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.
   c. When three 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.
5. Brief description of the course.
6. Prerequisites may be satisfied by the course or courses indicated or by equivalent preparation.
7. Corequisite course or courses should be taken in the same semester as the course.
8. Special requirements for the course.

Interpretation of course numbers:

001-099 Below baccalaureate degree.
100-199 Introductory-level courses.
200-299 Introductory and intermediate courses, usually requiring some previous knowledge or experience in the discipline.
300-399 Courses with a more concentrated focus on the subject matter in a particular discipline.
400-499 Advanced courses for majors and other qualified students.
500-599 Graduate-level courses for the nonspecialist.
600-699 Graduate-level courses, also open to advanced undergraduates.
800-899 Graduate-level courses.
900-999 Ph. D. level courses.
X66 Special problems and independent study.
X67 Experimental course (may be offered twice).

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

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

In those few cases where the number of either undergraduate students or graduate students does not permit adequate offerings of both a 400-level and a 600-level course, a graduate 600-level course may be combined with a separately numbered 400-level undergraduate course in the same section. The graduate component must then be offered with a graduate standard of expectation and grading.

The appropriateness of 600-numbered courses for graduate credit is subject to review by the Committee on Undergraduate Studies.

Codes for Subject Areas:

ACCT Accounting ........................................ 205
AFSC Air Force Science ................................ 206
AGED Agricultural Education .......................... 206
AGRI Agriculture ........................................ 206
ANSC Animal Science ................................... 206
ANTH Anthropology .................................... 208
ARAB Arabic ............................................... 210
ARTS Arts and Sciences ................................ 211
ART Art ..................................................... 211
ARTC Art Conservation ................................ 216
ARTH Art History ........................................ 217
BAMS Black American Studies ........................ 221
BISC Biological Sciences ................................ 221
BMSC Biomechanics and Movement Science ........ 225
BREG Bioresearch Engineering ........................ 225
BUAD Business Administration ........................ 225
BUS Business and Economics .......................... 225
COGC Cognitive Science ................................ 228
CHEG Chemical Engineering ........................... 228
CHEM Chemistry and Biochemistry ................. 230
CHIN Chinese .............................................. 233
CIEG Civil and Environmental Engineering ........ 233
CISC Computer and Information Sciences .......... 237
CMLT Comparative Literature ........................ 240
CNST Consumer Studies ................................ 241
COMM Communication .................................... 242
CPEG Computer Engineering ............................ 244
CRJU Criminal Justice .................................... 245
CSCC Center for Science and Culture ............... 246
EAGR Early American Culture .......................... 246
ECON Economics .......................................... 247
EDCE Counselor Education .............................. 250
EDED Educational Development ....................... 250
EDST Educational Studies ................................ 254
EDUC Education ........................................... 258
EGEG Engineering/Graphics and General ............ 258
EGTE Engineering Technology .......................... 258
ELEG Electrical Engineering ............................ 260
ENBL English .............................................. 261
ENTO Entomology and Applied Ecology .............. 266
FINC Finance .............................................. 268
FLIP Foreign Languages and Literatures ............. 268
FOSC Food Science ....................................... 270
FREC Food and Resource Economics .................. 271
FREN French ................................................ 272
GEOG Geography ........................................... 274
GEOL Geology ............................................. 277
GREE Greek ................................................... 279
GRMN German .............................................. 279
HEBR Hebrew ............................................... 281
HDPD Human Resources, Education and Public Policy 281
HIST History .............................................. 281
HPER Health, Physical Education, and Recreation 286
HRDM Hotel, Restaurant, and Institutional Management 291
HURE Human Resources .................................. 292
IFST Individual and Family Studies .................. 292
ITAL Italian ................................................. 295
JAPN Japanese .............................................. 296
JWST Jewish Studies ..................................... 296
LATN Latin ................................................... 296
LEGJ Legal Studies ....................................... 297
LING Linguistics ............................................ 297
MALS Liberal Studies .................................... 300
MASS Materials Science ................................ 300
MAST Marine Studies .................................... 301
MATH Mathematics ........................................ 304
MECH Mechanics .......................................... 307
MEDT Medical Technology ................................ 307
MEEE Mechanical Engineering.......................... 308
MLSC Military Science ................................... 311
MSST Museum Studies ..................................... 311
MUED Music Education ................................... 312
MUSIC Music ................................................. 313
NURS Nursing .............................................. 317
NUTR Nutrition and Dietetics .......................... 317
ORES Operations Research .............................. 321
PHIL Philosophy ............................................. 322
PHYS Physics and Astronomy ............................ 324
PHYT Physical Therapy .................................... 326
PLUG Plant and Soil Science .............................. 327
PORT Portuguese ............................................ 329
POSC Political Science and International Relations 329
PSYCH Psychology ......................................... 329
RUSS Russian .............................................. 356
SCEN Science .............................................. 357
SOCIO Sociology .......................................... 357
SPAN Spanish .............................................. 340
STAT Statistics ............................................. 342
SWAH Swahili ............................................. 345
THETA Theatre .............................................. 343
UAPP Urban Affairs and Public Policy ............... 347
UNIV University Course .................................. 350
WOMS Women's Studies ................................... 350
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 160</td>
<td>Introduction to Business Information Systems I</td>
<td>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.</td>
</tr>
<tr>
<td>ACCT 261</td>
<td>Introduction to Business Information Systems II</td>
<td>Introduction to management information systems. Structured programming techniques for problem solving with business productivity tools and software. Emphasis on business applications. PREREQ: ACCT260</td>
</tr>
<tr>
<td>ACCT 302</td>
<td>Accounting Information Systems</td>
<td>Accounting information and its place within an organization’s overall management information system. Emphasis on information and document flow, internal control, data organization, and the analysis, design, development, and audit of computer-based accounting systems. Includes some computer work. PREREQ: ACCT208, ACCT260</td>
</tr>
<tr>
<td>ACCT 313</td>
<td>Federal Taxes for Managers</td>
<td>Explores taxable entities, tax aspects of selecting a business form, income concepts, business deductions, tax factors in the acquisition, use, and disposition of fixed assets, non-taxable transactions, capital gains and losses, and tax planning. PREREQ: ACCT207</td>
</tr>
<tr>
<td>ACCT 315</td>
<td>Intermediate Accounting I</td>
<td>In-depth coverage of financial accounting. Topics include: environment and conceptual framework of financial accounting, review of the accounting process, preparation of financial statements, recognition and measurement of current assets, property, plant and equipment, and current liabilities. PREREQ: ACCT207, ACCT208</td>
</tr>
<tr>
<td>ACCT 316</td>
<td>Intermediate Accounting II</td>
<td>Continuation of ACCT315. Topics include: recognition and measurement of investments, long-term liabilities and stockholders’ equity, dilutive securities and earnings per share calculations, revenue recognition, accounting for income taxes, pensions and leases, accounting changes and error analysis, financial reporting and changing prices, preparation of the statement of cash flows, and disclosure requirements in financial reporting. PREREQ: ACCT315</td>
</tr>
<tr>
<td>ACCT 327</td>
<td>Cost Accounting</td>
<td>Process, job order and standard costing; direct and absorption costing; budgeting decentralization and transfer pricing; and cost analysis for managerial applications. PREREQ: ACCT208</td>
</tr>
<tr>
<td>ACCT 350</td>
<td>Business Law</td>
<td>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 accounts payable liability.</td>
</tr>
<tr>
<td>ACCT 351</td>
<td>Business Law II</td>
<td>Covers a variety of areas of the law, including agency, partnerships, corporations, unfair competition, debtor-creditor relationships, bankruptcy, secured transactions, real and personal property, wills and trusts. PREREQ: ACCT350</td>
</tr>
<tr>
<td>ACCT 366</td>
<td>Independent Study</td>
<td>1-6</td>
</tr>
<tr>
<td>ACCT 383</td>
<td>Introduction to International Accounting</td>
<td>Describes the functions of international accounting, foreign currency transactions, financial statement translation, inflation, auditing and taxation. Current issues are covered as appropriate. PREREQ: ACCT207</td>
</tr>
<tr>
<td>ACCT 395</td>
<td>Seminar: International Accounting</td>
<td>Seminar on selected topics in international accounting. Combines lectures and visits to local organizations. PREREQ: ACCT207</td>
</tr>
<tr>
<td>ACCT 413</td>
<td>Income Tax Accounting</td>
<td>Analysis of recent revenue acts; use of federal law and regulations to determine tax liability. PREREQ: ACCT315</td>
</tr>
<tr>
<td>ACCT 414</td>
<td>Federal Income Taxation: Research and Planning</td>
<td>Introduction to tax research and corporate and partnership tax laws. Introduces research tools useful for analyzing tax issues. Student uses acquired skills to explore corporate and partnership taxation concepts. PREREQ: ACCT413</td>
</tr>
<tr>
<td>ACCT 415</td>
<td>Advanced Accounting</td>
<td>Introduction to branch accounting, consolidations, partnerships, fund accounting for state and local governments, and accounting for international transactions. Other relevant topics may also be covered. PREREQ: ACCT316</td>
</tr>
<tr>
<td>ACCT 417</td>
<td>Auditing</td>
<td>An introduction to the standards and procedures underlying contemporary auditing. Topics include ethics, legal liability, internal control, audit evidence, audit reports, statistical sampling, the audit of computerized systems, operational auditing, other engagements and services. PREREQ: ACCT316</td>
</tr>
<tr>
<td>ACCT 466</td>
<td>Independent Study</td>
<td>1-6</td>
</tr>
<tr>
<td>ACCT 614</td>
<td>Federal Tax Research and Planning</td>
<td>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: ACCT413 or comparable undergraduate accounting course.</td>
</tr>
<tr>
<td>ACCT 800</td>
<td>Financial Reporting and Analysis</td>
<td>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.</td>
</tr>
<tr>
<td>ACCT 801</td>
<td>Management Control Systems</td>
<td>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: ACCT800 or equivalent</td>
</tr>
<tr>
<td>ACCT 802</td>
<td>Management Information Systems</td>
<td>Approaches to information system design, introduction to systems analysis, data base concepts, system evaluation, justification, and implementation; management and behavioral considerations. Case studies and independent research. No programming required. PREREQ: ACCT800.</td>
</tr>
<tr>
<td>ACCT 803</td>
<td>Accounting Systems: Analysis and Implementation</td>
<td>Identifying accounting systems requirements and designing systems to meet these requirements. Topics include design proposals, cost/benefit considerations, output and input design, file structures, and record handling, data communication and internal control. PREREQ: ACCT302.</td>
</tr>
<tr>
<td>ACCT 807</td>
<td>Applied Statistical Methods in Accounting</td>
<td>Promotes understanding and use of statistical methods and models fundamental to accounting research and practice. Applies statistical techniques in the context of promulgated professional standards and other institutional requirements. PREREQ: ACCT327, STAT201 and STAT202.</td>
</tr>
</tbody>
</table>

RESTRICTIONS: Open to Accounting graduate students only.
ACCOUNTING

ACCT 810  THEORY OF EXTERNAL REPORTING  3
Study of contemporary models of accounting for information needs external to the firm. Includes an examination of the institutional environment and the impact of the institutions on the development of accounting theory and practices
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 business and passive activity losses; compensation planning; tax factors in the acquisition; use of the disposition of fixed assets; nontaxable transaction; and family tax planning.
RESTRICTIONS: Not open to students with prior tax courses

ACCT 813  ADVANCED FEDERAL TAX ACCOUNTING  3
Advanced federal tax concepts including corporations, partnerships, estates and trusts
PREREQ: ACCT413

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: ACCT316

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  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

AIRC FORCE SCIENCE

AFSC 100  DEVELOPMENT OF AIR 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 deployment in military and nonmilitary operations in support of national objectives. Assesses oral and written communication skills

AFSC 101  DEVELOPMENT OF AIR POWER II  1
Continuation of AFSC100 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 200  THE AIR FORCE TODAY 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 201  THE AIR FORCE TODAY II  1
Continuation of AFSC200 Emphasis on mission, organization, and function of U.S. Air Force strategic, defensive, general purpose and aerospace support forces. Includes understanding the use of armed, naval, and reserve forces in achieving national security objectives. Assesses oral and written communication skills

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

AFSC 311  LEADERSHIP AND MANAGEMENT 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 FORCES IN U.S. SOCIETY 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 FORCES IN U.S. SOCIETY II  3
Continuation of AFSC410 Focuses on role and function of the professional officer in a democratic society; the socialization processes, prevailing public attitude and value orientations associated with military service; principal requisites for maintaining national security forces; and the military justice system. Continued emphasis on oral and written communication skills

AGRICULTURAL EDUCATION

AGED 380  AGRICULTURAL EDUCATION MATERIALS AND APPROACHES I  3
Teaching methods: treatment of aims, materials, unit organization, evaluation, and teaching techniques

AGED 381  AGRICULTURAL EDUCATION MATERIALS AND APPROACHES II  3
Methods of teaching and organization in the areas of supervised agricultural experience programs, agricultural mechanics, FFA, adult education and community activities as related to agriculture

AGED 466  INDEPENDENT STUDY  1-6

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 Agricultural Sciences

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

AGRI 300  DEAN'S SCHOLAR SEMINAR  1 PF
Consists of seven two hour seminars. Students discuss ideas and topics relevant to Agricultural Sciences
RESTRICTIONS: Requires 2.75 GPA and an invitation to participate

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

ANSC 111  ANIMAL SCIENCE LABORATORY  1
Laboratory providing the opportunity to handle animals and to become familiar with common management practices
COREQ: ANSC101

ANSC 140  FUNCTIONAL ANATOMY OF DOMESTIC ANIMALS  4
Emphasis on identifying the relationships that exist between form and function associated with growth, digestion, circulation, body defense and locomotion in domestic farm animals
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 201 Behavior of Domesticated Animals 3
Feeding, reproductive and social patterns of domesticated mammals and birds. Relationship between physical environment and behavior. Use of telemetry and recording systems.
RESTRICTIONS: Offered in Spring of even-numbered years.

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 3
Study of nutrients and their metabolism, nutrient requirements of livestock, nutritional value of feedstuffs and principles of ration formulation.
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 266 Special Problem 1-3
RESTRICTIONS: Contract must have department chair signature. Independent study to involve library or lab research.

ANSC 270 Biotech Science and Socioeconomic Issues 3
Introduction to agricultural biotechnology and socio-economic issues. Introduces genetic engineering and the basic scientific theory of biotechnology in animal, plant, food, and economic research and the latest application of biotechnology in agriculture production and research. Presents issues surrounding biotechnology and technology assessment, animal rights, public and private research interface, media and environmental perspectives, consumer acceptance, regulation and economic development. May be cross-listed with FREC270 and/or PLSC270.

ANSC 300 Principles of Animal and Plant Genetics 3
Introduction to the theory and application of genetics as related to the improvement of plants and animals. May be cross-listed with ENT0300 and/or PLSC300.
PREREQ: ANSC101 and ANSC140, or PLSC101.

