - sex and race discrimination, determination of wages and fringe benefits, labor unions, individual and firm investments in education and training, geographical mobility, labor supply, and professional sports.
PREREQ: ECON300 or ECON301
ECON 490 Economics of Health Policy 3
Theoretical analysis of healthcare issues and policies. Examination of changing relationships between patients, providers, hospitals, insurers, employers, communities and government. Analysis of spending policies, cost containment, hospital competition, care of the elderly, Medicare, Medicaid, managed care regulation, medical malpractice and provider (physician) manpower planning.
PREREQ: ECON251, ECON300 or ECON301
RESTRICTIONS: ECON390 and ECON490 cannot both count for degree credit.

ECON 530 Optimization and Game Theory 3
See MATH350 for course description.
PREREQ: MATH302, MATH349, ECON301 and ECON303

ECON 551 Managerial Economics 3
Employs microeconomic theory and analysis to enhance managerial decision-making. Emphasizes the development and analysis of economic models to understand the different market environments in which firms operate. Special attention is paid to the effects of antitrust policy, government regulation, and international trade policy.
PREREQ: MATH221.

ECON 552 Macroeconomic Environment of the Firm 3
Focuses on formal modeling of macroeconomic activity. Special attention is given to the short-run and long-run effects of monetary and fiscal policies on national output, economic growth, inflation, interest rates, business capital expenditures, exchange rates, and foreign trade.

ECON 668 Research 1-3

ECON 670 Applied Policy Analysis 3
See MATH672 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 and antitrust policy, the environment and taxation.
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.

ECON 672 Macroeconomics for Economic Educators 3
Includes national income accounting, theory of income determination, monetary and fiscal policies, budget deficits and surpluses, and national debt.
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.

ECON 673 Curriculum Strategies for Elementary Economic Educators 3
Curriculum applications incorporating proper treatment of economic concepts at elementary level. Strategies include techniques of motivation, training and reinforcement.
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.

ECON 674 Curriculum Strategies for Secondary Economic Educators 3
Curriculum applications incorporating proper treatment of economic concepts at secondary level. Strategies include techniques of motivation, training and reinforcement.
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.

ECON 675 Economics of Natural Resources 3
See MATH675 for course description.

ECON 676 Environmental Economics 3
See MATH676 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 Economic Education.

ECON 678 Monetary and International Trade Theories for Economic Educators 3
Studies international trade, free trade vs. protectionism, cartel, 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, neo-classical, 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 postbellum 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, game theory, information, public goods, and externalities.
PREREQ: ECON801.

ECON 812 Advanced Macroeconomic Analysis 3
Examines recent research and literature in macroeconomics. Topics include capital accumulation and economic growth, unemployment, inflation, financial markets, the open economy and international monetary economics, economic fluctuations, stabilization policy, fiscal policy, monetary and banking policy. Intended for doctoral students.
PREREQ: ECON802.

ECON 815 Managerial Forecasting 3
Reviews quantitative methods commonly used in forecasting within a business and economics environment, including causal and time series techniques. Emphasizes use and evaluation of techniques rather than their mathematical derivation. Economic theory integrates with statistical techniques providing forecasts of series such as prices, sales, inventories and costs.
PREREQ: MATH202.

ECON 819 Economics of Information 3
Extends basic economic paradigms to incorporate and assess the impact of imperfect information. Topics include analysis of principal-agent relationships with applications to insurance markets and signalling product quality, auctions, consumer search behavior, and an introduction to game theoretic models of economic behavior.
PREREQ: ECON551 or ECON801 or equivalent.

ECON 822 Econometric Theory 3
Examines recent research and literature in econometrics. 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 and ECON823 or equivalent.

ECON 824 Topics in Advanced Econometrics 3
Econometric techniques used in applied microeconomic analysis. Cross-section techniques, limited dependent variables, panel data analysis. Additional topics may also be covered. Intended for doctoral students.
PREREQ: ECON822 and ECON823 or equivalent.

ECON 825 Time-series Econometrics 3
Introduction to time-series methods, including modeling multivariate systems. Development of methods to test and insure goodness-of-fit of time-series models. Additional topics may also be covered. Intended for doctoral students.
PREREQ: ECON822 and ECON823 or equivalent.

ECON 827 Advanced Production Economics 3
See ECON282 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.
PREREQ: 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.

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EDCON 842 International Finance and Development 3
Continues ECON841. Covers foreign exchange markets, balance of payments, exchange rate systems and international economic policy. PREREQ: ECON552 or ECON802 or equivalent.

EDCON 846 Topics in Economic Development 3
Topics of current interest to economists, such as labor markets, populations, human capital and income distribution in less developed countries. Additional or substitute topics may also be covered. COREQ: ECON501 (ECON822 is recommended).

EDCON 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.

EDCON 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 ECON601 or equivalent.

EDCON 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: ECON501, ECON622 or equivalent.

EDCON 868 Research 1-9

EDCON 869 Master's Thesis 1-6

EDCON 875 Advanced Fisheries Economics 3
See MAST875 for course description.

EDCON 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.

EDCON 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: ECON501, ECON622 or equivalent.

EDCON 890 Colloquium: Economics Seminar Series 0 PF
Regularly-scheduled lectures by faculty and visiting researchers providing exposure to current research in economics.

EDCON 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: ECON552.

EDCON 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.

EDCON 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.

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 102 Sklmod: Academic Self Management 1 PF
Focuses on self-organization and growth in a college environment. Students investigate the nature of a university, learn how to maximize their productivity through time-management and careful decision-making and examine what a liberal arts education can mean to them.

EDUC 103 Sklmod: Study Skills 1 PF
Teaches strategies for understanding and remembering college lectures and test materials. Strategies include identifying the underlying discourse structure of the field, summarizing, comprehension monitoring and transforming notes into test format. Students practice on their own course materials.

EDUC 104 Sklmod: Critical Thinking 1 PF
Teaches strategies of good reasoning in humanities, social sciences and other liberal arts areas. Students learn how to become independent, well-informed thinkers and how to make persuasive arguments, using their own course materials.

EDUC 105 Sklmod: Problem Solving 1 PF
Teaches problem-solving strategies for college courses in chemistry, physics, economics, engineering, etc. Students learn methods for decomposing problems into manageable components and for using example problems strategically. Students apply these techniques to courses they are currently taking.

EDUC 166 Special Problem 1-3

EDUC 186 Educational Technology I: Productivity Tools 1
Acquaints students with basic computer concepts and personal productivity tools, including electronic mail, word processing, spreadsheets and graphics programs. Identifies and analyzes social and ethical issues raised by using and computer-mediated communication with respect to equal access, privacy and copyright.

EDUC 202 Human Development I: Grades K-4 3
Introduces 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 will be covered, including topics of language development and physical, cognitive and social-emotional changes in the middle school years. A field experience consisting of interviewing students in area middle schools is required.

EDUC 210 Literature and Literacy for Young Children 3
Introduces current theoretical perspectives of emergent literacy acquisition and development in home, community and school settings, and emphasizes the integration of reading, writing, oral language and literature. Takes a social constructivist orientation and highlights the influence of culture on literacy learning. Includes field experience.

EDUC 230 Introduction to Exceptional Children 3
Historical and philosophical basis for special education; physical and psychological characteristics of exceptional children; study and discussion of past and emerging educational practices for exceptional children with emphasis on pedagogical contexts. Systematic observation of a cross section of special education classes required. Emphasis on the school-age child.
EDUC 240 PROFESSIONAL ISSUES: PHILOSOPHICAL PERSPECTIVES 3
Introduction to ethical thinking and decision making. Focuses on ethical dilemmas encountered in planning for classroom management, maintaining intellectual freedom, teaching students equally, planning for moral or character education and other professional concerns.

EDUC 247 PROFESSIONAL ISSUES: HISTORICAL PERSPECTIVES 3
Interpretation of the history of American education as it has developed from the colonial era into current time, with particular attention to issues of equity, discipline, intellectual freedom and professionalism. Includes all levels of schooling in a social, multicultural context.

EDUC 258 CULTURAL DIVERSITY, SCHOOLING AND THE TEACHER 3
Examines roles and responsibilities of the classroom teacher vis-a-vis the demographic changes occurring in United States society and the public school student population. Topics include race, ethnicity, gender, sexual orientation, social class, poverty and language.

EDUC 266 SPECIAL PROBLEM 1-6

EDUC 286 EDUCATIONAL TECHNOLOGY II: PROFESSIONAL TOOLS 1
Theory and practice of technology in the teaching profession. Topics include lesson planning, classroom management, statistics, electronic gradebooks, presentation technology, integrated learning systems (ILS), and educational resources and communication on the Internet.

PREREQ: EDUC186.

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. Examines 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 1-2 PF
Theories and practices of designing and implementing thematic, interdisciplinary, interdisciplinary and integrated curricula 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 THE PRIMARY GRADES 3
Focuses on language arts development (reading, writing, listening, and speaking) of kindergarten through fourth grade children. Examines developmental approaches to appropriate practices. Includes a field experience in kindergarten through fourth grade classrooms.

COREQ: EDUC306.

EDUC 320 READING AND WRITING IN THE MIDDLE GRADES 3
Focusses on methods and materials for developing literacy from grades four through eight. Emphasizes practices suited to adolescent development. Includes a practicum in a fourth through eighth grade classroom.

PREREQ: EDUC141.
COREQ: EDUC335, EDUC341, EDUC346, EDUC436 and EDUC486 (for Elementary Education majors).

EDUC 335 ELEMENTARY CURRICULUM: MATHEMATICS 3
Selection and use of appropriate methods and curriculum for teaching arithmetic in grades K-6. Focuses on curriculum, teaching strategies, lesson planning and implementation and the appraisal of pupil achievement. Practicum included.

PREREQ: MATH253.
COREQ: EDUC320, EDUC335, EDUC341, EDUC346, EDUC436 and EDUC486 (for Elementary Education majors). EDUC310, EDUC335 and EDUC346 (for Early Childhood Development majors).

EDUC 336 MIDDLE SCHOOL MATHEMATICS CURRICULUM AND METHODS 3
Investigates curriculum and teaching methods for presenting mathematical concepts to middle school students (grades 6 through 8). Topics include the development of number sense, problem solving, and the use of calculator technology. Field experience included.

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.

COREQ: EDUC320, EDUC335, EDUC341, EDUC346, EDUC436 and EDUC486 (for Elementary Education majors). EDUC310, EDUC335 and EDUC346 (for Early Childhood Development majors).

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.

COREQ: EDUC320, EDUC335, EDUC341, EDUC436 and EDUC486 (for Elementary Education majors). EDUC310, EDUC335 and EDUC341 (for Early Childhood Development majors).

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-traditional groups oriented toward community service. Emphasis upon the role of these groups' educational practices to 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 as 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 LAB 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 and EDUC386.

EDUC 390 INSTRUCTIONAL STRATEGIES AND REFLECTIVE PRACTICE 3
Strategies for elementary school teaching, including classroom management and models of teaching. Emphasis on provisions for students with special needs.

COREQ: EDUC310 and EDUC386.

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.

EDUC 403 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 410 ASSISTIVE TECHNOLOGY 3
Introduces prospective teachers to technology that enhance learning for individuals with disabilities, including assistive technology to support academic learning and to compensate for cognitive, physical and sensory disabilities.

COREQ: EDUC431, EDUC432 and EDUC435.

EDUC 413 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; and student variability and exceptional students. May be cross-listed with PSYC413.

RESTRICTIONS: School practicum of 18 hours is required.

EDUC 414 EDUCATIONAL PSYCHOLOGY - COGNITIVE ASPECTS 3
Focuses on adolescent cognitive development and learning and the relationships between these cognitive processes and sound instructional models, strategies and practices for diverse and exceptional learners. Assessment and measurement of intelligence and aptitude for these students with special learning needs.

PREREQ: EDUC413.

EDUC 419 DIVERSITY IN THE CLASSROOM 3
Examines type and implications of student diversity in classrooms [cultural, gender, class, language, and handicapning conditional, cross-cultural processes and foundations of special education]. Examines best practices in multicultural education, classroom management and inclusion of secondary students with special learning needs.

RESTRICTIONS: Field experience of 18 hours is 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 FLT429 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 behavior and to teach academic skills. Includes explanation of classroom management techniques and systems for children and youth with and without disabilities. Students participate in a behavior analytic field experience in a public elementary school.
PREREQ: EDUC230.
COREQ: EDUC410, EDUC432 and EDUC435

EDUC 432 CURRICULUM FOR SCHOOL-AGE EXCEPTIONAL CHILDREN 3
Examination of instructional techniques, curriculum materials, and progress monitoring for school-aged children with mild disabilities including mental retardation, learning disabilities and social/emotional disturbance.
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 prospective teachers to technology available for use in identifying learning problems. Hands-on experience with test instruments used by school psychologists. Keeping a portfolio of student writing. Review and analysis of research and/or practices of a specific topic. Topics and format vary depending on the needs of the participants.
PREREQ: EDUC386.
COREQ: EDUC320, EDUC335, EDUC341, EDUC346 and EDUC486

EDUC 443 TEACHING SCIENCE IN MIDDLE SCHOOL 3
Introduction to curriculum and appropriate methods for teaching science concepts to middle school students (grades 6-8). Activities include review and evaluation of current middle school programs, research on student thinking, instructional materials, teaching strategies and approaches to student learning.
PREREQ: EDUC341.

EDUC 451 EDUCATIONAL ASSESSMENT FOR CLASSROOM TEACHERS 3
Conducts principles and methods for construction and evaluation of student learning assessments, including knowledge, understanding and skills. Provides methods to increase teacher inquiry into student learning. Considers strengths and limitations of each method in regard to informing teachers' judgements. Discusses implications of assessment policy.

EDUC 462 LANGUAGE ACQUISITION 4
The factors which distinguish human language from animal communication, as well as the development of many facets of language (semantics, syntax and phonology). To supplement reading and discussion, students gain research experience by working approximately eight hours per week on the on-going language acquisition projects. Students may be cross-listed with LING462 and/or PSYC462.

EDUC 465 MODEL OAS 3
See POSC465 for course description.

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, inter-agency collaboration and adult service systems.
RESTRICTIONS: Requires permission of instructor

EDUC 474 INSTRUCTIONAL METHODS IN SECONDARY SPECIAL EDUCATION 3
Reviews current issues and practices in curriculum and instruction for secondary students with mild/moderate disabilities. Within a school-to-adult life transition framework, examines general principles of effective instruction and their application to teaching academic, vocational and life skills at middle and high school levels.
RESTRICTIONS: Requires permission of instructor

EDUC 475 SENIOR THESIS 3
Substantial research paper directed by faculty mentor.

EDUC 476 SECOND LANGUAGE ACQUISITION AND BILINGUALISM 3
Introduces generative linguistic theories and the analysis of English phonology/morphology and syntax in the light of these theories. Contrastive analysis of English and a second language (such as Spanish). May be cross-listed with ENGL477 and/or LING476.
PREREQ: LING101.

EDUC 477 THE STRUCTURE OF ENGLISH 3
Introduces generative linguistic theories and the analysis of English phonology/ morphology and syntax in the light of these theories. Contrastive analysis of English and a second language (such as Spanish). May be cross-listed with ENGL477 and/or LING477.
PREREQ: LING101.

EDUC 485 MULTIMEDIA LITERACY 3
Introduces generative linguistic theories and the analysis of English phonology/ morphology and syntax in the light of these theories. Contrastive analysis of English and a second language (such as Spanish). May be cross-listed with ENGL477 and/or LING477.
PREREQ: LING101.

EDUC 486 EDUCATIONAL TECHNOLOGY IV: SCIENCE, SOCIAL STUDIES AND MATHEMATICS LAB 1
Introduces prospective teachers to technology available for use in mathematics, science, and social studies curricula. Enables students to evaluate this technology by applying the approaches studied in their mathematics, science, and social studies methods courses. Concludes with a teaching project incorporating the use of technology.
PREREQ: EDUC386.
COREQ: EDUC320, EDUC335, EDUC341, EDUC346 and EDUC436

EDUC 500 TOPICS: IN-SERVICE EDUCATION 1-6 PF
Review and analysis of research and/or practices of a specific topic. Topics and format 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 efficient conservation of natural resources. Introduces prospective teachers to technology available for use in mathematics, science, and social studies curricula. Enables students to evaluate this technology by applying the approaches studied in their mathematics, science, and social studies methods courses. Concludes with a teaching project incorporating the use of technology.
PREREQ: EDUC386.
COREQ: EDUC320, EDUC335, EDUC341, EDUC346 and EDUC436

EDUC 566 SPECIAL PROBLEM 1-12
EDUC 600 TEACHER AS RESEARCHER 3
Helps develop strategies to be used by teachers to design, implement and evaluate research projects. Enables teachers to conduct research on classroom problems related to teaching 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
EDUC 603 LITERATURE FOR ADOLESCENTS 3
Evaluation of classic and contemporary reading materials and their application to the junior-senior high school curriculum. Study of criteria, methods and tools for selection of books. Techniques for developing and promoting reading.

EDUC 604 TEACHING WRITING IN THE ELEMENTARY AND MIDDLE SCHOOL 3
Focuses on the development of appropriate instructional programs for elementary and middle school children. Provides information on the writing process, the beginnings of writing, exemplary programs, evaluation of children's writing and functions/roles 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.

EDUC 606 METHODS OF TEACHING FOREIGN/SECOND LANGUAGES IN ELEMENTARY SCHOOLS 3
See FLIL529 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 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 611 INTERNSHIP IN SCHOOL COUNSELING 3-6
On-site experiences in school counseling and guidance.

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.

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.

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.

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.

EDUC 618 SPECIAL SERVICES IN THE SCHOOLS 3
Explores roles and functions of psychologists, counselors and special educators in the schools. Study of school organization, professional standards, history of special services, legal and ethical issues and current issues pertaining to special education in the state and nation.

EDUC 619 DIVERSITY IN THE CLASSROOM 3

EDUC 620 FOUNDATIONS OF READING INSTRUCTION 3
Psychology and pedagogy of reading instruction. Lectures and demonstrations covering the following areas: psychology of the reading process, recent trends in reading instruction, initial reading procedures, directing reading activities, developing word recognition competence, developing efficient comprehension and differentiating instruction.

EDUC 621 DEVELOPMENTAL READING AND THE ROLE OF THE READING CONSULTANT 3
Laboratory course to prepare students as reading consultants. Teaching experience in the Reading Center is required along with visitations to different schools. Provides opportunities to study and compare remedial and developmental reading programs.

EDUC 622 THE ROLE OF LITERACY IN CONTENT AREAS 3
Explores the contributions of literacy research for content learning (e.g., math, science, social studies). Underscores the benefits of linking reading, writing, listening, speaking and viewing acquisition of domain knowledge and suggests various frameworks for supporting this linkage.

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 PSY623.

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.

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.

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.

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.

EDUC 629 PSYCHOLOGY OF TEACHING 3
A study of the research on teacher characteristics, teaching style and method, and teaching techniques.

EDUC 630 ASSESSMENT AND INSTRUCTION FOR READING DIFFICULTIES IN THE MIDDLE GRADES 3
Explores the practices and organizational arrangements that optimize literacy learning for middle level students who have not yet achieved appropriate literacy attainment. Designed for classroom and special education teachers as well as reading specialists.

PREREQ: EDUC608
EDUC 631 INSTRUCTIONAL DESIGN OF COMPUTER-BASED EDUCATION 3
Relates concepts and research in educational psychology to the development of instructional materials using the computer medium. Includes strengths and limitations of computers in meeting certain instructional needs and techniques for effective computer-based educational delivery.
PREREQ: Introductory course in Instructional Design.

EDUC 632 INTERNET CURRICULUM APPLICATIONS 3
Explores uses of the Internet to support, enhance, and deliver curriculum in grades K-12. Participants will use a variety of tools including the World Wide Web, File Transfer Protocol (FTP), listservs, newsgroups, and e-mail to access and utilize Internet resources in education and related fields. Participants will be expected to create units of instructional materials appropriate to their teaching level which utilize Internet tools and resources.
RESTRICTIONS: Familiarity with the World Wide Web and e-mail and an active e-mail account.

EDUC 633 INTRODUCTION TO COMPUTER INSTRUCTION 3
Introduction to the field of computer-based instruction, including instructional theory and design, hardware and software systems, artificial intelligence techniques, author languages and the politics and sociology of educational technology. May be cross-listed with CISC 633.

EDUC 634 TOPICS IN ELEMENTARY SCHOOL MATHEMATICS 3
Examines in-depth topics usually included in a K-8 mathematics program. Provides not only an overview of the topics, but increased understanding as well.

EDUC 635 TEACHING MATHEMATICS IN LOWER ELEMENTARY SCHOOL 3
Acquaints students with historic and recent information from theory and research on teaching and learning mathematics in grades 1-4, and will engage students in methods and materials for instruction that such information suggests.
PREREQ: EDUC 634 and MATH 252.
RESTRICTIONS: Grade of C or better in EDUC 634 or MATH 252.

EDUC 636 TEACHING MATHEMATICS IN UPPER ELEMENTARY SCHOOL 3
Acquaints students with historic and recent information from theory and research on teaching and learning mathematics in grades 4-8, and engages students in methods and materials for instruction that such information suggests.
PREREQ: EDUC 634 or MATH 252.
RESTRICTIONS: Grade of C or better in EDUC 634 or MATH 252.

EDUC 637 EDUCATIONAL PSYCHOLOGY 3
Study of research and theory in educational psychology and their application to instruction and schooling.
RESTRICTIONS: Not open to students with credit in EDUC 613 or EDUC 614. Requires permission of instructor or enrollment in a Master's Degree Program.

EDUC 638 PHILOSOPHY OF EDUCATION 3
Study of the philosophical assumptions basic to, and expressed in, American education; application of philosophy to the clarification of professional problems; and construction of a personal philosophy of education.

EDUC 639 EDUCATIONAL TECHNOLOGY TOPICS 3
In-depth study of a major problem in educational technology. Problems to be studied will vary with each offering.
RESTRICTIONS: May be repeated for credit when topics vary.

EDUC 640 INTRODUCTION TO CURRICULUM 3
Focuses on the curriculum that actually makes a difference - the curriculum that finds its way into the classroom. The three main topics are: a) major goals of education and their influence on curriculum policy and teacher planning; b) operational curriculum (what happens in the classroom); and c) strategies suitable for evaluating the operational curriculum.

EDUC 641 SCIENCE CURRICULUM AND INSTRUCTION 3
Examination of the goals of science education and their relation to science curricula. Examination of theories of learning and motivation as they relate to how individuals develop scientific concepts. Discussion and development of science instructional materials and strategies that are consistent with current learning theories.

EDUC 642 TOPICS IN SCIENCE EDUCATION 3
In-depth study of a major problem in science education.
RESTRICTIONS: May be repeated for credit when topics vary.

EDUC 643 ENVIRONMENTAL EDUCATION 3
Survey of and practice with existing environmental education materials and programs; the development of lessons in environmental education; and practical experiences with curriculum development and teaching procedures.

EDUC 644 SOCIAL STUDIES CURRICULUM AND INSTRUCTION 3
Compares the goals of the social studies curriculum with research on how teaching and learning typically occur in social studies classrooms. Consideration of traditional and innovative approaches to instruction, curriculum materials development and evaluation for the social studies.

EDUC 645 TOPICS: SOCIAL EDUCATION ISSUES 3
Analyzes selected topics and practices in social education. Reviews research findings, theoretical bases, 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
Focuses on knowledge, strategies, and skills for assessing and selecting appropriate technological tools and devices for use by secondary school students with disabilities. Includes discussion of assistive devices for students with physical and cognitive disabilities, and the need for specialized instruction, technology integration, and technology planning for these students.
PREREQ: Consent of instructor.

EDUC 647 HISTORY OF EDUCATION IN AMERICAN CULTURE 3
Focuses on the development of education in America from the colonial period to the present. Emphasis on the relationship between society and education, and the role of education in shaping American society. Includes an examination of the major historical events and figures that have shaped education in America.

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 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: EDUC 654.
COREQ: EDUC 669.
RESTRICTIONS: Requires permission of instructor.

EDUC 651 SCHOOL-BASED FAMILY ISSUES AND INTERVENTION 3
Focuses on the relationship 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 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: EDUC 650 or EDUC 669.

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: EDUC 652.

EDUC 654 AUGMENTATIVE AND ALTERNATIVE COMMUNICATION 3
Focuses on augmentative and alternative communication systems for persons with disabilities. Examples include the use of computers and other aids, human factors principles in the design and configuration of assistive devices and strategies and devices to improve the accessibility of learning and living environments.
PREREQ: EDUC 652.

EDUC 655 ASSISTIVE TECHNOLOGY 3
Focuses on the use of computer-based aids and other assistive devices to reduce barriers to the education and rehabilitation of children and adults with mild, moderate, and severe physical and cognitive disabilities. Topics include strategies to facilitate the learning of cause-and-effect, alternate control interfaces to access computers and other aids, human factors principles in the design and configuration of assistive devices and strategies and devices to improve the accessibility of learning and living environments.
PREREQ: EDUC 652.

EDUC 656 SCHOOL COUNSELING SERVICES 3
Detailed study of the function of school counselors with emphasis on developing a curriculum to promote social and emotional development of children. A practicum experience is included.

EDUC 657 CHILDREN, TELEVISION AND EDUCATION 3
See COMM 657 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  APPLIED EDUCATIONAL MEASUREMENT  3  
Theoretical and applied topics in basic educational measurement with emphasis on appli-
cation. Topics include norm-referenced versus criterion-referenced assessment, methods of
norming tests, reliability, validity, selecting and reviewing tests based on accepted stan-
dards of test construction, item analysis, classification of over- and under-achievement,
relationships among derived scores and an introduction to using the Statistical Packages
for the Social Sciences (SSPS).

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 learn-
er 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 exer-
cises and actual counseling sessions as a means of mastering particular skills.

EDUC 664  LEGAL ISSUES FOR SCHOOL MANAGERS  3  
Legal problems affecting school management including tort and contractual liability, pupil
personnel law, employee negotiations, Delaware school law and recent court decisions.

EDUC 665  ELEMENTARY STATISTICS  3  
Provides a conceptual understanding of some useful statistical techniques along with prac-
tical computer and statistical skills which will enable the student to answer realistic
research questions. Topics include descriptive statistics, regression, exploratory data anal-
ysis and hypothesis testing.

EDUC 666  SPECIAL PROBLEM  1-12  

EDUC 669  PRACTICUM IN SCHOOL COUNSELING  1-3  
Supervised counseling and guidance experiences in a school setting.
PREREQ: EDUC618, EDUC651, EDUC656, EDUC660, EDUC663 and EDUC677.
RESTRICTIONS: Requires contractual arrangement with University and on-site supervisor.

EDUC 670  PROGRAM DESIGN FOR ADULTS  3  
Program planning, development and evaluation for adult and continuing education pro-
grams. 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 intern-
ship in school psychology.
RESTRICTIONS: Requires permission of instructor.

EDUC 673  TRANSITIONS FROM SECONDARY SPECIAL EDUCATION  3  
Examines legislation, research and practices relating to school-to-adult life transition for
youth with mild/moderate/severe disabilities. Emphasis on model secondary programs and
instructional practices, family involvement, inter-agency collaboration and adult ser-
vice systems.

EDUC 674  INSTRUCTIONAL METHODS IN SECONDARY SPECIAL
EDUCATION  3  
Reviews current issues and practices in curriculum and instruction for secondary students
with mild/moderate disabilities. Within a school-to-adult life transition framework, exami-
nines general principles of effective instruction and their application to teaching academ-
ic, vocational and life skills at middle and high school levels.

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 UNG675 and/or PSYC675.

EDUC 676  SECOND LANGUAGE ACQUISITION AND BILINGUALISM  3  
Psycholinguistic, sociolinguistic and neurolinguistic approaches to Second Language
Acquisition (SLA). General models of first and second language learning. SLA within bilin-
gual education programs. The linguistic, psychological and social experiences of the bilin-
gual. Bilingual instruction and models of bilingual education. May be cross-listed with
UNG676.

EDUC 677  THE STRUCTURE OF ENGLISH  3  
Explores current generative linguistic theories and the analysis of English phonology/mor-
phology and syntax. Examines the foundations of these theories. Contrastive analysis of
English and a second language, such as Spanish. May be cross-listed with ENGL677 and/or UNG677.

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 develop-
ment.

EDUC 679  INSTRUCTING ELEMENTARY/MIDDLE SCHOOLERS WITH MILD
DISABILITIES  3  
Prepares students to teach children with mild disabilities, to identify and plan appropriate
strategies for the learning disabled, and to participate in the team conferences for these
students. May be cross-listed with UNG677, PSYC677.

EDUC 680  EDUCATIONAL DIAGNOSIS  3  
Provides an overview of assessment instruments for identification of a wide variety of
learning disabilities. Includes current theory regarding the nature of disability, the use of
various assessment techniques, and principles and practices of educational diagnosis.