ANSC 304 Dairy Cattle Judging and Selection 1
Characteristics of breeds, relationships of form to function in young stock and mature animals.
RESTRICTIONS: Offered in Spring of odd-numbered years.

ANSC 305 Food Science 2
See FOSC305 for course description.

ANSC 306 Food Science Laboratory 1
See FOSC306 for course description.

ANSC 310 Animal and Plant Genetics Laboratory 1
Laboratory exercises concerning genetic concepts, methods and applications using various plant and animal systems. May be cross-listed with ENT0310 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 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, respiration, stress physiology and the control and coordination of body functions via the nervous and endocrine system.
PREREQ: ANSC140

ANSC 346 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.

ANSC 404 Dairy Production 3
Principles of modern dairy production units emphasizing breed characteristics, genetic principles in sire evaluation and mathematical considerations.
PREREQ: ANSC101 and ANSC251
RESTRICTIONS: Offered in Spring of odd-numbered years.

ANSC 409 Food Processing I 4
See FOSC408 for course description.

ANSC 410 Food Processing II 4
See FOSC410 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 421 Poultry Production 4
Application of the fundamental principles of incubation, feeding, brooding, growing, disease control, processing and marketing as applied to breeders, heavy breeders and commercial egg producers. Additional hands-on experience outside of class is required.
PREREQ: ANSC101 and ANSC140.

ANSC 428 Food Chemistry 4
See FOSC419 for course description.

ANSC 429 Food Analysis 4
See FOSC429 for course description.

ANSC 431 Infection and Immunity in Animal Diseases 4
Study of the relationships of domestic animals with particular infectious agents and the nature of the immune response.
PREREQ: BISC371
RESTRICTIONS: Offered in Fall of even-numbered years.

ANSC 441 Reproductive Physiology of Domestic Animals 3
Emphasis on physiology and endocrinology of reproductive function in males and females. Comparative aspects of reproductive function and opportunity for enhancing production through newer management practices. Discussion and laboratory involves both classic and current state of knowledge in mammalian and avian reproduction.
PREREQ: ANSC345.

ANSC 464 Animal Science Field Experience 1-3
Opportunity to gain career-related work experience in a field related to the animal sciences and to explore potential occupational areas.
RESTRICTIONS: May be repeated once for credit. Separate application form for industry (off campus) or campus courses.

ANSC 465 Seminar 1
Development and presentation of oral reports on selected topics related to animal science. Proper selection, design, production and use of visual aids. Emphasis on the development of communication skills.
RESTRICTIONS: Senior status recommended.

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

ANSC 570 Principles of Molecular Genetics 3
Uses fundamentals of nucleic acid biochemistry (replication, repair, recombination) and bacterial genetics to provide background needed for detailed study of selected topics in animal and plant molecular biology.
PREREQ: BISC301 and ANSC300, or PLSC300 or ENT0300.

ANSC 609 Comparative Vertebrate Histology 4
See BISC618 for course description.
ANSC 624 MONOGASTRIC NUTRITION 3
Advanced study of the digestion, absorption and metabolism of nutrients in terms of the needs of monogastrics. Application of principles to swine, poultry and equine nutrition. May be cross-listed with NITD624.
PREREQ: ANSC452 or NITD400, and CHEM214.
RESTRICTIONS: Offered in Spring of odd-numbered years.

ANSC 630 TRACE MINERALS AND VITAMINS 3
See NITD630 for course description.

ANSC 632 EPIDEMIOLOGY 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 BISC371.

ANSC 637 AVIAN IMMUNOLOGY 4
Advanced study of the avian immune system covering cellular and humoral immune responses; autolimitation; neuroendocrine-immune interactions; nutritional effects on the immune system; and immunogenetics.
RESTRICTIONS: Offered in Fall of odd-numbered years.

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 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 NITD654.
PREREQ: ANSC452 or NITD400 and CHEM214.

ANSC 668 RESEARCH 1-6

ANSC 842 AVIAN MICROANATOMY 3
Study of avian histology using microscopy. Examines the microscopic structure, cytological 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.

ANSC 855 SEMINAR 1

ANSC 856 RESEARCH 1-9

ANSC 869 MASTER'S THESIS 1-6

ANSC 870 MOLECULAR BIOLOGY IN AGRICULTURE 2
Illustrates principles of recombinant DNA technology and the application of these methods in plant and animal agricultural research.
PREREQ: CHEM327, and ANSC300 or PLSC300.
RESTRICTIONS: Concurrent enrollment in ANSC871 recommended.

ANSC 871 MOLECULAR BIOLOGY IN AGRICULTURE LABORATORY 2
Utilizes recombinant DNA technology to illustrate application in plant and animal agricultural research. Exercises focus on construction of plasmids and lambda libraries, screening of libraries and characterization of recombinant clones.
COREQ: ANSC870.

ANSC 874 TOPICS IN MOLECULAR BIOLOGY 1
Provides a forum for the discussion of current topics in molecular biology, with critical reading of relevant primary literature. May be cross-listed with PLSC874.
RESTRICTIONS: Requires permission of instructor.

ANTH 101 INTRODUCTION TO SOCIAL AND CULTURAL ANTHROPOLOGY 3
Major ideas and areas of study in social and cultural anthropology. Use of ethnographic data and film to illustrate the anthropologist's view of societies in their sociocultural and ecological dimensions.

ANTH 102 INTRODUCTION TO BIOLOGICAL ANTHROPOLOGY 3
Genetic basis for human evolution; emergence of racial differences and ongoing human evolution, nonhuman primates and fossil evidence for human evolution.
RESTRICTIONS: Only one of either ANTH102 or ANTH104 can count for degree credit.

ANTH 103 INTRODUCTION TO PREHISTORIC ARCHAEOLOGY 3
Fundamental concepts and research procedures of archaeology. The history of archaeology, methods of fieldwork and artifact analysis, and theories of human behavior in archaeological research.
RESTRICTIONS: Only one of either ANTH103 or ANTH104 can count for degree credit.

ANTH 104 INTRODUCTION TO ARCHAEOLOGY AND BIOLOGICAL ANTHROPOLOGY 3
The fossil and archaeological record of human biological and cultural evolution. Emphasis on how archaeological and biological anthropological research are conducted, and how their treatment of data distinguish them as scientific disciplines.
RESTRICTIONS: Degree credit for ANTH102 and ANTH103 not granted if ANTH104 is taken.

ANTH 105 INTRODUCTION TO HISTORICAL ARCHAEOLOGY 3
Introduces principal ideas, approaches, and research methods in historical archaeology. Presented through a comparative case study of the emergence of the modern world.

ANTH 198 HONORS TOPICS 1
Weekly meetings with faculty to expand on topics treated in 100-level courses in which the student is currently enrolled.

ANTH 202 HUMAN EVOLUTION AND THE FOSSIL RECORD 3
A survey of the human fossil record from the origin of the human species to the establishment of agriculture. Includes evolutionary theory, anatomical interpretation and reconstruction of early social behavior.

ANTH 205 ANTHROPOLOGY AND HUMAN NATURE 3
Archaeological, biological and cultural anthropological organized around the theme of human nature.

ANTH 216 INTRODUCTION TO MATERIAL CULTURE STUDIES 3
Introduces students to material culture studies, broadly defined as study of all things people make and all the ways people have altered the physical world. Explores the approaches, concepts, and methods of numerous disciplines that investigate material culture.
May be cross-listed with HIST216.

ANTH 222 TECHNOLOGY AND CULTURE 3
Primitiive and preindustrial technologies. Theoretical issues of innovation, diffusion and adaptation. The relationship between technology and other aspects of culture.

ANTH 225 PEASANT SOCIETIES 3
Comparative study of peasant communities in European, Asian, African and Latin American societies, including case studies of family life, religion and forms of social control and relationships to the ruling classes.

ANTH 227 AMERICAN CULTURE 3
Concepts and methods of cultural anthropology in contemporary America. The culture concept, American social structure, language, values and beliefs.
ANTH 228  Peoples and Cultures of the Southwest  3
Cultures, institutions and ethnic groups of southwestern United States. Analysis of both
prehistoric and historic cultures, continuity and change

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

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

ANTH 231  Personality and Culture  3
Relationship of the individual to culture. Child-rearing customs and life cycles in cross-cultural
perspective. Cultural influences on motivation and cognition

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

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

ANTH 253  Applied Anthropology  3
Anthropology applied to practical problems, including community development, directed
change, agrarian reform and urban dislocation, particularly in Third World countries

ANTH 259  Hunting Societies  3
The role of hunting in human evolution, especially as a biobehavioral adaptation; the tech-
nology and political, social, economic and religious behavior and institutions of a sam-
ple of hunting peoples

ANTH 260  Sociocultural History of Africa  3
Development of African civilization: the varieties of these social systems as functioning
entities through time, and the ways they have affected each other and have been
changed by the impact of Western colonialism

ANTH 261  Peoples and Cultures of the Middle East  3
Cultures, institutions and ethnic groups of the Middle East. Description and analysis of
major cultural traditions and social institutions

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

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

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

ANTH 278  Historic Cultures of the Middle Atlantic Region  3
Explores the development of American culture utilizing the Middle Atlantic region
today's states of Delaware, Maryland, New Jersey, Pennsylvania, New York and Vir-
ginia - 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  1
Weekly meetings with faculty to expand on topics treated in 200-level courses in which
the student is currently enrolled

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

ANTH 305  The Evolution of Human Sex Roles and Reproduction  3
Survey of the evolution of human reproduction and sex differences. Evidence derived from
the human fossil record, living 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  3
Major cultural and social developments of prehistoric humans in North America, from the
entrance of the Paleoindians to the arrival of the Europeans in the 16th century

ANTH 322  The City in American Culture  3
Approaches the study of the historic American city from an interdisciplinary perspective.
Emphasis on reconstructing the culture and life of the city at specific points in time, as
well as on the processes of urbanization and change. May be cross-listed with HIST222

ANTH 323  Prehistory of South America  3
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  3
Survey of world prehistory, excluding the Americans, 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  3
Cultures and subcultures of Europe, with special attention to the rural sectors and their
historical development

ANTH 327  Peoples of the Caribbean  3
Culture, history and variations of Caribbean Island peoples; basic characteristics of
social institutions, religion, language; and continuity and change to the modern period

ANTH 330  Development and Underdevelopment  3
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  3
Social institutions and cultural traditions of Africa; political, economic, legal and kinship
systems, and modes of thought

ANTH 337  South American Indians  3
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  3
Arts and crafts technological processes invented by or available to tribal societies of
South America: Artistic and technical achievements in ceramic and textile

ANTH 340  Historical Archaeology  3
Survey of the concepts and methods historical archaeologists use in studying processes of
culture change

ANTH 342  Issues in American Cultures: Archaeological Perspectives  3
Archaeological perspectives on issues of concern in contemporary American culture,
including the environment, multiculturalism, war, gender, technology and production,
and class

ANTH 345  Methods of Cultural Analysis  3
Introduces the range of methods employed by scholars in the study of human cultures:
observation, participation, interview techniques, the study of historic documents and the
study of material culture by archaeologists, anthropologists and others

ANTH 360  Humanities Colloquium  3
See ARSC260 for course description

ANTH 363  Women in Cross-Cultural Perspective  3
See WOMS263 for course description

ANTH 366  Independent Study  1-6

ANTH 368  Anthropology of Slavery  3
Types and forms of servitude that have existed in societies around the world; and the use
of case studies to understand particular societies in greater detail

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

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

ANTH 377  Ecological Anthropology  3
Ecology in human adaptation. The ecology of hunting and gathering economies; domes-
tication of plants and animals; development of craft and industrial technologies

ANTH 379  Historical Archaeology of the Eastern United States  3
Surveys the substantive contributions of historical archaeology to the study of the cultural
history of eastern North America beginning with the period of initial European contact
May be cross-listed with HIST279
ANTH 380 People and Cultures of Mexico and Central America 3
Cultures, institutions and ethnic groups of contemporary Mexico and Central America. Description and analysis of major cultural traditions and social institutions of Indian and non-Indian groups.

ANTH 390 Honors Colloquium 3
See ARSC390 for description. May be cross-listed with WOMS390.
REQUIREMENTS: Requires a GPA of 3.0 or higher.

ANTH 398 Honors Topics 1
Weekly meetings with faculty to expand on topics treated in 400-level courses in which the student is concurrently enrolled.

ANTH 401 The Idea of Race 3
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.
REQUIREMENTS: Requires permission of instructor.

ANTH 402 Fossil Humans and the Plio-Pleistocene Epochs 3
Seminar course dealing with the details of Pleistocene climatic and geological events; evolutionary development of humans within this context.
REQUIREMENTS: Requires permission of instructor.

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

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

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

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

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

ANTH 457 Survey of African Art 3
Major African art styles, their interrelationships, the context of usage and the meanings of African artworks. May be cross-listed with ARTH457.

ANTH 463 Historical Archaeology and the Public 3
Detailed examination of the cultural sequence and prehistoric adaptations of eastern North America from Paleo-Indian times to European contact.
REQUIREMENTS: Requires permission of instructor.

ANTH 466 Humanities Colloquium 3
See ARSC466 for course description. May be cross-listed with MALS466.

ANTH 467 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.
REQUIREMENTS: Requires permission of instructor teaching the introductory course. Tutorial and primarily for majors.

ANTH 486 Tutorial in Social and Cultural Anthropology 3
History, theory and method in the field of social and cultural anthropology.
REQUIREMENTS: Open to majors only. Requires permission of instructor.

ANTH 487 Tutorial in Archaeology 3
History, theory and method in the field of archaeology.
REQUIREMENTS: Open to majors only. Requires permission of instructor.

ANTH 488 Tutorial in Physical Anthropology 3
History, theory and method in the field of physical anthropology.
REQUIREMENTS: Open to majors only. Requires permission of instructor.

ANTH 498 Honor Topics 1
Weekly meetings with faculty to expand on topics treated in 400-level courses in which the student is concurrently enrolled.

ANTH 601 The Idea of Race 3
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.
REQUIREMENTS: Requires permission of instructor.

ANTH 602 Fossil Humans and the Plio-Pleistocene Epochs 3
Seminar course dealing with the details of Pleistocene climatic and geological events; evolutionary development of humans within this context.

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

ANTH 610 Archaeological Analysis of Material Culture 3
Procedures of archaeological laboratory analysis stressing lithic and ceramic analysis, microscopy, experimental archaeology and application of the principles of artifact classification and taxonomy.
PREREQ: ANTH103.

ANTH 628 Prehistory of Eastern North America 3
Detailed examination of the cultural sequence and prehistoric adaptations of eastern North America from Paleo-Indian times to European contact.

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

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

ANTH 651 Myth and Culture 3
Comparative study of the relationships between world view, cosmology, mythology and social institutions, illustrating the analytic methods of structuralist and functional anthropology.
REQUIREMENTS: Requires permission of instructor.

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

ANTH 660 Humanities Colloquium 3
See ARSC660 for course description. May be cross-listed with MALS660.