EDUC 681  TECHNIQUES FOR BEHAVIOR CHANGE  3  
Provides an overview of behavior theory and research in educational contexts with an em-
phasis on different strategies for modifying student behavior. May be cross-listed with
UNG681.

EDUC 682  RESEARCH IN SPECIAL EDUCATION  3  
Reviews the literature in special education with emphasis on the development and evalua-
tion of assessment procedures. May be cross-listed with UNG682.

EDUC 683  CURRICULUM AND METHODS FOR TEACHING THE GIFTED
CHILD  3  
Focuses on the development of appropriate activities for gifted children. May be cross-
listed with UNG683.

EDUC 684  INSTRUCTIONAL METHODS FOR GIFTED CHILDREN  3  
Focuses on the development and use of appropriate methods and techniques for the in-
struction of the gifted. May be cross-listed with UNG684.

EDUC 685  MULTIMEDIA LITERACY  3  
Provides an introduction to the function and structure of multimedia applications. Em-
phasis on development and the effects of multimedia on classroom instruction.

EDUC 686  PSYCHOLOGISTS  3  
Reviews the literature in psychology, with an emphasis on the development and evalua-
tion of assessment procedures. May be cross-listed with UNG686.

EDUC 687  INTERPRETATION AND TESTING OF THE EXCEPTIONAL
CHILD  3  
Provides an introduction to the function and structure of multimedia applications. Em-
phasis on the development and evaluation of assessment procedures. May be cross-listed
with UNG687.

EDUC 688  PROGRAMMING FOR GIFTED CHILDREN  3  
Focuses on the identification of gifted and talented children and the development of pro-
grams to meet their needs.

EDUC 689  ADMINISTRATION OF ELEMENTARY AND MIDDLE
SCHOOLS  3  
Provides an introduction to the function and structure of multimedia applications. Em-
phasis on the development and evaluation of assessment procedures. May be cross-listed
with UNG689.

EDUC 690  ADMINISTRATION OF SECONDARY SCHOOLS  3  
Provides an introduction to the function and structure of multimedia applications. Em-
phasis on the development and evaluation of assessment procedures. May be cross-listed
with UNG690.

EDUC 691  SUPERVISION: PURPOSES AND EFFECTS  3  
Provides an introduction to the function and structure of multimedia applications. Em-
phasis on the development and evaluation of assessment procedures. May be cross-listed
with UNG691.
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 assessment, 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 SECONDARY CONTENT AREAS 1-2
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, and evaluating textbook-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 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 methodological 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 INTERN 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 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 placement credit during any semester varies according to the percentage of time spent in internship. May be repeated up to nine credits.

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 EDUC 875, Introduction to Educational Policy.

EDUC 812 REGRESSION MODELS IN EDUCATION 3
The use of regression models in education. Topics include simple and multiple regression, regression models for limited dependent variables and path analysis models.

PREREQ: EDUCB56 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 PSYC845.

RESTRICTIONS: Requires permission of instructor.

EDUC 814 PSYCHOLOGICAL ASSESSMENT OF CHILDREN 3
Intelligence and personality assessment of children. Offers extensive experience in administering and interpreting psychological tests, training in report writing and the development of treatment prescriptions.

RESTRICTIONS: Requires permission of instructor.

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, the Wechsler Intelligence Scale for Children, the Wechsler Adult Intelligence Scale-Revised and the Kaufman Assessment Battery for Children. May be cross-listed with PSYC817.

RESTRICTIONS: Requires permission of instructor.

EDUC 820 CONTEXTS FOR LEARNING 3
Current approaches to cognitive analysis of school subjects. Topics include theory and research in perceptual, 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 school learning. Topics include teacher decision making and effectiveness, classroom processes, instructional methods and design, models for teaching 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 skills. 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 825 PROSEMINAR: SOCIAL AND URBAN POLICY 3
See UAPP 825 for course description.

EDUC 829 RESEARCH ON TEACHING 3
A survey of scientific studies of classroom teaching. Teacher characteristics, teaching methods, learning environments, models of teaching, research methods and results of recent research.

EDUC 830 CONSULTATION AND INTERVENTION 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.

PREREQ: EDUC681.
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.
PREREQ: EDUC663
COREQ: EDUC671 or EDUC669
RESTRICTIONS: Requires permission of instructor.
EDUC 832 Advanced Practicum in School Psychology 3-12
Students will work in school, clinic or community settings under supervision to further develop their applied skills.
RESTRICTIONS: Permission of instructor; enrollment limited to PhD students in School Psychology or closely related field of study.
EDUC 834 Development of Mathematical Thinking 3
Study of how mathematical thinking develops in children. Consideration of major research paradigms and research findings on mathematical thinking in children ages 3-15. Focuses on naturally arising mathematics reasoning abilities and their relationships to school expectations and acquisitions.
EDUC 835 Past and Current Issues in Mathematics Education 3
Identifies and discusses continuing issues in mathematics education. Examines major historical themes that have shaped current theories and research. Analyzes past and current instructional programs.
EDUC 836 Problem Solving in Mathematics 3
Problem solving heuristics as they might be applied to the learning of mathematical concepts. Includes a review of the literature and examination of kindergarten through grade 12. Examines curriculum materials employed to develop productive student problem-solving skills.
EDUC 837 Seminar: Human Development 3
See PSYC804 for course description.
EDUC 840 Research Colloquium in Education 1-3 PF
A detailed analysis of the research currently under way at the University of Delaware and other institutions, including doctoral dissertations, that has application to human learning in an educational environment.
RESTRICTIONS: Open to Ph.D. and advanced master's students.
EDUC 843 Proseminar in Science Education 3
Covers critical issues in curriculum, research on learning and teaching.
RESTRICTIONS: Topics vary. May be repeated for credit.
EDUC 845 Seminar in Social Studies Education 3
The role of school programs in citizenship education. Selected topics may include analysis of the citizenship mission of American education, examination of how American culture is transmitted and evaluated in school programs and changing conceptions of civic education in an increasingly diverse nation.
RESTRICTIONS: May be repeated for credit when topics vary.
EDUC 848 Seminar in Language Development 3
Covers aspects of semantic, syntactic and phonological development through an examination of current research and theory in the field. Treats the educational implications of language development. May be crosslisted with LING848.
EDUC 850 Qualitative Research and Evaluation Designs 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.
PREREQ: EDUC850.
EDUC 856 Introduction to Statistical Inference 3
Quantitative analysis topics include describing univariate and bivariate data distributions, calculating and interpreting summary statistics, the logic of least squares estimation, the rudiments of probability theory, selected probability models and their interrelationships, the logic of null hypothesis testing, interval estimation and selected inferential techniques.
PREREQ: EDUC665 or equivalent.
RESTRICTIONS: Requires admission to doctoral program.
EDUC 860 Curriculum Theory 3
Introduces curriculum theory and the history of curriculum as a field of study. Topics include societal forces influencing curriculum, assumptions underlying curriculum decisions and conflicting views of curriculum.
EDUC 861 Curriculum Development and Evaluation 3
Major curriculum theories and their relationships to planning, improvement and evaluation of school programs. Consideration of strategies for affecting curriculum change.
EDUC 862 Quantitative Issues in Education Research 3
Considers general topics relevant to the quantitative analysis of educational data. Topics include the use of major educational databases, sampling issues, experimental, quasi-experimental and non-experimental designs. Issues of the philosophy and epistemology of quantitative methodology as they pertain to educational research.
PREREQ: EDUC850.
RESTRICTIONS: Requires admission to doctoral program.
EDUC 863 Principles of Educational Evaluation 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.
EDUC 865 Educational Measurement Theory 3
Focuses on both classical and modern test theory including scaling, scoring, reliability, validity, generalizability theory, bias, item analysis, item response theory and equating with applications to norm-referenced and criterion-referenced assessment frameworks.
PREREQ: EDUC665 or equivalent.
EDUC 869 Master's Thesis 1-6
EDUC 871 Topics in Research Methodology 3
Concerns the substantive applications of research and evaluation to education problems and is taught in a rotating manner. Possible topics include history and sociology of testing, visual and graphical display of data, models of educational stratification and problems of educational evaluation.
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: EDUC850 and EDUC865.
EDUC 873 Multilevel Models in Education 3
Designed to introduce students to the method of multilevel modeling. Such modeling is useful for studies of organizations such as schools in which units of observations are nested in other units (e.g., students in schools). Also considers the analysis of growth and change as a special case of multilevel modeling.
PREREQ: EDUC812 and EDUC850, or equivalent.
EDUC 874 Multivariate Data Analysis in Education 3
Topics covered include regression, factor analysis, discriminate analysis and multivariate analysis of variance. Emphasis on applications and the use of computer packages.
PREREQ: EDUC812 and EDUC850.
EDUC 875 Introduction to Educational Policy 3
Survey of the origins, nature and impact of the major state and federal educational policies of the past 20 years. What do officials seek when they frame policies; what happens when innovations take hold; how do we explain the frequent discrepancies between intentions and results?
EDUC 876 Structural Models in Education 3
Concerns the statistical modeling of latent variables arising in educational settings. Topics include model specification, identification, estimation and testing. Considers structural models in single and multiple groups, structural means analysis and structural analysis of categorical and other nonnormal data.
PREREQ: EDUC812, EDUC850 and EDUC874.
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: EDUC679, EDUC680 and EDUC681.
EDUC 879 Internship in Education 3-9
Supervised, on-the-job experience in one specific area of education (i.e., administration, guidance, etc.), in which such internships are required as a part of graduate degree programs.
RESTRICTIONS: Credit during any semester varies according to the time spent in internship.
EDUC 883 Administration of Adult and Continuing Education Programs 3
Considers the administration, design, implementation, and evaluation of programs for postsecondary students in formal and informal training, degree and nondegree programs. Will consider factors influencing the administration and design of programs such as institutional demands.
EDUC 885 Educational Technology Topics 3
Indepth study of a major problem in educational technology.
RESTRICTIONS: May be repeated for credit when topics vary.
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EDUC 888 PUBLIC EDUCATION FINANCE 3
Review of approaches to collecting and distributing local, state, and federal funds for public education. Analysis of issues of funding public education and its economic aspects

RESTRICTIONS: Open only to students in the Ed D. program in Educational Leadership

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 MANAGEMENT APPLICATIONS RESEARCH I 2
Focuses on conceptualizing, writing and designing quantitative decision-oriented studies for education administrators and policymakers

RESTRICTIONS: Open only to students in the Ed D. program in Educational Leadership

EDUC 892 MANAGEMENT APPLICATIONS RESEARCH II 1
Focuses on developing, organizing and analyzing quantitative management-oriented data for education administrators and policymakers

PREREQ: EDUC665, EDUC997

RESTRICTIONS: Open only to students in the Ed D. program in Educational Leadership

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 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 899 ECONOMICS OF EDUCATION 3
Introduces economic analysis as it pertains to educational systems and their impact on economic growth. General economic principles related to specific education issues and problems such as productivity, human capital, effectiveness and funding. Approaches used by economists are presented in evaluating educational activities and their policy impact

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 GRAPHICS AND GENERAL

EGGG 132 ENGINEERING GRAPHICS AND ANALYSIS 2
Fundamental concepts of multiview projection drawing and application of drawing conventions. Includes sectional views, dimensioning, pictorial representation, fastener specifications and drawings for various engineering disciplines. Computer applications include data structure for computer modeling, plotting routines for computer drawing and an introduction to CAD principles

COREQ: MATH241 and a programming language

EGGG 300 DEAN'S SCHOLAR SEMINAR 1 PF
Seminar examines ideas that are not regular course work and that are not closely related to students' disciplines. Topics reflect values that civic and community leaders should know

RESTRICTIONS: Requires an invitation to participate

EGGG 352 MICROCOMPUTER CAD FOR DESIGN AND MODELING 3
Microcomputer methods for development of design concepts. Modeling fundamentals including shading (rendering), hidden lines, unary and binary (Boolean) operations are included

PREREQ: EGGG132

RESTRICTIONS: Requires a moderate proficiency in CAD software. Not open to freshmen

EGGG 392 GRAPHIC SIMULATION AND ANALYSIS 3
Advanced topics in applied descriptive geometry as related to mining, drainage and surveying. Development of nomographs, analysis for empirical functions, graphic Fourier analysis of typical transient disturbances and graphic solutions of ordinary differential equations

PREREQ: MATH302

EGGG 432 PRINCIPLES OF COMPUTER-AIDED DRAWING 3
Concepts of computer graphics as related to CAD systems. Underlying procedure and algorithms for hidden line/surface treatment, animation, rendering and graphics standards. Modeling transformations for projection drawings and definition of curves, surfaces and solids. Emphasis on implementation of concepts through application programming

PREREQ: MATH243 and CIS106

RESTRICTIONS: Requires knowledge of FORTRAN

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 nonmajors 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

RESTRICTIONS: Open to nonmajors

EGTE 105 POWER AND MACHINERY 4
Principles of operation, selection and management of power and machining units used in agricultural crop production

RESTRICTIONS: Open to nonmajors only

EGTE 107 WELDING AND METALS 2
Arc welding, gas welding, soldering, sheet metal layout and fabrication, and properties of metals

RESTRICTIONS: Taught during first half of fall semester

EGTE 108 UTILITIES 2
Domestic water supply and waste disposal, house wiring, heating systems

RESTRICTIONS: Taught during second half of fall semester

EGTE 109 TECHNICAL DRAFTING 2
Basic principles of technical drawing, including sketching, use of drafting equipment, orthographic projection, pictorial drawing and architectural plans

EGTE 111 COMPUTER APPLICATIONS IN ENGINEERING TECHNOLOGY 3
A foundation course in the application of engineering principles and modern technology in agriculture and industry. Emphasis on problem solving and elementary Fortran programming

EGTE 112 PERSONAL COMPUTERS AND TECHNOLOGY 3
Introductory course in 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 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 INTRODUCTION TO HYDRAULICS 4
Fluid properties, fluid statics, pipe flow, distribution systems, pumps, open channel flow, ground-water hydraulics, hydraulics structures. Laboratory includes flow measurements, energy measurements and analysis of data

PREREQ: EGTE111, MATH221 and PHYS201

EGTE 223 SURVEYING 3
See CIEG223 for course description

PREREQ: MATH115, MATH221, or MATH241

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 electromechanical devices

EGTE 306 COST ESTIMATING 2
Building components, bill of materials and cost estimating using cost of materials plus labor system

PREREQ: EGTE112

RESTRICTIONS: Offered only in Winter Session

EGTE 307 BUILDING CONSTRUCTION 1
Practical building experience with emphasis on light frame construction

RESTRICTIONS: Offered only in Winter Session

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**ELECTRICAL ENGINEERING**

**EGTE 309 ADVANCED COMPUTER-AIDED DRAFTING 2**
Advanced topics in AutoCAD, including 3D, perspectives, oblique projections, creation and modification of three dimensional models, 2D toasts from 3D models, rendering and programming in AutoCAD LISP language.
**PREREQ: EGTE209.**

**EGTE 311 FUNDAMENTALS OF THERMODYNAMICS 3**
**PREREQ: EGTE215.**
**COREQ: MATH222 or MATH242.**

**EGTE 321 STORM WATER MANAGEMENT 4**
Hydrology for small (urban/suburban/rural) watersheds. Fundamentals of open channel hydraulics; design of culverts, spillways, vegetated waterways and detention basins.
**PREREQ: EGTE111, EGTE112 and EGTE215.**

**EGTE 328 WASTE MANAGEMENT SYSTEMS 3**
Properties of agricultural, food processing and industrial wastes. Wastewater treatment, sludge management and waste utilization.
**PREREQ: CHEM104, EGTE111 or EGTE112.**

**EGTE 331 MECHANICAL POWER UNITS 4**
**PREREQ: EGTE111, EGTE215 and EGTE311.**

**EGTE 344 ELECTRONICS AND MICROPROCESSORS 3**
Survey course with emphasis on fundamental electronic concepts and devices. A logical progression is made from semiconductors through microprocessors. Topics include diodes, transistors, SCR's, triacs, digital logic, memory systems, lisp maps, shift registers, counters, microprocessors, assembly language programming, A/D conversion and data communications.
**PREREQ: EGTE244.**

**EGTE 346 RURAL AND LIGHT INDUSTRIAL BUILDINGS 4**
Analysis, design, materials and construction of rural and light industrial buildings.
**PREREQ: EGTE111, EGTE112 and EGTE209.**

**EGTE 365 JUNIOR SEMINAR 1**
Invited speakers, faculty presentations, and oral and written reports required on selected topics in agricultural engineering.

**EGTE 366 INDEPENDENT STUDY 1-3**
**PREREQ: EGTE215 or equivalent.**

**EGTE 401 INTRODUCTION TO QUALITY CONTROL 2**
Fundamental of quality and quality control. Topics include Pareto diagrams, matrix analysis, Grier diagrams, Ishikawa, process capability, control charts for variables and attributes, cumulative sum, weighted moving average and exponential weighted moving average.
**PREREQ: MATH201 or equivalent.**

**EGTE 402 QUALITY CONTROL APPLICATIONS 2**
Application of quality and quality control techniques. Topics include lot by lot acceptance, sampling plan systems such as MPS, quality costs, quality software, total quality management, ISO9000, international quality standards and quality exam preparation.
**PREREQ: EGTE401, MATH201 or equivalent.**

**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. Some problems are solved using differential calculous and spreadsheets.
**PREREQ: MATH221 or equivalent, EGTE112.**

**EGTE 417 PROJECT MANAGEMENT 2**
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: EGTE111 or EGTE112.**
**RESTRICTIONS: Only offered in Winter Session.**

**EGTE 421 BIORESOURCES MANAGEMENT SYSTEMS 4**
Water movement in soil/plant/atmosphere continuum. Heat flow in soils, radiant energy in plant environment, ground-water, soil erosion and design of irrigation, drainage and soil erosion control systems.
**PREREQ: EGTE321, PSC204, BISC103.**

**EGTE 431 MECHANICAL ASPECTS OF BIOLOGICAL AND NATURAL RESOURCES 4**
Mechanical properties of biological materials; mechanics of cutting and processing. Mechanics of soil cutting and traction. Design of off-highway equipment for biological and natural resources including machines for plant and soil systems, watershed management, resource conservation and the land application of waste materials.
**PREREQ: MATH243, PHYS207, and either EGTE111 or CISC106.**

**EGTE 435 MACHINERY DESIGN AND DEVELOPMENT 3**
Fundamental requirements and relationships of agricultural machinery components, analysis of forces involved, design of machines and components, and field testing procedures.
**PREREQ: EGTE215, General Physics and EGTE354.**

**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: EGTE111 and EGTE209.**

**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, EGTE244 or EGTE344.**

**EGTE 444 PROGRAMMABLE LOGIC CONTROL SYSTEMS 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: EGTE111, EGTE244 or equivalent.**

**EGTE 445 FOOD ENGINEERING TECHNOLOGY 4**
See FOSC445 for course description.

**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 456 FUNDAMENTALS OF HVAC 3**
Heating, ventilating and air conditioning of rural and light industrial 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: EGTE111, EGTE112, EGTE215 and EGTE311.**

**EGTE 466 INDEPENDENT STUDY 1-3**
**PREREQ: EGTE215 or equivalent.**

**ELECTRICAL ENGINEERING**

**ELEG 101 INTRODUCTION TO ELECTRICAL AND COMPUTER ENGINEERING 1**
Overview of key principles and subject areas which define the electrical and computer engineering degrees.

**ELEG 205 ANALOG CIRCUITS 1 4**
Laws of the electric circuit, analysis of DC and AC circuits, network equations and network theorems.
**PREREQ: MATH242 and PHYS207.**

**ELEG 212 SIGNALS AND COMMUNICATIONS 4**
Introduction to signals, systems and communications. Covers discrete and continuous time systems, sampling, and conversion between analog and digital signals. Sample systems studied may include voice coding, telephony, television and digital audio.
**PREREQ: MATH242, ELEG205.**

**ELEG 240 PHYSICAL ELECTRONICS 4**
Introduction to semiconductor devices, electromagnetic fields and waves, and optics. Covers basic electronic devices including diodes, transistors, lasers, antennas and optical elements.
**PREREQ: MATH243, ELEG205.**

**ELEG 302 INTRODUCTION TO DEVICES AND MATERIALS 3**
Emphasizes concepts and properties of materials important in modern solid state electronics; topics include structure and processing of electrical materials, band structure, carrier concentration and dynamics, junction phenomena and optical and magnetic phenomena.
**PREREQ: MATH243 and PHYS208.**

**ELEG 305 SIGNAL PROCESSING 1 3**
Continuous and discrete time signals and systems at the introductory level. Introduces Z, Laplace and Fourier transforms and uses these to solve difference and differential equations arising from circuit theory and signal processing. Present theory of linear and causal systems.
**PREREQ: ELEG212.**
ELEG 306  SIGNAL PROCESSING II   3
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   4
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   3
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   4
Low-frequency and high-frequency response of RC-coupled amplifiers, Class A tuned
amplifiers, tuned power amplifiers, frequency response and stability of feedback amplifi-
cers, oscillators, modulation and demodulation circuits.
PREREQ: ELEG309.

ELEG 314  ELECTRONICS AND INSTRUMENTATION   4
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 information handling.
PREREQ: PHYS208 and MATH302
RESTRICTIONS: Not for major credit.

ELEG 320  FIELD THEORY I   3
Study of theory and problems in electrostatic and magnetostatic fields. Maxwell's equa-
tions.
PREREQ: PHYS208, MATH342 and ELEG205.

ELEG 340  SOLID STATE ELECTRONICS   3
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   4
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   3
Review of signal theory, Fourier transforms, linear and time-invariant systems; review of
probability and random signals; information theory, source entropy, channel capacity;
baseband data transmission, modulation, noise in analog systems and digital carrier
modulation.
PREREQ: ELEG306.

ELEG 410  SIGNALS AND COMMUNICATIONS DESIGN   4
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.
PREREQ: ELEG306 or ELEG403 or ELEG413.

ELEG 413  FIELD THEORY II   4
Electrodynamics based on Maxwell's equations. Energy storage and flow in electromag-
etric fields. Transmission lines, waves and radiating systems.
PREREQ: ELEG320.

ELEG 418  DIGITAL CONTROL SYSTEMS   3
Study of closed-loop digital control systems. Emphasis is on simulation methods and pole
placement techniques for controller development. Both root locus and input/output pole
placement using the Diophantine equation are used to generate designs. MATLAB is used
for computer aided design

ELEG 419  MULTIMEDIA COMMUNICATIONS   3
The theory and principles of multimedia communications, including data compression,
CD-ROMs, multimedia networking and standards (JPEG, MPEG, H261, H263, RTP, etc.)

ELEG 420  ELECTRONIC CIRCUIT DESIGN   4
Design with and application of operational amplifiers using integrated circuit units. Design
of discrete element clamping and clipping circuits, logic circuits, multivibrators, etc.
Analysis and simulation of digital integrated circuits. Laboratory studies involve extensive
use of analog and digital computers.
PREREQ: ELEG312.

ELEG 423  ELECTRICAL PROPERTIES OF MATTER   3
Provides basic understanding of electronic behavior in materials used for fabricating semi-
iconductor devices. Introduces fundamentals of electron theory; elementary quantum
mechanics (as applied to semiconductors); concept of energy bands; electronic behavior
in crystals; electrical conduction in metals, alloys, semiconductors and insulators; metal-
semiconductor contacts and metallization.
PREREQ: ELEG320 and ELEG340.

ELEG 424  QUANTUM MECHANICS   3
See PHYS424 for course description.

ELEG 428  SYSTEMS ANALYSIS AND CONTROL   3
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
invoking the use of MATLAB are stressed.

ELEG 430  MICROWAVE CIRCUIT DESIGN PRINCIPLES   4
Provides a comprehensive introduction to time and frequency domain integrated circuit
design in the dicesecond/GHz regime. Major design project to complete course.
PREREQ: ELEG312 and ELEG320.

ELEG 433  ENERGY SYSTEMS   3
Study of basic principles underlying systems for distribution and utilization of electric
power. Consideration of load scheduling, polyphase systems, faults and stability, and
power system economics.
PREREQ: ELEG309 and ELEG320.

ELEG 438  THEORY AND DESIGN OF DIFFRACTIVE OPTICS   4
Applications of Fourier analysis to diffraction, imaging optical data processing and holog-
ography. Major design project required.
PREREQ: ELEG305, ELEG306 and ELEG320.

ELEG 440  OPTOELECTRONICS   3
Study of the generation, transformation and applications of coherent optical waves
Introduction to engineering optics. Laser theory; optical wave propagation, modulation
detection; holography; opto-electronic systems and related engineering applications

ELEG 445  OPTICAL COMMUNICATION SYSTEMS   3
Introduces the building blocks for modern optical communication systems, including opti-
cal devices such as lasers, detectors, fiber, lens, etc. and incorporate these devices into
communication systems that exhibit wavelength division multiplexing, parallel data links,
etc.

ELEG 450  SEMICONDUCTOR DEVICE DESIGN AND FABRICATION   4
Instruction in design and fabrication of simple bipolar and MOS integrated circuits.
Specific topics include semiconductor device and integrated circuit design, photolitho-
graphic mask design and fabrication, photolithography, diffusion and implantation, P-
 MOS, metallization and device and integrated circuit testing

ELEG 466  INDEPENDENT STUDY   1-6
ELEG 461  LINEAR SYSTEMS THEORY   3
Reviews the fundamentals of matrix and linear algebra, introduces the ideas around state-
space representations of linear systems and demonstrate application areas in signal pro-
cessing including estimation and control of dynamic systems.

ELEG 462  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 464  FUNDAMENTAL DEVICE PRINCIPLES   3
Introduces fundamental principles of solid state physics upon which subsequent device-
based courses build. Reviews the basic technologies and materials systems which are
technologically important.
PREREQ: ELEG302 and ELEG423 or equivalents and ELEG424.
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 631 Digital Signal Processing 3
Theory of discontinuous 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: ELEG 305

ELEG 633 Image Processing 3
Review of concepts of linear systems and spectral analysis, human visual response, scanning and display of images, Fourier optics, image enhancement and feature extraction, design of digital filters for image processing, 2D fast Fourier transform algorithms and computed tomography. May be cross-listed with MAST 633.
Restrictions: Requires permission of instructor.

ELEG 634 Signals and Systems 3
Reviews basic concepts of discrete and continuous time signals, control systems, and linear algebra. Transforms, sampling, aliasing, linear algebra and systems of equations, matrix factorizations, eigenvalues and eigenvectors, least squares, and the Cayley-Hamilton theorem are studied.
Prereq: ELEG 305 and MATH 342 or MATH 349 or equivalents

ELEG 635 Digital Communication 3
The theory and applications of digital communication including source coding dealing with lossless and lossy compression of data such as images and speech, channel coding dealing with error control techniques to fight noise, and modulation dealing with the efficient transmission of signals over waveform channels.
Restrictions: Familiarity with probability and linear systems required.

ELEG 636 Statistical Signal Processing 3
Classical and modern spectrum estimation.
Prereq: Undergraduate courses in probability and signals and linear systems.

ELEG 638 Theory and Design of Diffractive Optics 4
Applications of fourier analysis to diffraction, imaging, optical data processing and holography. Major design project required.
Prereq: ELEG 305, ELEG 306 and ELEG 320.

ELEG 640 Opto-Electronics 3
Study of the generation, transformation and applications of coherent optical waves. Introduction to engineering optics. Laser theory, optical wave propagation, modulation and detection, holography, opto-electronic systems, and related engineering applications. May be cross-listed with MAST 640.

ELEG 641 Antenna Theory and Design 3
The radiation characteristics of antennas, numerical and analytical antenna analysis methods and design techniques for many types of antenna. Topics include wire antennas, antenna arrays, broadband antennas and microstrip antennas.
Prereq: ELEG 370 or ELEG 413.

ELEG 643 Computational Methods for Electromagnetics 3
Develop and apply numerical techniques for solving Maxwell's equations as they apply to radiation, propagation and scattering problems. Techniques such as the finite-difference time and frequency-domain methods, finite element method, method of moments and the boundary element method will be introduced.

ELEG 645 Optical Communication Systems 3
Introduces the building blocks for modern optical communication systems, including optical devices such as lasers, detectors, fiber, lens, etc. These devices are then incorporated into communication systems that exhibit wavelength division multiplexing, parallel data links, etc.

ELEG 648 Advanced Engineering Electromagnetics 3
Development and application of Maxwell's equations as they apply to the analysis of guided wave, radiation, and scattering problems. Topics include wave propagation, reflection and transmission, vector potentials, transmission lines and antennas, and special emphasis on antennas and scattering structures.

ELEG 650 Semiconductor Device Design and Fabrication 3
Instruction in design and fabrication of simple bipolar and MOS integrated circuits. Specific topics include semiconductor device and integrated circuit design, photolithographic mask design and fabrication, photolithography, N- and P-diffusion and P- and N-type MOS, metallization, and device and integrated circuit testing.
Prereq: ELEG 340.

ELEG 651 Computer Networking Communications 3
Presents basic concepts in computer network analysis and design. Emphasizes generic principles developed over the last two decades in the specification, implementation and evaluation of modern computer networks and networking systems.
Restrictions: Requires undergraduate mathematical maturity, including calculus, analytical geometry and infinite series and courses in operating systems and computer architecture.

ELEG 652 Principles of Parallel Computer Architectures 3
Provides an introduction to the principles of parallel computer architecture. Begins at a level that assumes experience in introductory undergraduate courses such as digital system design, computer architecture, and microprocessor-based systems.

ELEG 653 Computer System Security 3
Surveys current topics in computer network security, including technology to protect networks, protocols and applications from intrusion and theft. Topics include techniques for authentication, privacy, denial of service and non-repudiation.
Prereq: CISC 661 or CISC 660 or permission from the instructor.

ELEG 661 Materials and Devices Seminar 1 PF
Lectures and discussions by faculty and students on specialized topics in materials and devices.

ELEG 662 Digital Systems Seminar 1 PF
Lectures and discussions by faculty and students on specialized topics in digital systems.

ELEG 663 Signal Processing Seminar 1 PF
Lectures and discussions by faculty and students on specialized topics in signal processing and communications.

ELEG 681 Remote Sensing of Environment 3
See MAST 681 for course description.

ELEG 809 Electromagnetic Theory 3
See PHYS 809 for course description.

ELEG 810 Electromagnetic Theory 3
See PHYS 810 for course description.

ELEG 811 Channel Coding Theory and Practice 3
Reviews basic concepts of discrete and continuous time signals, control systems, and linear algebra. Transforms, sampling, aliasing, linear algebra and systems of equations, matrix factorizations, eigenvalues and eigenvectors, least squares, and the Cayley-Hamilton theorem are studied.
Prereq: ELEG 305, ELEG 306 and ELEG 320.

ELEG 832 Wavelets and Filter Banks 3
Provides an introduction to the principles of parallel computer architecture. Begins at a level that assumes experience in introductory undergraduate courses such as digital system design, computer architecture, and microprocessor-based systems.

ELEG 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 3
Introduces the building blocks for modern optical communication systems, including optical devices such as lasers, detectors, fiber, lens, etc. These devices are then incorporated into communication systems that exhibit wavelength division multiplexing, parallel data links, etc.

ELEG 851 Computer Networking Communications 3
Presents basic concepts in computer network analysis and design. Emphasizes generic principles developed over the last two decades in the specification, implementation and evaluation of modern computer networks and networking systems.
Restrictions: Requires undergraduate mathematical maturity, including calculus, analytical geometry and infinite series and courses in operating systems and computer architecture.

ELEG 852 Principles of Parallel Computer Architectures 3
Provides an introduction to the principles of parallel computer architecture. Begins at a level that assumes experience in introductory undergraduate courses such as digital system design, computer architecture, and microprocessor-based systems.

ELEG 853 Integrated Optics 3
Surveys current topics in computer network security, including technology to protect networks, protocols and applications from intrusion and theft. Topics include techniques for authentication, privacy, denial of service and non-repudiation.
Prereq: CISC 661 or CISC 660 or permission from the instructor.

ELEG 861 Remote Sensing of Environment 3
See MAST 681 for course description.

ELEG 862 Digital Systems Seminar 1 PF
Lectures and discussions by faculty and students on specialized topics in digital systems.

ELEG 863 Signal Processing Seminar 1 PF
Lectures and discussions by faculty and students on specialized topics in signal processing and communications.

ELEG 881 Statistical Mechanics and Thermodynamics 3
See PHYS 813 for course description.

ELEG 882 Microwave Devices and Circuits 3
Discusses basic goals, principles and techniques of integrated optics. Topics include optical waveguides, guided wave propagation, high-speed semiconductor lasers and optical detectors. Includes applications of optical integrated circuits.
Prereq: ELEG 630 and ELEG 6340.

ELEG 883 Microwave Devices and Circuits 3
Discusses basic goals, principles and techniques of integrated optics. Topics include optical waveguides, guided wave propagation, high-speed semiconductor lasers and optical detectors. Includes applications of optical integrated circuits.
Prereq: ELEG 630 and ELEG 6340.

ELEG 884 Advanced Computational Electromagnetics 3
Focuses on the development and application of the finite-difference time-domain method to the solution of Maxwell's equations. Applications to guided wave, radiation and scattering problems will be addressed. Topics include sources, absorbing boundaries, propagation, symmetry and multiple coordinate systems.

ELEG 885 Integrated Optics 3
Surveys current topics in computer network security, including technology to protect networks, protocols and applications from intrusion and theft. Topics include techniques for authentication, privacy, denial of service and non-repudiation.
Prereq: CISC 661 or CISC 660 or permission from the instructor.

ELEG 886 Microwave Devices and Circuits 3
Discusses basic goals, principles and techniques of integrated optics. Topics include optical waveguides, guided wave propagation, high-speed semiconductor lasers and optical detectors. Includes applications of optical integrated circuits.
Prereq: ELEG 630 and ELEG 6340.

ELEG 887 Microwave Devices and Circuits 3
Discusses basic goals, principles and techniques of integrated optics. Topics include optical waveguides, guided wave propagation, high-speed semiconductor lasers and optical detectors. Includes applications of optical integrated circuits.
Prereq: ELEG 630 and ELEG 6340.

ELEG 888 Microwave Devices and Circuits 3
Discusses basic goals, principles and techniques of integrated optics. Topics include optical waveguides, guided wave propagation, high-speed semiconductor lasers and optical detectors. Includes applications of optical integrated circuits.
Prereq: ELEG 630 and ELEG 6340.

ELEG 889 Microwave Devices and Circuits 3
Discusses basic goals, principles and techniques of integrated optics. Topics include optical waveguides, guided wave propagation, high-speed semiconductor lasers and optical detectors. Includes applications of optical integrated circuits.
Prereq: ELEG 630 and ELEG 6340.
ENGL 200 Approaches to Literature 3
Dual emphasis on reading and writing. Offers an introduction to poetry, fiction, and drama, and provides for extensive practice in writing about literary subjects.
PREREQ: ENGL110.

ENGL 202 Biblical and Classical Literature 3
Study of Greek, Roman, and Biblical literatures, set in their mythical, historical and cultural contexts, introducing appropriate critical concepts. May be crosslisted with CMLT 202, FLT 202, and/or JWST 202.
PREREQ: ENGL110.
RESTRICTIONS: Not for major credit.

ENGL 204 American Literature 3
Study of representative nineteenth-and twentieth-century works, set in their historical and cultural contexts, introducing appropriate critical concepts.
PREREQ: ENGL110.
RESTRICTIONS: Not for major credit.

ENGL 205 British Literature I 3
Study of representative Medieval and Renaissance British works, set in their historical and cultural contexts, introducing appropriate critical concepts.
PREREQ: ENGL110.

ENGL 206 British Literature II 3
Study of representative eighteenth- through twentieth-century British works, set in their historical and cultural contexts and introducing appropriate critical concepts.
PREREQ: ENGL110.

ENGL 207 Introduction to Poetry 3
Representative masterworks of English, American and world verse.
PREREQ: ENGL110.

ENGL 208 Introduction to Drama 3
Representative masterworks from the classical era to the present. May be crosslisted with CMIT218.
PREREQ: ENGL110.

ENGL 209 Introduction to the Novel 3
Representative masterworks of fiction, emphasizing those of Europe and America. May be crosslisted with CMIT219.
PREREQ: ENGL110.

ENGL 210 Short Story 3
Study of the short story as a narrative form, with readings from American and foreign short story traditions.
PREREQ: ENGL110.
RESTRICTIONS: Not for major credit.

ENGL 211 Great Writers of the Western World I: 1100-1700 3
See CMIT 207 for course description.

ENGL 212 Great Writers of the Western World II: 1650-1950 3
See CMIT 208 for course description.

ENGL 214 Literature and Gender 3
Specific concepts of gender in society, as manifested in the literature of writers of both sexes.
PREREQ: ENGL110.

ENGL 217 Introduction to Film 3
Focuses on different techniques of acting, mise-en-scene, cinematography, editing, sound, color movies used to encourage audiences to respond in the ways they do. May be cross-listed with CMIT217.
PREREQ: ENGL110.

ENGL 260 Humanities Colloquium 3
See ARSC 260 for description.
PREREQ: ENGL110.

ENGL 266 Special Problem 1-3

ENGL 300 Texts and Contexts 3
Examines cultural, historical, and theoretical contexts of a broad range of literary, critical, and non-traditional texts.
PREREQ: ENGL202, ENGL205 and ENGL206.
RESTRICTIONS: Any two of the three Prerequisites acceptable.

ENGL 301 Expository Writing 3
Expository writing, with related studies in grammar, diction and rhetoric.
PREREQ: ENGL110.
RESTRICTIONS: Does not count toward English major.

ENGL 302 Advanced Composition 3
Expository writing in a variety of forms, with emphasis on literary analysis.
PREREQ: ENGL110.

ENGL 304 Poetry Writing 3
Practice in writing a variety of verse forms.
PREREQ: ENGL110.
RESTRICTIONS: Final enrollment set after first class and submission of five poems.

ENGL 305 Fiction Writing 3
Practice in writing the short story.
PREREQ: ENGL110.
RESTRICTIONS: Final enrollment set after first class and submission of a short story.

ENGL 306 Topics in Writing 3
Variable content. Include autobiography, scriptwriting, etc.
PREREQ: ENGL110.
RESTRICTIONS: Final enrollment set after first class and submission of appropriate written sample.

ENGL 307 News Writing and Editing 3
News judgment, news gathering, feature writing, libel problems, and ethics. Assignments include writing for the campus newspaper.
PREREQ: ENGL110.
RESTRICTIONS: Minimum grade of B required in ENGL110. Counts toward English major only as part of journalism concentration.

ENGL 308 Reporter's Practicum 3
Builds on ENGL307 with extensive reporting and writing for the campus newspaper. Attention to libel and privacy issues.
PREREQ: ENGL307.
RESTRICTIONS: Counts toward English major only as part of journalism concentration.

ENGL 309 Feature and Magazine Writing 3
All aspects of the newspaper and feature article. Developing ideas, researching, interviewing, writing, and selling.
PREREQ: ENGL307.
RESTRICTIONS: Counts toward English major only as part of journalism concentration.

ENGL 310 Copy Editing and Layout 3
Newspaper copy editing, headline writing and layout, with emphasis on practical experience. Explores improvement or updating of news stories by rewriting.
PREREQ: ENGL307.
RESTRICTIONS: Counts toward English major only as part of journalism concentration.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<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. Students write memos, letters, proposals and reports that simulate on-the-job communication tasks, and are encouraged to use materials from their fields of specialization. PREREQ: ENGL110. RESTRICTIONS: Counts toward English major only as part of the concentration in business and technical writing.</td>
</tr>
<tr>
<td>ENGL 314</td>
<td>Introduction to Folklore and Folklife</td>
<td>3</td>
<td>Traditional forms of folklore with emphasis on modern folklore as it functions in contemporary societies. May be crosslisted with CMLT314. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 316</td>
<td>Peer Tutoring/Advanced Composition</td>
<td>3</td>
<td>See ARSC316 for course description.</td>
</tr>
<tr>
<td>ENGL 317</td>
<td>Film History</td>
<td>3</td>
<td>History of American or various foreign national cinemas. May be cross-listed with CMLT517. PREREQ: ENGL110. RESTRICTIONS: May be repeated for credit when topics vary.</td>
</tr>
<tr>
<td>ENGL 318</td>
<td>Studies in Film</td>
<td>3</td>
<td>Special topics such as film genres, major directors and Soviet cinema. May be cross-listed with CMLT318, JWST318, and/or WOMS318. PREREQ: ENGL110. RESTRICTIONS: May be repeated for credit when topics vary.</td>
</tr>
<tr>
<td>ENGL 320</td>
<td>The Bible as Literature</td>
<td>3</td>
<td>Studies the cultural contexts, narrative strategies, poetic forms, and literary archetypes of the Hebrew and Christian scriptures. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 321</td>
<td>Medieval Literature and Culture</td>
<td>3</td>
<td>Study of selected topics in medieval literature (romance, Chaucer’s contemporaries, drama). Texts usually read in English translations. Emphasis on medieval culture as a European phenomenon. Variable content. May be cross-listed with CMLT321. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 322</td>
<td>Chaucer</td>
<td>3</td>
<td>The Canterbury Tales (in part), Troilus and Criseyde, and some of the shorter poems. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 324</td>
<td>Shakespeare</td>
<td>3</td>
<td>Representative histories, comedies and tragedies. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 325</td>
<td>Renaissance Literature</td>
<td>3</td>
<td>Survey of varied literature written in English during the sixteenth and seventeenth centuries, from the age of the Reformation through the English Civil Wars. For example, selected works of Wyatt, Sidney, Spenser, Marlowe, Shakespeare, Jonson, Webster, Herbert, Vaughan, Marvell and Milton. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 328</td>
<td>Milton</td>
<td>3</td>
<td>Milton’s major poetry and selected prose. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 330</td>
<td>The Detective in Film and Fiction</td>
<td>3</td>
<td>See CRJ535. PREREQ: CRJ201.</td>
</tr>
<tr>
<td>ENGL 331</td>
<td>The Age of Satire</td>
<td>3</td>
<td>Dryden, Pope, Swift and their contemporaries. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 332</td>
<td>Studies in Restoration and Eighteenth-Century Literature</td>
<td>3</td>
<td>Studies of selected topics in Restoration and eighteenth-century literature and culture, e.g., the epistolary novel, Restoration and eighteenth-century drama and women in eighteenth-century literature. PREREQ: ENGL110. RESTRICTIONS: May be repeated for credit when topics vary.</td>
</tr>
<tr>
<td>ENGL 333</td>
<td>The Early Romantics</td>
<td>3</td>
<td>Poetry and prose of Blake, Coleridge, Wordsworth, and their associates. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 334</td>
<td>The Later Romantics</td>
<td>3</td>
<td>Poetry and prose of Byron, Shelley, Keats and their associates. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 335</td>
<td>Victorian Poetry</td>
<td>3</td>
<td>Tennyson, the Brownings, Arnold, Bronte, and their contemporaries. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 337</td>
<td>Victorian Prose</td>
<td>3</td>
<td>Carlyle, Ruskin, Arnold and their contemporaries. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 338</td>
<td>Victorian Fiction</td>
<td>3</td>
<td>Authors may include Dickens, the Brontes, Eliot, Hardy and their contemporaries. May be cross-listed with WOMS337. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 340</td>
<td>American Literature to the Civil War</td>
<td>3</td>
<td>PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 341</td>
<td>American Literature: Civil War to World War II</td>
<td>3</td>
<td>PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 342</td>
<td>American Literature Since World War II</td>
<td>3</td>
<td>PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 344</td>
<td>African American Literature I</td>
<td>3</td>
<td>Literature by African American writers from the eighteenth century to the Harlem Renaissance. May be cross-listed with BAMS313. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 345</td>
<td>African American Literature II</td>
<td>3</td>
<td>Literature by African American writers from the Harlem Renaissance to the present. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 347</td>
<td>Studies in American Literature</td>
<td>3</td>
<td>Special topics, ranging from the beginnings to contemporary American literature; may include studies in a single author or authors (e.g., the detective stories of Poe) or period and genre studies (e.g., the Harlem Renaissance or the humor of the old southwest). Variable content. RESTRICTIONS: May be repeated once for credit when topics vary.</td>
</tr>
<tr>
<td>ENGL 348</td>
<td>Contemporary Jewish-American Literature</td>
<td>3</td>
<td>Lectures and discussions of outstanding contemporary Jewish American novelists, short story writers, and others. May be cross-listed with JWST348. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 349</td>
<td>Introduction to Jewish Sources: Text and Interpretation</td>
<td>3</td>
<td>Examines the central texts which form the basis of Jewish thought, religion and culture—the Torah, or Hebrew Bible (in translation) and the interpretive traditions which have evolved to understand it (e.g., Midrash, Rashi, contemporary theology) as sources of uniquely Jewish meanings. May be cross-listed with JWST349.</td>
</tr>
<tr>
<td>ENGL 351</td>
<td>Introduction to Irish Literature</td>
<td>3</td>
<td>Survey emphasizing modern and contemporary writers of various genres such as Yeats, Synge, Joyce, Beckett, Heaney and Boland. Critical reading set in mythic, historic and cultural contexts. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 352</td>
<td>Studies in Nineteenth-Century Literature</td>
<td>3</td>
<td>Special topics in an author or authors, a genre, literary movement, or an idea. May be cross-listed with WOMS352. PREREQ: ENGL110. RESTRICTIONS: May be repeated once for credit when topics vary.</td>
</tr>
<tr>
<td>ENGL 353</td>
<td>Twentieth Century British Literature</td>
<td>3</td>
<td>Broadly focused study of literature in several genres, including a variety of eras and movements such as turn-of-the-century realism, war poetry, modernism, and post-colonial writing. May be cross-listed with WOMS353. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 355</td>
<td>King Arthur in Literature</td>
<td>3</td>
<td>Study of the historical background and literary treatments of Arthurian characters and themes in English literature. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 356</td>
<td>Studies in Modern/Contemporary Literature</td>
<td>3</td>
<td>Study of selected topics in 20th Century British, American and world literature, e.g., the contemporary epic novel, post-colonial writing and politics. PREREQ: ENGL110. RESTRICTIONS: May be repeated once for credit when topics vary.</td>
</tr>
</tbody>
</table>
ENGL 357 LITERATURE OF LONDON  3
The interaction between London and a variety of literary works
RESTRICTIONS: Offered only through the Semester in London Program

ENGL 358 LINGUISTICS AND LANGUAGE ARTS  3
See EDUC358 for course description

ENGL 361 LITERARY CRITICISM AND THEORY  3
Study of problems in textual interpretation and aesthetics from the ancient world through
the present, with attention to both the principal movements in critical theory and the
social and philosophical contexts of interpretation. May be cross-listed with CMLT361.
PREREQ: ENGL110

ENGL 365 STUDIES IN LITERARY GENRES, TYPES AND MOVEMENTS  3
Particular areas or writers to be announced. May be cross-listed with CMLT365 and/or
CSCC365.
PREREQ: ENGL110

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
and history of science and theory and history of literature and the analysis of individual
scientific and literary texts. May be cross-listed with CSCC368.
PREREQ: ENGL110.

ENGL 369 LITERATURE AND MEDICINE  3
See CSCC369 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: ENGL110
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: ENGL110
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: ENGL110
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: ENGL202, ENGL205, ENGL206, ENGL324.
RESTRICTIONS: Requires permission of instructor. 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 women's
tradition, formation of the canon, use of gender, language, and form. May be cross-listed
with JWST380 and/or WOMS380
PREREQ: ENGL110

ENGL 381 WOMEN IN LITERATURE  3
Cultural representations of women by male as well as female writers. Variable in histori-
cal range, geography, and genre. May be cross-listed with WOMS381
PREREQ: ENGL110

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 JWST382 and/or WOMS382.
PREREQ: ENGL110
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
CMLT385.
PREREQ: ENGL110
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 lin-
guistic approaches. May be cross-listed with LING390.

ENGL 391 HONORS COLLOQUIUM  3
See ARSC390 for description. May be cross-listed with JWST390 and/or MUSC390.
PREREQ: ENGL110

ENGL 404 ADVANCED POETRY WRITING  3
Intensive practice in composition. Group discussion and individual conferences. Wide ref-
erence to professional poems as well as models. Emphasis on student competence in tra-
ditional prosody as well as exploring free forms
PREREQ: ENGL304
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: ENGL305
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: ENGL307
RESTRICTIONS: Maximum of three credits for any registration with no more than six cred-
its toward graduation. Counts toward English major only as part of the journalism con-
centration.

ENGL 408 SPORTS WRITING  3
Training and covering all major sports including women's and men's sports. Topics
include keeping statistics, game coverage, player profiles, and sports columns.
PREREQ: ENGL307

ENGL 409 TOPICS IN JOURNALISM  3
Special studies and writing in selected kinds of journalism (opinion writing, science jour-
nalism) or in an aspect of the profession (history of American journalism, ethics of jour-
nalism). Variable content
PREREQ: ENGL110
RESTRICTIONS: May be repeated once for credit when topics vary. Counts toward
English major only as part of the journalism concentration.

ENGL 410 TECHNICAL WRITING  3
Selected problems in technical communications, the preparation of reports and technical
editing.
PREREQ: ENGL110
RESTRICTIONS: Counts toward English major only as part of the concentration in business
and technical writing

ENGL 411 RHETORIC FOR BUSINESS AND TECHNICAL WRITERS  3
Study of rhetorical theories and strategies within the context of business and technical
skills.
PREREQ: ENGL312, ENGL410, or ENGL415
RESTRICTIONS: Counts toward English major only as part of the concentration in business
and technical writing

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 pro-
posals, formal reports, brochures and newsletters.
PREREQ: ENGL411.
RESTRICTIONS: Counts toward English major only as part of the concentration in business
and technical writing

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 com-
munication profession (e.g., ethics of business and technical communication)
PREREQ: ENGL312, ENGL410, or ENGL415.
RESTRICTIONS: Counts toward English major only as part of the concentration in business
and technical writing. May be repeated for credit when topics vary.

ENGL 414 TECHNICAL EDITING  3
Practical work and study of the editorial procedures essential in editing technical publi-
cations and documentation.
PREREQ: ENGL312, ENGL410, or ENGL415.

ENGL 415 WRITING IN THE PROFESSIONS  3
Designed to improve the communications skills of students aiming toward careers in any
of the professions
PREREQ: ENGL110
RESTRICTIONS: Counts toward English major only as part of the concentration in business
and technical writing

ENGL 417 FILM THEORY AND CRITICISM  3
Survey of major theories of film.
PREREQ: ENGL217
RESTRICTIONS: For film concentrators and advanced film students.
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: ENGL411 and ENGL412
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 CMLT465 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 EDUC477 for course description.

ENGL 480 SEMINAR 3
Intensive capstone program in creative writing or study of some aspect of literature, be it a critical problem (e.g., reader response criticism), a movement (e.g., experimental American literature), a single author (e.g., John Keats), a group of authors (e.g., Fitzgerald, Hemingway, Steinbeck), or a genre (e.g., autobiography). Stresses critical writing and literary research. May be cross-listed with 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 ENGL 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 and graduate students.

ENGL 483 SEMINAR IN TEACHING ENGL II 3
Prepares English education Seniors and graduate students to teach adolescent literature, classic literature and non-print literary expression at the secondary school level.
COREQ: ENGL482/682.
RESTRICTIONS: Enrollment limited to English education Seniors and graduate students.

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 given 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
Wide reference to professional poems as models. Emphasis on student competence in traditional prosody as well as exploring freer forms.

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., orthography and literacy, epic and romance, genres).
RESTRICTIONS: For graduate students with little or no medieval literature and culture background.

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 conundrums 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 the Romantic and/or Victorian literature.
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 636 TWENTIETH-CENTURY LITERATURE 3
Broadly focused to include multiple genres and/or movements (e.g., turn-of-the-century realism, war poets, modernism, postmodern drama) from before and after World War II. May include American, European and post-colonial, in addition to British literature.

ENGL 639 STUDIES IN MODERN/CONTEMPORARY LITERATURE 3
Study of selected poetry, prose, and drama of the twentieth century, with an emphasis on the major texts of English and American literature during the period. Some attention given to other literary traditions and writings.
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 641 AMERICAN LITERATURE: PERIOD STUDIES 3
Historical survey of American literature of the Colonial Romantic period or the Realist 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 in 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 in 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 EDUC677 for course description.

ENGL 680 SEMINAR 3

ENGL 682 SEMINAR IN TEACHING ENGL 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 ENGL 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 antecedents.
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 685 CULTURAL THEORY AND CRITICISM 3
A topical introduction to cultural theory, emphasizing in different terms such varied topics as semiotics, deconstructionism, feminism, post-colonial and third-world studies, and problems of representation and signification in literary and non-literary texts.
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 688 TEACHING COMPOSITION 3
Study of current composition theory, with emphasis on the relationship between theory and classroom practices.

ENGL 694 HISTORY OF THE ENGLISH LANGUAGE 3
Development of Modern English, with emphasis on changes in sounds, inflections, spelling, and vocabulary. Attention also given to usage, dialects, attitudes toward language, and cultural history.

ENGL 802 STUDIES IN OLD AND MIDDLE ENGLISH 3
A study of the English language either from before 1100 or between 1100 and 1400
with selected readings in Old or Middle English Poetry and prose
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 804 STUDIES IN MEDIEVAL LITERATURE AND CULTURE 3
Intensive study of literature and language in Old English or Middle English, with attention
in history and culture. Recent course titles: Chaucer, Beowulf, The Gower/Foot, The Age
of Longfellow, The Romance
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 806 STUDIES IN RENAISSANCE LITERATURE 3
Focus on one or two authors (e.g., Shakespeare or Spenser), genres (e.g., narrative verse
and prose, the lyric, drama) or specific periods (Elizabethan, Jacobean, the Civil War)

ENGL 815 STUDIES IN SEVENTEENTH-CENTURY LITERATURE 3
Research seminars on writers (Donne and Jonson; Bacon, Browne, Hobbes, and Locke;
the Fletchers, Cowley, and Milton); genres (classical, metataphorical, and neo-classical
poetry; Jacobean, Caroline, and Restoration drama); or topics and themes (empiricism;
skepticism; gender and society; literature of the civil wars, puritan culture)
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 820 STUDIES IN EIGHTEENTH-CENTURY LITERATURE 3
Variable content: Possible course topics include: The Restoration Theatre; English Neo-classicism;
The Rise of the Novel; individual writers or groups of writers; applications of theory

ENGL 830 STUDIES IN NINETEENTH-CENTURY LITERATURE 3
Seminar in Romantic and/or Victorian literature with emphasis on selected writers, gen-
res, and/or topics. Possible course topics: women and nature poetry; Dickens; religious
questions; the provincial novel

ENGL 840 STUDIES IN TWENTIETH-CENTURY LITERATURE 3
Variable content: Concentrated study of an aspect of Twentieth-Century British, European,
American and/or post-colonial literatures. Possible courses: a genre, a set of writers, cul-
tural issues (e.g., gender, race, the Holocaust, aesthetics vs. politics)

ENGL 844 SEMINAR: SPECIAL TOPICS IN AMERICAN LITERATURE 3
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 846 SEMINAR: SPECIAL TOPICS IN ENGLISH LITERATURE 3
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 848 SPECIAL TOPICS IN COMPARATIVE LITERATURE 3
Variable content: Possible course topics include: Existential literature, The Avant-Garde,
and Literature and Aesthetics
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 850 STUDIES IN COLONIAL AMERICAN LITERATURE 3
Topics may include New England Puritanism, Southern Colonial literature, and Major
Early American Authors
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 852 SEMINAR: AMERICAN REALISM AND NATURALISM 3
Classic works by Clemens, James, Crane, Chopin, Dreiser, Stein, and Wharton, with focus
on the practice of theory and aesthetic assumptions of current criticism and on labels for the period (Realism, Naturalism) as formulations from specific literary texts
(including some expurgated texts)
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 853 MODERN/POSTMODERN AMERICAN LITERATURE 3
Modern American Novelists (Fitzgerald, Hemingway, Faulkner); modern and postmodern
American novelists (Fitzgerald, Hemingway, Faulkner); modernism; modernity; poetry
(Pound, Eliot, Stevens); Drama of the Absurd
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 868 RESEARCH 3

ENGL 869 MASTER'S THESIS 1-6

ENGL 884 STUDIES IN LITERARY AND CULTURAL THEORY 3
Close examination of a single topic or a closely related group of topics (e.g., psycho-
analysis and interpretation, genre theory, literary historiography, feminist critique) in tex-
tual study
PREREQ: ENGL884 or 685.
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 890 STUDIES IN LINGUISTICS 3
See LING890 for course description.

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

ENGL 969 DOCTORAL DISSERTATION 1-12 PF
ENTO 344 FOCUS ON INSECT COLLECTIONS
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0305

ENTO 347 INSECT IDENTIFICATION - TAXONOMY
Lecture and laboratory course in the collection, preservation and classification of common insect families.
PREREQ: ENT0305

ENTO 348 INSECT PHYSIOLOGY
Comparative functional anatomy and evolution of arthropods, especially the Insecta. Emphasis on structures and their functions as adaptive responses to selective pressures. Laboratory dissections emphasizing anatomical variation within external and internal systems.
PREREQ: ENT0406.

ENTO 349 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.
COREQ: ENT0406.

ENTO 350 INSECT IDENTIFICATION - TAXONOMY
Introduction to the ecological relationships among arthropod disease vectors, the diseases they transmit and arthropods as human parasites. Interactions of vectors and arthropod parasites, host responses to these organisms and environmental mechanisms that foster vector/disease relationships.
PREREQ: BISC208

ENTO 351 INSECT PEST MANAGEMENT
Principles of Managing insect populations to reduce losses caused by insects attacking our food, fiber, buildings,-domestic animals and human populations in an environmentally compatible manner. Diagnostic recognition, control and habits of major pest species.
PREREQ: ENT0205.