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

ARABIC

ARAB 105 Arabic I - Elementary 4
Introduction to the Arabic language and development of speaking, listening, reading and writing skills through the use of basic texts. Language laboratory as needed.

ARAB 106 Arabic II - Elementary/Intermediate 4
Completion of basic Arabic: increasing mastery of the basic skills of speaking, listening, reading and writing.
PREREQ: ARAB105.
REQUIREMENTS: Two to three years of high school Arabic acceptable in lieu of ARAB105.

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

ARTS AND SCIENCE

ARSC 125 The Shaping of the Modern Mind I 1 PF
Lectures by faculty from various departments on classical, medieval and Renaissance thinkers who have most deeply influenced the modern mind.

ARSC 126 The Shaping of the Modern Mind II 1 PF
Lectures by faculty from various departments on 17th- to 20th-century thinkers who have most deeply influenced the modern mind.
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: ART 111 or ART 113.

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: ART 110 or ART 112.

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: ART 110.
COREQ: ART 111 or ART 113.

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: ART 110 or ART 112.

ART 114  FOUNDATION COLLOQUIUM 0 PF
A weekly forum for the discussion of issues common to beginning level art students currently enrolled in foundation art courses. Presentations include overviews of disciplines within the Art Department and examinations of professional art practices.
COREQ: ART 110, 111, 112 or 113.

ART 115  FOUNDATION COLLOQUIUM 0 PF
A weekly forum for the discussion of issues common to beginning level art students currently enrolled in foundation art courses. Presentations will include overviews of disciplines within the Art Department and examinations of professional art practices.
COREQ: ART 110, 111, 112 or 113.

ART 120  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 III: 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 paint. 
RESTRICTIONS: Open to nonmajors and nonminors only.

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

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

ART 210  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: ART 200.
COREQ: ART 211.
RESTRICTIONS: Requires permission of instructor.

ART 219  PHOTO DESIGN I  3
Introduction to photographic principles and techniques as applied to design, visual thinking and communication problem solving. Includes various films and light sources for color and black and white photography, line processes, image modification and the aesthetics of photo design.
COREQ: ART 200.
RESTRICTIONS: Requires permission of instructor.

ART 211  PHOTO DESIGN II  3
Continuation of the introduction of principles of photography as applied to advertising and graphic design requirements. Exploring the relationship of the photographer, art director and the graphic designer including issues of electronic computer imaging.
COREQ: ART 201.
RESTRICTIONS: Requires permission of instructor.

ART 220  BEGINNING ILLUSTRATION  3
Introduction to the basic use of black and white drawing and painting media and their techniques. Use of dry color media. Emphasis is on approaches to illustration visual imagery in the areas of editorial, book, institutional and advertising.

ART 230  FIGURE DRAWING  3
Drawing the human figure with emphasis on structure, proportion, volume, and anatomy. Various drawing media explored.
PREREQ: ART 112.
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 236 BASIC WATERCOLOR 3
Basic techniques in the use of watercolor and materials related to the media. Subjects range from still life and landscape to portraiture.

PREREQ: Art foundation courses.

ART 241 BEGINNING SCREENPRINTING AND LITHOGRAPHY 3
An introduction to basic water-based screenprinting including block-out, drawing fluid and crayon resist techniques for multicolor screenprints. Lithographic processes include stone and plate lithography.

ART 243 ALTERNATIVE PRINTMAKING TECHNIQUES 3
Investigation of alternative approaches in printmaking to produce multiple or one-of-a-kind images through techniques such as plastic plate engraving, collagraph, photoprint collage and mixed media.

ART 246 PHOTO SCREENPRINTING 3
Photo silk-screening is an introduction to water-based screen-printing, focusing on the use of photographic stencils in combination with hand drawn or photographically generated transparencies. Shot camera and computer process for imaging will be discussed as tools for image manipulation to produce screenprinted editions.

RESTRICTIONS: Offered only during Winter and Summer Sessions.

ART 250 BEGINNING SCULPTURE 3
Through assigned problems students are introduced to basic tools and process and safely 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 260 BEGINNING METALS 3
Introduction to tools, processes and aesthetics of jewelry and metalwork. Projects involve working in copper, brass, nickel and silver with techniques primarily concentrating on soldering, stone setting and casting.

ART 261 METALS, COLORS AND CHEMICALS 1-3
Application of chemicals and industrial processes to art, including copper electroforming, patinizing of metals, anodizing and dyeing of aluminum. Laboratory work includes anodizing of titanium, and aluminum, and obtaining texture embellishments on copper. Metals use cold connecting methods of joining.

ART 262 ENAMELING 3
Introduction to enameling techniques primarily working in copper and silver. Exploration of basic metalworking techniques along with design development.

ART 270 BASIC FIBERS: COMPUTER AIDED DESIGN SIMULATION OF TEXTILES 3
Introduction to artistic use of computers via software, drawing tablets, and image capture digitizers. Textile design simulation with limited production includes strong emphasis on study and creative adaptation of nonwestern imagery. Traditional ethnic source materials analyzed to develop innovative and pluralistic approaches to contemporary surface design.

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 dillloom techniques will probe both process and context.

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

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

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

PREREQ: ART 201 and ART 211.
COREQ: ART 304.

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

PREREQ: ART 302.
COREQ: ART 305.

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: ART 201 and ART 211.
COREQ: ART 302.

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: ART 304.
COREQ: ART 303.

ART 306 TV COMMERCIALS TO MTV 3
An introduction to 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 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 making and production.

ART 310 PHOTOGRAPHY: GRAPHIC DESIGN 3
The development of conceptual and technical skills emphasizing both studio and location assignments for graphics design projects including editorial, annual reports, collateral materials, books, book jackets and packaging.

PREREQ: ART 211.

ART 311 PHOTOGRAPHY: ADVERTISING DESIGN 3
The development of conceptual and technical skills emphasizing both studio and location assignments involving still life, product photography and constructed environments for advertising design projects including print advertising, posters and collateral materials.

PREREQ: ART 211.

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 62 credit hours.

ART 320 INTERMEDIATE ILLUSTRATION 3
The application of creative illustration concepts with an emphasis on color, painting in gouache and acrylic. Projects consist of editorial, book, institutional and advertising.

PREREQ: ART 220.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 321 TOPICS: ILLUSTRATION 3
The in depth study and technical use of a specific media and its application in illustration. Media offered in this course includes pen and ink, acrylic, scratchboard, gouache, oil and other important media used in illustration.

PREREQ: ART 220.

RESTRICTIONS: Requires permission of instructor. May be repeated for up to six credit hours.

ART 323 AIRBRUSH 3
Introduction to elementary uses of the airbrush and various techniques, media and materials.

PREREQ: ART 220, ART 236 or ART 320.

RESTRICTIONS: May be repeated for up to nine credit hours.

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

PREREQ: ART 230.

RESTRICTIONS: May be repeated for credit when topics vary.

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

PREREQ: ART 231.

RESTRICTIONS: May be repeated for up to six credit hours.

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: ART 230 and ART 231.

ART 336 ADVANCED WATERCOLOR 3
In depth study of advanced techniques in watercolor and the aesthetic of the medium. A variety of techniques and materials with a concern for advanced concepts and pictorial content.

PREREQ: ART 236.
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, lifeground 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 are strongly encouraged to find and pursue individual goals. Students are guided in selecting media and types of artistic expressions that best suit each individual. Researching into 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 360 Intermediate Metals 3
Application of techniques introduced in ART 260 and ART 261. Projects are produced primarily in silver and copper and anodized metals. Students are introduced to professional practices including photography documentation of work.
PREREQ: ART 260 or ART 261.
RESTRICTIONS: May be repeated for up to six credit hours.

ART 366 Independent Study 1-6
ART 370 Fiber Survey: Structure and Surface 3
Introduction to filament and thread as the flexible graphic building blocks used to fabricate innovative textile and dimensional forms with multilayer and computer-driven hand looms, and simple tool interfacing systems, e.g. felting, crocheting, basketry. Emphasis placed on craftsmanship, experimental finishing processes, and expressive content.
PREREQ: 200 level fibers course.
RESTRICTIONS: May be repeated for up to six credit hours.

ART 371 Cloth Corollaries: Craft/Content Connection 3
Emphasis on contextual transformation of cloth via creative manipulation of fibers and fabrics to uncover expressive potentials. Independent assignments require students to research, professionally produce, document, and discuss collections made with materials and processes of choice, such as, embellishment and destabilization techniques.
PREREQ: ART 270, ART 274 or ART 370.
RESTRICTIONS: May be repeated for up to six credit hours.

ART 380 Intermediate Photography: Black & White 3
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.
PREREQ: ART 280.
RESTRICTIONS: Ability to work independently.

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 403 Portfolio Preparation I 3
Directed toward the production of a portfolio which accurately and effectively defines the student's conceptual and practical skills in advertising design or graphic design situations.
PREREQ: ART 303 and ART 305.
COREQ: ART 402.
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 II 3
Continuation of the production of a portfolio which accurately and effectively defines the student's conceptual and practical skills in advertising design or graphic design situations.
PREREQ: ART 402 and ART 403.
COREQ: ART 404.
RESTRICTIONS: May be repeated for up to six credit hours.

ART 408 Internship 3
Field experience in an advertising agency, design studio, corporate design department or commercial photography studio in the student's discipline concentration.
PREREQ: ART 303 and ART 305, or ART 310 and ART 311.
RESTRICTIONS: Requires permission of instructor. May be repeated for up to six credit hours.

ART 410 Advanced Applied Photography 3
Introduction to large format techniques and equipment and their application to advertising, graphic design, and editorial requirements. Assignments with emphasis on studio lighting and professional practices.
PREREQ: ART 310 or ART 311.
RESTRICTIONS: May be repeated for up to six credit hours.

ART 411 Advanced Applied Photography II 3
Continuation of ART 410 directed toward the production of a portfolio which accurately and effectively defines the student's conceptual and practical capabilities in applied photography situations.
PREREQ: ART 410.
RESTRICTIONS: May be repeated for up to six credit hours.

ART 416 Professional Practices 3
Discussion of selection, presentation and installation of work in preparation for the BFA exhibition; documentation of art work and resume writing; strategies for application to graduate school, art galleries and grants; and refinement as professional artists.
RESTRICTIONS: BFA senior level 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 senior level 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 discipline.
COREQ: Requires permission of instructor.
RESTRICTIONS: May be repeated for up to six credit hours.

ART 420 Advanced Illustration 3
Specializes in story, cinema and product illustration. Projects deal with full color solutions and emphasizes the refinement of imagery to a professional quality.
PREREQ: ART 320.
RESTRICTIONS: May be repeated for up to nine credit hours.

ART 421 Illustration Studio 3
Directs portfolio preparation, development of a resume, BFA exhibition and aids in an individual direction of illustration for each student. Explores and refines advanced illustration techniques for individuals in their chosen area of interest.
PREREQ: ART 320.
RESTRICTIONS: May be repeated for up to nine credit hours.

ART 424 Studio in the Materials and Techniques of Drawing in the West 3
See ARTC480 for course description.

ART 425 Seminar in Materials and Techniques of the Contemporary Painter and Draftsman 3
See ARTC481 for course description.
ART 426  COLOR MIXING AND MATCHING  3
See ARTC485 for course description

ART 427  STUDIO MATERIALS AND TECHNIQUES OF PAINTING I  3
See ARTC488 for course description

ART 428  STUDIO MATERIALS AND TECHNIQUES OF PAINTING II  3
See ARTC489 for course description.

ART 429  STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I  3
See ARTC490 for course description.

ART 430  DRAWING STUDIO  3
Drawing as unique works on paper using traditional or non-traditional media. Work produced will be determined by each student as an extension of their studio concentration.
PREREQ: ART 230
COREQ: 400 level art course
RESTRICTIONS: May be repeated for up to six credit hours

ART 432  ADVANCED PAINTING  3
Provides muting 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 ART 331 or three credits of ART 331 and three credits of ART 334
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 distincting individual painting ideas down to their essence through a process of rigorous group and self criticism.
PREREQ: ART 432
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 quantity of work required.
PREREQ: ART 241, and ART 341 or ART 342.
RESTRICTIONS: May be repeated up to nine credit hours

ART 441  ADVANCED PRINTMAKING  3
Advanced techniques in lithography and screenprinting or papermaking, monotyping, etching and woodcut. Processes vary according to instructor.
PREREQ: ART 241, and ART 341 or ART 342
RESTRICTIONS: May be repeated for up to nine credit hours

ART 450  SCULPTURE STUDIO  3
Designed to assist the student in the never ending search to find the best materials and means of personal expression in sculpture as well as the relationship of differing fields of artistic expression. An increasing emphasis on involvement in the profession of sculpture through outlets within and outside of the University.
PREREQ: ART 351
RESTRICTIONS: May be repeated for up to nine credit hours

ART 451  ADVANCED SCULPTURE  3
At this level, students are expected to have put together a solid body of work with a clear direction. Advanced studio work is based on agreements between the student and the instructor regarding content and quality of work requirements. Each student receives personal instruction and attention as to what is planned to become the student's profession.
PREREQ: ART 351
RESTRICTIONS: May be repeated for up to nine credit hours

ART 460  METALS STUDIO  3
Directed studio work using techniques such as dieforming, photocasting and production casting with exploration of career opportunities in metals. Advanced studio work based on agreement between student and instructor as to content and quality of work.
PREREQ: ART 260, ART 261 and ART 360.
RESTRICTIONS: May be repeated for up to nine credit hours

ART 461  ADVANCED METALS  3
Advanced problems and professional practice in jewelry and metalwork. Focus on the execution of designs and presentation skills with the culmination of a senior exhibition. Develop written communication skills in a statement and resume.
PREREQ: ART 260, ART 261 and ART 360
RESTRICTIONS: May be repeated for up to nine credit hours

ART 466  INDEPENDENT STUDY  1-6
ART 470  SPECIAL TOPICS IN FIBER  3
Emphasis placed on mature artistic presentation of specialized studio topics or historic media processes. Participants will be expected to develop critical evaluation skills, portfolio and juried journal advancement, and introductory professional practices, such as participation in workshops, exhibitions, competitions, design meetings, and field experiences.
PREREQ: ART 270, ART 274 or ART 370.
RESTRICTIONS: May be repeated for up to nine credit hours

ART 471  ADVANCED FIBER STUDIO  3
Mature study of selected media from previous fiber coursework. Emphasis placed on highly developed artistic presentations, decision evaluation skills, and accomplishment of advanced professional practices, such as participation in external competitions, exhibitions, professional conferences and workshops, portfolio enhancements, journal and resume documentation, artist statements and thesis exhibition design and graphics.
PREREQ: ART 370, ART 371 or ART 470.
RESTRICTIONS: May be repeated for up to nine credit hours

ART 481  PHOTOGRAPHY STUDIO  3
Advanced studio and conceptual work based on agreement between student and instructor as to content and quality of work required.
PREREQ: ART 381
RESTRICTIONS: May be repeated for up to nine credit hours

ART 482  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: ART 381
RESTRICTIONS: May be repeated for up to nine credit hours

ART 483  PORTFOLIO & EXHIBITION TECHNIQUE  3
Emphasis on professional methods involved in presenting a portfolio for publication or exhibition. Organization, editing and sequencing, as well as attitudes and strategies form the basis of study.
PREREQ: ART 380
RESTRICTIONS: Previous photographic experience.