ENTO 352 WILDLIFE RESEARCH TECHNIQUES
Research design, field sampling techniques, data analysis and interpretation and preparation of publication quality manuscripts.
PREREQ: ENT0325; PREC048 or STAT200; and two courses from ENTO318, ENTO418, ENTO424 or ENTO425.
COREQ: PSC212 or PSC402 or ENT0344.
RESTRICTIONS: Open only to Seniors.

ENTO 353 INSECT IDENTIFICATION - TAXONOMY
Birds as adaptive complexes. Anatomy, physiology and behavior associated with feeding, thermoregulation, flight, migration, communication and reproduction. An abnormal distribution of insects within an environment.
PREREQ: BSC208.
RESTRICTIONS: Requires Junior status.

ENTO 354 HERPETOLOGY
Introduction to the biology and ecology of reptiles and amphibians. Evolution, feeding behavior, life history, reproduction, physiology, population structure and dynamics, migration and movements, and conservation.
PREREQ: BSC302.
RESTRICTIONS: Requires Junior status.

ENTO 355 MAMMALOGY
PREREQ: BSC208.
RESTRICTIONS: Requires Junior status.

ENTO 356 AQUATIC INSECTS
Biology and systematics of aquatic insects with emphasis on the fauna of North America. Collection of immature aquatic insects required.
PREREQ: ENT0305.
RESTRICTIONS: Requires Junior status.

ENTO 357 INSECT IDENTIFICATION - TAXONOMY
An introduction to the principles of close-up and ultra-close-up photography of natural history subjects, including insects, with emphasis on the use of macro lenses and electronic flash systems for biological photography. Field and indoor techniques. In-class analysis of student slides.
PREREQ: BISC208.
RESTRICTIONS: Requires permission of instructor.

ENTO 358 INTEGRATED PEST AND DISEASE MANAGEMENT
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 BSC440.
PREREQ: ENT0205 and PSC303.

ENTO 359 CONSERVATION OF TROPICAL BIODIVERSITY
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.
RESTRICTIONS: Winter Session only. Taught in Costa Rica or Peru.

ENTO 360 INSECT FIELD TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 361 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 362 INSECT PHYSIOLOGY
Comparative functional anatomy and evolution of arthropods, especially Insecta. Emphasis on structures and their functions as adaptive responses to selective pressures. Laboratory dissections emphasizing anatomical variation within external and internal systems.
PREREQ: ENT0406.

ENTO 363 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 364 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 365 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 366 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 367 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 368 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 369 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 370 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 371 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 372 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 373 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 374 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 375 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 376 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 377 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 378 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 379 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 380 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 381 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 382 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 383 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 384 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 385 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 386 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 387 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 388 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 389 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 390 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 391 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 392 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 393 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 394 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 395 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.

ENTO 396 INSECT IDENTIFICATION - TAXONOMY
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0406.
ENTO 611 INSECT PEST MANAGEMENT 3
Principles of managing insect populations to reduce losses caused by insects attacking our food, fiber, buildings, domestic animals and human population in an environmentally compatible manner. Diagnostic recognition, control and habits of major pest species.
PREREQ: ENTO205

ENTO 614 INSECT ECOLOGY 3
The interaction of insects with their environment as it influences their distribution, abundance, life history and evolution. Emphasis on primary research literature
PREREQ: BISC208 and ENTO205, or BISC437

ENTO 615 WETLAND RESEARCH TECHNIQUES 3
Research design, field sampling techniques, data analysis and interpretation and preparation of publication quality manuscripts. Class and individually designed field projects will focus on regional wetlands and their habitats.
PREREQ: ENTO205; PREC408 or STAT200, and two courses from ENTO318, ENTO347, ENTO424, or ENTO429.
COREQ: PLS212 or PLS402 or ENTO344
RESTRICTIONS: Open to graduate students only or by permission of instructor

ENTO 617 FIELD NATURAL HISTORY 1-3
An extended field trip or several shorter trips to natural and managed areas. Emphasis on identification and observation of biota, field notes, knowledge of natural habitats, ecological processes and wildlife conservation issues and practices. Individual projects.
RESTRICTIONS: Requires junior status and consent of instructor. Credit depends on extent of travel; maximum of three credits allowed toward major.

ENTO 618 AVIAN BIOLOGY 3
Birds as adaptive complexes. Anatomy, physiology and behavior associated with feeding, thermoregulation, flight, migration, communication and reproduction.
PREREQ: BISC208

ENTO 619 PRINCIPLES OF BIOLOGICAL CONTROL OF INSECTS 3
Historical, ecological and biological bases of biological control of pest insects and weeds. Procedures and techniques (e.g., foreign exploration) and related aspects (e.g., insect pathology and insect resistance in crop plants).
PREREQ: ENTO305

ENTO 620 BEHAVIORAL ECOLOGY 3
Theoretical treatment of the factors that have dominated the evolution of animal behavior; hypothesis testing emphasized.
PREREQ: BISC302 and ENTO406 or ENTO606

ENTO 622 TOXICOLOGY OF INSECTICIDES 3
Principles of insecticide toxicology. Classification, biochemical and physiological bases of toxic action, animal and plant metabolism, and environmental dynamics of insecticides.
PREREQ: CHEM213

ENTO 624 HERPETOLOGY 3
Introduction to the biology and ecology of reptiles and amphibians. Evolution, feeding behavior, life history, reproduction, physiology, population structure and dynamics, migration and movements, and conservation.
PREREQ: BISC302

ENTO 625 MAMMALLOGY 3
PREREQ: BISC208
RESTRICTIONS: Open to graduate students only or by permission of instructor

ENTO 626 AQUATIC INSECTS 3
Biology and systematics of aquatic insects with emphasis on the fauna of North America. Collection of immature aquatic insects required.
PREREQ: ENTO305
RESTRICTIONS: Requires junior status.

ENTO 630 CLOSE-UP NATURE PHOTOGRAPHY 3
Introduction to the principles of close-up and ultra close-up photography of natural history subjects. Lens and electronic flash systems for biological photography, plus field and indoor techniques. In-class analysis of student slides.
RESTRICTIONS: Requires permission of instructor.

ENTO 640 INTEGRATED PEST AND DISEASE MANAGEMENT 3
Introduction to the theory and practice of integrated pest management (IPM), especially as it applies to insects and plant pathogens. Integration of cultural, biological, host resistance and other management strategies to achieve control in an economically and environmentally sound manner. May be crosslisted with PLSC440.
PREREQ: ENTO205 and PLSC303

ENTO 655 CONSERVATION GENETICS 3
Principles of genetics applied to the conservation 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

ENTO 688 RESEARCH 1-9

ENTO 689 MASTER'S THESIS 1-6

FINANCE

FINC 200 FUNDAMENTALS OF FINANCE 3
Provides non-business majors with an overview of the role of finance within a business organization. Topics include financial statement analysis, time value of money, capital budgeting, valuation and the cost of capital.
RESTRICTIONS: Not open to business administration, finance or accounting degree candidates.

FINC 307 FINANCIAL MANAGEMENT 3
RESTRICTIONS: Not open to business administration, finance or accounting degree candidates.

FINC 311 PRINCIPLES OF FINANCE 3
Management technique and information related to the financial function of business firms. An analysis of the role of the financial manager within a business organization. Emphasizes the understanding of material covered in FINC311 through the application of analytical methods and the effective usage of information technology in a contemporary financial environment.
PREREQ: FINC211.
RESTRICTIONS: Requires a grade of C- or better in ACCT208

FINC 313 FINANCIAL MARKETS 3
Management technique and information related to the financial function of business firms. An analysis of the domestic and international financial markets. Characteristics of the market makers are examined, e.g., investment bankers, brokers, dealers. This analysis includes the description of the financial instruments that are used in money and capital markets and their relevant risk, liquidity and risk-return trade-offs.
PREREQ: FINC211.
RESTRICTIONS: Requires a grade of C- or better in FINC311

FINC 407 SECURITIES ANALYSIS 3
Introduction to security analysis and the establishment of investment standards and policies.
PREREQ: FINC313

FINC 412 FINANCIAL INSTITUTIONS 3
An analysis of the domestic and international financial markets. Characteristics of the market makers are examined, e.g., investment bankers, brokers, dealers. This analysis includes the description of the financial instruments that are used in money and capital markets and their relevant risk, liquidity and risk-return trade-offs.
PREREQ: FINC313 and ECON302.
FLLT 101 ESSENTIAL FOREIGN LANGUAGE: LANGUAGE 1 PF
Basic, practical vocabulary and idiomatic expressions for beginners in the Foreign Language (e.g. French, Spanish, Chinese, Bulgarian, Hungarian, 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.

FLLT 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.

FLLT 106 MODERN LANGUAGE II - ELEMENTARY/INTERMEDIATE
Completion of the basic modern language. Increasing mastery of the basic skills (speaking, listening, reading and writing).

PREREQ: FLLT105

FLLT 202 BIBLICAL AND CLASSICAL LITERATURE 3
See ENGL202 for course description.

FLLT 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 CMT316.

RESTRICTIONS: Open to first-year students.

FLLT 320 VARYING AUTHORS AND GENRES 3
Cultural, especially cross-cultural and/or interdisciplinary studies with primary emphasis on the aesthetic context of the announced topic, e.g., Nordic Saga and Myth; Courtly Love; and the European Postwar Novel. May be cross-listed with FLLT320 and/or WOMS320.

RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 322 TOPICS: CLASSICAL LITERATURE IN TRANSLATION 3
Special topics in Greek and Roman culture and civilization. Particular areas and writers to be announced, e.g., ancient epic, ancient drama, Greek literature in translation. May be cross-listed with CMT322 and/or WOMS322.

RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 324 TOPICS: FRENCH LITERATURE IN TRANSLATION 3
Study of the works of one or more outstanding authors or of a special theme. Course taught in English. Topics vary and are announced in registration booklet.

RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 326 TOPICS: HISPANIC LITERATURE IN TRANSLATION 3
Study of the works of one or more outstanding authors or of a special theme. Course taught in English. Topics vary and are announced in registration booklet.

RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 327 TOPICS: RUSSIAN LITERATURE IN TRANSLATION 3
Study of the works of one or more outstanding authors or of a special theme. Course taught in English. Topics vary and are announced in registration booklet.

RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 328 TOPICS: JAPANESE LITERATURE IN TRANSLATION 3
Study of the works of one or more outstanding authors or of a special theme. Course taught in English. Topics vary and are announced in registration booklet.

RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 329 TOPICS: ITALIAN LITERATURE IN TRANSLATION 3
Study of the works of one or more outstanding authors or of a special theme. Course taught in Italian. Topics vary and are announced in registration booklet.

RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 330 VARYING AUTHORS, THEMES AND MOVEMENTS 3
Cultural, especially cross-cultural, study with primary emphasis on the historical development of the announced area, e.g., The Faust Theme in Western Literature, Dante Through the Ages, Don Juan, and the Transformation of a Myth. Topics vary and are announced in registration booklet.

May be cross-listed with CMT330, CSCC330, and/or WOMS330.

RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 338 LIGHT AND SHADOW—JAPANESE FILMS 3
Study of Japanese films from the immediate postwar period to the present. Both aesthetic and technical elements of film production and reception featured. Discussion intensive.

FLLT 366 INDEPENDENT STUDY 1-6

FLLT 375 TOPICS: RUSSIAN AND SOVIET CULTURE IN TRANSLATION 3
Special topics in Russian and Soviet culture. Course taught in English. Topics vary and are announced in registration booklet.

May be cross-listed with WOMS375.

RESTRICTIONS: May be repeated for credit when topics vary.
FOOD SCIENCE

FOSC 102 Food for Thought 3
Overview of popular aspects of foods and beverages. Topics to include: food composition; how our foods are produced, processed, packaged and stored; factors directing product development and the marketing of new foods; environmental and social issues involved in food production and current controversies surrounding the food we eat.

FOSC 166 Special Problem 1-3

FOSC 265 Seminar on Food Science 1
Overview of world food 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: NTD1201, NTD1211 and CHEM123

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 ANSC326.
PREREQ: CHEM213 or CHEM221 or CHEM214.

FOSC 329 Food Analysis 4
Critically analyses food analysis methods and data from journal articles and reports including official AOAC and AACC methods. Develop food label for your favorite food using above techniques; prepare scientific reports and presentations. Introduction to instrumentation, spectroscopy, chromatography, enzyme assays. May be crosslisted with ANSC329.
PREREQ: CHEM214/216 or CHEM527.

FOSC 359 Topics in Food Science 1-3
Bridges prerequisite science courses and applications in food science. Utilization of fundamental sciences linked with food applications of the scientific method will be stressed. Demonstrates basic concepts used to quantitatively solve everyday problems in the food industry. Uses mathematical principles as tools for problem solving. Develops awareness of the intimate relationship between mathematical principles and physical phenomenon.
PREREQ: Math221 and Math222 or Math241 and Math242.

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 stability 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 learn-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 foods spoilage, preservation, fermentation, sanitation, and poisoning. Current methodology used in the microbiological examination of foodstuffs.
PREREQ: BISC300.

FOSC 445 Food Engineering Technology 4
Engineering fundamental for processing of food materials, including applied thermodynamics and heat transfer principles and operations. May be crosslisted with ENGE445.
RESTRICTIONS: Not open to majors in mechanical or chemical engineering.

FOSC 449 Food Biotechnology 4
Processes used in industrial fermentations and biotechnology: essential biochemical background of commercial microorganisms, use and genetics of starter cultures, design and control of fermenter systems, kinetics of growth and product recovery. Biotechnological production of alcohols and alcoholic beverages, organic acids, cultured dairy, vegetable and meat products, enzymes, vitamins and therapeutic compounds.
PREREQ: BISC300 or FOSC439.

FOSC 459 Topics in Food Science 3
In-depth studies on specific aspects of current food science research and application.

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 courses.

FOSC 466 Independent Study 1-6
RESTRICTIONS: Contract must have department chair signature. Independent study to involve library or lab research.
FOOD AND RESOURCE ECONOMICS

FOSC 609 Food Processing 4
Rationale and history of food processing; organizing unit operations; maintenance of food quality including food safety and nutritive value; separation technology includ-
ing 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, characteriza-
tion of food polymers, effects of physical and chemical factors on the structure and funct-
ionality of food
PREREQ: CHEM231 and CHEM214

FOSC 629 Food Analysis 4
The application of instrumentation: UV/Vis, FTIR and Fluorescence Spectrophotometry, Chromatography (TLC, IC, GC and HPLC), Electrophoresis, and Enzyme Assays for the determination of food constituents and additives. Official AOAC and AOAC methods util-
ized. May be cross-listed with ANSC629
PREREQ: CHEM216

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 ANSC639
PREREQ: BISC300

FOSC 645 Food Engineering Technology 4
Engineering fundamentals for processing of food materials, including applied thermody-
namics 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
Processes used in industrial fermentations and biotechnology: essential biochemical back-
ground of commercial microorganisms, use and genetics of starter cultures, design and control of fermentor systems, kinetics of growth and product recovery. Biotechnological production of alcohols and alcoholic beverages, organic acids, cultured dairy, vegetable and meat products, enzymes, vitamins and therapeutic compounds
PREREQ: BISC300 or FOSC459

FOSC 659 Topics in Food Science 2-6
In-depth studies on specific aspects of current food science research and application.
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 110 Introduction to Food and Agribusiness Industry 1
Designed to introduce students to the food and agribusiness industry. The economic struc-
ture 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 communi-
cations 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 use of accounting for control and decision-making purposes
RESTRICTIONS: Designed for nonbusiness and non-accounting majors

FREC 212 Food Retailing and Consumer Behavior 3
Topics include consumer market environment, demographic characteristics of the popula-
tion, 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
Determination of market equilibria and optimization of static models
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 & 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 335 Advanced Data Management 3
Advanced use of microcomputer systems and application software used in agricultural sci-
cences
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, manage-
ment 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 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 pro-
ducers, consumers and taxpayers, especially contemporary issues and market failures
PREREQ: FREC150 or ECON151

FREC 408 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; aggre-
gate 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 empha-
sized. 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  Agribusiness Financial Management  3
Study of the principles and tools of finance to identify and solve agribusiness financial
management problems through the application of quantitative analytical methods and
problem solving techniques.
PREREQ: FREC201 or ACCT207 and a statistics course

FREC 429  Community Economic Development  3
Community economic development in the United States; application of economic princi-
ipples 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 enter-
prise. Including strategic marketing concepts, competitive, communication, site, and finan-
cial 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 environ-
mental 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

FREC 466  Agribusiness Internship  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
Oval 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 ECON501

FREC 480  Geographic Information Systems in Natural
Resource Management  4
Introductory hands-on training in geographic information systems for environmental and
natural resource management.

FREC 408  Research Methods  3
Experimental design and plot plans, collection, analysis and presentation of data in agri-
cultural and biological research

FREC 415  Advanced Prices and Statistics  3
Statistical tools used in agricultural economics research and operations research.
Introduction to econometric foundations, estimation and interpretation. May be cross-list-
ed with ORES615

FREC 467  Applied Data Base 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 482  Spatial Analysis of Natural Resources  4
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 empir-
cial applications of economic theory and econometric tools in consumer demand and mar-
keting 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: FREC800

FREC 810  International Agricultural Trade Special Topics  3
Advanced theory, issues and policies in international agricultural trade emphasizing interna-
tional finance and agriculture, agricultural trade and development, empirical and method-
ological issues and international market modeling. 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 evolution,
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 analysis 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

FREN

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 Prereq. Course sat-
isfies Arts and Science foreign 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. Course sat-
isfies Arts and Science 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 improve-
ment of basic conversational skills. Grammar review where appropriate, and/or some
written work
PREREQ: FREN107 or FREN112 or one 200-level course
RESTRICTIONS: Minimum grade of B required for Prerequisites

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 oral lan-
guage skills
PREREQ: FREN107 or FREN112
RESTRICTIONS: Taught in France

FRENCH

FRENCH

FRENCH
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 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 107 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 107 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 analyses, 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.

FREN 306 Practical Oral/Written Expression 3
Strengthens grammar and vocabulary skills in preparation for advanced courses. Class exercises include oral exposes, discussion of articles and videos, textual analysis and compositions.
PREREQ: Any two 200-level French courses conducted in French.
RESTRICTIONS: Course 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 200-level French courses taught in the French language.
RESTRICTIONS: Course taught abroad only. Taught in French.

FREN 313 Intensive French Composition 3
Exercises and practice in composing correct and idiomatic French.
PREREQ: Any two 200-level French courses.

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.

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 401 Advanced French Grammar 3
Selected problems in French grammar. Analysis of the French verb system.
PREREQ: Any two 300-level French courses.

FREN 402 Advanced French Composition 3
PREREQ: Any two 300-level French courses.

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 II: 1100-1750 3
Selected readings of master authors and works from the Middle Ages to the Age of Enlightenment. Authors may include Villon, Rabalais, Montaigne, Moliere, Cornelle, Mme. de Lafayette, Montesquieu, Voltaire and others.
PREREQ: Any two 300-level French literature courses.

FREN 412 Great Authors II: 1750-Prezent 3
Selected readings of master authors and works from the dawn of Romanticism to the present. Authors may include Prevost, Rousseau, Hugo, Flaubert, Baudelaire, Gide, Proust, Camus, Sartre, Ionesco, Beckett, Duras and others.
PREREQ: Any two 300-level French literature courses.

FREN 423 French Medieval Literature 3
Survey of French literature to 1500.
PREREQ: Any two 300-level French literature courses.

FREN 424 French Renaissance Literature 3
Selected works by Rabelais, the poets of the Plaiside, Montaigne and others.
PREREQ: Any two 300-level French literature courses.

FREN 437 Seventeenth-Century French Theatre 3
Growth of French dramatic literature before 1715 and analysis of the principal plays of Corneille, Racine and Moliere.
PREREQ: Any two 300-level French literature courses.

FREN 438 Seventeenth-Century French Poetry and Prose 3
Representative novelists, poets, critics and moralists from Descartes and Pascal to La Fontaine, Boileau, 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, Voltaire, Prevost and Voltaire.
PREREQ: Any two 300-level French literature courses.

FREN 442 The Eighteenth Century: The Age of Rousseau 3
Novels, plays, essays and poetry of such authors as Diderot, Rousseau, Beaumarchais and Chenuer.
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 Malroux 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, Sarroute, Pene, Tommer, Duras, Dorg, Bonnalety, Jacet and Barfis.
PREREQ: Any two 300-level French literature courses.

FREN 453 Contemporary French Civilization: 1958-Prezent 3
Culture, customs and political and economic life in France since 1958.
PREREQ: Any two 300-level French courses.

FREN 490 Independent Study 1-3

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FREN 454 FRENCH CINEMA 3
Study of modern French cultural history through the films of such masters as Vigo, Gance, Pagnol, Renoir, Bresson, Resnais, Malle and others.
PREREQ: Any two 300-level French literature courses.

FREN 455 SELECTED AUTHORS, WORKS AND THEMES 3
Works of one or more outstanding authors or on a special theme.
PREREQ: Any two 300-level French literature courses.
RESTRICTIONS: May be repeated for credit when topics vary.

FREN 456 FRENCH THEATER WORKSHOP 3
Study of French theater of different periods and genres, with an emphasis on staging and performance. Class activities include dramatic readings, improvisation, and exercises to improve diction. 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, Sub-Saharan Africa, the Caribbean, Quebec, regions of the Indian and Pacific Oceans) as well as the Beur (children of Maghrebi immigrants) phenomenon in the French suburbs, through theoretical texts, films, music.
PREREQ: Any two 300-level French courses.

FREN 466 INDEPENDENT STUDY 1-3
FREN 533 FRENCH READINGS FOR PH.D. CANDIDATES 3 PF
A basic course with emphasis on developing reading comprehension.
RESTRICTIONS: Designed for graduate students in other disciplines who have had little or no previous experience with French.

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, Moliere, 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 Prevost, 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 Pléiade, 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 Montesquieu, Marivaux, Prevost and Voltaire.

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

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, Cocteau 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, Sarroute, P asc, Tournier, Duras, Ponge, Bonnefoy, Jacolliot and Barthes.

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 869 MASTER’S THESIS 1-6
FREN 875 TOPICS: FRENCH LITERATURE 3
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.

GEOGRAPHY

GEOG 101 PHYSICAL GEOGRAPHY: CLIMATIC PROCESSES 3
Introduction to processes responsible for weather, climate and climatic change. Implications of climate for ecosystems and human activities. Earth-sun relations, geographic coordinate systems and map interpretation. Together GEOG 101 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 GEOG 101 and 106 form a comprehensive introduction to physical geography and its tools.

GEOG 120 WORLD REGIONAL GEOGRAPHY 3
Introduction to the geographic regions of the world and the changing relations between regions. Emphasis is on environmental, economic, and political geographic relationships between industrial and developing nations.

GEOG 152 CLIMATE AND LIFE 4
Introduction to those physical and biological processes that shape our climatic environment. Important themes include the exchanges of energy and mass between the atmosphere and both vegetation and built environments; and the influence of climate on humans and humans on climate.

GEOG 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 resources 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 417 SEMINAR IN CLIMATE CHANGE 3
Examines facts and fallacies regarding global warming and climate science and assess-
es the current state of scientific understanding of and ability to forecast climate change
PREREQ: GEOG101 or GEOG152 or GEOG220 or equivalent

GEOG 420 ATMOSPHERIC PHYSICS 3
Introduction to energy and moisture flows in the atmosphere at small scales. Includes atmo-
spheric thermodynamics, cloud physics and radiation.
PREREQ: GEOG220 and MATH242

GEOG 422 RESOURCES, DEVELOPMENT AND THE ENVIRONMENT 3
Focuses on food, resources, energy and population issues in relationship to economic
development and the global environment. The main objective is to engage students in dis-
cussion and debate on sustainable development policies

GEOG 423 ATMOSPHERIC DYNAMICS 3
Investigates atmospheric motion in a quantitative manner. Explores basic conservation
laws to derive the equations of atmospheric motion and to develop the concepts of vor-
ticity and circulation. Discusses atmospheric wave motion and general circulation
PREREQ: MATH242 and GEOG220
COREQ: MATH243

GEOG 427 APPLIED ENVIRONMENTAL SCIENCE 3
Introduction to the diverse field of environmental consulting: an application of science to
the solution of environmental problems. Topics include project planning, data collection
and analysis, health and safety, work products, business management, accounting and
contracts, marketing, professional responsibility and ethics
RESTRICTIONS: Open to Junior and Seniors or by permission of instructor

GEOG 428 ISSUES IN LAND USE AND ENVIRONMENTAL PLANNING 3
Examines theory and contemporary practice in land use and environmental planning with
emphasis on creating an integrated framework that balances development demands for
urban, suburban, and agricultural land against the needs to conserve and enhance envi-
ronmental and cultural resources

GEOG 438 WORLD CITIES IN COMPARATIVE PERSPECTIVE 3
World city as a new and distinctive geographic urban form in the world economy. Case
studies explore common features of internal structure and external relationships of world
cities, their growing environmental problems and extent to which they have decoupled
from national cultures and economies

GEOG 445 METHOD AND THEORY IN GEOGRAPHY 3
The nature of geography, its history, methodology and applications in research and soci-
etal problems. A pre-professional course.

GEOG 449 ENVIRONMENT AND SOCIETY 3
Considers the relationships between environmental and social processes from the theo-
retical, philosophical and methodological perspectives of geography. Explores the ethical
and contextual implications of framing environmental questions and posing solutions.
Examines approaches to the geographical analysis of environmental problems

GEOG 450 PROSEMINAR IN ENVIRONMENTAL SCIENCE 3
Discussion of the history and state of environmental science as well as its relation to cur-
rent environmental problems. Survey of research topics and methodologies in the current
scientific literature. May be cross-listed with BISC450 and/or GEOU450.
RESTRICTIONS: Open to Environmental Science majors only, or requires permission
of instructor

GEOG 451 MICROCLIMATOLOGY 3
Introduction to instrumentation and techniques involved in microclimatic monitoring and
sampling. Field observation programs carried out in varying environmental situations.
PREREQ: GEOG412

GEOG 452 SEMINAR IN CLIMATOLOGY 3
General theoretical and practical considerations of research in climatology
RESTRICTIONS: Requires permission of instructor

GEOG 453 SYNPTIC CLIMATOLOGY 3
Physical processes involved with development of transportation of weather systems,
including relationships between upper atmospheric flow and surface weather pheno-
mena, synoptic evaluation of air masses, synoptic techniques for environmental analysis.
PREREQ: GEOG220

GEOG 454 NEW EUROPE: CULTURE, GEOPOLITICS, MILIEU 3
Post-Soviet Europe is examined in terms of emerging economic, cultural, and ethnic con-
figurations; tensions between national and supra-national territories; the role of mass
media in ethnic, political, and ecological space; processes of transformation in former
Soviet states; dynamics of regional cooperation on environmental issues

GEOG 455 WATER BUDGET IN ENVIRONMENTAL ANALYSIS 3
The development of the climatic water budget and its use in understanding problems in
hydrology, agriculture, forestry, urban planning and the distribution of environmental sys-
tems. Evaluation of the influence of different human activities on the factors of the water
budget
GEOG 456 HYDROCLIMATOLOGY 3
Study of the hydrologic cycle as it relates to water in the atmosphere and in and on the
earth's surface. Hydrologic processes including precipitation, soil moisture, evapotranspi-
ration, runoff and streamflow will be examined
PREREQ: MATH241 and GEOG250 or equivalent.

GEOG 460 WOMEN IN INTERNATIONAL DEVELOPMENT 3
See SOC460 for course description.

GEOG 464 INTERNSHIP IN GEOGRAPHY 1-6
On the job experience in governmental or private planning, consulting, environmental or
engineering agencies.

GEOG 466 INDEPENDENT STUDY 1-6

GEOG 469 SENIOR RESEARCH AND THESIS 1-6

GEOG 470 COMPUTER CARTOGRAPHY 4
Introduction to cartographic theory and computational methods necessary for drawing
maps with the aid of a digital computer.
PREREQ: GEOG250.

GEOG 471 ADVANCED GEOGRAPHIC INFORMATION SYSTEMS 4
Commercial geographical information systems (GIS) are introduced and used to analyze
a wide variety of spatial data bases. Georeferenced data are acquired, restructured and
manipulated in a GIS environment. GIS methods are applied to local-scale geographical,
environmental and land planning problems.
PREREQ: GEOG250 and GEOG270 or GEOG372 or GEOG470.

GEOG 474 INTRODUCTION TO ENVIRONMENTAL REMOTE SENSING 3
Introduction to the basic physics, techniques and theory of remote sensing in geography
and environmental sciences. Digital image processing of satellite imagery and its incor-
poration into geographic information systems is emphasized. A set of computer-based lab-
oratory exercises will be required.
PREREQ: GEOG250 and GEOG272.

GEOG 475 STATISTICS FOR ENVIRONMENTAL SCIENCE 3
See STAT475 for course description.

GEOG 482 PHYSICAL GEOGRAPHY OF COLD ENVIRONMENTS 3
Survey and analysis of land surface processes in polar and mountain environments.
Emphasis on the ground thermal regime, permafrost, periglacial (cold climate, nonglacial)
landforms and environmental problems in cold regions. May be cross-listed with GEOL482.
PREREQ: GEOG106 or GEOL105/115 or GEOL107.

GEOG 600 PRELUDE TO GEOGRAPHY 1
Introduction to contemporary American geography, especially its research and educa-
tional frontiers. Also emphasizes theoretical and practical considerations in formulating,
carrying out and evaluating geographic research. Students additionally are required to
attend (and then discuss) the Department's Friday afternoon guest lectures.
RESTRICTIONS: Open to graduate students in Geography and Climatology only.

GEOG 611 FLUVIAL GEOMORPHOLOGY 3
See GEOG611 for course description.

GEOG 612 PHYSICAL CLIMATOLOGY 4
Energy and moisture exchange between the atmosphere and land surface for character-
istic natural and human-modified environments.
PREREQ: MATH241 and GEOG250.

GEOG 614 THE AMERICAN SUBURB 3
See UAPP614 for course description.

GEOG 615 URBAN, REGIONAL AND ENVIRONMENTAL PLANNING 3
See UAPP615 for course description.

GEOG 617 SEMINAR IN CLIMATE CHANGE 3
Examine facts and fallacies regarding global warming and climate science and assess-
e the current state of scientific understanding of and ability to forecast climate change.
PREREQ: GEOG101 or GEOG152 or GEOG220 or equivalent.

GEOG 620 ATMOSPHERIC PHYSICS 3
Introduction to energy and moisture flows in the atmosphere at small scales. Includes atmo-
spheric thermodynamics, cloud physics and radiation
PREREQ: MATH242 and GEOG220.
COREQ: GEOG250.

GEOG 622 RESOURCES, DEVELOPMENT AND THE ENVIRONMENT 3
Focuses on food, resources, energy and population issues in relationship to economic
development and the global environment. The main objective is to engage students in dis-
cussion and debate on sustainable development policies. May be cross-listed with UAPP622.

GEOG 623 ATMOSPHERIC DYNAMICS 3
Investigates atmospheric motion in a quantitative manner. Expands basic conservation
laws to derive the equations of atmospheric motion and to develop the concepts of vari-
ticity and circulation. Discusses atmospheric wave motion and general circulation.
PREREQ: MATH242 and GEOG220.
COREQ: MATH243.

GEOG 628 ISSUES IN LAND USE AND ENVIRONMENTAL PLANNING 3
Examines theory and contemporary practice in land use and environmental planning.
With emphasis on creating an integrative framework that balances development demands for
urban, suburban, and agricultural land against the need to conserve and enhance envi-
ronmental and cultural resources. May be cross-listed with UAPP628.

GEOG 635 THE EVOLUTION OF THE AMERICAN URBAN LANDSCAPE 3
See UAPP635 for course description.

GEOG 636 RESEARCH TOPICS IN HISTORIC PRESERVATION 3
See UAPP636 for course description.

GEOG 638 WORLD CITIES IN COMPARATIVE PERSPECTIVE 3
World cities 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 MAPPING AND THEOREY IN GEOGRAPHY 3
The nature of geography, its history, methodology and applications in research and soci-
etal problems. A preprofessional course.

GEOG 649 ENVIRONMENT AND SOCIETY 3
Considers the relationships between environmental and social processes from theoretical,
philosophical, and methodological perspectives of geography. Explores the ethical and
contextual implications implied in framing environmental questions and posing solutions.
Examines approaches to the geographical analysis of environmental problems.

GEOG 651 MICROCLIMATOLOGY 3
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 3
General theoretical and practical considerations of research in climatology.
RESTRICTIONS: Requires permission of Instructor.

GEOG 653 SYNTHETIC CLIMATOLOGY 3
The physical processes involved in the development and transportation of weather sys-
tems. Selected topics include relationships between upper atmospheric flow and surface
weather phenomena, synthetic evaluation of air masses and synoptic techniques for envi-
ronmental analysis.
PREREQ: GEOG220.

GEOG 654 NEW EUROPE: CULTURE, GEOPOlITICS, MILEU 3
Post-Soviet Europe is examined in terms of emerging economic, cultural and ethnic con-
figurations; tensions between national and supranational territories; the role of mass
media in ethnic, political and ecologic space; processes of transformation in former Soviet
states; dynamics of regional cooperation on environmental issues.

GEOG 655 WATER BUDGET IN ENVIRONMENTAL ANALYSIS 3
The development of the climatic water budget and its use in understanding problems in hydro-
logy, agriculture, forestry, urban planning and the distribution of environmental systems.
Evaluation of the influence of different human activities on the factors of the water budget.

GEOG 656 HYDROCLIMATOLOGY 3
Study of the hydrologic cycle as it relates to water in the atmosphere and in and on the
earth's surface. Hydrologic processes including precipitation, soil moisture, evapotranspi-
ration, runoff and streamflow will be examined.
PREREQ: MATH241 and GEOG250 or equivalent.

GEOG 657 CLIMATE DYNAMICS 3
Investigation of the physical processes controlling global climate, starting with the earth-
sun relationship and adding additional processes to increase complexity and realizism.
Extensive use of models to explore the importance of each process.
PREREQ: GEOG250 and MATH302.

GEOG 670 COMPUTER CARTOGRAPHY 4
Introduction to cartographic theory and computational methods necessary for drawing
maps with the aid of a digital computer.
PREREQ: GEOG250.

GEOG 671 ADVANCED GEOGRAPHIC INFORMATION SYSTEMS 4
Commercial geographical information systems (GIS) are introduced and used to analyze
a wide variety of spatial data bases. Georeferenced data are acquired, restructured and
manipulated in a GIS environment. GIS methods are applied to local-scale geographical,
environmental and land planning problems.
PREREQ: GEOG250 and GEOG270 or GEOG372 or GEOG470.
GEOG 672 Seminar in Geographic Information Systems 3
Principles underlying geographic information systems (GIS) are examined, and sample geographic problems are analyzed. Design and programming of modules for data acquisition and storage, map projection, map overlay, spatial data analyses, and graphic output are considered. Geographic themes and data vary each time the seminar is offered. PREREQ: GEOG470, GEOG470 or GEOG472

GEOG 674 Satellite Climatology 3
Use of satellite observations to study the climate system. Discussions consider the development of satellite climatology, sensors, platforms and methodologies used to estimate climate variables from 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 681 Remote Sensing of Environment 3
See MAST681 for course description.

GEOG 682 Physical Geography of Cold Environments 3
Survey and analysis of land surface processes in polar and mountain environments. Emphasis on the ground thermal regime, permafrost, periglacial (cold climate, non-glacial) landforms and environmental problems in cold regions. May be crosslisted with GEOG682

GEOG 803 Topics in Geomorphology 1-3
See GEOG03 for course description

GEOG 855 Climatological Research 3
Techniques of research in basic and applied climatology: to include field study, and the analysis of climatological data. RESTRICTIONS: Requires permission of instructor.

GEOG 868 Research 1-9 PF
GEOG 869 Master’s Thesis 1-6
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

GEOG 969 Doctoral Dissertation 1-12 PF

GEOLOGY

GEOL 105 Geological Hazards and Their Human Impact 3
Geological processes and events that adversely affect humans and civilization. Methods for predicting and dealing with geological hazards. May be taken with a 1 credit lab. GEOL115

GEOL 107 General Geology 4
Principles of physical and historical geology and their application in interpreting earth processes and the history of the earth. Laboratory covers identification of earth materials including fossils and the interpretation of topographic and geologic maps

GEOL 108 Volcanoes and Earthquakes 3
Violent geologic activity as illustrated by volcanoes and earthquakes. The nature, causes and origins of volcanic and earthquake activity, their interactions with humans and their potential control.

GEOL 109 Planets, Asteroids and Impacts 3
Composition, structure, surface features, origin, and evolution of the planets, satellites, asteroids, and comets. The course will also explore the possible connection between meteorite impacts and mass extinctions. Did an asteroid kill off the dinosaurs?

GEOL 110 Earth History: Evolution, Extinction and the Geological Record 3
History of the earth and its biota. Origins, evolution and mass extinctions of major groups of organisms as demonstrated by the earth's fossil record. History of the Phanerozoic eon, the age of the dinosaurs, and the evolution of humans.

GEOL 111 Geology of Delaware and Its Neighbors 3
Introduction to the geologic setting of Delaware and neighboring states. Rocks and fossils of the region. Emphasis on formation and evolution of the region through geologic time. Studies Delaware's coastal zone and the effect of coastal processes on recent geologic history of Delaware.

GEOL 112 Earth Resources and Public Policy 3
Introduction to the geologic occurrence of resources including water, energy, metals and industrial minerals. Discussion of the geology, politics and economics of resource extraction and utilization. Environmental implications of resource use; methods of estimation of resource availability.

GEOL 113 Earth Science 4
Earth materials, structure and the geologic phenomena that produce them. Physical and temporal aspects of earth history. Laboratory examination of rocks, minerals and fossils. Experiments in geological processes and interpretation of geologic maps. RESTRICTIONS: Open to education majors and other selected programs. Does not satisfy Group D requirement in Arts and Science

GEOL 115 Geological Hazards Laboratory 1
Laboratory investigation of environmental geological processes and their impact on society: earthquakes, volcanoes, coastal hazards, rivers and streams, groundwater. Identification of earth materials and study of earth processes using topographical, geological and tectonic maps.

GEOG 300 The Earth’s Materials I: Minerals 4
Systematics, identification, properties and associations of minerals and other raw materials of the earth. Economically significant minerals and their uses. PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113

GEOG 301 Systematic and Evolutionary Paleontology 3
Classification of fossils, organic evolution, paleoecology; and application to geologic principles. PREREQ: GEOL107

GEOG 302 The Earth’s Materials II: Rocks 4
Identification, description, occurrences, origins and uses of rocks and ores. PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113; GEOL300

GEOG 303 The Earth’s Surface I: Surficial Processes 4
Uplift, weathering, sediment transport, depositional processes and selected depositional environments. Quaternary history and geochronology. Subsurface fluid flow in surficial environments. Environmental and applied aspects of surficial processes. PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113

GEOG 304 The Earth’s Surface II: Stratigraphy 4
Description and correlation of stratigraphic units; concepts of time and methods of absolute dating; environments of deposition and modern/ancient analogs and facies analysis; basin analysis. PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113; GEOL303

GEOG 305 The Earth’s Lithosphere I: Structural Geology and Plate Tectonics 4
The study of geologic structures, geologic stress and the responses of rocks to stress. Examines plate tectonics and the major structural and tectonic relations generated at plate boundaries. PREREQ: GEOL105 and GEOL115, or GEOL107 or GEOL113

GEOG 306 The Earth’s Lithosphere II: Field Geology 4
Training and experience in geological mapping and field methods. Geologic map construction and interpretation. Includes rock descriptions, stratigraphic analysis and correlation, and structural methods. Emphasis on regional Piedmont and coastal plain geologic settings. PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113; GEOL305

GEOG 307 The Earth’s History I: Paleobiology 4
Recognition, biology and paleobiology of major groups of invertebrates. Use of the fossil record in solving environmental and paleoenvironmental problems. Principles of stratigraphy and correlation and origin and development of the geologic time scale. PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113.

GEOG 308 The Earth’s History II: Earth System Science 4
Interaction and evolution of the lithosphere, biosphere, hydrosphere and atmosphere. Examination of the geologic record as a test for hypotheses about earth system processes including climate change, paleoceanography and tectonics. Integrative study of the history of the earth and its inhabitants. PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113; GEOL307

GEOL 366 Independent Study 1-3

GEOL 385 Geomorphology 4
Survey of landforms and processes that shape them. Description and classification of landforms, relation to geological and climatic processes, rates of landform development and change. Laboratory involves map/air photo interpretation and analysis of digital elevation models. May be crosslisted with GEOG385. PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113, or GEOL106

GEOL 405 Introduction to Research 1-3
Undergraduate research carried out under the supervision of the staff. Written report required. RESTRICTIONS: May be repeated once if project warrants it

GEOL 407 Petrology 3
 Petrography, chemistry, origin and tectonic significance of the major classes of igneous, sedimentary, or metamorphic rocks. PREREQ: Completion of any of the one-year undergraduate core course sequences (GEOL 300-302, 303-304, 305-306, or 307-308)
GEOL 411 FLUVIAL GEOMORPHOLOGY 3
PREREQS: Completion of any of the one-year undergraduate core course sequences (GEOL 300-302, 303-304, 305-306, or 307-308).

GEOL 412 GEOLOGICAL APPROACHES TO ARCHAEOLOGY AND HISTORY 3
Geological techniques in interpretation of archaeological sites and their surrounding geographic terrain; paleogeographies of archaeological settings; and use of geology for interpretations of history. May be crosslisted with GEOG 412.
PREREQS: Completion of any of the one-year undergraduate core course sequences (GEOL 300-302, 303-304, 305-306, or 307-308).

GEOL 414 QUaternARY GEOLOGY AND GECHRONOLOGY 3
Survey of the stratigraphy and chronology of marine and terrestrial records and theories of climatic change. Studies of the stratigraphy of significant Quaternary successions throughout the world and their correlation and absolute dating. May be crosslisted with GEOG 414.
PREREQS: Completion of any of the one-year undergraduate core course sequences (GEOL 300-302, 303-304, 305-306, or 307-308).

GEOL 416 PALEOECOLOGY 3
Paleoenvironmental and stratigraphic interpretation of sediments and fossils. Basic statistics, bioturbation models, welllogging and sequence stratigraphy. Application to geology problems. May be crosslisted with GEOG 416.
PREREQS: Completion of any of the one-year undergraduate core course sequences (GEOL 300-302, 303-304, 305-306, or 307-308).

GEOL 421 ENVIRONMENTAL AND APPLIED GEOLOGY 3
The application of geologic principles to matters of environmental concern. Discussion, examples, techniques and case histories in water supply, waste disposal, zoning and land use, mining, legislation, regulation and professionalism emphasizing the role of geologist and the educated citizen. May be crosslisted with GEOG 421.
PREREQS: Completion of any of the one-year undergraduate core course sequences (GEOL 300-302, 303-304, 305-306, or 307-308).

GEOL 422 OSHA 40-HOUR HAZARDOUS MATERIALS SAFETY TRAINING 3
OSHA 40-hour safety training certification hazardous waste operations health and safety training program includes material from environmental regulations, hazard recognition, toxicology, environmental monitoring, personal protective equipment, site characterization and analysis, site zone and control, health and safety plans, decontamination and spill response recovery. RESTRICTIONS: GEOL 422 cannot be applied toward the 9 credits of 400-level Geology electives required of BS Geology majors.

GEOL 428 HYDROGEOLOGY 3
Principles of groundwater flow and water chemistry in varied geologic media. Evaluation of groundwater resources and assessment of environmental problems associated with groundwater use. May be crosslisted with GEOG 428.
PREREQS: Completion of any of the one-year undergraduate core course sequences (GEOL 300-302, 303-304, 305-306, or 307-308).

GEOL 431 MARINE GEOLOGY 3
Geology of the ocean basins and their continental margins; sedimentation within the marine environment and its uses in interpreting geologic history and paleoecology. May be crosslisted with GEOG 431.
PREREQS: Completion of any of the one-year undergraduate core course sequences (GEOL 300-302, 303-304, 305-306, or 307-308).

GEOL 434 GEOLGY OF COASTS 3
Erosional, depositional and tectonic processes; morphology and classification, and geologic history of the coastal areas of the world. May be crosslisted with GEOG 434.
PREREQS: Completion of any of the one-year undergraduate core course sequences (GEOL 300-302, 303-304, 305-306, or 307-308).

GEOL 446 GENERAL GEOCHEMISTRY 3
Chemical principles applied to geologic processes and environments. Thermochemistry of mineral equilibria; mineral stabilities at high temperature and pressure. Radioisotopes and methods of geochronology. The geochemical history of the earth. May be crosslisted with CHEM 446.
PREREQS: GEOL 107 and CHEM 103.

GEOL 450 PROSEMINAR IN ENVIRONMENTAL SCIENCE 3
See GEOG 450 for course description.

GEOL 453 ELEMENTARY GEOPHYSICS I 3
PREREQS: GEOL 107 or GEOG 105/115 or GEOG 113; MATH 242; PHYS 201 and PHYS 202.

GEOL 454 ELEMENTARY GEOPHYSICS II 3
Gravity and the shape of the earth and theories of isostasy. Geomagnetism, magnetization of rocks and polemagnetism. Gravity and magnetic surveys and interpretations. Electrical and radioactive surveying and well logging. May be crosslisted with GEOG 454.
PREREQS: GEOL 107 or GEOG 105/115 or GEOG 113; MATH 242; PHYS 201 and PHYS 202.

GEOL 466 INDEPENDENT STUDY 1-3

GEOL 482 PHYSICAL GEOGRAPHY OF COLD ENVIRONMENTS 3
See GEOG 482 for course description.

GEOL 601 GEOLOGICAL SCIENCES AT DELAWARE 1 PF
Overview of the graduate program in geology at the University of Delaware. Research opportunities and current activities. Orientation in department practices and procedures. Guidelines for preparation of research proposals. Professional activities and career options. May be crosslisted with GEOG 601.

GEOL 602 CASE STUDIES OF NEAR SURFACE GEOLOGIC SYSTEMS 3
Broad overview of the history and processes of selected near surface geologic systems. Environmental and applied aspects of near surface geologic systems. May be crosslisted with GEOG 602.

GEOL 603 NUMERICAL MODELING OF NEAR SURFACE GEOLOGIC SYSTEMS 3

GEOL 605 STRATIGRAPHY 3
Principles of stratigraphy and application of stratigraphic methods (e.g., lithostratigraphy, biostratigraphy, chronostratigraphy, sequence stratigraphy and magnetic stratigraphy) for basin analysis. Interpretation of sedimentary facies. Application of sequence stratigraphy to the Quaternary Period. May be crosslisted with GEOG 605.

GEOL 606 FIELD METHODS - NEAR SURFACE GEOLOGIC SYSTEMS 3
Training and experience in obtaining and interpreting surface and shallow subsurface data. Emphasis on the correlation and interpretation of morphostratigraphic relationships and history. Field methods to be employed include: augering and coring, shallow geophysical methods and modern surveying techniques. May be crosslisted with GEOG 606.

GEOL 607 PETROLOGY 3
Petrography, chemistry, origin and tectonic significance of the major classes of igneous, sedimentary, or metamorphic rocks. May be crosslisted with GEOG 607.

GEOL 611 FLUVIAL GEOMORPHOLOGY 3

GEOL 612 GEOLOGICAL APPROACHES TO ARCHAEOLOGY AND HISTORY 3
Geological techniques in interpretation of archaeological sites and their surrounding geographic terrain; paleogeographies of archaeological settings; and use of geology for interpretations of history. May be crosslisted with GEOG 612.

GEOL 614 QUaternary GEOLOGY AND GECHRONOLOGY 3
Survey of the stratigraphy and chronology of marine and terrestrial records and theories of climatic change. Studies of the stratigraphy of significant Quaternary successions throughout the world and their correlation and absolute dating. May be crosslisted with GEOG 614.

GEOL 616 PALEOECOLOGY 3
Paleoenvironmental and stratigraphic interpretation of sediments and fossils. Basic statistics, bioturbation models, welllogging, and sequence stratigraphy. Application to geology problems. May be crosslisted with GEOG 616.

GEOL 621 ENVIRONMENTAL AND APPLIED GEOLOGY 3
The application of geologic principles to matters of environmental concern. Discussion, examples, techniques and case histories in water supply, waste disposal, zoning and land use, mining, legislation, regulation and professionalism emphasizing the role of geologist and the educated citizen. May be crosslisted with GEOG 621.

GEOL 622 OSHA 40-HOUR HAZARDOUS MATERIALS SAFETY TRAINING 3
OSHA 40-hour safety training certification hazardous waste operations health and safety training program includes material from environmental regulations, hazard recognition, toxicology, environmental monitoring, personal protective equipment, site characterization and analysis, site zone and control, health and safety plans, decontamination and spill response recovery. May be crosslisted with GEOG 622.

GEOL 626 COMPUTER SIMULATION OF SELECTED GEOLGY PROCESSES 3

GEOL 627 SEDIMENTARY ROCKS AND MINERALS 3
Sedimentary rocks and minerals. Formation and alteration of sedimentary rocks and minerals. Petrography, chemistry, origin and tectonic significance of the major classes of igneous, sedimentary, or metamorphic rocks. May be crosslisted with GEOG 627.

GEOL 631 PETROGRAPHY AND FACIES ANALYSIS 3
Petrography, origin and tectonic significance of the major classes of igneous, sedimentary, or metamorphic rocks. May be crosslisted with GEOG 631.
GEOL 628 Hydrogeology 3

GEOL 631 Marine Geology 3
The geology of the ocean basins and their continental margins; sedimentation within the marine environment and its uses in interpreting geologic history and paleoecology. May be cross-listed with MAST631.

GEOL 634 Geology of Coasts 3
Erosional, depositional and tectonic processes; morphology and classification; and geologic history of the coastal areas of the world.

GEOL 646 General Geochemistry 3
Chemical principles applied to geologic processes and environments. Thermochemistry of mineral equilibria; and mineral stabilities at high temperature and pressure. Radioisotopes and methods of geochronology. The geochemical history of the earth.

GEOL 650 Clay Mineralogy 3
See MAST650 for course description.

GEOL 653 Elementary Geophysics I 3

GEOL 654 Elementary Geophysics II 3
Gravity and the shape of the earth, theories of isostasy. Geomagnetism, magnetization of rocks and paleomagnetism. Gravity and magnetic surveys and interpretations. Electrical and radioactive surveying and well logging.

GEOL 657 Statistics for Earth Sciences 3
See STA657 for course description.

GEOL 676 Statistical Mechanics 4
Thermodynamics, statistical mechanics, and the concepts of entropy and temperature. Applications to simple chemical systems and to the interpretation of experimental data. The macroscopic concepts developed in statistical mechanics. Correlation and interaction parameters for gases and liquids. The statistical mechanics of the solid state and results for simple crystals. Statistical interpretation of thermodynamics of chemical reactions. Use of the computer in performing significant statistical calculations.

GEOL 682 Physical Geography of Cold Environments 3
See GEOG682 for course description.

GEOL 701 Topics in Planetary Science 1-3
Selected topics in planetary science Topics vary according to instructor's preference. Restrictions: May be taken more than once for graduate credit.

GEOL 702 Topics in Geophysics 1-3
Selected topics in geophysics. Topics vary according to instructor's preference. Restrictions: May be taken more than once for graduate credit.

GEOL 703 Topics in Geomorphology 1-3
Selected topics in geomorphology. Topics vary according to instructor's preference. Restrictions: May be taken more than once for graduate credit.

GEOL 704 Topics in Geochemistry 1-3
Selected topics in geochemistry. Topics vary according to instructor's preference. Restrictions: May be taken more than once for graduate credit.

GEOL 707 Topics in Mineralogy and Petrology 1-3
Selected topics in mineralogy and petrology. Topics vary according to instructor's preference. Restrictions: May be taken more than once for graduate credit.

GEOL 708 Topics in Structural Geology 1-3
Selected topics in structural geology. Topics vary according to instructor's preference. Restrictions: May be taken more than once for graduate credit.

GEOL 709 Topics in Sedimentology and Stratigraphy 1-3
Selected topics in sedimentology and stratigraphy. Topics vary according to instructor's preference. Restrictions: May be taken more than once for graduate credit.

GEOL 818 Topics in Paleobiology 1-3
Selected topics in paleobiology. Topics vary according to instructor's preference.

GEOL 857 Paleoceanography 3
See MAST857 for course description. Prerequisites: Algebra, Precalculus, CHEM101 through CHEM102, PHYS201-202, BISC103, Geophysical Oceanography (MAST637) and Geosystems Geology and Geochronology (GEOL614), or equivalent. Restrictions: Open to seniors and graduate students only.

GEOL 868 Research 1-9
Enables students to begin planning work and research before admission to dissertation candidacy and GEOL699.

GEOL 869 Master's Thesis 1-6

GEOL 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.

GEOL 969 Doctoral Dissertation 1-12 PF

GREEK

GREK 101 Elementary Ancient Greek I 3
Course for beginners.

GREK 102 Elementary Ancient Greek II 3
Completion of basic Greek. Prerequisites: GREK101.

GREK 213 Plato 3

GREK 214 Homer 3
Restrictions: Satisfies College of Arts and Sciences foreign language requirement.

GREK 366 Independent Study 1-3

GREK 466 Independent Study 1-3

GERMAN

GRMN 101 Elementary German I 3
Introduction to the German language and a development of speaking, listening, reading and writing skills through the use of basic texts.

GRMN 102 Elementary German II 3
Completion of basic German. Prerequisites: GRMN101 or GRMN105.

GRMN 105 German I - Elementary 4
Introduction to the German language and development of speaking, listening, reading and writing skills through the use of basic texts.

GRMN 106 German II - Elementary/Intermediate 4
Completion of basic German. Increasing mastery of the basic skills of speaking, listening, reading and writing. Prerequisites: GRMN105. Restrictions: Two to three years of high school German acceptable in lieu of prerequisites.

GRMN 107 German III - Intermediate 4
Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty. Prerequisites: GRMN106. Restrictions: Four years of high school German acceptable in lieu of prerequisites. Satisfies Arts and Sciences foreign language requirement.

GRMN 111 Intermediate German I 3
Review of grammar. Increasing mastery of the basic skills of speaking, listening, reading and writing. Prerequisites: GRMN102 or GRMN106. Restrictions: Three years of high school German acceptable in lieu of prerequisites.

GRMN 112 Intermediate German II 3
Continued practice in speaking and writing, reading texts of average difficulty, grammar review as needed. Prerequisites: GRMN111. Restrictions: Four years of high school German acceptable in lieu of prerequisites. Satisfies Arts and Sciences foreign language requirement.

GRMN 200 German Grammar Review 3
Systematic review of elementary and intermediate German grammar. Emphasis on grammar, conversational practice. Prerequisites: GRMN107. Restrictions: Not intended for students who have already taken a 200 or 400 level course in German.

GRMN 205 German Conversation 3
Practical use of German by means of oral reports and discussions. Emphasis on improvement of basic conversational skills. Grammar review where appropriate, and/or some written work. Prerequisites: GRMN107 or one 200 level German course. Restrictions: Prerequisites require minimum grade of B. Not intended for students who have already taken a 300 or 400 level course in German.
GRMN 206 Culture Through Conversation 3
Discussion of topics drawn from contemporary German life. Designed for students who wish to broaden their knowledge of German culture while improving their oral and aural language skills.
PREREQ: GRMN 107.

GRMN 208 Contemporary Germany I 3
An introduction to contemporary Germany, its culture, its people, their way of life and the issues confronting them.
RESTRICTIONS: Taught abroad only, in both English and German. Not for major credit. Does not satisfy foreign language requirement.

GRMN 211 German Reading and Writing 3
Reading and discussion of 20th-century German short stories and novels. 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 250 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: 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 Composition 3
Discussion of current cultural, social and political topics in German-speaking countries. Vocabulary building, grammar exercises and frequent compositions.
PREREQ: One of GRMN 200, GRMN 205, GRMN 206, GRMN 211, or GRMN 250.

GRMN 306 Practical Oral/Written Expression 3
Strengthens grammar and vocabulary skills in preparation for advanced courses. Class exercises include oral exposes, discussion of articles and videos, textual analysis and compositions.
PREREQ: Any two 200-level German courses conducted in German.
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 taught in the German language.
RESTRICTIONS: Taught abroad only. Taught in German.

GRMN 311 Introduction to German Literature I 3
Masterpieces of poetry, narrative prose and drama from the 18th to the mid-19th century.
PREREQ: GRMN 211 or GRMN 255.

GRMN 312 Introduction to German Literature II 3
Masterpieces of poetry, narrative prose and drama from the mid-19th century to the present.
PREREQ: GRMN 211 or GRMN 255.

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.
RESTRICTIONS: GRMN 211.

GRMN 340 Focus on Genre: German Drama, Prose or Poetry 3
Introduces one of three major genres by examining a specific theme. The subject matter varies and will be announced in the registration booklet.
PREREQ: GRMN 211 or GRMN 255.
RESTRICTIONS: May be repeated for credit when topics vary.

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: GRMN 211 or GRMN 255.
RESTRICTIONS: May be repeated for credit when topics vary.

GRMN 366 Independent Study 1-3

GRMN 406 Advanced German 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 German course.
RESTRICTIONS: Taught abroad only.