ART 490  ADVANCED CERAMICS  3
Continuation of Intermediate Ceramics II with emphasis on individual development of design and form.
PREREQ: ART 391
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: ART 391
RESTRICTIONS: May be repeated for up to nine credit hours

ART 600  APPLIED DESIGN TUTORIAL  3
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than applied design or where the work in applied design has been with an aspect of the subject that is substantially different from what is now being studied.
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.
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.
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.
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.
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 been with an aspect of the medium that is substantially different from what is now being studied.
RESTRICTIONS: May be repeated for up to twelve credit hours
ART 606 Metals Tutorial 3
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than metals or where the work in metals has been with and aspect of the medium that is substantially different from what is now being studied.
RESTRICTIONS: May be repeated for up to twelve credit hours.

ART 607 Fibers Tutorial 3
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than fibers or where the work in fibers has been with an aspect of the medium that is substantially different from what is now being studied.
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.
RESTRICTIONS: May be repeated for up to twelve hours.

ART 609 Ceramics Tutorial 3
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than ceramics or where the work in ceramics has been with an aspect of the medium that is substantially different from what is now being studied.
RESTRICTIONS: May be repeated for up to twelve 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: ART 411
RESTRICTIONS: May be repeated for up to twelve credit hours.

ART 611 Advanced Applied Photography 3
Continuation of ART 610 directed toward the production of a portfolio which accurately and effectively defines the student's conceptual and practical capabilities in applied photography.
PREREQ: ART 411
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 creative direction.
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 quality 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 660 Jewelry Studio and Metalwork 3-6
Student driven, advanced studio work based on agreement between student and instructor as to content and quality of work required.
RESTRICTIONS: May be repeated for up to six credit hours.

ART 661 Jewelry and Metalwork 3-6
Advanced problems in jewelry techniques.
RESTRICTIONS: May be repeated for up to six credit hours.

ART 670 Fibers 3-6
Application of advanced fiber techniques.
RESTRICTIONS: May be repeated for up to six credit hours.

ART 671 Fibers 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 six credit hours.

ART 678 Seminar: Studio Instruction Practicum 3
Planning, instruction and evaluation of art disciplines or 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 684 Photography Studio 3-6
Advanced studio work based on agreement between student and instructor as to content and quantity of work required.
RESTRICTIONS: May be repeated for up to eighteen credit hours.

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

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

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

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

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

ART 691 Ceramics 3-6
Problems in throwing, glazing and firing techniques.
RESTRICTIONS: May be repeated 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 concern characterizing personal artistic development experienced during graduate study.
RESTRICTIONS: Approval of the student's individual Graduate Committee.
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ART HISTORY

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 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 artistic change. 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 until the time of Constantine the Great.

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

ARTH 210 LATER MEDIEVAL ART, 1000-1400 AD 3
Painting, sculpture, and architecture of the Christian world, treating later Byzantine, Romanesque and Gothic artistic traditions in the 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 Dürer and Pieter Bruegel.

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

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

ARTH 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 Velazquez. 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 its social-historical context. Emphasis on such major artists as 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 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.

ART HISTORY

ART 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.

ART 680 STUDY IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST 3
See MSST680 for course description.

ART 681 MATERIALS AND TECHNIQUES OF THE CONTEMPORARY PAINTER AND DRAFTSMAN 3
See MSST681 for course description.

ART 685 COLOR MIXING AND MATCHING 3
See MSST681 for course description.

ART 689 STUDY MATERIALS AND TECHNIQUES OF PAINTING I 3
See MSST689 for course description.

ART 690 STUDY MATERIALS AND TECHNIQUES OF PAINTMAKING I 3
See MSST690 for course description.

ART 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.

ART 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.

ART 969 DOCTORAL DISSERTATION 1-12 PF

ART HISTORY

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 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.

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

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

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

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Examines major trends and artists in 18th-century European painting, sculpture and architecture in its social-historical context. Emphasis on such major artists as Hogarth, Blake, Chardin, Canova, David and Goya.

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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 Delacroix, Turner, Courbet and Monet.

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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.

ART HISTORY
ART 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.
RESTRICTIONS: Usually offered in Fall semester.

ART 231 AMERICAN ART: 1865-PRESENT 3
Architecture, painting, sculpture, photography and decorative arts in the United States from the Civil War to 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.
RESTRICTIONS: Usually offered in Spring semester.

ART 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.

ART 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.

ART 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.

ART 236 THE ARTS OF ISLAM 3
Survey of architecture, painting, ceramics and metalwork of Islam in Western and Southern Asia, Islamic Africa and the Iberian peninsula. Also treats influences of Islamic design on the arts of Judeo-Christian Europe and the rich secular cultures that flourished in modern nations.

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

ART 240 WOMEN IN ART 3
Analyzes the depiction of women in art from pre-history to the present in the light of recent feminist studies. Topics have been arranged to correspond with particular periods in history. Each class includes a brief discussion of women artists and their works. May be cross-listed with WOMS242.

ART 250 RULES' IMAGES FROM AUGUSTUS TO GEORGE WASHINGTON 3
Thirteen rulers from the ancient, medieval and early modern worlds as they were depicted in contemporary arts and literary works. Rulers studied include Augustus, Justinian, Saint Louis, Napoleon Bonaparte and Washington. Focuses on 'rules' images in the modern world.
RESTRICTIONS: Usually offered in Spring semester.

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

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

ART 304 NORTHERN BAROQUE ART: THE AGE OF RUBENS, REMBRANDT AND VERMEER 3
Painting, printmaking and architecture from the time of Caravaggio and the Caracci to Bernini and Tintoretto. Topics such as the Counter-Reformation and its impact on the arts, the rise of naturalism and illusionism, the design process and the function of drawings, theatricality and rhetoric.

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

ART 308 MODERN ARCHITECTURE I: 1750-1900 3
Aesthetic and technological developments in architecture, interior design and the planned environment, beginning with the mid-18th century break from Renaissance tradition to Art Nouveau and the end of 19th century rise of the skyscraper. Architects such as Ledoux, Soane, Richardson, Sullivan, Horta and Gaudi.

ART 309 MODERN ARCHITECTURE II: THE TWENTIETH CENTURY 3
Aesthetic and technological developments in architecture, interior design and the planned environment from the early work of Wright through the contributions of the Bauhaus, Mies van der Rohe and Le Corbusier to PostModernism and other trends of the last third of the 20th century.

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

ART 318 HISTORY OF PHOTOGRAPHY 3
History and aesthetics of photography from its beginnings to the present. Emphasis on photography as artistic expression, the importance of technology and photography in relation to the other arts and social history. Photographers such as Négre, Emerson, Stieglitz, Cunningham, Weston and Arbus.

ART 321 HISTORY OF AFRICAN-AMERICAN ART 3
See BAMS320 for course description.

ART 322 INTRODUCTION TO HISTORIC PRESERVATION 3
Examines a specific research issue within historic preservation including hypothesis construction, design of research methodology and evaluation of results.

ART 335 ARTS AND ARCHITECTURE OF PENNSYLVANIA GERMANS 3
The distinctive regional culture of the Pennsylvania Germans in the 18th and 19th centuries will be examined through the study of their cultural landscapes, houses and other buildings, decorative arts, gravestones, and manuscript traditions. Explores themes of ethnic aesthetic expression, sectarian culture, community identity, and the functions of art in everyday life.

ART 339 ART AND ARCHITECTURE OF EUROPE III 3
Primary focus on painting, sculpture and architecture in Central Europe from the Romanesque to the Modern Eras. Subject matter determined by country in which overseas program is conducted.
RESTRICTIONS: Offered only in conjunction with a foreign study program. May be repeated for credit when topics vary.

ART 341 BRITISH ART AND ART INSTITUTIONS 3
Provides an introduction to British Art and Art institutions from 1700 to present day. Special emphasis placed on collecting of art, display in museums, and the British School of painting.

ART 351 INTRODUCTION TO DECORATIVE ARTS 3
An examination of interior architecture, furniture, metalwork, ceramics, glass, and textiles from the Renaissance to the present in Europe and America, with investigation of the relationship to architecture and the other arts during this period.

ART 360 HUMANITIES COLLOQUIUM 3
See ARSC360 for course description.

ART 366 INDEPENDENT STUDY 1-6
Art history independent study.

ART 402 UNDERGRADUATE SEMINAR IN THE HISTORY OF ART 3
RESTRICTIONS: For undergraduates only. May be repeated for credit when topics vary.

ART 403 HISTORY, PHILOSOPHY, FUNCTIONS AND FUTURE OF MUSEUMS 3
See MSST403 for course description.

ART 405 SEMINAR IN GREEK AND ROMAN ART 3
The art and architecture of antiquity from the origins of Greek civilization to the fall of Rome. Topics change with each time of offering. Recent topics include Architektonik: Greek Vase Painting, Hellenistic Greek Sculpture, Late Roman Portraiture and Roman Architecture.
PREREQ: ART420B
RESTRICTIONS: May be repeated for credit when topics vary.

ART 406 SEMINAR IN MEDIEVAL ART 3
The art of Europe from the fall of Rome to the late Gothic period. Topics change with each time of offering. Recent topics include The Court of Charlemagne, Early Irish and Anglo-Saxon Art, and Saint Denis and the Origins of Gothic Architecture.
PREREQ: ART420B or ART4210
RESTRICTIONS: May be repeated for credit when topics vary.

ART 408 SEMINAR IN NORTHERN RENAISSANCE ART 3
The arts in Northern Europe from 1300 to 1600. Topics may change with each time of offering.
RESTRICTIONS: May be repeated for credit when topics vary.
ARTH 413 SEMINAR IN ITALIAN RENAISSANCE ART 3
Italian art from 1300 to 1600. Topics change with each time of offering. 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. Topics change with each time of offering. Recent topics include Bernini and Roman Baroque Sculpture, Seicento Painters and Imagery, Caravaggio, and Origins of the Baroque. The Caracci 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. Topics change with each time of offering. 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 419 SEMINAR IN EIGHTEENTH-CENTURY ART 3
Art from the Enlightenment to the Age of Revolution. Topics change with each time of offering. Recent topics include Goya and the Spanish Enlightenment, David and Early Romanticism.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 421 SEMINAR IN NINETEENTH-CENTURY ART 3
Art from David to Impressionism. Topics change with each time of offering. Recent topics include Gericault, Delacroix, Cassatt, Art and Politics, The Theory and Practice of Romanticism, Historicism from David to Goyen, 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 PostImpressionism to the present. Topics may change with each time of offering. Recent topics include Symbolism, Picasso, Dada and Surrealism, Cubism and its influence, and PostModernism.
PREREQ: ARTH227 or ARTH228
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 424 SEMINAR IN NINETEENTH-CENTURY PHOTOGRAPHY 3
Aspects of the history and aesthetics of 19th-century photography. Topics change with each time of offering. Recent topics include Photography and Art, Documentary Photography, and "Art" Photography.
PREREQ: ARTH227 or ARTH318
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. Topics change with each time of offering. Recent topics include the Architecture of Neoclassicism; and Sullivan, Wright and the Prairie School.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 430 SEMINAR: REGIONAL ARTS AND ARCHITECTURE 3
Explores the historical development and cultural background of traditional material culture. Each seminar focuses on a particular theme such as the Pennsylvania-Germans, Carolina Low Country, or New England Settlements. Topics include architecture, landscape, decorative arts, and material life.

ARTH 431 SEMINAR IN AMERICAN ARCHITECTURE 3
American architecture from the Colonies to the present. Topics change with each time of offering. 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 432 MAKING THE AMERICAN CITY 3
Examination of historical and cultural issues related to housing, consumerism, gender, ethnicity, craft, poverty and wealth as a means to interpreting the city as artifact and symbolic setting. Includes field trips to cities in the region. Students will work with primary sources including archaeological materials, architecture and documentary evidence.

ARTH 435 SEMINAR IN AMERICAN ART 3
American art from the Colonies to the present. Topics change with each time of offering. Recent topics include Salins 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 440 SEMINAR ON PRINTS AND DRAWINGS 3
Graphic art from the 15th to 19th century with an emphasis on original works of art. Topics change with each time of offering. Recent topics include Renaissance and Baroque Graphic Art, Prints in the Age of Durer, and Problems in Prints from the Renaissance to the 19th Century.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 454 VERNACULAR ARCHITECTURE 3
See HIST454 for course description.

ARTH 457 SURVEY OF AFRICAN ART 3
See ANTH457 for course description.

ARTH 466 INDEPENDENT STUDY 1-6

ARTH 480 STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST 3
See ARTH480 for course description.

ARTH 481 SEMINAR IN MATERIALS AND TECHNIQUES OF THE CONTEMPORARY PAINTER AND DRAFTSMAN 3
See ARTH481 course description.

ARTH 488 STUDIO MATERIALS AND TECHNIQUES OF PAINTING I 3
See ARTH488 for course description.

ARTH 489 STUDIO MATERIALS AND TECHNIQUES OF PAINTING II 3
See ARTH489 for course description.

ARTH 490 STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I 3
See ARTH490 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 Archaic 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. Topics change with each time of offering. Recent topics include the Court of Chartres, Early Irish and Anglo-Saxon Art, and Medieval Ivories.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 608 STUDIES IN NORTHERN RENAISSANCE ART 3
The arts in Northern Europe from 1300 to 1600. Topics may change with each time of offering.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 611 STUDIES IN ITALIAN RENAISSANCE ART 3
Italian art from 1300 to 1600. Topics change with each time of offering. 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 615 STUDIES IN EARLY CHRISTIAN AND BYZANTINE ART 3
The beginnings of Christian expression under the Romans to the fall of the Byzantine Empire. Topic of study may change with each time of offering.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 616 STUDIES IN ITALIAN BAROQUE ART 3
Italian art in the 17th century. Recent topics include Bernini and Roman Baroque Sculpture, Seicento Poetics and Imagery, Caravaggio, and Origins of the Baroque. The Caracci and their Academy.
RESTRICTIONS: May be repeated for credit when topics vary.
ART HISTORY

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 619 STUDIES IN EIGHTEENTH-CENTURY ART 3
Art from the Enlightenment to the Age of Revolution. Recent topics include Goya and the Spanish Enlightenment, J. J. David and Early Romanticism. 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 Gericault, Delacroix, Cézanne, Art and Politics (1780-1880), The Theory and Practice of Romanticism, Historicism from David to Gérôme, and Orientalism. RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 622 RESEARCH TOPICS IN HISTORIC PRESERVATION 3
See UAPP635 for course description.