GRMN 422 Age of Goethe 3
Major works by Lessing, Lenz, Goethe, Schiller and their contemporaries. The importance of the Enlightenment, the Storm and Stress movement, the Classical period and early Romanticism.
PREREQ: Any two 300-level German courses.

GRMN 433 Nineteenth-Century German Literature 3
Studies major literary trends and figures (Heine, Buechner, Droscher-Hauchhoff, Grillparzer, Hebbel, Keller, Stifter, Storm and Nietzsche) from the end of Romanticism to Naturalism.
PREREQ: Any two 300-level German courses.

GRMN 442 From Naturalism to Expressionism 3
Main literary currents from the 1880's to the 1920's. The drama from Hauptmann to Kaiser; the poetry of Hofmannsthal, Rilke, Laske-Schueler, and others; narrative prose including Thomas Mann and Kafka.
PREREQ: Any two 300-level German courses.

GRMN 453 Contemporary German Literature 3
Major authors and literary movements from 1945 to the present. Works by Boell, Grass, 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 300-level German literature courses.
RESTRICTIONS: May be repeated for credit when topics vary.

GRMN 462 Early German Literature 3
Representative authors and themes: 12th-17th centuries. "Courtly love" and "Knighthood" (Minnesang, Das Nibelungenlied); "bourgeoisie vs. peasantry" during the Reformation (Sachs' Fastnachtspiele, Eutenspiegel); and the Baroque themes of "corps cien" and "memento mori" (Grimmelshausen's Simplicissimus, Gryphius' plays, Baroque poetry).
PREREQ: Any 400-level German literature course.

GRMN 466 Independent Study 1-3

GRMN 533 German Readings for Ph.D. Candidates 3 PF
A basic course in German for graduate students in other disciplines who have had little or no previous experience in the language. Emphasis on developing reading comprehension.

GRMN 622 Age of Goethe 3
Major works by Lessing, Lenz, Goethe, Schiller and their contemporaries. The importance of the Enlightenment, the Storm and Stress movement, the Classical period and early Romanticism.

GRMN 633 Nineteenth-Century German Literature 3
A study of major literary trends and figures (Heine, Buechner, Droscher-Hauchhoff, Grillparzer, Hebbel, Keller, Stifter, Storm and Nietzsche) from the end of Romanticism to Naturalism.

GRMN 642 Naturalism to Expressionism 3
Main literary currents from the 1880's to the 1920's. The drama from Hauptmann to Kaiser; the poetry of Hofmannsthal, Rilke, Laske-Schueler and others, and narrative prose including Thomas Mann and Kafka.

GRMN 653 Contemporary German Literature 3
Major authors and literary movements from 1945 to the present. Works by Boell, Grass, 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.
RESTRICTIONS: May be repeated for credit when topics vary.

GRMN 662 Early German Literature 3
Representative authors and themes: 12th-17th centuries. "Courly love" and "Knighthood" (Minnesang, Das Nibelungenlied); "bourgeoisie vs. peasantry" during the Reformation (Sachs' Fastnachtspiele, Eutenspiegel); and the Baroque themes of "corps cien" and "memento mori" (Grimmelshausen's Simplicissimus, Gryphius' plays, Baroque poetry).

GRMN 869 Master's Thesis 1-6

GRMN 875 Seminar: Topics in German Literature 3
Study of selected topics, authors and works in the various fields of German literature. Variable content. Emphasizes preparation of seminar presentations and term paper.
RESTRICTIONS: May be repeated for credit when topics vary.

HEBREW

HEBR 105 Hebrew I - Elementary 4
Introduction to the Hebrew language and development of speaking, listening, reading and writing skills through the use of basic texts. May be cross-listed with JWST 105.
HEBR 105 Hebrew II - Elementary/Intermediate 4
Completion of basic Hebrew. Increasing mastery of the basic skills of speaking, listening, reading and writing. May be cross-listed with JWST 106.
PREREQ: HEBR 101
RESTRICTIONS: Requires current Red Cross Advanced lifesaving Certificate

HEBR 107 Hebrew III - Intermediate 4
Review of grammar, continued practice in speaking and writing and reading texts of average difficulty. May be cross-listed with JWST 107.
PREREQ: HEBR 106
RESTRICTIONS: Four years of high school Hebrew acceptable in lieu of HEBR 107.

HEBR 266 Special Problem 1-4

HUMAN SERVICES, EDUCATION & PUBLIC POLICY

HEPP 100 Introductory Seminar 1 PF
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 160 Special Topics 3
Freshman level interdisciplinary course on topics drawn from disciplines within the College of Human Services, Education and Public Policy. Course 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. Course 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. Course content varies each semester. May be repeated as topics change.

HEPP 400 Service Learning Practicum 3-6 PF
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 for students 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. Course content varies each semester. May be repeated as topics change.

HEPP 465 Senior Seminar in Disabilities Studies 3
Culminates the Disabilities Studies minor with an integrative seminar requiring a significant project in the student's area of specialization.
PREREQ: IFST270 and EDUC230

HEPP 533 Internet Literacy 3
Provides the conceptual background and the online skills needed for students 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 124 Aerobic Instructor Training Certification 2
Provides the potential teacher with pertinent, current knowledge on aerobic dance, to allow them to design safe and effective programs. Emphasis on 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
Teaches 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 HESC majors.

HESC 138 Lifeguard Training Instructor 2
RESTRICTIONS: Current certification in First Aid, CPR and Lifeguard Training.

HESC 139 Curriculum in Physical Education 3
Focuses on curriculum and teaching methods for K-12 physical education. Examines student characteristics, domains of learning, movement concepts, planning and assessment to meet national and state content standards.
RESTRICTIONS: Open to HPE majors.

HESC 140 Fundamental Skills Analysis 3
Designed to develop cognitive understanding and practical experience for the teaching and refinement of fundamental skills in grades K-12. Emphasis 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 155 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 HESC 214.

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 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 Introduction to Recreation and Sport Management 3
Survey of the field of recreation and sport management with an emphasis on the professional opportunities in the public, private and commercial sectors.
RESTRICTIONS: Open to health behavior management majors with a concentration in recreation and park administration or sport management.

HESC 210 Safety, First Aid and Emergency Care 3
Practical approach to first aid, safety, family health and prevention. Topics include basic concepts, needs, purposes, individual skills and legal implications.
RESTRICTIONS: Requires permission of instructor. Open to HESC majors 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.

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.
HEALTH AND EXERCISE SCIENCES

HESC 216 **PRACTICUM IN TEACHING** 1 PF
- Practical teaching experience. Student is assigned to lifetime sports activity courses 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 **OFFICiating RECREATIONAL SPORTS** 1
- Theory and practice of officiating recreational sports. Introduces 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 233 **ADVANCED SCUBA DIVING** 2
- In-depth study and review of material from entry and mid-level scuba diving courses. Opportunity to use advanced diving skills and knowledge under controlled conditions.
- RESTRICTIONS: Requires basic scuba certification.

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 PES concentration majors.

HESC 250 **MOTOR DEVELOPMENT** 3
- RESTRICTIONS: Open to HPE majors only.

HESC 251 **SKILLS, TECHNIQUES AND KNOWLEDGE OF RHYTHMS 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, TECHNIQUES 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.

HESC 256 **TAPPING TECHNIQUES** 1
- Learn accepted and approved taping/wrapping and splinting techniques which are NATA certified and accepted as standard measured by First Aid and CPR requirements.

HESC 257 **ATHLETIC TRAINING PRACTICUM** 3
- Supervised clinical experience in athletic training. Focuses on development of competence related to pathology of injuries and illnesses, acute care of injury and illness, and nutritional aspects of injury and illness.
- PREREQ: HESC305
- RESTRICTIONS: Restricted to students admitted to the athletic training major.

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 on-field transportation techniques; and equipment fitting and modification techniques.
- RESTRICTIONS: Open to athletic training majors only.

HESC 261 **LEISURE SERVICE PROGRAMMING AND LEADERSHIP** 3
- Fundamental principles related to leisure service programming and leadership. Emphasis on the development of programming principles, objectives, program evaluation and applicable leadership theories and principles. Development and execution of a comprehensive program of campus-wide or broader scope is required.
- PREREQ: HESC207
- RESTRICTIONS: Open to health behavior management majors with a concentration in recreation and park administration or sport management.

HESC 263 **LEADERSHIP PRACTICUM** 1
- Students work under the auspices of an appointed professional to develop leadership skills in fitness activities.

HESC 275 **TACTICAL APPROACH TO TEACHING SPORTS** 3
- Uses tactical problems to teach invasion, wall/net and fielding/run-scoring activities. Students will analyze strategies for successful transfer across similar games. Appropriate practices and outcomes of quality physical education programs will be emphasized.
- RESTRICTIONS: Open to HPE majors only.

HESC 276 **PERSONAL COMPUTERS IN HEALTH, PHYSICAL EDUCATION AND RECREATION** 2
- Focuses on the fundamental characteristics of microcomputer systems and their increasing importance in the physical education and recreation areas. Basic concepts of programming as well as an overview of existing software packages.
- RESTRICTIONS: Open to 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 HESC majors only.

HESC 302 **PRACTICUM IN SPORT MANAGEMENT/RECREATION** 1 PF
- A pre-internship professional experience in a sport management/recreation agency. Students work under the auspices of a professional mentor to gain practical experience.
- PREREQ: HESC207 and HESC261
- RESTRICTIONS: Open to Junior and Senior health behavior management majors with concentrations in recreation and park administration or 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: HESC220

HESC 306 **ADVANCED SEMINAR IN SPORTS ORTHOPAEDICS** 1 PF
- Provides student with an understanding of diagnostic and decision making processes for common orthopaedic sports injuries. Rationale for the use of diagnostic tests and principles of consultation and referral will be emphasized.
- PREREQ: HESC220 and HESC305.
- RESTRICTIONS: Open to athletic training majors only or permission of instructor.

HESC 307 **ADVANCED SEMINAR IN SPORTS ORTHOPAEDICS** 1 PF
- Provides student with an understanding of special tests used in the diagnosis of common orthopaedic sports injuries and their anatomic and biomechanical basis.
- PREREQ: HESC220 and HESC305.
- RESTRICTIONS: Open to athletic training majors only or permission of instructor.

HESC 315 **INSTRUCTIONAL STRATEGIES FOR DRUG EDUCATION** 3
- Provides 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 class presentations.
- PREREQ: HESC214 and HESC230.

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: NDT200.
- 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, psychology, ergogenic aids and effects of strength training on the cardiovascular system.
- PREREQ: HESC220.
- RESTRICTIONS: Open to HESC 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 HESC 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 affective age specific educational strategies.
PREREQ: HESC315 IFST401 highly recommended
RESTRICTIONS: HPE majors or permission of instructor

HESC 329 DYNAMICS OF TEAM PROBLEM SOLVING 3
Development of teaming skills and their application in solving real life health-related issues. Topics include facilitation and leadership, dialogue and discussion, team maintenance and development and conflict resolution.

HESC 330 TEACHING COMMUNITY AND MENTAL HEALTH 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: HESC214
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 is placed on skills and competencies necessary for programming and evaluation including needs assessment, research, communication and team process.
RESTRICTIONS: Open to students in HPE or fitness management concentration

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 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. Laboratory section involves participation and skill development in a variety of outdoor recreation activities.

HESC 342 SURVEY IN ADEQUATE 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 347 LEGAL ASPECTS OF SPORTS MANAGEMENT 3
An introduction to the legal system and liability issues of tort law, agency law, antitrust labor law, and constitutional law as they apply to professional and amateur sports.
RESTRICTIONS: Open to 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: HESC220
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 indepth 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
A survey in figure skating science covering the basics of coaching and teaching, including an in-depth review of the instructional and competitive programs of the Ice Skating International Association and U.S.F.S.A. Extensive study and work in the basic badge programs of the I.S.I.A. and U.S.F.S.A.
RESTRICTIONS: Open to figure skating science majors only

HESC 356 FIGURE SKATING PRACTICUM II 3
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 I 3
Supervised clinical experience in athletic training. Focuses on development of competencies related to assessment and evaluation, therapeutic modalities and health care administration.
PREREQ: HESC257
RESTRICTIONS: Restricted to students in the athletic training major

HESC 358 ATHLETIC TRAINING PRACTICUM III 3
Supervised clinical experience in athletic training. Focuses on development of competencies related to assessment and evaluation, pharmacology, risk management and injury prevention and general medical conditions and disabilities.
PREREQ: HESC357
RESTRICTIONS: Restricted to students in the athletic training major.

HESC 370 METHODS/MATERIALS: 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: HESC140, HESC210, HESC250 and HESC276. Satisfactory completion of Praxis I.
COREQ: HESC380
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 380 METHODS/MATERIALS: 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: HESC140, HESC210, HESC250 and HESC276. Satisfactory completion of Praxis I.
COREQ: HESC370
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 will be introduced. Activities, low-level group initiatives through participation on high level "ropes courses" is 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 using communication skills, teaching skills, sport psychology and managing team related responsibilities and relationships including risk management.
RESTRICTIONS: Open to coaching science minors only.

HESC 395 SPORT MEDICINE PHARMACOLOGY 3
Provides 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, pharmacokinetics, pharmacokinetics, drugs affecting skeletal muscle, pain and inflammation.
RESTRICTIONS: Open to athletic training majors only.

HESC 400 RESEARCH METHODS 3
Introduction to research on health and physical activity, including types of research, research design, matching appropriate statistical tools with research designs, research writing style and format and ethical issues related to research.
PREREQ: Junior or Senior standing. Completion of STAT200 with at least a C.
RESTRICTIONS: Restricted to majors in the Department of Health and Exercise Sciences.

HESC 401 FOUNDATIONS OF HUMAN SEXUALITY 3
See IFST401 for course description.

HESC 403 PRACTICUM IN ADAPTED PHYSICAL EDUCATION 3-9 PF
Experience working with special children in a physical education setting. Clinical experiences may include work with a particular group of disabled children (e.g. mentally retarded, visually or hearing impaired or orthopaedically handicapped) Variable time involvement up to a maximum of 14 weeks.
PREREQ: HESC342.
RESTRICTIONS: Open to HESC 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: For students in the athletic training curriculum.
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: HESC400 and HESC411 or HESC420

HESC 409 THERAPEUTIC MODALITIES 4
Provides both theory and clinical experience in the use of the most common types of therapeu-
tic modalities utilized in sports medicine.
RESTRICTIONS: For students in athletic training education curriculum.

HESC 414 METHODS AND MATERIALS IN HEALTH EDUCATION 3
Emphasis on health education in the school curriculum: curriculum content and organiza-
tion of materials for instructional purposes.
PREREQ: HESC210, HESC214, HESC276, HESC315, HESC325 and HESC330.
Satisfactory completion of Praxis I
RESTRICTIONS: Junior status, upper division clearance, minimum gpa of 2.50, major
index of 2.75 and completion of all skills requirements

HESC 420 FUNCTIONAL HUMAN ANATOMY 4
Anatomical individuality, functional significance and human performance interpretations
involved through the consideration of muscular, skeletal and nervous systems. Laboratory
experience emphasizes the meaning and significance of musculoskeletal movements and util-
izes prospected human specimens, models, arrays, 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 oper-
ations and manage these types of facilities.
RESTRICTIONS: Open to Junior health behavior management majors

HESC 426 BIOMECHANICS I 4
Studies the scientific principles of biomechanics. Develops fundamental understanding of
the mechanics of the human body at rest or in motion. Includes basic principles of statics
and dynamics as applied to the quantitative analysis of selected activities in sport
RESTRICTIONS: Open to 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: HESC276, HESC426 and MATH242.

HESC 430 PHYSIOLOGY OF ACTIVITY 3
Study of integration of the body systems in performance of exercise, work and sports activ-
ities. Performance of exercise activities by the human body under environment, stress sit-
uations.
PREREQ: HESC220
COREQ: HESC431.

HESC 431 PHYSIOLOGY OF ACTIVITY LABORATORY 4
Laboratory experiences include the measurement of physiological parameters under exercise
conditions.
COREQ: HESC430.

HESC 432 BASIC EXERCISE PRESCRIPTION 3
Studies the principles and guidelines (as established by the American College of Sports Medicine) for the development of exercise programs for apparently healthy populations
Emphasis on individualization of fitness programs for optimum client participation
PREREQ: HESC430.
RESTRICTIONS: Open to EKSS majors only.

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 facili-
ties development.
RESTRICTIONS: Open to EKSS majors only.

HESC 437 SPORT MARKETING 3
A study of basic marketing concepts with applications to sport organizations, both ama-
teur and professional. Topics include promotions and public relations, sport consumer
behavior, strategic market planning, marketing information management, marketing com-
munications and sponsorship.
PREREQ: BUSAD100
RESTRICTIONS: Open to Junior and Senior health behavior management majors with
a concentration in sport management.

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

HESC 445 CONCEPTS OF PHYSICAL FITNESS TESTING 3
Combines both practical and theoretical aspects of physical fitness training. Special ref-
erence made to aging, youth fitness, diabetes, arthritis, obesity and obese individuals
PREREQ: HESC265, HESC430, HESC431 and HESC432

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 vol-
ume, 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 HESC426
with at least a C.
RESTRICTIONS: Restricted to majors in the Department of Health 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

HESC 449 ADVANCED TOPICS IN SPORTS MEDICINE 3
Exposure to a variety of medical specialists and allied health professionals including phys-
ical therapists, dentists, nurses and specialists in orthopaedics, neurology, cardiology,
pediatrics, internal medicine, ophthalmology and physical medicine.
RESTRICTIONS: Open to athletic training majors only

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 adminis-
trative aspects of testing, metabolic calculations, a variety of testing protocols, basic exer-
cise physiology and exercise prescription

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

HESC 455 FIGURE SKATING PRACTICUM III 3
Concentration on advanced teaching/coaching techniques related to the skill required in
I.S.A. and U.S.F.S.A. Levels with an analysis of progression and sequencing. Seminar ses-
tions 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
Direct involvement in the teaching/coaching of beginner elite national and world com-
petitors 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
Supervised clinical experience in athletic training. Focuses on development of competen-
ces related to therapeutic exercise, psychosocial intervention and referral and profes-
sional development and responsibilities.
PREREQ: HESC358.
RESTRICTIONS: Restricted to students in the athletic training major

HESC 460 COACHING/PERFORMANCE PRACTICUM 3 PF
Practical coaching/performance experience in a scholastic/clinical setting with the sea-
son 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, HESC332 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 HESC320,
HESC432 and HESC447 with at least a C.

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 sec-
ondary schools. Provides a forum for analyzing and discussing topics of interest to pre-
professionals and includes participation of professionals from the school community.
COREQ: EDUC400.
RESTRICTIONS: Open to HPE majors only
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, ballpark history 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 instruction 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 special and stress tests will be discussed.

**PREREQ:** HESC 220 and HESC 305

**RESTRICTIONS:** Restricted to students admitted to the athletic training major.

HESC 481 **LOWER EXTREMIT Y AND SPINE EVALUATION** 3
Evaluation of the lower extremity, lumbar spine and sacroiliac joint. SOAP format evaluation, on-field evaluation, mechanics and pathomechanics of joint movement, detailed anatomy, etiology of specific injuries and special and stress tests will be discussed.

**PREREQ:** HESC 220 and HESC 305

**RESTRICTIONS:** Restricted to students admitted in the athletic training major.

HESC 484 **WOMEN IN SPORTS** 3
Contemporary view of women in the world of sports. Emphasis on biological, physiological, sociological, psychological, historical and legal aspects. May be crosslisted with WOMS 484.

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
Reviews the pathophysiology of cardiovascular disease, including the theory and principles of major risk factor development. Prepares students to plan, create and implement health promotion programs in the workplace, focusing on program selection, promotion, evaluation and expansion.

**PREREQ:** HESC 430 and HESC 432

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 research methods 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 604 **SPORTS IN AMERICA: A HISTORICAL PERSPECTIVE** 3

**HESC 605 PROGRAM DEVELOPMENT IN ATHLETIC INJURY REHABILITATION** 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 return to competition. Involves a series of case studies and planning/implementing a rehabilitation program for a specific injury.

**RESTRICTIONS:** For students in the athletic training curriculum.

HESC 608 **CURRICULUM IN PHYSICAL EDUCATION** 3
Curriculum design content, foundations and related research topics as well as principles of supervision appropriate for the student teacher, cooperating teacher and/or the chairperson of a physical education department.

HESC 610 **SEMINAR: TEACHING LIFETIME ACTIVITIES** 3
Concentration on five lifetime sports, including archery, badminton, bowling, golf and tennis. Discusses methods of teaching the skills, including proper progression, skill analysis, use of teaching aids and safety responsibilities. Presents an opportunity to upgrade individual proficiency level in each activity.

**RESTRICTIONS:** Open to graduate students only.

HESC 612 **MECHANICAL ANALYSIS OF SPORT SKILLS** 3
A mechanical interpretation and analysis of human performance in sport based upon a critical review of current research. Practical demonstrations and exercises are used to further identify the important laws that govern motion of the human body. Stresses the relationship between anatomical structure and mechanical function.

**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 628 **PHOTOGRAPHY IN SPORT** 3
Discusses basic design and operation principles of photographic systems with emphasis on use and application in sport activities. Deals primarily with black and white film and color slides. Extensive classroom experiences provided.

HESC 629 **SPORT PSYCHOLOGY SKILLS TRAINING** 3
Presents the study in a field setting with university athletes and students. Emphasis on research and designing of workshops and lectures for university, high school and recreational teams and/or individual athletes in the areas of psychological skills training to improve individual and team performances.

HESC 635 **SEMINAR IN TEACHING PHYSICAL EDUCATION** 3
Major goal is educational instructional improvement in elementary and secondary settings. Students critique pedagogical research and study methods of systematic observation of instruction and analysis of effective teaching behavior. Examines pedagogical trends, current issues and coaching methods.

HESC 640 **CREATIVE DANCE FOR CHILDREN** 3
Focuses on creative dance for elementary school children. Includes theory related to the structure and content of creative dance lessons and ideas and techniques for planning lessons.

HESC 644 **OUTDOOR EXPERIENTIAL EDUCATION FOR TEACHERS AND RECREATORS** 3
Focuses on development of a broad spectrum of curriculum materials and instructional aids to be 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 helps 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 **PERCEPTUAL MOTOR DEVELOPMENT** 3
Analysis of perceptual motor concepts and theory. Emphasis on screening techniques utilized to identify perceptual motor difficulties in children and development of remediation programs.

HESC 659 **CARDIOPULMONARY REHABILITATION PRACTICUM** 1
Students will assist in the phase III cardiac and pulmonary rehabilitation.

HESC 660 **ADMINISTRATION OF PHYSICAL EDUCATION AND SPORTS** 3
Provides students with knowledge of the basic principles of administration with specific application to the areas of physical education and athletics.

HESC 664 **FIELD STUDY IN PHYSICAL EDUCATION AND SPORT** 3
Affords an opportunity to apply information derived from the graduate course of study to a physical education or sport setting. Includes selecting, organizing, conducting, evaluating and presenting a seminar on a project, plus developing a professional portfolio.

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, hypertrophy and infarction.

**HESC 667 **CRITICAL ISSUES IN PHYSICAL EDUCATION AND ATHLETICS** 3
Focuses on three themes: historical perspective; current issues facing physical education and athletics; and trends toward the future in physical education.

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 cardiotocography.

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:** CB 11 and CV II.

**HESC 688 **ELECTROMYOGRAPHIC KINESIOLOGY** 3
Introduction to the theoretical basis and practical application of electromyography. Topics include the electrophysiological basis of muscle actions, mechanical properties of muscle, EMG recording and processing methods and applications of EMG to the study of human motion.
HEALTH AND EXERCISE SCIENCES

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 HESC800.
PREREQ: HESC690 and HESC800.
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 801 SKELETAL MUSCLE PHYSIOLOGY 3
Topics include development, physiology, metabolism, and adaptation (at the whole muscle to molecular level).
PREREQ: Undergraduate background in exercise physiology.
RESTRICTIONS: Class size will be limited to 15.

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 work 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 will be limited to 15.

HESC 807 MOTOR LEARNING 3
Evaluation and application of research literature concerned with motor learning as it relates to teaching elementary and secondary physical education. Laboratory work includes major research techniques used in motor learning. Research proposal required at completion of the course.

HESC 810 BIOMECHANICS OF SPORTS 3
Mechanics of human motion. Investigation into the action of forces on bodies during the performance of sport activities.
PREREQ: College algebra, trigonometry and calculus.

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

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 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
Introduction to African history south of the Sahara, from the earliest times to 1914. Includes major themes in African history: pre-colonial African political, social and economic institutions; diversity in African political organizations; slave trade and colonialism. 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 CIVILIZATIONS: CHINA 3
A survey of major aspects of Chinese civilization, relating the past to the present.

HIST 138 EAST ASIAN CIVILIZATIONS: 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. Topics and approach vary with the instructor.

HIST 210 WAR AND SOCIETY 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, large-enrollment course on the history of the American Civil Rights Movement. Deals with the crucial years from 1954 to 1970 and examines the larger historical context of American race relations. May be cross-listed with BAMS220.

HIST 221 FILM AND AMERICAN SOCIETY 3
Examines how American political, social and cultural beliefs found expression in American feature films from World War II through the 1990s. Weekly lectures and classic films such as On the Waterfront, Dr. Strangelove, Bonnie and Clyde, others.

HIST 241 HISTORY OF CHRISTIANITY TO 1300 3
A survey of the evolution of Christianity from its origins to 1300.

HIST 245 MEDIEVAL KINGS AND QUEENS 3
An intensive examination, based on primary sources, of the deeds and lives of selected medieval kings and queens of the Middle Ages, Byzantine rulers and the popes.

HIST 250 ROOTS OF CONTEMPORARY CULTURE 3
Main developments in literature and the arts from the early 18th century to World War II from a social and historical perspective. Stresses the impact of social and political change on conceptions of the function of the arts.

HIST 254 JEWISH HOLOCAUST: 1933-1945 3
Focuses on the infamous "Final Solution," with particular emphasis on the roots of Anti-Semitism, National socialist policies and plans, ghetto and camp life, the Einsatzgruppen, resistance, the politics of rescue and the art and literature of the Holocaust. May be cross-listed with JWST254.

HIST 260 SEMINAR 3
Introduction to the study and writing of history. Individual instructors take different approaches but all stress the nature and verification of historical evidence, its interpretation and its communication in writing.
RESTRICTIONS: Open to history majors only.

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 278 HISTORIC CULTURES OF THE MIDDLE ATLANTIC REGION 3
See ANTH278 for course description.

HIST 280 SCIENCE AND CIVILIZATION 3
Changing conception of the universe and of humanity's place within it, as seen in ideas and institutions of science from ancient to modern times.
HIST 291 *Women's History through Film* 3
See WOMS291 for course description

HIST 300 *Women in American History* 3
The position of women in American life viewed from a historical perspective including such topics as home and family life, women in the work force, women as agents of social change and feminism. May be cross-listed with WOMS300.

HIST 301 *The Worker in American Life* 3
Survey of the major historical transformations affecting the lives of American working people and their social, political, economic and cultural responses to these changes. Special attention given to how workers' world views and the nature of work have evolved over the course of American history.

HIST 302 *The World in Our Time* 3
An examination of current events within the context of historical forces

HIST 303 *American Intellectual History* 3
The development of principal patterns of American religious, social and scientific thought before 1865.

HIST 304 *American Intellectual History* 3
The development of principal patterns of American religious, social and scientific thought after 1865.

HIST 305 *Images of Race and Ethnicity in American Culture* 3
Study of how images have shaped attitudes toward race and ethnicity in American culture from the colonial era to the present. Will study Native Americans, African-Americans and immigrants. Visual materials include works of fine art, folk art, photographs, cartoons, motion pictures and popular illustrations. May be cross-listed with BAM3305.

HIST 306 *History of American Foreign Policy* 3
Foreign policy of the United States and the nation's changing relations with the outside world. Covers the period 1900 to the present. Special attention given to presidential personality-how a President's background and personality affect the making of foreign policy.

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 *U.S. 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 312 *Crime and Punishment in American History* 3
See CRJUS12 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 315 *Postwar America: The United States Since 1945* 3
A social, intellectual and political history of the United States from the death of Franklin D. Roosevelt to the resignation of Richard M. Nixon. Topics covered are the origins of the cold war, Truman, McCarthyism, the 1950's, JFK, LBJ, and Nixon and Watergate.

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 mixed 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 CRJUS24 for course description

HIST 325 *History of Black America to the Civil War* 3
See BAM3504 for course description

HIST 326 *History of Black America Since the Civil War* 3
See BAM3506 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 POSC329 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 victory?

HIST 331 *History of Caribbean I* 3
Examines major themes in Caribbean history from the pre-Columbian period to the end of slavery in 1838. Discussion of the demographic and ecological consequences of European contact, sugar and slavery, the evolution of creole cultures and slave resistance. May be cross-listed with BAM331.