ARTH 623 STUDIES IN TWENTIETH-CENTURY ART 3
Art in Europe, with some reference to later American art, from 1900 to the present. Recent topics include Symbolism, Picasso, Dada and Surrealism, and Cubism and French Art.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 627 STUDIES IN THE HISTORY OF PHOTOGRAPHY 3
Aspects of the history and aesthetics of photography. Recent topics include 19th-Century Documentary Photography, 19th-Century “Art” Photography, 20th-Century Photography and Criticism, and 20th-Century Photography and Art. 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 UAPP629 for course description.

ARTH 629 STUDIES 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 630 HISTORY OF THEORIES IN MATERIAL CULTURE 3
See EAMC605 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 UAPP632 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 UAPP630 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 638 EUROPEAN DECORATIVE ARTS 3

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 639 AMERICAN DECORATIVE ARTS 3
Interiors, furniture and decorative arts in America from the 17th century to the present. RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 640 STUDIES IN EIGHTEENTH-CENTURY ART 3
Art and art theory in England and the Continent. Topic of study may vary with each time of offering.

PREREQ: ARTH214 or ARTH215

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 647 SEMINAR IN PRINTS AND DRAWINGS 3
Graphic art from the 15th to 19th century emphasizing original works of art. Recent topics include Renaissance and Baroque Graphic Art, Prints in the Age of Durer, and Problems in Prints from the Renaissance to the 19th Century. RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 657 SURVEY OF AFRICAN ART 3
See ARTH657 for course description.

ARTH 660 STUDY IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST 3
See MSST680 for course description.

ARTH 681 MATERIALS AND TECHNIQUES OF THE CONTEMPORARY PAINTER AND DRAFTSMAN 3
See MSST681 for course description.

ARTH 688 STUDY MATERIALS AND TECHNIQUES OF PAINTING I 3
See MSST688 for course description.

ARTH 689 STUDY MATERIALS AND TECHNIQUES OF PAINTING II 3
See MSST689 for course description.

ARTH 690 STUDY IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I 3
See MSST690 for course description.

ARTH 801 INTRODUCTION TO DECORATIVE ARTS IN AMERICA TO 1850 3
See EAMC801 for course description.

ARTH 811 STUDIES IN AMERICAN PAINTING BEFORE 1800 3
Painting of Colonial and Early Federal America: Topics change with each time of offering. Recent topics include the Puritan Aesthetic, the Influence of English Art, the Rise of Native-born Talent, and the Work of Such Artists as Copley and Peale.

PREREQ: ARTH320

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

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

PREREQ: ARTH320

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

ARTH 850 BIBLIOGRAPHY AND RESEARCH METHODS IN ART HISTORY 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 examination 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
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 HIST134 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 210 AFRICAN CIVILIZATIONS AND WORLD HISTORY 3
African social, economic and cultural contributions to the whole of human civilization in antiquity, medieval, Renaissance and modern times

BAMS 212 AFRO-CARIBBEAN LIFE AND CULTURE 3
Study of Afro-Caribbean life and culture Examines African cultural background, the pre-Columbian presence of Blacks in the New World, and social and cultural variations among Black peoples living in selected societies

BAMS 220 THE AMERICAN CIVIL RIGHTS MOVEMENT 3
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 RACE, ETHNICITY AND CULTURE PF
See WOMS298 for course description

BAMS 304 HISTORY OF BLACK AMERICA TO THE CIVIL WAR 3
Black historical impact on American life and culture to the Civil War May be cross-listed with HIST325
PREREQ: BAMS110

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

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

BAMS 307 BLACK THOUGHT AND PHILOSOPHY 3
Readings and discussions of Black philosophers, 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 3
See ENGL344 for course description

BAMS 320 HISTORY OF AFRO-AMERICAN ART 3
Review and study of major artistic movements and works by Afro-American artists from the early American colonial times to the Harlem renaissance era to the present. May be cross-listed with ARTH221
RESTRICTIONS: ARTH150 recommended

BAMS 324 AFRO-AMERICAN MUSIC 3
Historical analysis of origins and development of the Black musical experience in America. Contributions of Afro-American music studied by examining the function and meaning of the music, its idioms and characteristics, and its growth and development

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 communications.

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 360 METHODOLOGY AND BLACK AMERICAN STUDIES 3
Research methods, techniques and data-collecting as applied to the Afro-American experience.

BAMS 361 RACE, POWER AND SOCIAL CONFLICT 3
See SOC261 for course description

BAMS 395 PAN AFRICANISM 3
See HIST395 for course description

BAMS 415 RACE, CLASS AND GENDER 3
See SOC415 for course description

BAMS 432 PSYCHOLOGICAL PERSPECTIVES ON THE BLACK AMERICAN 3
See PSYC432 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 625 CURRICULUM MATERIALS AND METHODS IN AFRO-AMERICAN STUDIES 3
Curriculum laboratory to familiarize prospective and practicing teachers with trends, methods, materials and strategies for teaching Afro-American studies
RESTRICTIONS: Requires permission of instructor

BAMS 650 BLACK COMMUNITY STUDIES 3
Investigation and analysis of various topics and developments of interest and significance to the Black community. Topics vary.
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 freshmen 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 NEUROBIOLOGY OF THE BRAIN 3
Survey of modern knowledge about neurons and their organization into functional circuits
RESTRICTIONS: Open to non-majors only

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

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BISC 110  VIRUSES, GENES AND CANCER  3
Biologies of normal and malignant cells, and current knowledge of the genetic lesions
causing malignancy. Environmental and inherited factors contributing to one's risk of
cancer, and prospects for prevention. Standard and innovative means for detection and
treatment of cancer.
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 117  ELEMENTARY EVOLUTIONARY ECOLOGY LABORATORY  1
Laboratory exercises to compliment the subject matter of BISC107.
COREQ: BISC107
RESTRICTIONS: Open to non-majors only

BISC 195  BIOLOGICAL EVOLUTION  3
Historical background of the idea of evolution, the work of Charles Darwin, an explora-
tion of the modern theory of evolution and the contributions to it from other biological
disciplines, and philosophical issues related to evolution.  RESTRICTIONS: Open to non-
majors only.

BISC 207  INTRODUCTORY BIOLOGY I  4
Introduction to the molecular biology of eucaryotes and procaryotes; Topics include struc-
ture and function of proteins and nucleic acids; replication and repair of DNA; biosyn-
thesis of RNA and proteins; membranes, transport, composition and function of the
eucaryotic cell, chromosomes, viruses, the immune system and recombiant DNA.
PREREQ: BISC207 and one semester of organic chemistry

BISC 208  INTRODUCTORY BIOLOGY II  4
Biologie of cells, including both structure and function. The perpetuation of life: cell divi-
sion, genetics and development. Lastly, the origin and diversity of life. Laboratory focuses
on exerimentation, data analysis and an introduction to diversity.
COREQ: CHEM102, CHEM103, CHEM105 or CHEM112.
RESTRICTIONS: Non-majors may not take both BISC103 and BISC207 to fulfill the
group D requirement in Arts and Science.

BISC 276  HUMAN PHYSIOLOGY AND ANATOMY  4
Physiology and anatomy of the basic organ systems of humans
PREREQ: BISC207 or BISC208, and CHEM101, CHEM103, CHEM105 or CHEM111
RESTRICTIONS: Open to non-majors only.

BISC 301  MOLECULAR BIOLOGY OF THE CELL  4
Introduction to the molecular biology of eucaryotes and procaryotes. Topics include struc-
ture and function of proteins and nucleic acids; replication and repair of DNA; biosyn-
thesis of RNA and proteins; membranes, transport, composition and function of the
eucaryotic cell, chromosomes, viruses, the immune system and recombiant DNA.
PREREQ: BISC207 and one semester of organic chemistry

BISC 302  GENERAL ECOLOGY  3
Interactions between organisms and their environments, population dynamics and inter-
actions, communities, energy transfer within an ecological system, and components of the
ecosystem.  PREREQ: BISC208
RESTRICTIONS: Either BISC302 or BISC321, but not both, will count toward Biology major.

BISC 303  GENETIC AND EVOLUTIONARY BIOLOGY  4
The physical and chemical basis of heredity, the nature and mechanisms of gene action,
genese in populations, speciation. Laboratory included.  PREREQ: BISC207 and one semester of organic chemistry

BISC 305  CELL PHYSIOLOGY  4
Cell Physiology covers the structure and function of eucaryotic cell organelles. Emphasis
is put on dynamic processes such as membrane transport, cell motility and protein traf-
fling. Current studies from the literature and experimental techniques are also stressed.
PREREQ: BISC207, BISC208, CHEM103 and CHEM104.

BISC 306  GENERAL PHYSIOLOGY  4
Principles underlying function of organisms at the organ system level; ionic composition
and regulation, respiration, circulation, nutritive metabolism, excretion and neurosomatic
function activity. Lab included.
PREREQ: BISC208 and two semesters of chemistry

BISC 311  MOLECULAR BIOLOGY OF THE CELL  3
Introduction to the molecular biology of eucaryotes and procaryotes. Topics include struc-
ture and function of proteins and nucleic acids; replication and repair of DNA; biosyn-
thesis of RNA and proteins; membranes, transport, composition and function of the
eucaryotic cell, chromosomes, viruses, the immune system and recombiant DNA.
PREREQ: BISC207 and one semester of Organic Chemistry
RESTRICTIONS: Open to non-majors only.

BISC 312  GENETIC ENGINEERING LABORATORY  1
Laboratory and field exercises demonstrating basic ecological principles and quantitative
techniques. Emphasis on population and community phenomena. Natural habitats stud-
eied include local fields, forests and streams
COREQ: BISC302

BISC 321  ENVIRONMENTAL BIOLOGY  3
Basic ecological principles with major emphasis on the effect of man-caused environmen-
tal alterations on populations, communities and ecosystems.
RESTRICTIONS: Either BISC302 or BISC321, must be taken with both Biology major
RESTRICTIONS: Either BISC302 or BISC321, but not both, will count toward Biology major

BISC 324  INVERTEBRATE ZOOLOGY  4
Structure and function, life cycles, phylogenetic relationships and ecology of the major
invertebrate phyla
PREREQ: BISC207 and BISC208

BISC 326  HONORS: 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 bio-
chemistry of visual pigments, the electrophysiology of the visual pathway, the psy-
chophysics of visual perception and robotic vision. Emphasis on an interdisciplinary
approach to the subject.
PREREQ: BISC207 and BISC208

BISC 366  INDEPENDENT STUDY  1-6

BISC 371  INTRODUCTION TO MICROBIOLOGY  4
Major groups of microorganisms (algae, protozoa, fungi and bacterial) are studied
Emphasis on the physiology, metabolism, diversity and interactions between and among
each group. Lastly, bacteria and their interactions with humans. Lab included.
PREREQ: BISC207 and BISC208

BISC 390  HONORS COLOQUIUM  3
See ARSC390 for course description

BISC 405  VERTEBRATE EMBRYOLOGY  4
Morphological and epigenetic processes leading to the establishment of the vertebrate
body plan; the role of the nervous system during embryogenesis. Experiments and obser-
vations on living and non-living embryos
PREREQ: BISC207 or BISC208

BISC 408  MAMMALIAN HISTOLOGY  4
Microscopic organization, identification and functional anatomy of mammalian organ
systems and tissues
PREREQ: BISC207 or BISC208

BISC 412  MARINE ECOLOGY  4
Advanced treatment of selected topics in marine ecology, laboratory included
PREREQ: BISC302 and BISC324

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

BISC 440  NATURAL HISTORY OF PLANTS  4
Observations of plants over time to document their behavior. Individual field projects.
Attention to temporal and spatial patterns of growth, leaf production, flowering, fruiting
and leaf senescence, both within individuals and within populations. Review of evolution-
ary theory as it relates to plants
RESTRICTIONS: Requires permission of instructor
BISC 442 VERTEBRATE MORPHOLOGY 4
The evolutionary history of vertebrates from a structural and functional viewpoint. Laboratory includes vertebrate dissection.
PREREQ: BISC207 or 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 SEMINAR 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: BISC207, BISC208, BISC301 or BISC305, BISC371.

BISC 472 PRINCIPLES OF INFECTIOUS DISEASES 3
Etiology, pathology, immunology and epidemiology of selected bacterial, viral and parasitic diseases. The impact of disease on human affairs is considered.
PREREQ: BISC 371.
RESTRICTIONS: BISC301 recommended in addition to prerequisite.

BISC 480 VERTEBRATE NATURAL HISTORY 4
Study of vertebrate organisms dealing specifically with adaptations to the environment, morphology, physiology and taxonomy.
PREREQ: BISC207 and BISC208.

BISC 492 HUMAN AND MAMMALIAN CYTOGENETICS 3
Introduction to the structure, function and behavior of eukaryotic chromosomes with special emphasis on those from human and mammalian species. Covers methods of chromosome study, gene mapping and medical cytogenetics.
PREREQ: BISC207 and BISC208.
COREQ: BISC493.
RESTRICTIONS: BISC303 recommended in addition to Prerequisites. Offered in Spring of odd-numbered years.

BISC 493 HUMAN AND MAMMALIAN CYTOGENETICS LABORATORY 3
Teaches 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 cytochemical procedures.
PREREQ: BISC492.

BISC 494 EXPERIMENTAL ECOLOGY 3
"Hands-on" experience with techniques of modern experimental ecology. Emphasis on individual research projects in local natural habitats to expose students to experimental design, sampling techniques and data interpretation.
PREREQ: BISC302.
RESTRICTIONS: For biology majors. Requires permission of instructor.

BISC 495 EVOLUTION 3
Present status of the theory of biological evolution and its implications in the different areas of biology.
PREREQ: BISC207 or BISC208.

BISC 498 TOPICS IN BIOLOGY 3
In this multisection course, topics may vary from section to section. Information about each section is available in the Biology Office prior to registration. May be cross-listed with CSCC498.
PREREQ: BISC207 and 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 499 COMPUTERS IN BIOLOGICAL RESEARCH 4
Survey of current topics in biological research utilizing computers. Topics include data acquisition, analysis, interpretation, and modeling of biological phenomena. Student development of software to solve specific problems in biological research.
PREREQ: BISC207, BISC208.
RESTRICTIONS: Requires permission of instructor.

BISC 507 ECOSYSTEMS AND ENVIRONMENTAL BIOLOGY 3
Adaptation to the physical and biological environment, factors limiting the distribution and abundance of organisms, population and ecosystem processes, applications.
PREREQ: BISC207, BISC208, PHYS201, MATH222, and CHEM104.
RESTRICTIONS: Open to Environmental Science graduate students.

BISC 601 IMMUNOCHEMISTRY 4
Methods as basic as immunization and as complex as developing monoclonal antibodies. Methods used to investigate the genetics and protein structure of B-galactosidase.
PREREQ: BISC301 or Biochemistry.
RESTRICTIONS: Requires permission of instructor.

BISC 602 MOLECULAR BIOLOGY OF ANIMAL CELLS 3
Examination of eucaryotic genes, synthesis and processing of messenger RNA and control of protein synthesis with emphasis on regulation of normal cellular growth and differentiation and the process of cancer cell transformation. Emphasis on recombinant DNA technology, monoclonal antibody production and tissue culture.
PREREQ: BISC301 and BISC303.

BISC 604 RECOMBINANT DNA LABORATORY 4 PF
Introduces techniques of gene cloning, amplification, manipulation and expression in Esherichia coli and Bacillus subtilis.
PREREQ: BISC301 and BISC463.
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 mechanisms.
PREREQ: BISC605.

BISC 608 GENETIC TOXICOLOGY 2
Chemical mutagenesis and carcinogenesis at the cellular and molecular level. Human genetic monitoring for chemical exposure. Mutagenic risk assessment.
PREREQ: BISC303 or Biochemistry.

BISC 610 GENERAL ENDOCRINOLOGY 3
Coordination and regulation of normal body processes and functions by the secretory products of the endocrine glands. Primary emphasis on vertebrates.
PREREQ: BISC306 or BISC406.
RESTRICTIONS: Biochemistry recommended.

BISC 612 MARINE ECOLOGY 4
Selected topics in marine ecology, laboratory included.
PREREQ: BISC302 or BISC324.

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 COMPARATIVE VERTEBRATE HISTOLOGY 4
Structure and functional relationships of microscopic anatomy of organ systems and tissues of mammals and birds. Introduction to pathohistology of diseased tissues. Laboratory utilizes prepared slides, microscope video projection, microfiche and other audiovisual aids for recognition and identification of tissues. May be cross-listed with ANSC609.
RESTRICTIONS: Offered in Fall of odd-numbered years.

BISC 619 MACROMOLECULES LABORATORY 4
Laboratory course in techniques of molecular biology. Student generates recombinant viruses which can express large amounts of foreign protein. The protein will be purified and characterized functionally and biochemically using such methods as in vitro DNA replication, DNA footprinting, DNA melting and/or unwinding and gel retardation.
PREREQ: BISC301.
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 cross-listed with PSYC626.
PREREQ: BISC306 or BISC406, PSYC314 or BISC314, 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 cross-listed with PSYC627.
PREREQ: BISC306 or BISC406, PSYC310 or PSYC312, and PSYC314 or BISC314.

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

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BISC 637  Population Ecology  3
Theoretical and experimental aspects of single-species growth and multispecies interactions
PREREQ: BISC302

BISC 640  Natural History of Plants  4
Observations of plants over time to document their behavior. Individual field projects
Atention to temporal and spatial patterns of growth, leaf production, flowering, fruiting,
and leaf senescence, both within individuals and within populations. Review of evolutionary
theory as it relates to plants.
RESTRICTIONS: Requires permission of instructor.

BISC 641  Microbial Ecology  3
Principles of microbial interactions in natural environments, including applications to
industrial microbiology and certain types of pollution
PREREQ: BISC371

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 649  Physiology of Flowering Plants  3
Life processes of flowering plants and the influence of the environment on them, exam-
ined at each major developmental stage through the life cycle
PREREQ: BISC207, BISC208 and biochemistry.
RESTRICTIONS: BISC301 recommended

BISC 650  Bacterial Physiology  3
Survey of bacterial physiology in which representative biochemical processes are exam-
ined. Emphasis on the significance of individual reactions to the overall activities of the
bacterial cell
PREREQ: BISC371

BISC 653  Recent Advances in Molecular Biology  2
Focuses on technical and conceptual advances in gene identification, cloning, manipula-
tion, amplification, characterization and expression
PREREQ: BISC301 or equivalent or one semester 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 ribosomme structure and function.
PREREQ: BISC303 or Biochemistry

BISC 656  Evolutionary Genetics  3
Exploration of the theory, methods and experiments underlying current research in evolu-
tionary processes determining genetic variation within and between species, estimation
of population structure from genetic data, and the genetics of speciation
PREREQ: BISC303

BISC 658  Developmental Genetics  3
How genes control the development of organisms. Emphasis on the regulation of develop-
mental genes and on application of recombinant DNA techniques (gene cloning, etc.)
to this problem. Examples include genes in sporulating bacteria, Drosophila, chick,
mouse and man
PREREQ: BISC303

BISC 660  Environmental Physiology  3
Biochemical and morphological adaptive responses of animals to environmental factors;
adjustments to changes in solute, 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 con-
traction, 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: BISC306 or BISC406

BISC 666  Special Problem  1-6

BISC 670  Immunobiology Laboratory  1
Preparation of antigens and antiserum; antibody analysis by precipitation, agglutination,
complement fixation and other serological techniques
COREQ: BISC671

BISC 672  Neuroimmunology  3
Examines reciprocal communication between the nervous and immune systems. Analyzes
the influence of humoral (neurotransmitters and neuromodulators) and neuronal (neu-
roanatomical pathways) factors on components comprising the immune system; and the
influence of humoral factors (immunomodulators, released by immune system cells) on the
central nervous system
PREREQ: BISC471, BISC671, or BISC671; and BISC306 or BISC406

BISC 673  Topics in Immunogenetics  3
In-depth discussion of a number of topics in immunogenetics, e.g., genetics of the
immunoglobulin molecule, genetics of the cellular immune response, genetic basis of
human immunological diseases.
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 includ-
ing gas exchange and transport between the circulating medium and the external
environment.
PREREQ: A physiology course at or above the 300 level.
COREQ: BISC676
RESTRICTIONS: Corequisite applies to Biology majors only

BISC 676  Cardiopulmonary Seminar  1
Mammalian cardiopulmonary physiology
COREQ: BISC676

BISC 679  Virology  3
Molecular biology of animal viruses. Virus structure and organization; mechanisms of
penetration, replication, maturation and transformation.
PREREQ: BISC301 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 varia-
tion such as cyogenetics and cell genetics, biochemical genetics, developmental genet-
ics and teratology, principles of genetic counselling, multifactorial inheritance and the
 genetics of cancer.
PREREQ: BISC303

BISC 694  Experimental Ecology  3
Provides "hands-on" experience with techniques of modern experimental ecology.
Emphasis on individual research projects in local natural habitats which expose students
to experimental design, sampling techniques and data interpretation.
PREREQ: BISC302
RESTRICTIONS: Requires permission of instructor. For biology majors

BISC 696  Vertebrate Reproduction  3
Neural, neuroendocrine and endocrine mechanisms regulating vertebrate reproduction.
Integration of environmental information in timing reproductive processes
PREREQ: BISC306

BISC 697  Reproduction Techniques  6
Experimental techniques used in laboratory investigations of the physiology and
endocrinology of vertebrate reproduction
PREREQ: BISC696

BISC 698  Comparative Endocrinology  3
Functional evolution of hormone systems throughout the animal kingdom. Chemical inte-
gration of physiological processes regulating day-to-day and season-to-season adapta-
tions of organisms to environmental changes.
PREREQ: BISC276 or BISC306

BISC 699  Computers in Biological Research  4
Survey of current topics in biological research utilizing computers. Topics include data
acquisition, analysis, interpretation, image analysis and modeling of biological pheno-
mena. Student development of software to solve specific problems in biological research.
PREREQ: BISC207 and BISC208
RESTRICTIONS: Requires permission of instructor.

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

BISC 802  Cell and Genetic Systems  1 PF
Critical evaluation of selected topics in cell and genetic systems through presentations
given by researchers from both inside and outside the University community.
RESTRICTIONS: Requires permission of instructor
### BUSINESS ADMINISTRATION

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUAD 806</td>
<td>ADVANCES IN PHYSIOLOGY</td>
<td>2</td>
<td>Callioquim and special studies on a selected aspect of animal physiology.</td>
</tr>
<tr>
<td>BUAD 810</td>
<td>ADVANCED ENDOCRINOLOGY</td>
<td>2</td>
<td>Selected topics pertaining to hormonal function.</td>
</tr>
<tr>
<td>BUAD 820</td>
<td>ENVIRONMENTAL RESEARCH</td>
<td>3</td>
<td>See GEOG820 for course description.</td>
</tr>
<tr>
<td>BUAD 868</td>
<td>RESEARCH</td>
<td>1-12</td>
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<tr>
<td>BUAD 869</td>
<td>MASTER’S THESIS</td>
<td>1-6</td>
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</tr>
<tr>
<td>BUAD 964</td>
<td>PRE-CANDIDACY STUDY</td>
<td>3-12 PF</td>
<td>Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work. Restrictions: Not open to students who have been admitted to candidacy.</td>
</tr>
<tr>
<td>BUAD 969</td>
<td>DOCTORAL DISSERTATION</td>
<td>1-12 PF</td>
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### BIOMECANICS & MOVEMENT SCIENCE

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<tbody>
<tr>
<td>BMSC 865</td>
<td>SEMINAR</td>
<td>0 PF</td>
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<tr>
<td>BMSC 866</td>
<td>SPECIAL PROBLEM</td>
<td>3</td>
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<tr>
<td>BMSC 868</td>
<td>RESEARCH</td>
<td>3</td>
<td></td>
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<tr>
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<td>MASTER’S THESIS</td>
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<td>PRE-CANDIDACY STUDY</td>
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<td>Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work. Restrictions: Not open to students who have been admitted to candidacy.</td>
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<td>BMSC 969</td>
<td>DOCTORAL DISSERTATION</td>
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### BIORESOURCES ENGINEERING

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<tbody>
<tr>
<td>BREG 603</td>
<td>SOIL PHYSICS</td>
<td>3</td>
<td>Relationship of soil moisture, soil temperature, soil structure, shear strength and compaction to irrigation, drainage, plant growth, tillage and erosion. May be cross-listed with PLSC603.</td>
</tr>
<tr>
<td>BREG 621</td>
<td>BIORESOURCES MANAGEMENT SYSTEMS</td>
<td>4</td>
<td>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.</td>
</tr>
<tr>
<td>BREG 628</td>
<td>LAND APPLICATION OF WASTES</td>
<td>3</td>
<td>Principles and design of land treatment systems for municipal and industrial wastes. Topics include nutrient and metal transport in soils, slow rate systems, rapid infiltration systems, overland flow systems, on-site wastewater systems and land disposal of sludges.</td>
</tr>
<tr>
<td>BREG 666</td>
<td>SPECIAL PROBLEM</td>
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<tr>
<td>BUAD 030</td>
<td>COOPERATIVE EDUCATION PROGRAM</td>
<td>1 RP</td>
<td>Assists students to integrate classroom theory with onthejob experience through analysis of their Cooperative work assignments. Business Administration, Accounting, and Economics Co-op students must enroll for one credit hour of BUAD030 during their Co-op work term.</td>
</tr>
<tr>
<td>BUAD 100</td>
<td>INTRODUCTION TO BUSINESS</td>
<td>3</td>
<td>A survey of basic business concepts designed for the non-business major. Topics covered will include business organization, management, marketing, operations research, and finance. Restrictions: No majors within the Business Administration or Accounting degree programs may receive credit for this course.</td>
</tr>
<tr>
<td>BUAD 301</td>
<td>INTRODUCTION TO MARKETING</td>
<td>3</td>
<td>Management of the marketing functions, marketing research, product planning, distribution channels, pricing, personal selling and advertising. Emphasis on consumer and industrial markets. PreReq: ECON100 or ECON153.</td>
</tr>
<tr>
<td>BUAD 302</td>
<td>MARKETING RESEARCH</td>
<td>3</td>
<td>Focus on the marketing research process as an aid in marketing decision making. Defining marketing problems, identifying marketing information needs, developing methods to gather information, and applying research results to marketing problems. PreReq: STAT202, BUAD301, and ACCT260.</td>
</tr>
<tr>
<td>BUAD 306</td>
<td>OPERATIONS MANAGEMENT</td>
<td>3</td>
<td>Analysis of major problems faced by operations managers at different levels of management. Topics include scheduling, forecasting, process design, inventory management and quality management. PreReq: MATH300, STAT202, and ACCT260.</td>
</tr>
<tr>
<td>BUAD 309</td>
<td>MANAGEMENT AND ORGANIZATIONAL BEHAVIOR</td>
<td>3</td>
<td>The processes and procedures used to manage performance effectively, including behavioral implications and an awareness of the individual's impact on others.</td>
</tr>
<tr>
<td>BUAD 341</td>
<td>ENVIRONMENT OF MULTINATIONAL CORPORATIONS</td>
<td>3</td>
<td>Interdisciplinary approach explores the multinational corporation: its political and economic environment; current attitude of policy makers; and techniques used to earn profits. Material supplemented by practicing economists, financial experts, business executives and political analysts. May be cross-listed with ECON414 and/or POSC341. PreReq: ECON152. Restrictions: Counts as a BUAD elective for students receiving a degree in Business Administration. Credit for BUAD/ECON/POSC341 given only once.</td>
</tr>
<tr>
<td>BUAD 346</td>
<td>ANALYSIS OF OPERATIONS PROBLEMS</td>
<td>3</td>
<td>Intensive treatment of topics covered in BUAD306 to include the investigation and development of the decision making process in an operations environment. Emphasis on practical applications. PreReq: BUAD306.</td>
</tr>
<tr>
<td>BUAD 366</td>
<td>INDEPENDENT STUDY</td>
<td>1-6</td>
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<tr>
<td>BUAD 383</td>
<td>SEMINAR ON INTERNATIONAL BUSINESS</td>
<td>3</td>
<td>Surveys the economic, political, and institutional context of international business as well as the strategic operations of the international company. Special attention is given to cross-discipline topics, both in the form of interdisciplinary materials and lectures and institutional and company visits. Restrictions: Taught abroad.</td>
</tr>
<tr>
<td>BUAD 385</td>
<td>ADMINISTRATIVE THEORY</td>
<td>3</td>
<td>Concepts of administration at the individual, group and organizational level of analysis. Emphasis on organizational level of analysis with topics including job design, organization structure and design, and inter-and intra-organizational processes. PreReq: BUAD309.</td>
</tr>
<tr>
<td>BUAD 393</td>
<td>SEMINAR ON INTERNATIONAL MARKETING</td>
<td>3</td>
<td>Seminar on selected topics in international marketing management. Combines lectures and visits to local organizations. Research paper typically required. PreReq: BUAD301. Restrictions: Taught abroad. Counts as BUAD elective for BSBA candidates.</td>
</tr>
<tr>
<td>BUAD 394</td>
<td>SEMINAR ON INTERNATIONAL OPERATIONS MANAGEMENT</td>
<td>3</td>
<td>Seminar on selected topics in international operations management. Combines lectures and visits to local organizations. Research paper typically required. PreReq: BUAD306. Restrictions: Taught abroad. Counts as BUAD elective for BSBA candidates.</td>
</tr>
<tr>
<td>BUAD 420</td>
<td>INDUSTRIAL RELATIONS</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>BUAD 421</td>
<td>HUMAN RESOURCE MANAGEMENT</td>
<td>3</td>
<td>Emphasizes key human resource management requirements: recruitment, selection, training and development, and maintenance of personnel (evaluation, compensation, working conditions and labor relations). PreReq: BUAD309.</td>
</tr>
</tbody>
</table>
BUSINESS ADMINISTRATION

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 hours of management courses

BUAD 441 BUSINESS POLICY 3
Case studies and concepts in the determination of top-level company policy and the solution of problems that cross major functional areas in business

PREREQ: BUAD301, BUAD306, BUAD309, and FINC311
RESTRICTIONS: Requires Senior standing in business administration or accounting

BUAD 442 NEW VENTURE PLANNING 3
Entrepreneurship and entrepreneurial activities studied through lecture and casework. Business knowledge applied to the development of business plans for new ventures of the students' choosing

PREREQ: BUAD301, BUAD306, BUAD309, and FINC311

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

RESTRICTIONS: Requires Senior status in Business Administration or Accounting

BUAD 446 OPERATIONS PLANNING AND CONTROL 3
Management of operations and inventories in a variety of organizations including banks, hospitals, government and manufacturing firms. Topics include forecasting, operations planning and scheduling, material requirements planning and purchasing

PREREQ: BUAD306
COREQ: BUAD447

BUAD 447 QUALITY MANAGEMENT 3
The new technology for quality and productivity. Emphasis on actual implementation of total quality management in general and statistical process control in particular

PREREQ: BUAD306
COREQ: BUAD446

BUAD 448 DECISION SUPPORT SYSTEMS FOR OPERATIONS 3
Effective design and implementation of decision support for operations. Selection of appropriate models for decision support.Emphasis on project work in which an actual decision support system is designed and implemented.