HIST 332 *History of Caribbean II* 3
Examines the period from 1838 to the present. Includes a discussion of the social and economic adjustments to emancipation, the making of plural societies with the importation of Asian laborers, African imperialism and political and social movements of the twentieth century. May be cross-listed with BAM332.

HIST 336 *Topics in Latin American History* 3
History and culture of Latin American peoples.

HIST 337 *Ancient Religion and Civilization* 3
Outlines religion in Europe and the Near East from the Paleolithic period to the rise of Islam. Covers religious beliefs, rituals, death and beliefs of ancient man and construction and use of religious edifices.

HIST 338 *Greek-Roman Sport-Recreation* 3
Covers period 2000 B.C. to 6th century A.D. from point of view of spectator and participant: use of ancient authors in translation, artistic representations and secondary literature. Extensive use of slides.

HIST 339 *Topics in Modern European History* 3
A reflection of developments in modern European history from the First World War to the present. Emphasis on political, social, cultural and economic patterns of the period, complemented by visits to museums and appropriate historic sites.

HIST 340 *Ancient Near East and Greece* 3
Stresses such themes as the way in which the world view of the ancients was different from ours, and the relationship between the individual and society. Readings in ancient historical works and ancient literature. Extensive use of slides.

HIST 341 *Ancient Rome* 3
Students encouraged to form opinions on such questions as why and how Rome came to rule its empire; why Julius Caesar was murdered; and why Augustus succeeded where Julius Caesar had failed. Readings in ancient sources. Extensive use of slides.

HIST 342 *Barbarian Europe* 3
A survey of political, social, cultural and economic developments in Europe between 300 and 1050.

HIST 343 *Medieval Europe: 1050-1350* 3
A survey of political, social, cultural and economic developments in Europe between 1050 and 1350.

HIST 344 *Renaissance Europe* 3
Europe from the late 13th to the early 16th century, with stress on the consequences of the Black Death, the reform of the Church and the flowering of cultural and intellectual life in Italy and northern Europe.

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HIST 411  Seminar in American History  3

HIST 430  Seminar in Twentieth Century Latin American Revolutions  3
Focuses on four 20th century Latin American revolutions. Concentrates on the historical background and events of the Mexican, Guatemalan, Cuban and Nicaraguan revolutions.

HIST 439  Women and Revolution in Africa  3
Discusses the critical roles played by women in African revolutionary movements. Why did women join these revolutionary movements? What is the relationship between feminism and revolution? May be cross-listed with WOMS439.

HIST 440  Seminar in Africa Under Colonial Rule  3
Introduces various Colonial policies of the European powers in Africa, emphasizing the comparisons and contrasts among these policies. Attention paid to the effect of Colonialism on Africa's economic, social and political development.

HIST 444  Seminar: Women in the Islamic Middle East  3
Examines the major developments, themes and problems in women's history in the Middle East from the advent of Islam to the present. By tracing women's legal status, sexual morality, family and social life, and female economic and political participation, it seeks to shed light on the process of women's roles in society and to challenge the notion that gender divisions and roles have been static over time. May be cross-listed with WOMS444.

HIST 446  Seminar in Industrial Revolution in Europe  3
The origins and spread of rapid, sustained economic growth since 1750.

HIST 449  Seminar: Science, Technology and Medicine  3
Topics vary. May include topics such as The American System, History of Chemistry, or History of Engineering.

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.

HIST 454  Vernacular Architecture  3
The study of traditional American folk architecture from the 17th century to the present. Examination of changes in construction, house types and decoration in vernacular buildings, as well as issues of regional differences and individual craftsmanship. May be cross-listed with ARTH454.

HIST 459  Seminar in United States Urban History  3
The process of urbanization in America with special emphasis on the Philadelphia-Wilmington area.

HIST 463  Historical Archaeology and the Public  3
See ANTH463 for course description.

HIST 466  Independent Study  1-6

HIST 470  Seminar in Ancient History  3
Topics vary. May include topics such as Slavery in Antiquity, The Archaeology of the Ancient World or The Greek City State.

HIST 471  Seminar in Medieval History  3
Topics may include Europe in the 10th Century, Europe in the 11th Century, and Women in Europe to 1600. May be cross-listed with WOMS472.

HIST 473  Seminar in Early Modern European History  3
Topics vary. May include topics such as Renaissance Humanism, or Women in Europe, 1100-1600.

HIST 474  Seminar in English History  3

HIST 475  Seminar in Modern European History  3
Topics vary. May include The Holocaust, The Cold War, Hitler's Germany, or The Age of Revolution. May be cross-listed with WOMS475.

HIST 477  Seminar in Latin American History  3
Topics vary. May include topics such as History of Mexico, History of the Caribbean or Slavery in the New World.

HIST 479  Seminar 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 483  Seminar in Comparative History  3
Topics vary, but all compare some aspect of American with European history or Western with non-Western history.

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 experiences.

HIST 601  United States Historiography  3
Introduces changing interpretations of United States history and examines the developments of the American historical profession.

HIST 602  European Historiography  3
Introduces changing interpretations of various aspects of European history.

HIST 603  Historiography of Technology  3
Introduces major historiographic issues and examines the development of this subfield of history.

HIST 604  History and Philosophy  3
Survey of major historians from the Bible and Herodotus through the 19th century, together with some of the most influential philosophers of history.

HIST 605  History of Theories in Material Culture  3
See EAMC605 for course description.

HIST 606  Issues in American Material Culture  3
See EAMC606 for course description.

HIST 607  Readings in American Material Life  3
Readings of recent monograph and serial publications pertaining to American Material Life. Topics include Landscape, Architecture, Work, Department, Family and Religion. Discussion and interpretation of authors' arguments. Review of material life historiography. Emphasis on broad synthesis of material culture literature.

HIST 608  Public History: Resources, Research and Practice  3
Team-taught seminar that acquaints students with the function and resources of American historical organizations and how to use these resources in the non-academic setting for productive historical research. Addressed to those pursuing careers in public history and teaching and scholarship. May be cross-listed with MSST608.

HIST 611  Seminar in American History  3

HIST 614  The American Suburb  3
See UAPP614 for course description.

HIST 617  Seminar in Gender and Women's History  3
Reading seminar. Topics vary and may include U.S. Women's History, U.S. Women's History in Comparative Perspective, Gender in History, or European Women's History.

HIST 620  The Invasion of America  3
Reading seminar devoted to exploring the experiences of Native Americans in the presenaday United States and Canada from the sixteenth century to the Indian Removal of the 1830s.

HIST 621  Seminar on American Society and Culture before the Revolution  3
Reading seminar in American society and culture from the first settlements to the Revolution.

HIST 623  Age of the American Revolution  3
Reading seminar on political and constitutional changes from 1760 to 1790 as well as the social and cultural history of that period.

HIST 625  U.S. 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  U.S. 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 U.S. 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 U.S. IN THE TWENTIETH CENTURY 3
Reading seminar on 20th century U.S. history

HIST 634 METHODS IN HISTORIC PRESERVATION 3
See UAPP630 for course description.

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 SOCI637 for course description.

HIST 638 AFRICA UNDER COLONIAL RULE 3
Introduces various Colonial policies of the European powers in Africa, emphasizing the contrasts and comparisons among these policies. Attention paid to the effect of Colonialism on Africa's economic, social and political development.

HIST 646 INDUSTRIAL REVOLUTION OF EUROPE 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 UAPP629 for course description.

HIST 654 VERNACCULAR 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 655 ARCHIVAL MANAGEMENT I 3
Survey of the various types of archival institutions and practices, the principles of manuscript curatorship, the problems associated with huge archives generated by modern bureaucracies.

HIST 656 ARCHIVAL MANAGEMENT II 3
Internship and paper

HIST 657 HISTORICAL ARCHAEOLOGY AND MUSEUM INTERPRETATION 3
Introduction to the methods and practices of historical archaeological research from a museum perspective. Readings, demonstration techniques and field work.

HIST 660 HUMANITIES COLLOQUIUM 3

HIST 663 HISTORICAL ARCHAEOLOGY AND THE PUBLIC 3
See ANTH663 for course description.

HIST 671 STUDIES IN MEDIEVAL HISTORY 3
Topics vary and may include Europe in the 10th Century, Europe in the 11th Century, and Women in Europe to 1600.

HIST 673 STUDIES IN EARLY MODERN EUROPEAN HISTORY 3
Topics vary and may include Renaissance Humanism, Women in Europe, 1100-1600 or Rome and Religion.

HIST 675 SEMINAR IN MODERN EUROPEAN HISTORY 3
Topics vary and may include The Holocaust, The Cold War or Hitler's Germany.

HIST 677 STUDIES IN LATIN AMERICAN HISTORY 3
Topics 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 and may include History of Southeast Asia, 20th Century China or Japan in the 20th Century

HIST 683 STUDIES IN COMPARATIVE HISTORY 3
Topics vary, but all compare some aspect of American history with European history or Western history with non-Western history.

HIST 692 PLANNING A COURSE OF INSTRUCTION 3
Aims, course planning, instructional strategies, evaluation and selection of materials for teaching history and the social sciences in secondary schools.

HIST 693 SEMINAR: PROBLEMS IN TEACHING HISTORY AND SOCIAL SCIENCE 3
Helps beginning teachers carry out planned instructional strategies, analyze their teaching behavior, evaluate the effectiveness of their instruction and modify their instructional plans based on their teaching experience.

HIST 802 RESEARCH AND WRITING SEMINAR: EUROPEAN HISTORY 3
Original research and writing on subjects in European history. Evaluation of sources, interpretation of evidence and presentation of research papers. Emphasis on professional standards of criticism.

HIST 803 RESEARCH AND WRITING SEMINAR: AMERICA TO 1860 3
Original research and writing on subjects in American history before 1860. Evaluation of sources, interpretation of evidence and presentation of research papers. Emphasis on professional standards of criticism.

HIST 804 MUSEUM INTERNSHIP 3
See MIST804 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 Library and Archives 3
Original research and writing on a variety of subjects based on research materials available at the Hagley Museum and Library. Evaluation of sources, interpretation of evidence and presentation of research papers. Emphasis on professional standards of criticism.

HIST 808 RESEARCH 1-9 PF

HIST 809 MASTER'S THESIS 1-6

HIST 964 PRE-CANDIDACY STUDY 1-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.

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

HIST 969 DOCTORAL DISSERTATION 1-12 PF

HEALTH PROMOTION

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.

PREREQ: HESC490

RESTRICTIONS: Open to graduate students only

HLPR 807 TOPICS AND ISSUES IN HEALTH PROMOTION 3
Using a seminar format and a multidisciplinary approach to study current issues in health promotion, different faculty review issues from the viewpoint of their discipline. Students participate in the selection of topics and are required to prepare and present an in-depth report on multiple issues.

RESTRICTIONS: Open to graduate students only

HLPR 809 HEALTH BEHAVIOR 3
Health and behavioral science theory and research provide a framework for the analysis of health-related behaviors across the lifespan. Emphasis 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 823 HUMAN RESPONSE TO STRESS 3
Provides an overview of current models and theories of stress, a review of multidisciplinary approaches to the study of stress in applied settings, and a reading knowledge of selected research findings in the field of stress.

RESTRICTIONS: Open to graduate students only.
for building decision-making confidence on the one hand, they relate to the hospitality industry
affords an opportunity to apply information derived from the graduate program of study to a health promotion setting or specific population. Involves selecting, organizing, conduct-
140 MANAGEMENT, NETWORKS
CRS

HLPR 280 Property Management 3
Affords an opportunity to evaluate the service delivery systems of service organizations, focusing on the methodologies unique to each property and group served by anyone.

HLPR 281 Quantity Food Service Management 2
Principles of quantity food service management with an emphasis on quality and cost control. Topics include menu planning, sanitation, and technical operations, as well as labor, food, and energy cost containment.
PREREQ: HRIM 201 and NTDT 200
COREQ: HRIM 325

HLPR 282 Retail Design and Consumer Behavior 3
See CNST 322 for course description.

HLPR 288 Management of Lodging Operations 3
Management of front desk, housekeeping, maintenance, security and conference operations.
PREREQ: HRIM 280

HLPR 289 Management of Food and Beverage Operations 3
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

HLPR 290 Managerial Accounting and Finance in the Hospitality Industry 3
Generation and analysis of quantitative information for planning, control and decision making by managers at various levels. Use of timely and relevant information as a vital tool in management.
PREREQ: ACCT 200 or both ACCT 207 and ACCT 208

HOTEL RESTAURANT INSTITUTIONAL MANAGEMENT

HRIM 140 Information Technology and Services Management 3
Overview of the service industry, its history, current status and future trends. Uses an integrated approach to the study of services, stressing the importance of understanding the underlying processes of service delivery and the way new technologies are affecting them.

HRIM 144 Hospitality Information Management, Networks and Systems 3
Examines network architectures that support hospitality and retail systems, such as LANs, WANs, and Internet-based networks. Students plan and define the supporting telecommunications and cable infrastructure needed to create data highways in today's hotels and retail operations, using workflow analysis to shape the flow of information.

HRIM 180 Introduction to Hospitality 3
Objectives within the industry, the means of achieving these objectives and opportunities for career development. History of hospitality, current trends and related issues.

HRIM 201 Food Principles 2
Examines the chemical and physical properties of food and its preparation. Includes the composition and structure of food, functional properties of ingredients, and methods to obtain desired sensory and nutritional qualities.
COREQ: HRIM 211

HRIM 211 Food Principles Laboratory 1
Principles of food selection and preparation as related to the chemical and physical properties of food. Includes the composition and structure of food, functional properties of ingredients, and methods to obtain desired sensory and nutritional qualities.
COREQ: HRIM 201

HRIM 212 Club Management 3
Provides an overview of elements unique to club management such as the nature of private membership, investment, governance, club house operations, food and beverage operations, elements of quality service, financial structures of clubs, accounting and private club marketing.

HRIM 214 Issues in Tourism Management 3
Examines the scope and organization of the tourism industry, motivations for travel, and the management of micro and macro tourism resources. Economic, social, political, and environmental impact of tourism are considered along with the issue of sustainable development within the industry.

HRIM 215 Meeting and Conference Management 3
Development of management strategies applicable to meeting and conference management including the methodologies unique to each property and group served by any one operation.

HRIM 217 Catering Management 3
Application of management principles to the catering function. Topics include: developing catering management; catering menu planning and design; on-premise versus off-premise catering management; and food production. Students plan and implement actual catered events.

HRIM 218 Beverage Management 3
Beverages are a complex product category with legal and social issues that require special attention from management. Emphasizes legal and ethical issues associated with serving alcoholic beverages, an in-depth study of wine, mixology, inventory control, and profitability of beverage management.

HRIM 219 Quality Management for the Hospitality Industry 3
Examines the quality revolution in the hospitality industry. Control charts, Pareto charts, scatter diagrams, and other tools used in re-engineering, re-engineering, and continuous quality improvement are explored. Integrates principles of customer quality focus and organizational behavior as they apply to the hospitality industry.

HRIM 230 Decision-Making Skills and Techniques 3
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 235 Assessment and Evaluation in Service Delivery Systems 3
Introduction to the research process as it applies to the evaluation of service delivery systems, including design, data collection, analysis, interpretation and reporting of findings. Special emphasis is placed on the development and use of service delivery evaluation instruments.

HRIM 250 Hospitality Services Management 3
Examination of the strategic and general management issues facing profit and not-for-profit service organizations. Emphasizes the unique characteristics and operations of service organizations, concentrating on functions critical to the effective delivery of service: marketing, operations and human resources.

HRIM 310 Hospitality Virtuosi 3
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 311 Hospitality Contract Management 3
Reviews contract management issues as they pertain to the hospitality industry, non-commercial and recreational food service, and facilities management. Emphasizes the development of contracts, bidding and negotiation, and the procedures and management of contracts.

HRIM 313 Principles of Gaming Management 3
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 Secrecy Act.

HRIM 316 Cross Cultural Etiquette and Protocol 3
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 to 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 3
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 2
Principles of quantity food service management with an emphasis on quality and cost control. Topics include menu planning, sanitation, and technical operations, as well as labor, food and energy cost containment.
PREREQ: HRIM 201 and NTDT 200
COREQ: HRIM 325

HRIM 364 Hospitality and Industry Web-Based Marketing 3
Provides the information necessary to understand the world of online service industry marketing. Through the use of case studies and examples, students learn how to manage the design, implementation and evaluation of web-based marketing programs.

HRIM 365 Hospitality Franchise Management 3
Provides students with the necessary background to understand and operate under management contracts, franchise agreements and national and international ventures as they relate to the hospitality industry.

HRIM 366 Independent Study 1-6

HRIM 380 Management of Lodging Operations 3
Management of front desk, housekeeping, maintenance, security and conference operations.
PREREQ: HRIM 280

HRIM 381 Management of Food and Beverage Operations 3
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 3
Generation and analysis of quantitative information for planning, control and decision making by managers at various levels. Use of timely and relevant information as a vital tool in management.
PREREQ: ACCT 200 or both ACCT 207 and ACCT 208
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 information system. Multi-unit consolidations using traditional polling techniques and innovative web-based consolidations are the key to organization of data into an up-to-date and accurate source of management information for analysis.

HRIM 458  Entrepreneurship in Hospitality  
Provides students with knowledge of entrepreneurship in the hospitality industry. Students will become familiar with owning and managing hospitality operations.

HRIM 466  Independent Study  
Practical and applied work in a hospitality industry environment involving learning experiences specifically designed to meet the needs of the student.

HRIM 480  Human Resources Management in the Hospitality Industry  
Techniques and philosophies of personal 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 apply 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.

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 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 life cycles, positioning and packaging. Includes the latest trends in product development and theoretical and practical issues related to multi-unit operations.

PREREQ: HRIM 602

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 industry. Examines the structures, cultures and goals of organizations for the purpose of developing effective customer service management strategies.

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 603, 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 687  Management Systems in the Hospitality Industry  
Examines issues surrounding the implementation of information technology in supporting hospitality operations from a guest service perspective and decision making from the viewpoint of management. Case studies and review of various software utilized to understand the various subsystems in a hospitality property.

PREREQ: HRIM 601

HEALTH SERVICES ADMINISTRATION

HSAD 818  Roles of Healthcare Providers  
See NURS803 for course description

HSAD 836  Health Administration Theories  
See NURS836 for courses description

COREQ: HSAD 818

HSAD 837  Health Planning Strategies  
See NURS836 for course description

PREREQ: HSAD 836

HSAD 838  Health Services Evaluation  
See NURS839 for course description

PREREQ: HSAD 837

HSAD 864  Health Services Administration Practicum  
See NURS864 for course description

COREQ: HSAD 836, HSAD 837, or HSAD 838

HSAD 868  Research/Scholarly Project  
See NURS868 for course description

PREREQ: Research and statistics and any two of the following: HSAD 836, HSAD 837, HSAD 838

COREQ: HSAD 864

INDIVIDUAL AND FAMILY STUDIES

IFST 101  Introduction to Community and Family Services  
A broad overview of the many services available within the community and state to assist individuals and families in resolving major life concerns and problems. Insights into the human services profession by leaders in the field.

IFST 165  Seminar  
Practical experience for intermediate and advanced students in the field.

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  
Fundamental descriptions of family forms and issues as they affect individual families and cohorts in historical and contemporary perspective. Emphasis on multicultural diversity and social change in families.

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 socialemotional, 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  
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: IFST 221

COREQ: IFST 224
IFT 224  
**Early Childhood Curriculum I: Practicum 2**

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.

IFT 225  
**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; career information; issues; theories and program models; ethical and legal issues; emerging careers; public policy and advocacy. Program observations and interviews.

**PREREQ:** IFST221 or IFST201.

IFT 230  
**Emerging Life Styles 3**

Interdisciplinary approach to the processes stereotyping masculine and feminine behavior issues in women's and men's liberation; and an analysis of the present opportunity structure for individual choices.

IFT 235  
**Survey in Child and Family Services 3**

Introduces the scope of human service agencies focusing on the needs of children and families.

**PREREQ:** IFST101.

IFT 236  
**Infants and Toddlers: Development and Programs 3**

Study of the infant and toddler with emphasis on interrelated growth patterns and processes, appropriate curriculum and stimulation, and the effects of prenatal and perinatal conditions on future development.

**PREREQ:** IFST221.

IFT 270  
**Families and Developmental Disabilities 3**

Focuses on people with developmental disability in the context of their family and culture from a multidisciplinary perspective. Covers disabilities and their causes; changing needs across the life span; gender, cross-cultural and legal issues; and information about prevention/intervention, employment, inclusion, and empowerment. May be cross-listed with PSYC280 and/or SOC280.

IFT 275  
**Human Development Through the Arts 3**

Introduction to issues in individual and Family Studies as viewed through literature, film and other media. Specific genre will vary. Content matched with current and/or classic readings from social sciences. Life span perspective.

IFT 293  
**Honors Short Course 1**

See ARSC293 for course description.

IFT 310  
**Parenting Through the Lifespan 3**

Applied focus on parenting styles, roles, issues and goals through the lifespan. Parent diversity, includes with schools and community, resources, theoretical perspectives, and developmental needs of children and parents are examined.

**PREREQ:** IFST201 or PSYC350.

IFT 328  
**Introduction to the Research Process 3**

Exposure to the research process through attending and critiquing research presentations, reading and reviewing scholarly papers, and development of a variety of research skills, such as instrument design, coding and data entry. Students' work will contribute to the development of a professional portfolio.

**PREREQ:** IFST201 and IFST202.

IFT 329  
**Adolescent Development 3**

Physical, intellectual and social-emotional development of adolescents and youth in the context of the family, peer groups and the community. Emphasis on theories, current research and the transition from adolescence to young adulthood.

**PREREQ:** EDUC202 or IFST201.

IFT 330  
**Helping Relationships 1 PF**

Introduction to the core dimensions of counseling and helping relationships: empathy, respect, genuineness and concreteness. Practice in communicating these levels of the core dimensions that are facilitative to interpersonal functioning.

IFT 332  
**Counseling Theories 3**

Examination of selected counseling theories from a theoretical, personal, functional and philosophical point of view.

IFT 333  
**Development of Human Relationships 3**

Developmental theory and research related to interpersonal and intrapersonal conditions, characteristics, attitudes and behaviors necessary for effective human relationships. Focus on the psychology of the individual, relationship skills, conflict management and intimacy.

IFT 334  
**Experiential Education 3**

Fifty hours of field experience (internship) required combined with a seminar emphasizing career development and personal learning skills. Internship must be arranged and Learning Contract signed prior to first class meeting.

IFT 338  
**Sexuality in Contemporary Society 3**

A multidisciplinary approach to controversial human sexuality issues which examines and addresses societal solutions to these controversies.

IFT 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.

IFT 340  
**Early Childhood Curriculum II 3**

History, research and practical issues in the organization and operation of early childhood programs with an 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.

IFT 346  
**Delivery of Human Services 3**

Present approaches to interviewing and working with individuals and families in a variety of community-based services settings. Discusses prevention, advocacy, and empowerment strategies of community intervention. Explores professional and ethical issues in providing family and community services.

**PREREQ:** IFST101 and IFST235.

IFT 347  
**Human Service Delivery Systems 3**

Focuses on organizational and work related issues, including program development, networking, fund raising, administrative procedures and program evaluation. Basic skills for the development, delivery and administration of a wide range of human service programs including preventive interventions for families and individuals.

**PREREQ:** IFST101 and IFST235.

IFT 350  
**Learning in Community Contexts 3**

See EDUC350 for course description.

IFT 364  
**Field Experiences in Individual and Family Studies 2-4**

Provides opportunities to work/participate in human service agencies, businesses and industry, as well as formal and non-formal educational settings.

**RESTRICTIONS:** May be repeated for up to nine credit hours.

IFT 365  
**Seminar 1-3**

IFT 366  
**Independent Study 1-12**

IFT 380  
**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.

IFT 381  
**Curriculum and Evaluation 3**

Foundations of curriculum development and evaluation as applied to programming in formal and non-formal Home Economics/Family Life educational settings.

**PREREQ:** IFST390.

IFT 390  
**Honors Colloquium 3**

Topics vary within the Individual and Family Studies content; often multidisciplinary. May be cross-listed with WOMS390.

IFT 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. This course deals with sexuality explicit material. May be cross-listed with HESC301 and/or WOMS401.

IFT 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.

IFT 404  
**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 will be studied.

IFT 405  
**Impact of Aging on the Family 3**

Psychological, physical, and financial impact of aging persons on younger family members; increased interdependence and dependence; and family adjustment, both positive and conflicting.

IFT 410  
**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.

**PREREQ:** IFST222 and IFST224.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites and Restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFST 422</td>
<td><strong>Family Relationships</strong></td>
<td>3</td>
<td>Interpersonal relationships and problems in courtship, marriage, and the family in contemporary society. PREREQ: IFST202</td>
</tr>
<tr>
<td>IFST 428</td>
<td><strong>Educational Research and Issues in Human Resources</strong></td>
<td>3</td>
<td>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</td>
</tr>
<tr>
<td>IFST 430</td>
<td><strong>Teaching Family Life</strong></td>
<td>3</td>
<td>Selection, presentation and evaluation of subject matter and materials essential to understanding relationships within the family. Emphasis on needs, interests and abilities of secondary school students. May be cross-listed with WOMS430. PREREQ: IFST221 and IFST422</td>
</tr>
<tr>
<td>IFST 435</td>
<td><strong>Early Childhood Programs for Children with Exceptionalities</strong></td>
<td>4</td>
<td>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</td>
</tr>
<tr>
<td>IFST 438</td>
<td><strong>Leadership Development in Human Sexuality</strong></td>
<td>3</td>
<td>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: IFST230 or IFST401. RESTRICTIONS: Requires permission of instructor. For undergraduate teaching assistants only.</td>
</tr>
<tr>
<td>IFST 445</td>
<td><strong>Family, Community and School Partnerships</strong></td>
<td>2</td>
<td>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.</td>
</tr>
<tr>
<td>IFST 449</td>
<td><strong>Internship in Community Services</strong></td>
<td>3-9 PF</td>
<td>On-the-job experience in a community and family service agency. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>IFST 450</td>
<td><strong>Technology in Early Childhood</strong></td>
<td>3</td>
<td>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: IFST224 and IFST24.</td>
</tr>
<tr>
<td>IFST 452</td>
<td><strong>Assessment of Young Children</strong></td>
<td>3</td>
<td>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: IFST224 or PSYC325.</td>
</tr>
<tr>
<td>IFST 459</td>
<td><strong>Child Development Practicum</strong></td>
<td>1-9 PF</td>
<td>Supervised student teaching experience. PREREQ: IFST435, IFST452 and IFST470. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>IFST 460</td>
<td><strong>Women in International Development</strong></td>
<td>3</td>
<td>See SOC1460 for course description.</td>
</tr>
<tr>
<td>IFST 463</td>
<td><strong>Atypical Infant and Toddler</strong></td>
<td>3</td>
<td>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 IFST246.</td>
</tr>
<tr>
<td>IFST 465</td>
<td><strong>Seminar</strong></td>
<td>1-3 PF</td>
<td></td>
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<tr>
<td>IFST 466</td>
<td><strong>Independent Study</strong></td>
<td>1-12</td>
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<tr>
<td>IFST 470</td>
<td><strong>Families and Children at Risk</strong></td>
<td>3</td>
<td>Deals with sociodemographic 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: IFST221 or PSYC325.</td>
</tr>
<tr>
<td>IFST 475</td>
<td><strong>Topics in Individual and Family Studies</strong></td>
<td>1-3</td>
<td>Selected topics focusing on current issues affecting families from an interdisciplinary and global perspective. May be cross-listed with WOMS475. RESTRICTIONS: Prerequisites vary by topic and instructor.</td>
</tr>
<tr>
<td>IFST 480</td>
<td><strong>IFST Senior Seminar</strong></td>
<td>1-3</td>
<td>Discussion-oriented and problem-centered with emphasis on the role and contributions of the individual to the profession and society.</td>
</tr>
<tr>
<td>IFST 490</td>
<td><strong>Development through the Lifespan</strong></td>
<td>3</td>
<td>Exploration of all segments of the lifespan from a bio-psycho-social perspective. Special emphasis on research and theory concerning families and the lifespan as contexts of development.</td>
</tr>
<tr>
<td>IFST 603</td>
<td><strong>Basic Concepts in Gerontology</strong></td>
<td>3</td>
<td>Theories and practices of gerontology with emphasis on their relationships to the elderly and their needs for the development of resources.</td>
</tr>
<tr>
<td>IFST 604</td>
<td><strong>Interdisciplinary Gerontology</strong></td>
<td>3</td>
<td>Considers theoretical and practical approaches to the dimensions of aging. Emphasis on the provisions of material and human resources to meet the basic needs of food, shelter, clothing and income adequacy. Relevant community programs and government services studied.</td>
</tr>
<tr>
<td>IFST 605</td>
<td><strong>Impact of Aging on the Family</strong></td>
<td>3</td>
<td>Psychological, physical and financial impact of aging persons on younger family members; increased dependence; family adjustment, both positive and conflicting.</td>
</tr>
<tr>
<td>IFST 606</td>
<td><strong>Skills Development in Individual and Family Studies</strong></td>
<td>3</td>
<td>Application of theories and concepts necessary to specific skills and techniques central to working within the student's field of specialization.</td>
</tr>
<tr>
<td>IFST 607</td>
<td><strong>Seminar in Community Development and Nonprofit Leadership</strong></td>
<td>3</td>
<td>See UAPP607 for course description.</td>
</tr>
<tr>
<td>IFST 608</td>
<td><strong>Poverty, Neighborhoods and Community Development</strong></td>
<td>3</td>
<td>See UAPP608 for course description.</td>
</tr>
<tr>
<td>IFST 610</td>
<td><strong>The Hospitalized Child</strong></td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>IFST 614</td>
<td><strong>Evaluation Practices</strong></td>
<td>3</td>
<td>Techniques and methods for assessing professional growth of adults as well as performances and learning of adolescents and special clientele; differentiates evaluation and measurement; explores current issues in evaluation.</td>
</tr>
<tr>
<td>IFST 615</td>
<td><strong>Research Methods</strong></td>
<td>3</td>
<td>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 an research project proposal.</td>
</tr>
<tr>
<td>IFST 621</td>
<td><strong>Family Studies</strong></td>
<td>3</td>
<td>Critical analysis of selected topics and readings in family studies. Explores the family as a social system including the family as a social system, the family as a social system, the family as a social system, the family as a social system.</td>
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<tr>
<td>IFST 623</td>
<td><strong>Applied Human Development in the Schools</strong></td>
<td>3</td>
<td>See EDUC23 for course description.</td>
</tr>
<tr>
<td>IFST 630</td>
<td><strong>Teaching of Family Life</strong></td>
<td>3</td>
<td>Selection, presentation and evaluation of subject matter and materials basic to understanding relationships within the family. Emphasis on needs, interests and abilities of secondary school students.</td>
</tr>
<tr>
<td>IFST 637</td>
<td><strong>Program Planning, Assessment and Evaluation</strong></td>
<td>3</td>
<td>Methods of program planning, summative and formative evaluation and assessment including models, rationales and evaluation techniques as they relate to individual classroom, educational programs and community settings.</td>
</tr>
<tr>
<td>IFST 638</td>
<td><strong>Adolescence and Youth Theories</strong></td>
<td>3</td>
<td>A critical review of the theories pertaining to personal, physical and socio-emotional development of the periods from early adolescence through youth by an examination of significant research.</td>
</tr>
<tr>
<td>IFST 639</td>
<td><strong>Curriculum Methods and Assessment</strong></td>
<td>3</td>
<td>Curriculum and instruction and methods of accountability as they relate to educational programs in community and family service agencies. Includes curriculum development and assessment and developmentally appropriate practices with emphasis on integrating languages and literacy, social sciences, mathematics, science and the arts.</td>
</tr>
</tbody>
</table>
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  INFANT DEVELOPMENT AND STIMULATION  3-6
Cognitive, social, emotional and motor development from conception to two years, with implications for home and group care. Concurrent observation of infants required.