PREREQ: BUAD306, ACCCT261
COREQ: Open only to Operations management majors with senior status. Not open to students who have taken BUEC431.
RESTRICTIONS: Requires Senior status. Not open to students who have taken BUEC431

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 decision 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 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
Focuses 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

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

BUAD 836 PROBLEM STRUCTURING AND ANALYSIS FOR DECISION MAKING 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

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

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 to them and prepare formal presentations of their findings.
PREREQ: Requires 24 MBA credits

BUAD 864 INTERNSHIP 1 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.
PREREQ: BUAD870

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 experimental exercises. Individual and organizational level topics are emphasized. Some group level topics are also included.
PREREQ: BUAD870.

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 MANAGEMENT, ORGANIZATION, AND INFORMATION PROCESSING 3
Analyzes organizations as complex systems whose major function is information processing. Emphasizes organizational structure and culture as information processors. Investigates the role of information technology as an information processing tool and its effects on organizations.
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 practice, 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. 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 and implementing strategies and their implementation 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 individual and ultimate consumers.
PREREQ: ACCT800 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 limitation of marketing research data, enabling them to evaluate marketing research activities. Emphasizes interpretation, not computation, from statistical analyses.
PREREQ: BUAD820 and BUAD880.

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

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

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

BUAD 885 MARKETING CHANNELS 3
Examines 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.

BUAD 889 INDUSTRIAL MARKETING 3
Studies the marketing of goods and services to businesses, institutions, and the government. Covers organizational buying behavior, product/market planning, sales force and distribution management, pricing and promotion from the perspective of both the buyer and the seller.
PREREQ: BUAD880.

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

BUSINESS AND ECONOMICS

BUAD 8629 SPECIAL TOPICS IN BUSINESS ADMINISTRATION 3
Examines the issues faced by senior and middle level marketing executives in an organization. Emphasizes developing a comprehensive marketing strategy that is consistent with corporate plans. Issues explored include: opportunity assessment and competitive analysis, segmentation and positioning, and the development of integrated marketing mix programs.
PREREQ: BUAD880.

BUAD 8629 CORPORATE STRATEGY 3
Emphasizes total organization function and performance in a global environment. Examines general management responsibilities for determining objectives and future strategies and seeking commitment for their implementation, integrates functional course concepts to enhance decision making and communication skills through individual and group analyses of specific companies.
PREREQ: FINC850, BUAD831, BUAD870, BUAD880.

BUEC 325 MODERN BUSINESS COMPUTING 3
Use of higher level contemporary computing languages to structure solutions to business problems. Prototyping applications of systems.
PREREQ: ACCT260

BUEC 330 SYSTEMS ANALYSIS AND IMPLEMENTATION 3
Provides a conceptual basis for the analysis of business information problems and the design and implementation of systems to solve those problems. Considers alternative methodologies for analyzing, designing and implementing management information systems.
BUSINESS AND ECONOMICS

BUEC 366  INDEPENDENT STUDY  1-6
BUEC 430  INFORMATION PLANNING AND DATA MANAGEMENT  3
Emphasis on applying a systems approach to planning information requirements for an organization. Considers both theoretical and practical data base methodologies.
PREREQ: BUEC330 and BUEC255

BUEC 431  DECISION SUPPORT SYSTEMS  3
The process of 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: MI/DSS minors must take BUEC432 as a corequisite.

BUEC 432  SYSTEMS DEVELOPMENT  3
Capstone course in the Business and Economics MI/DSS minor. Emphasis on applying the concepts of project management to real management information problems.
PREREQ: BUEC430
RESTRICTIONS: MI/DSS minors must take BUEC431 as a corequisite.

BUEC 466  INDEPENDENT STUDY  1-6

COGNITIVE SCIENCE

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 algorithms in theories of processing and development. Includes alternatives posed by connectionist models of cognition.

CGSC 314  BRAIN AND BEHAVIOR  3
See PSYC314 for course description.

CGSC 330  PHILOSOPHY OF MIND  3
See PHIL330 for course description.

CGSC 340  COGNITION  3
See PSYC340 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 CIS480 for course description.

CGSC 481  ARTIFICIAL INTELLIGENCE  3
See CIS481 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 641  VISUAL COGNITION  3
See PSYC641 for course description.

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

CGSC 650  COGNITIVE NEUROSCIENCE  3
See PSYC650 for course description.

CGSC 667  EXPERIMENTAL COURSE  1-6

CGSC 681  ARTIFICIAL INTELLIGENCE  3
See CIS681 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  1-3

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.
COREQ: MATH242

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: CHEG112 and MATH243
COREQ: CHEM443.

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. Application 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: CHEG235, CHEM444 and MATH302.

CHEG 341  FLUID MECHANICS  3
Theory of flow of incompressible viscous and nonviscous fluids; flow of non-Newtonian fluids; empirical correlations for laminar and turbulent flow; and applications in chemical processing.
PREREQ: MATH302 and CHEG231.

CHEG 342  HEAT AND MASS TRANSFER  4
Theory of heat transfer in flow and nonflow systems. Fundamentals of mass transfer. Empirical correlations for transfer in free and forced convection; and application to process engineering problems.
PREREQ: 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 3
Analysis of transients in chemical processing equipment and chemical reactors. Frequency response analysis, state variable, representation and design of linear control systems.
PREREQ: MATH302, CHEG332 and CHEG443.

CHEG 432 CHEMICAL PROCESS ANALYSIS 4
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 and CHEG443.
COREQ: CHEG401.

CHEG 443 MASS TRANSFER OPERATIONS 3
Application 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 illustrate 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 601 STRUCTURE AND PROPERTIES OF POLYMER MATERIALS 3
See MASC601 for course description.

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

CHEG 603 POLYMERIZATION REACTION ENGINEERING 3
Introduction to polymer chemistry and reactor design with emphasis on mechanics and kinetics of polymerization, macromolecular structure, and the influence of reactor geometry and process conditions on polymer properties.
PREREQ: CHEM444.

CHEG 604 INTRODUCTION TO POLYMER SCIENCE AND ENGINEERING II 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.
PREREQ: CHEG603.

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, turbulencenon-Newtonian flow and pipe flow.
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 non-uniform surfaces.
PREREQ: CHEM331, CHEM443, CHEM444 and CHEG332.

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

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

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

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 crosslisted with MASC516.

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: CHEG332 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—dispersion of chemicals and particulates, source models, chemical and biological treatment of wastes.
PREREQ: CHEG341 and CHEG325.
COREQ: CHEG342.

CHEG 635 AIR POLLUTION AND ITS CONTROL 3
See CHEG635 for course description.

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

CHEG 691 TECHNICAL PROJECT MANAGEMENT 3
The organization, planning, and control of technical projects. Emphasis on the application of quantitative techniques of management, critical path analysis, linear programming, stochastic decision making, risk analysis and forecasting.
RESTRICTIONS: Requires permission of instructor.

CHEG 801 PROCESS CONTROL AND DYNAMICS 3
Extension 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 825 CHEMICAL ENGINEERING THERMODYNAMICS 3
Applications of classical and molecular thermodynamics to industrial problems in chemical and phase equilibrium. Topics include nonideal solutions, high pressure systems, complex reaction equilibria, generalized correlations and equations of state.
PREREQ: CHEG325 and CHEM444.

CHEG 826 CHEMICAL ENGINEERING THERMODYNAMICS 3
Applications of classical and molecular thermodynamics to industrial problems in chemical and phase equilibrium. Topics include nonideal solutions, high pressure systems, complex reaction equilibria, generalized correlations and equations of state.
PREREQ: CHEG325 and CHEM444.

CHEG 827 CHEMICAL ENGINEERING PROBLEMS 2-3
The application of 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 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.

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CHEM 836  APPLIED CHEMICAL KINETICS  3  
Topics in chemical reaction engineering, applied kinetics and industrial catalysis  
PREREQ: CHEG835

CHEG 863  DIFFUSIONAL OPERATIONS  3  
Advanced coverage of the latest theoretical and experimental studies in several fields 
involved mass transfer. These fields include humidification, absorption, extraction, distilla-
tion, 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 lack-
ing, with the goals of contributing novel 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 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

CHEG 969  DOCTORAL DISSERTATION  1-12 PF  

CHEMICAL ENGINEERING

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 prepara-
tion 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 recom-
mended. 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, equilibria and 
energy relationships. Includes one three-hour laboratory per week.  
COREQ: MATH114 or higher  
RESTRICTIONS: For majors in the physical and natural sciences, mathematics and engi-
neering. 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 of CHEM103. Includes one three-hour laboratory per week that is a continu-
ation of the laboratory experience begun in CHEM103.  
PREREQ: CHEM101, CHEM103 or CHEM105  
RESTRICTIONS: For majors in the physical and natural sciences, mathematics and engi-
neering. Only one course among CHEM102, CHEM104 and CHEM112 can count toward graduation.

CHEM 105  GENERAL CHEMISTRY  5  
Nuclear chemistry, periodicity, structure and bonding, classes of reactions, stoichiome-
try, solution chemistry, chemical equilibria and electrochemistry. Includes one three-hour 
laboratory per week.  
COREQ: MATH100  
RESTRICTIONS: For nursing majors who will continue with CHEM106. High school alge-
bra required in lieu of Corequisites; one year of high school chemistry recommend-
ed. Only one course from among CHEM101, CHEM103, CHEM105 and CHEM111 can count toward graduation.

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

CHEM 111  GENERAL CHEMISTRY  3  
Fundamental laws of chemical action with emphasis on atomic structure, chemical bond-
ing, equilibrium, reaction kinetics and the important classes of substances.  
PREREQ: One semester 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  
A continuation of CHEM111  
PREREQ: CHEM103 or CHEM111  
COREQ: CHEM120.  
RESTRICTIONS: For chemistry and chemical engineering students. Only one course 
among CHEM102, CHEM104 and CHEM112 can count toward graduation.

CHEM 119  QUANTITATIVE CHEMISTRY  1  
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 Prereq.

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  
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 CHEM105  
RESTRICTIONS: Designed for students of agriculture, human resources and medical 
technology.

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

CHEM 216  ELEMENTARY BIOCHEMISTRY LABORATORY  1  
Principal classes of biomolecules and their metabolic interrelationships.  
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 
chromatographic and spectrometric measurements.  
PREREQ: CHEM102, CHEM104 or CHEM105  
COREQ: CHEM220.

CHEM 310  COMPUTERS IN CHEMISTRY  3  
Introduction to computers, programming and typical applications of computers in chem-
istry. Applications include data analysis, numerical methods, curve-fitting, chemical struc-
ture coding and the use of chemical data bases  
PREREQ: MATH242 and CHEM120 or CHEM220 and CHEM221

CHEM 311  SURVEY OF ORGANIC CHEMISTRY I  3  
First half of a two-semester survey of the structure, synthesis, and reactions of organic 
compounds.  
PREREQ: CHEM104  
RESTRICTIONS: Not for credit for CHEM BS majors. Neither CHEM311 and CHEM321 
nor CHEM311 and CHEM331 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 reaction of organic 
compounds.  
PREREQ: CHEM311  
RESTRICTIONS: Not for credit for CHEM BS majors. Neither CHEM312 and CHEM322 
nor CHEM312 and CHEM332 can both be counted toward graduation.
CHEM 321 Organic Chemistry 4
First half of a two-semester survey of the structure, synthesis, and reactions of organic compounds. Includes one three-hour laboratory per week that introduces the basic laboratory techniques of organic chemistry.
PREREQ: 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 compounds. Includes one three-hour laboratory per week that introduces the basic laboratory techniques of organic chemistry.
PREREQ: CHEM321
RESTRICTIONS: Not for CHEM BS majors. CHEM321 and CHEM331 cannot both be counted toward graduation.

CHEM 331 Organic Chemistry 3
Major classes and reactions of organic compounds, emphasizing stereochemistry, reaction mechanisms and synthetic methods.
PREREQ: CHEM104, CHEM112 or CHEM120.
COREQ: CHEM332
RESTRICTIONS: For chemistry and chemical engineering majors and any 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, reaction mechanisms and synthetic methods.
PREREQ: CHEM331
COREQ: CHEM334
RESTRICTIONS: For chemistry and chemical engineering majors and any other students desiring fuller treatment than in CHEM321. Neither CHEM312 and CHEM322, nor CHEM322 and CHEM332 can both count 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 laboratory 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 society, role of scientific publication and use of the library. Reading of a series of research papers to gain an understanding of what a biochemist does. Perspectives on the history of biochemistry.
PREREQ: CHEM331

CHEM 365 Seminar 1 PF

CHEM 366 Independent Study 1-3 PF

CHEM 418 Introductory Physical Chemistry 3
Less rigorous than CHEM443-444. Kinetics and mechanisms of reactions; chemical thermodynamics; states of matter; phase and chemical equilibria; colligative properties of solutions; and atomic and molecular structure.
PREREQ: General Chemistry and Calculus (MATH221 and MATH222 or MATH241)
RESTRICTIONS: Course acceptable for B.A. but not B.S. degree in chemistry. CHEM418 and CHEM443 cannot both be counted toward graduation.

CHEM 419 Introductory Physical Chemistry 3
Continuation of CHEM418.
PREREQ: CHEM418
RESTRICTIONS: CHEM419 and CHEM444 cannot both be counted toward graduation.

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 3
Application of the principles and methods of mathematics and physics to the quantitative study of chemical problems.
PREREQ: CHEM120 or CHEM220 and CHEM221, MATH242 (MATH243 recommended), PHYS208 (recommended) or PHYS202.
RESTRICTIONS: CHEM418 and CHEM443 cannot both be counted toward graduation.