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 multiliteracy 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 communality 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 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 postsecondary 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  3
Sensory, motor and psychosocial development in infancy. Observation and participation with infants. Early diagnosis and assessment of developmental disabilities.

IFST 665  SEMINAR  1-6
Supervised work with children, adults and/or families in educational and/or community settings.

IFST 666  RESEARCH  1-6
Supervised work with children, adults and/or families in educational and/or community settings.

RESTRICTIONS: Credit may be awarded over more than one semester.

IFST 670  FAMILY RISK AND RESILIENCY  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 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 and School Counseling.

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.
RESTRICTIONS: Open only to majors in Counselor Education.

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 and School Counseling.

IFST 685  MULTICULTURAL ISSUES IN COUNSELING  3
Examines the influence of cultural background, including ethnicity, gender, sexual orientation, socio-economic factors, religious preference and age in the counseling relationship. Introduction to nontraditional theories and techniques useful with special populations. Emphasis on increased sensitivity toward cultural influences.
RESTRICTIONS: Open only to majors in Counselor Education and School Counseling.

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 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 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 methods and design course.

IFST 823  PROSEMINAR: SOCIAL AND URBAN POLICY  3
See UAPP 823 for course description.

IFST 828  TRENDS AND ISSUES IN INDIVIDUAL AND FAMILY STUDIES  3
Historical and theoretical frameworks for understanding current issues in research, policy development and practice in individual and family studies. Selected issues identified and analyzed for past and future contribution to the field of study.

IFST 850  CHILD AND FAMILY THEORY  3
Analysis of theories of individual development, behavior and family life, and applications to research models. Emphasis on historical and philosophical influences on theory building, the functions of theories, the process of theory construction and critical comparisons of specific theoretical perspectives on children and families.

407
ITAL 105  ITALIAN I - ELEMENTARY  4
Introduction to the Italian language and development of speaking, listening and reading writing skills through the use of basic texts.

ITAL 106  ITALIAN II - ELEMENTARY/INTERMEDIATE  4
Completion of basic Italian. Increasing mastery of the basic skills of speaking, listening and reading writing.
PREREQ: ITAL105

ITAL 107  ITALIAN III - INTERMEDIATE  4
Review of grammar, continued practice in speaking and writing, reading texts of average difficulty.
PREREQ: ITAL106

ITAL 108  ITALIAN IV - ADVANCED  4
Comprehensive review of grammar and preparation for advanced courses offered in second part of the semester. Class exercises and frequent compositions.
PREREQ: Two to three years of high school Italian acceptable in lieu of Prerequisite.

ITAL 200  ITALIAN GRAMMAR REVIEW  3
Systematic review of fundamental aspects of Italian grammar. Study of special problem areas. Some conversational practice.
PREREQ: ITAL107

ITAL 205  ITALIAN CONVERSATION  3
Practical use of Italian by means of oral reports and discussions. Emphasis on improvement of basic conversational skills. Grammar review and written work when appropriate.
PREREQ: ITAL107

ITAL 206  CULTURE THROUGH CONVERSATION  3
Discussion of topics drawn from contemporary Italian life. Designed for students who wish to broaden their knowledge of Italian culture while improving their oral and cultural language skills.
PREREQ: ITAL107

ITAL 208  CONTEMPORARY ITALY I  3
An introduction to contemporary Italy, its culture, its people, their way of life and the issues confronting them.
PREREQ: Taught abroad only

ITAL 211  ITALIAN READING AND COMPOSITION: SHORT FICTION  3
Reading and discussion of Italian short stories. Several short compositions. Grammar review where appropriate.
PREREQ: ITAL200, ITAL205 or ITAL206

ITAL 212  ITALIAN READING AND COMPOSITION: DRAMA AND PROSE  3
Reading and discussion of some major 20th-century plays and prose texts. Several short compositions. Grammar review where appropriate.
PREREQ: ITAL200, ITAL205 or ITAL206

ITAL 250  INTRODUCTION TO BUSINESS ITALIAN  3
Students are introduced to the cultural and functional aspects of business communication in Italian. Course in the Italian language.
PREREQ: Taught abroad only

ITAL 305  ADVANCED ITALIAN CONVERSATION AND COMPOSITION  3
Discussion of current cultural, social and political topics in Italy. Vocabulary building, grammar exercises and frequent compositions.
PREREQ: ITAL211 or ITAL212

ITAL 306  PRACTICAL ORAL/Written Expression  3
Offered abroad only, is designed to strengthen skills in grammar and vocabulary in preparation for advanced courses offered in second part of the semester. Class exercises include oral exposés, discussion of articles and videos, textual analysis and compositions.
PREREQ: Any two 200-level Italian courses conducted in Italian

ITAL 308  CONTEMPORARY ITALY II  3
Discussion and study of issues related to contemporary cultural, political and social developments in Italy, including its place in today's European community. The course will be conducted in Italian.
PREREQ: Any two 200-level Italian courses taught in the Italian language.

ITAL 311  SURVEY OF ITALIAN LITERATURE  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 311  SURVEY OF ITALIAN LITERATURE  3
Development of Italian literature from its origins to the mid-17th century. Study and discussion of representative works.
PREREQ: ITAL211 or ITAL212.

ITAL 325  ITALIAN CIVILIZATION AND CULTURE  3
Study 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
Studies examining special interest topics in family studies. Topics usually are presented from an interdisciplinary perspective.
PREREQ: Taught abroad only

ITAL 366  INDEPENDENT STUDY  1-3

ITAL 400  ADVANCED ITALIAN GRAMMAR AND STYLISTICS  3
Introduction to the various written and spoken styles of contemporary Italian. Course in the theoretical foundation building.
PREREQ: Any two 200-level Italian courses.

ITAL 403  HISTORY OF THE ITALIAN LANGUAGE  3
Development of the Italian language from its Latin origins. Examination of the question of its origins, including its place in today's European community.
PREREQ: Any two 200-level Italian courses.

ITAL 404  PRE-CANDIDACY STUDY  3-12 PF
Research and readings in preparation of dissertation topics and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required coursework.
PREREQ: Taught abroad only

ITAL 404  PRE-CANDIDACY STUDY  3-12 PF

ITAL 407  FAMILY PROCESSES  3
Advanced study of selected topics in family processes. Theory, research and interpretation of family interaction over the life course, emphasizing historical and contextual influences. Topics include intergenerational relationships; family communication, affiliation and support; stress, adaptation and coping; and conflict, power and violence.

ITAL 408  DIVERSITY IN FAMILY STRUCTURES  3
Analysis of family patterns in American society and in other cultures. Impact of socioeconomic, political and demographic change on family structures and kin relationships (including trends in marital status, parenthood, mortality rates); ethnic, racial and cultural variations; and historical and life course changes in family patterns.

ITAL 409  ADVANCED SEMINAR IN FAMILY STUDIES  1-3
Restricions: May be repeated for credit when topics vary

ITAL 450  CHILDREN AND COMPUTERS  3
Students participate in building a sound theoretical and pedagogical foundation for the use of computers in young children's education. Developmental perspectives such as Papert, Piaget, Vygotsky, and NAEYC's guidelines for Developmentally Appropriate Practice form the core of theoretical foundation building.

ITAL 451  FAMILY CRISIS AND COPING  3
Focuses on how the family interfaces with a range of institutions such as the legal system, social services, educational and health care systems. Discusses the effects of institutions on families and the influence of families on institutional policies and processes.

ITAL 452  CHILDREN AND COMPUTERS  3
Students participate in building a sound theoretical and pedagogical foundation for the use of computers in young children's education. Developmental perspectives such as Papert, Piaget, Vygotsky, and NAEYC's guidelines for Developmentally Appropriate Practice form the core of theoretical foundation building.

ITAL 453  INDEPENDENT STUDY  1-3

ITAL 454  CHILDREN AND COMPUTERS  3
Students participate in building a sound theoretical and pedagogical foundation for the use of computers in young children's education. Developmental perspectives such as Papert, Piaget, Vygotsky, and NAEYC's guidelines for Developmentally Appropriate Practice form the core of theoretical foundation building.

ITAL 455  INDEPENDENT STUDY  1-3

ITAL 456  CHILDREN AND COMPUTERS  3
Students participate in building a sound theoretical and pedagogical foundation for the use of computers in young children's education. Developmental perspectives such as Papert, Piaget, Vygotsky, and NAEYC's guidelines for Developmentally Appropriate Practice form the core of theoretical foundation building.
**ITAL 406  ADVANCED ITALIAN LANGUAGE 3**  
Grammatical analysis 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:** ITAL 310 and ITAL 311  
**RESTRICTIONS:** Can be repeated for credit when topics vary. May be offered jointly with ITAL 465.

**ITAL 466  INDEPENDENT STUDY 1-3**

**ITAL 601  ADVANCED ITALIAN GRAMMAR AND SYLISTICS 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. Exposure of the questions 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 ITAL 403.

**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 ITAL 455.

**JAPANESE**

**JAPN 105  JAPANESE I - ELEMENTARY 4**  
Introduction to the contemporary Japanese language through developing listening comprehension, speaking, reading, and writing skills, including mastery of the Hiragana and Katakana syllabaries and introduction to Kanji characters. Media Center resources utilized.

**JAPN 106  JAPANESE II - ELEMENTARY/INTERMEDIATE 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 to male/female speech patterns. Media Center resources utilized.  
**PREREQ:** JAPN 105.  
**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 Japanese level, including continued practice in identifying and reproducing Kanji characters, handling a greater variety of formality levels, and further comprehending gender-based language differences. Media Center resources utilized.  
**PREREQ:** JAPN 106.  
**RESTRICTIONS:** Four years of high school Japanese acceptable in lieu of Prerequisite.

**JAPN 200  JAPANESE GRAMMAR AND COMPOSITION 3**  
Further study of Japanese grammar, Kanji characters and reading and writing skills for communication.  
**PREREQ:** JAPN 107.

**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:** JAPN 105.

**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:** JAPN 107.  
**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:** JAPN 107.  
**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 relations with supervisors. Skills and role-playing featured.  
**PREREQ:** JAPN 107.

**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:** Two of the following: JAPN 200, JAPN 205, JAPN 206.

**JAPN 340  TECHNICAL JAPANESE I 3**  
Introduction to technical Japanese vocabulary and Kanji reading.  
**PREREQ:** Two of the following: JAPN 200, JAPN 205, JAPN 206.

**JAPN 350  BUSINESS JAPANESE I 3**  
Familiarizes students with characteristics of business Japanese. Vocabulary, terminology, syntactical patterns and aspects of the Japanese business community.  
**PREREQ:** Two of the following: JAPN 200, JAPN 205, JAPN 206.

**JAPN 355  SPECIAL TOPICS 3**  
Explores an area of special interest in Japanese literature or culture studies. The subject matter varies and will be announced in the registration booklet.  
**PREREQ:** Two of the following: JAPN 200, JAPN 205, JAPN 206.  
**RESTRICTIONS:** May be repeated for credit when topics vary.

**JAPN 366  INDEPENDENT STUDY 1-3**  
**PREREQ:** Two of the following: JAPN 200, JAPN 205, JAPN 206.

**JAPN 440  TECHNICAL JAPANESE II 3**  
Further study in the reading and writing of technical Japanese, including the translation of technical writings.  
**PREREQ:** JAPN 240.

**JAPN 466  INDEPENDENT STUDY 1-3**  
**PREREQ:** One 300-level Japanese course.

**JEWISH STUDIES**

**JWST 105  HEBREW I - ELEMENTARY 4**  
See HEBR 105 for course description.

**JWST 106  HEBREW II - ELEMENTARY/INTERMEDIATE 4**  
See HEBR 106 for course description.

**JWST 107  HEBREW III - INTERMEDIATE 4**  
See HEBR 107 for course description.

**JWST 201  HEBREW I - ELEMENTARY 3**  
See HEBR 101 for course description.

**JWST 202  BIBLICAL AND CLASSICAL LITERATURE 3**  
See ENGL 202 for course description.

**JWST 208  INTRODUCTION TO JEWISH PHILOSOPHY 3**  
See PHIL 208 for course description.

**JWST 254  JEWISH HOLOCAUST: 1933-1945 3**  
See HIST 254 for course description.

**JWST 261  PEOPLES AND CULTURES OF THE MIDDLE EAST 3**  
See ANTH 261 for course description.

**JWST 308  TOPICS IN JEWISH THEOLOGY 3**  
See PHIL 308 for course description.  
**PREREQ:** Recommended: PhD 208/JWST 208 Introduction to Jewish Philosophy.

**JWST 318  STUDIES IN FILM 3**  
See ENGL 318 for course description.

**JWST 348  CONTEMPORARY JEWISH-AMERICAN LIT 3**  
See ENGL 348 for course description.

**JWST 349  INTRODUCTION TO JEWISH SOURCES: TEXT AND INTERPRETATION 3**  
See ENGL 349 for course description.

**JWST 360  SOCIOLOGY OF RELIGION 3**  
See SOC 360 for course description.

**JWST 380  WOMEN WRITERS 3**  
See ENGL 380 for course description.

**JWST 382  STUDIES IN MULTICULTURAL LITERATURE IN ENGLISH 3**  
See ENGL 382 for course description.
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 do multicultural societies choose a common language? What is the relation between language and thought?)

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 338  LINGUISTICS AND LANGUAGE ARTS  3  
See EDUC358 for course description.

LING 366  INDEPENDENT STUDY  1-3

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 non-referenced tests, defining target behaviors and developing observation skills are covered. Treatment planning and intervention include developing a treatment program, getting 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 390  ENGLISH LINGUISTICS  3  
See ENGL390 for course description.

LING 401  HISTORICAL LINGUISTICS  3  
Languages of the world, Indo-European languages, the comparative method and linguistic evolution.
PREREQ: Completion of two years of a college language course.
LING 407 PHONOLOGY I 3
Basic introduction to phonology, concentrating on principles of articulatory phonetics, IPA transcription system, distinctive feature theory, segmental phonological analysis and the writing of phonological rules.
PREREQ: LING101
RESTRICTIONS: Requires permission of instructor.

LING 409 SYNTAX I 3
Introduction to syntactic theory and analysis for advanced undergraduates. Emphasis on argumentation and analysis rather than on the fine points of syntactic theory.
PREREQ: LING101
RESTRICTIONS: Requires permission of instructor.

LING 417 LANGUAGE PLANNING 3
Sociolinguistic study of the interaction between official and indigenous languages as well as the role of minority groups in national policy making. Highlights language as a cultural, political and social marker.

LING 421 METHODS OF TEACHING FOREIGN LANGUAGES 3
See FLT421 for course description

LING 422 LANGUAGE SYLLABUS DESIGN 3
See FLT422 for course description

LING 424 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 cross-listed with FLT424.

LING 433 INTRODUCTION TO ACOUSTIC PHONETICS 3
Introduction to articulatory, acoustic, and perceptual characteristics of speech with emphasis on the acoustic properties of phonemes. While primarily a lecture course with assigned text, a few laboratory sessions will provide an introduction to computer-based methods used in instrumental studies of speech.
PREREQ: LING253

LING 462 LANGUAGE ACQUISITION 4
See EDUC462 for course description

LING 466 INDEPENDENT STUDY 1-3

LING 476 SECOND LANGUAGE ACQUISITION AND BILINGUALISM 3
See EDUC476 for course description

LING 477 THE STRUCTURE OF ENGLISH 3
See EDUC477 for course description

LING 480 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 491 SEMANTICS I 3
Introduction to linguistic theories of meaning. Survey of the semantic issues in reference, ambiguity, presupposition and implicature. Selected linguistic phenomena (e.g., tense, aspect, predication, thematic roles). Some elements of formal semantics.
PREREQ: LING101 or equivalent.

LING 497 SOCIOLINGUISTICS OF ENGLISH IN 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 498 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; and devising and presenting lesson plans.

LING 499 ISSUES IN TEACHING LEP STUDENTS 3
Addresses theoretical and instructional issues related to teaching Limited English Proficient 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 601 HISTORICAL LINGUISTICS 3
The languages of the world, the Indo-European languages, the comparative method and linguistic evolution.
PREREQ: Completion of two years of a college language course.

LING 607 PHONOLOGY I 3
Basic introduction to phonology, concentrating on principles of articulatory phonetics, IPA transcription system, distinctive feature theory, segmental phonological analysis and the writing of phonological rules.

LING 608 PHONOLOGY II 3
Continuation of LING607. More advanced phonological analysis and rule writing. Introduction to recent developments in nonsegmental phonology: autosegmental, metrical and prosodic theories.
PREREQ: LING607

LING 609 SYNTAX I 3
Introduction to syntactic theory and analysis. Emphasis on argumentation and analysis rather than on the fine points of syntactic theory.

LING 610 SYNTAX II 3
Continuation of LING609. More advanced analysis of syntactic structures. Attention given to the theory of Government and Binding and to principles of universal grammar.
PREREQ: LING609

LING 612 INTRODUCTION TO MORPHOLOGY 3
Introduces major types of morphological phenomena, their analysis and current theoretical approaches to handling them.
PREREQ: LING607

LING 617 LANGUAGE PLANNING 3
Sociolinguistic study of the interaction between official and indigenous languages as well as the role of minority groups in national policy making. Highlights language as a cultural, political and social marker.

LING 621 METHODS OF TEACHING FOREIGN LANGUAGES 3
See FLT621 for course description

LING 622 LANGUAGE SYLLABUS DESIGN 3
See FLT622 for course description

LING 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. Discrete point versus integrative or pragmatic measures. Practice in item construction and analysis. May be cross-listed with FLT624.

LING 633 INTRODUCTION TO ACOUSTIC PHONETICS 3
Introduction to articulatory, acoustic, and perceptual characteristics of speech with emphasis on the acoustic properties of phonemes. While primarily a lecture course with assigned text, a few laboratory sessions will provide an introduction to computer-based methods used in instrumental studies of speech.

LING 646 INDEPENDENT STUDY 1-3

LING 657 LANGUAGE ACQUISITION 4
See EDUC657 for course description

LING 659 LANGUAGE SYLLABUS DESIGN 3
See EDUC677 for course description.

LING 667 THE STRUCTURE OF ENGLISH 3
See EDUC677 for course description.

LING 677 SECOND LANGUAGE ACQUISITION AND BILINGUALISM 3
See EDUC676 for course description.

LING 678 THE STRUCTURE OF ENGLISH 3
See EDUC677 for course description.

LING 680 INTRODUCTION TO SOCIOLINGUISTICS 3
Theories (e.g., variation theory), research and methods of analysis of the interrelationships of language and society. Particular attention paid to application of sociolinguistic research to the solution of educational problems of various groups.

LING 691 SEMANTICS I 3
Introduction to linguistic theories of meaning. Survey of the semantic issues in reference, ambiguity, presupposition and implicature. Selected linguistic phenomena (e.g., tense, aspect, predication and thematic roles). Some elements of formal semantics.
PREREQ: LING607 or equivalent.

LING 697 SOCIOLINGUISTICS OF ENGLISH IN THE INNER CITY 3
Application of sociolinguistic principles and research to the teaching of multicultural students in American educational systems. Topics include societal multilingualism, language attitudes, vernacular language education, diglossia, instructional methods for teaching English as a second dialect, and reactions of the educational community to Black English Vernacular.

LING 698 TEACHING ENGLISH AS A SECOND LANGUAGE 3
Investigation of the literature containing the traditional and modern techniques of teaching the pronunciation, grammar and vocabulary of American English. Devising and presenting lesson plans.
PREREQ: Three credits of English at the 200 level.

LING 699 ISSUES IN TEACHING LIMITED ENGLISH PROFICIENT STUDENTS 3
Addresses theoretical and instructional issues related to teaching Limited English Proficient (LEP) students. Topics include issues in bilingual education, theories of L2 acquisition, LEP educational models, integrating language and content instruction, documentation and assessment of LEP skills, and understanding cultural diversity.

LING 801 OLD ENGLISH 3
See ENGL801 for course description

LING 803 MIDDLE ENGLISH 3
See ENGL803 for course description.
LING 830 SYNTAX III 3
In-depth investigation of syntactic universals and recent developments in the theory of syntax.
PREREQ: LING 810.
RESTRICTIONS: May be repeated for credit when topics vary.

LING 831 TOPICS IN SYNTAX 3
Current topics in syntactic theory, problems in the syntactic analysis of specific languages
PREREQ: LING 830.
RESTRICTIONS: May be repeated for credit when topics vary.

LING 832 SEMINAR IN LANGUAGE DEVELOPMENT 3
See EDUC 848 for course description.

LING 850 LINGUISTICS AND WRITING 3
Survey of writing systems Problems of text structure.

LING 851 LINGUISTIC FIELD METHODS 3
Development of skills and techniques in various kinds of field analysis Use of native informants. Discussion of the relationship between data collecting and grammatical statement.

LING 853 TOPICS IN THE STRUCTURE OF CHINESE 3
Formal analysis of selected aspects of the grammar of Chinese and related dialects. Topics may include phonology, morphology, syntax and semantics.
RESTRICTIONS: May be repeated for credit when topics vary.

LING 854 TOPICS IN THE STRUCTURE OF FRENCH 3
Formal analysis of selected aspects of the grammar of French and related dialects. Topics may include phonology, morphology, syntax and semantics.
RESTRICTIONS: May be repeated for credit when topics vary.

LING 855 TOPICS IN THE STRUCTURE OF GERMAN 3
Formal analysis of selected aspects of the grammar of German and related dialects. Topics may include phonology, morphology, syntax and semantics.
RESTRICTIONS: May be repeated for credit when topics vary.

LING 856 TOPICS IN THE STRUCTURE OF ITALIAN 3
Formal analysis of selected aspects of the grammar of Italian and related dialects. Topics may include phonology, morphology, syntax and semantics.
RESTRICTIONS: May be repeated for credit when topics vary.

LING 857 TOPICS IN THE STRUCTURE OF JAPANESE 3
Formal analysis of selected aspects of the grammar of Japanese and related dialects. Topics may include phonology, morphology, syntax and semantics.
RESTRICTIONS: May be repeated for credit when topics vary.

LING 861 TOPICS IN PHONOLOGY 3
Detailed examination of one or more current (controversial) issues in phonological theory.
PREREQ: LING 608.
RESTRICTIONS: May be repeated for credit when topics vary.

LING 862 ACQUISITION OF PHONOLOGY 3
Development of phonology in normal children from babbling stage through acquisition of phonemes and basic phonological rules of a language. Examination of data from a variety of languages, focusing on language specific and universal phenomena.
PREREQ: LING 608.

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 acoustics phonetics, speech analysis, or speech synthesis. Projects will be suggested by the instructor, however, students may (with instructor's approval) choose a project of their own design.

LING 880 SECOND LANGUAGE ACQUISITION 3
A detailed analysis of current issues in second language acquisition based on extensive readings of research findings. Topics include monitor model, pidginization process, natural versus formal second language acquisition, and adulthood/acquisition.

LING 890 STUDIES IN LINGUISTICS 3
Varying topics in linguistics, such as grammatical theory, grammatical analysis, syntax, historical-comparative linguistics, stylistics and grammar testing. May be cross-listed with CGSC 890 and/or ENGL 890.

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

LING 969 DOCTORAL DISSERTATION 1-12 PF

LIBERAL STUDIES

MALS 600 NATURE AND HUMAN NATURE 3
Concentrates on salient views of nature and human nature, and the ways in which they have been shaped by the historical circumstances and disciplinary perspectives from which they were developed.
RESTRICTIONS: Open to majors only.

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 nonfiction narratives, both in print and on film. It looks at social 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 EXPERIENCE 3
Examines recurring issues and problems in Latin America. The conflict between church and state and 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 615 REASON, REVOLUTION AND THE RIGHTS OF MAN 3
Examines eighteenth-century French and English movement away from Cartesian rationalism and towards a rejection of reason leading to romanticism and revolution and an application of reason leading to a discussion of civil and human rights.
RESTRICTIONS: Open to majors only.

MALS 617 AMERICAN ART IN CONTEXT 3
This course is 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 encompasses such subjects as patronage, regionalism, ethnicity, and gender.
RESTRICTIONS: Open to majors only.

MALS 619 THE SCIENTIST IN SOCIETY 3
Scientific research is directly influenced by the society in which it is conducted. In addition to financial limitations, constraints are imposed by societal norms of what are acceptable topics and procedures for research. Focus on the philosophical basis of science as well as consequences to society of the scientific revolution.
RESTRICTIONS: Open to majors only.

MALS 620 THE USE OF SCIENCE IN PUBLIC DISCOURSE 3
Examines important questions of general interest to both individuals and to governmental bodies that depend heavily on scientific information.
RESTRICTIONS: Open to majors only.

MALS 621 THE IMPACTS OF EUROPEAN CONTACTS ON NATIVE AMERICANS 3
Considers how the arrival of the first Europeans in North America affected the indigenous Native Americans.
RESTRICTIONS: Open to majors only.

MALS 622 INTERPRETING THE PAST 3
Considers the different perspectives that can be applied to learning about the past.
RESTRICTIONS: Open to majors only.

MALS 623 MOZART AND NOVERRE 3
Mozart's contributions to opera and how they compare favorably to Noverre's contributions to dance. Noverre's letters reveal his innovative ideas about dance while several of the final operatic masterpieces of Mozart are useful examples to study and understand his musical, sociological and philosophical environment.
RESTRICTIONS: Open to majors only.

MALS 624 INTRODUCTION TO GRADUATE RESEARCH/Writing in Liberal Studies 3
Focuses on developing research and writing skills by concentrating on one issue, such as the family, the environment, or education. Students will be taught to narrow the focus of a topic, create an arguable thesis, gather source information from both library and on-line resources, evaluate the source of information, organize a logical argument, incorporate source information into the argument and revise into a finished paper.
RESTRICTIONS: Open to majors only.

MALS 647 PHILOSOPHY OF TECHNOLOGY 3
See PHIL 647 for course description.

MALS 648 ENVIRONMENTAL ETHICS 3
See PHIL 648 for course description.