CHEM 444 Physical Chemistry 3
Continuation of CHEM443.
PREREQ: CHEM120 or CHEM220 and CHEM221, MATH242 (MATH243 recommended), PHYS208 (recommended) and PHYS202.
RESTRICTIONS: CHEM419 and CHEM444 cannot both be counted toward graduation.

CHEM 445 Physical Chemistry Laboratory 1
Physical methods for studying properties of matter.
PREREQ: CHEM120 or CHEM220 and CHEM221.
RESTRICTIONS: To be taken concurrently with or subsequent to CHEM443 and CHEM444, or CHEM418 or CHEM419.

CHEM 446 Physical Chemistry Laboratory 1
Continuation of CHEM445.
PREREQ: CHEM120 or CHEM220 and CHEM221.

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 written thesis).

CHEM 502 Environmental Chemistry 3
Chemical principles underlying and analytical tools employed in air and water pollution, the greenhouse effect, ozone layer depletion, waste disposal and recycling, energy conservation, and other selected environmental topics.
PREREQ: An undergraduate level Chemistry or Calculus course.
RESTRICTIONS: Open to Environmental Science graduate students.

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 PLS608 for course description.

CHEM 610 History of Chemistry 3
A survey of the development of chemistry. Use made of the UNIDEL Collection of Rare Books in the History of Chemistry.
PREREQ: General Chemistry.

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 CHEM438.

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 CHEM438.

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.

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CHEM 871 STATISTICAL THERMODYNAMICS 3
Applications of statistical mechanics to chemical problems
RESTRICTIONS: Requires permission of instructor.

CHEM 874 SPECIAL TOPICS IN PHYSICAL CHEMISTRY 1-3
RESTRICTIONS: Requires permission of instructor. May be repeated for credit when topics vary.

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

CHEM 969 DOCTORAL DISSERTATION 1-12 PF

CHINESE

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

CHIN 106 CHINESE II - ELEMENTARY/INTERMEDIATE 4
Continued practice in the aural, oral, reading and writing skills of Mandarin Chinese including the indentation and reproduction of basic Chinese characters. Introduction to formality levels and to reading and writing texts in Chinese characters. Media Center utilized.
PREREQ: CHIN 105

CHIN 107 CHINESE III - INTERMEDIATE 4
Development of aural, oral, reading and writing skills at the intermediate Chinese level, including continued practice in identifying and reproducing Chinese characters, handling a greater variety of formality levels, and further comprehending spoken (Koutouyu) and written (Shumianyu) language differences. Media Center resources utilized.
PREREQ: CHIN 106
RESTRICTIONS: Satisfies the Arts and Science foreign language requirement.

CHIN 266 SPECIAL PROBLEM 1-4

CIVIL AND ENVIRONMENTAL ENGINEERING

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

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

CIEG 211 STATICS 3
Analysis of force systems and equilibrium of rigid bodies in two and three dimensions. Determination of centers of gravity of and centroids of statically determinate structures. Simple frames and "machines." Introduction to the analysis of beams.
COREQ: MATH 243

CIEG 212 STRENGTH OF MATERIALS 3
Stresses and displacements in axially loaded beams and in bars subjected to torsion. Analysis of stresses and deflections of laterally loaded beams. Study of stresses and strains in a plane. Mohr's circle for stresses. Failure theories. Design of structural members using strength criteria.
PREREQ: CIEG 211
COREQ: MATH 302

CIEG 213 MATERIALS 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, traverse, route surveying, triangulation and field astronomy. Also includes computer methods for area, cut/fill, grade elevations and other processing of survey data.
PREREQ: MATH 115, MATH 221 or MATH 241

CIEG 233 ENVIRONMENTAL ENGINEERING PROCESSES 3
Quantified descriptions of physical, chemical, and biological processes of environmental importance. Introductory level analysis of pollution transport, treatment, containment, remediation. Process engineering approach to contaminant removal methods, including use of appropriate computer software.
PREREQ: CIEG 122, MATH 242
RESTRICTIONS: Open to Civil Engineering majors only.

CIEG 301 ANALYSIS OF STRUCTURES 4
PREREQ: CIEG 212, MATH 302
COREQ: MATH 302.

CIEG 302 MECHANICS 4
An intermediate-level development of the kinematics and dynamics of particles, systems of particles and rigid bodies. Vibrations of machines and structures. Emphasis on solution of engineering problems by force, energy and momentum methods of analysis. Applications to the dynamics of machines, structures and vehicles.

CIEG 337 ENVIRONMENTAL ENGINEERING LABORATORY 1
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, alkalinity, hardness. Quality assessment and quality control.
PREREQ: CHEM 120 and CIEG 333.
COREQ: CIEG 432.
RESTRICTIONS: Open to juniors only.

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

CIEG 366 INDEPENDENT STUDY 1-6
The study and application of automatic digital computation; the calculus of finite differences; matrices; iterative, numerical and relaxation procedures; and special applications to civil engineering problems.
PREREQ: MATH 302.

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: CIEG 381.

CIEG 402 STEEL DESIGN 3
Design of metal structures; connections, tension members, columns, and beams with and without lateral support.
PREREQ: CIEG 301.

CIEG 403 CONCRETE DESIGN 3
Reinforced concrete structures; ultimate strength design; and related topics.
PREREQ: CIEG 301.

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: CIEG 403.

CIEG 405 MATRIX STRUCTURAL ANALYSIS 3
Computer analysis of two- and three-dimensional frameworks using matrix methods. Straight, tapered, curved and beam on elastic foundation members; flexible supports, element and temperature loads, partially rigid connections and finite sized joints; material and geometric nonlinearities; stability analyses; and determination of ultimate load capacities.
PREREQ: CIEG 301.

CIEG 406 STRUCTURAL MATERIALS 3
PREREQ: CIEG 212, CIEG 213, and MASC 302.
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: CIEG402 and CIEG403.

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

CIEG 415  RELIABILITY IN DESIGN IN CIVIL ENGINEERING  3
Reliability analysis of civil engineering systems, using concepts and methods of probability and statistics to supplement the engineer's judgment when addressing uncertainty in design. Topics include elements of probability and statistics, measure of reliability, time to failure, reliability bounds, confidence of reliability and Monte Carlo simulation.

CIEG 417  ADVANCED STRUCTURAL ANALYSES  3

CIEG 418  CONTINUOUSLY SUPPORTED STRUCTURES  3

CIEG 420  SOIL MECHANICS  4
Soil properties, soil-water interaction, soil stresses, two-dimensional flow, soil compressibility, shear strength and lateral earth pressures. PREREQ: CIEG212 and MECH305.

CIEG 421  FOUNDATIONS AND SUBSTRUCTURES  3

CIEG 422  EARTH STRUCTURES ENGINEERING  3
Properties of soils and methods to determine them: water flow through homogeneous and anisotropic earth, predictions of porewater pressures, stresses and settlement predictions; slope stability; types 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: CIEG420.

CIEG 425  GEOENVIRONMENTAL ENGINEERING  3

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: CIEG331 and MECH305.

CIEG 432  WASTEWATER ENGINEERING  3
Source and character of wastes; design and operation of wastewater treatment facilities; ultimate disposal of wastewater residues and considerations of discharge criteria, and economic and regulatory aspects. PREREQ: CIEG331.

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: CIEG331.

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. Particular removal from industrial emission sources. Resource recovery and reuse presented as an important option for the management of industrial wastes. PREREQ: CIEG333 and CHEG325.

CIEG 437  WATER AND WASTEWATER QUALITY  3
Principles and applications of analysis of solids, organic load, dissolved oxygen, disinfectants, nutrients, trace metals, trichloroethylene and micromolecules. Lecture and laboratory. PREREQ: CIEG331.

CIEG 441  HYDROLOGY  3
The fundamentals of climatology, meteorology and hydrologic cycle; their relation to surface water and groundwater; rainfall runoff characteristics; frequency analysis; flood routing; floodplain hydrology; and groundwater flow. PREREQ: MECH305.

CIEG 442  HYDRAULIC ENGINEERING  3
Application of the principles of fluid mechanics to flow in pipelines, open channels, sediment transport, drainage, hydraulic structure and hydraulic models. PREREQ: MECH305.

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

CIEG 453  TRAFFIC ENGINEERING  3
Essential elements of traffic engineering including road users characteristics, vehicle kinematics and roadway and geometric design; traffic engineering studies and analysis such as highway capacity concepts, statistical accident analysis and origin-destination studies; other elements such as traffic control devices and signal systems coordination. PREREQ: CIEG351.

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

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

CIEG 461  SENIOR DESIGN PROJECT  1-3
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 surges, littoral processes, wave forces on structures and design of coastal structures. Includes observations of hydraulic model tests in the Ocean Engineering Laboratory. PREREQ: MECH305.

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

CIEG 486  ENGINEERING MANAGEMENT  3
Present worth concept; annual costs, rate of return and break-even studies; replacement analysis; depreciation, depletion and income tax. Criteria for public works investment including benefit-cost and marginal analysis and the handling of risk and uncertainty. Applications to engineering projects and problems.
CIEG 601 INTRODUCTION TO THE FINITE ELEMENT METHOD
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 604 PRESTRESSED CONCRETE DESIGN
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: CIEG403.

CIEG 605 MATRIX STRUCTURAL ANALYSIS
Computer analysis of two- and three-dimensional frameworks using matrix methods. Straight, tapered, curved and beam on elastic foundation members; flexible supports, element and temperature loads, partially rigid connections and finite sized joints; material and geometric nonlinearities; stability analyses; and determination of ultimate load capacities.
PREREQ: CIEG301.

CIEG 606 STRUCTURAL MATERIALS
PREREQ: CIEG212, CIEG213 and MASC302.

CIEG 608 INTRODUCTION TO BRIDGE DESIGN
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: CIEG402 and CIEG403.

CIEG 611 STRUCTURAL DYNAMICS
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.

CIEG 615 RELIABILITY DESIGN IN CIVIL ENGINEERING
Reliability analysis of civil engineering systems using concepts and methods of probability and statistics to supplement the engineer’s judgment when addressing uncertainty in design. Topics include elements of probability and statistics, measure of reliability, time to failure, reliability bounds, confidence of reliability and Monte Carlo simulation.

CIEG 617 ADVANCED STRUCTURAL ANALYSES
PREREQ: CIEG212 and MATH302.

CIEG 618 CONTINUOUSLY SUPPORTED STRUCTURES
PREREQ: CIEG212 and MATH302.

CIEG 620 SOIL MECHANICS II
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: CIEG420.

CIEG 621 FOUNDATION ENGINEERING
Field investigation techniques; interpretation of data; theory and design of shallow and deep foundations, retaining walls, sheet pile walls, caisson-type bored excavations and geosynthetically reinforced soil.
PREREQ: CIEG421.

CIEG 622 EARTH STRUCTURES ENGINEERING
Properties of soils and methods to determine them: water flow through homogeneous 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: CIEG420.

CIEG 623 SOIL MECHANICS LAB
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, traxial (CU, CD, III) tests simulating various loading paths, and liquefaction.
PREREQ: CIEG420.

CIEG 624 SOIL DYNAMICS
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: CIEG420.

CIEG 625 GEOMATERIALS ENGINEERING
RESTRICTIONS: Engineering or science background required.

CIEG 631 WATER QUALITY AND POLLUTION CONTROL
Covers water and its impurities, water quality criteria and monitoring, transport and transformation of chemicals in the aquatic environment, stream sanitation, ecological aspects of impoundments and estuarification processes, groundwater systems, decontamination of subsurface water systems, land application of wastewater and current topics in water pollution.

CIEG 632 CHEMICAL ASPECTS OF ENVIRONMENTAL ENGINEERING
The principles and applications of aqueous chemistry to environmental systems. Includes a review of general chemistry, with emphasis on the structure of matter and stoichiometry; chemical thermodynamics; chemical kinetics; equilibrium reactions in homogeneous and heterogeneous systems; applied electrochemistry and Redox reaction; and interfacial phenomena.

CIEG 633 HAZARDOUS WASTE MANAGEMENT
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 of existing disposal sites.

CIEG 634 PHYSICAL ASPECTS OF ENVIRONMENTAL ENGINEERING
Principles and applications of colloidal chemistry to environmental systems. Elements of physical chemistry, mass transfer, and phase separation relevant in environmental engineering. Colloid and particle characterization; rheological, diffusive, and settling behavior of colloidal systems; adsorption and electrical double layer theory; electrokinetics; particle stability and flocculation.

CIEG 635 AIR POLLUTION AND ITS CONTROL
Sources and effects of atmospheric pollutants: meteorological and solar radiation phenomena and atmospheric chemistry. Emphasis on gas cleaning operations such as absorption, chemical conversion and particulate removal. Processes, among other control measures. May be crosslisted with CHEG635.
RESTRICTIONS: Requires upper division or graduate standing in engineering.

CIEG 636 BIOLOGICAL ASPECTS OF ENVIRONMENTAL ENGINEERING
Presents fundamental molecular biological concepts which pertain to cellular function in the environment and in engineered environmental treatment systems. Briefly reviews elementary organic chemical classifications.
PREREQ: CIEG331.

CIEG 637 WATER AND WASTEWATER QUALITY
Principles and applications of analysis of solids, organic load, dissolved oxygen, disinfectants, nutrients, trace metals, trace organic compounds and microorganisms. Lecture and laboratory.
PREREQ: CIEG331.

CIEG 639 HYDROMECHANICS
Kinematics and dynamics of incompressible fluids with emphasis on engineering problems in the hydraulic and hydrologic environment. Governing equations, solutions for laminar, creeping and porous media flows. Turbulence, boundary layers, potential flows, water waves, and stratified and rotating systems.
PREREQ: MECH305.

CIEG 650 URBAN TRANSPORTATION SYSTEMS
Design and operation of urban transportation systems, characteristics of public transportation modes, vehicle design, right-of-way types and terminal facilities. Application of operations research techniques to analysis of scheduling, network optimization, capacity and evaluation of alternatives. May be crosslisted with CIES650.
RESTRICTIONS: Requires permission of instructor.
CIEG 652 Transportation Facilities Design 3
Theoretical concepts of general transportation demand, supply and flow analysis. Planning and design of multi-modal transportation facilities including streets and highways, railroads and guideways, airports, and harbors and ports. Engineering, social and economic evaluation of alternative design schemes for case studies and existing transportation facilities. RESTRICTIONS: Requires permission of instructor.

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

CIEG 659 Railroad Engineering 3
Evolution and analysis of railroad track design and components, ballast and subgrades, rail axial forces, expansion joints, anchors, and track buckling and preventive measures. Response of tracks to moving and static track loading problems and track tests. Review of track standards. Movies on maintenance and construction.

CIEG 672 Water Wave Mechanics 4
Primary emphasis on linear water wave theory and its applications. Shoaling, refraction and diffraction of waves as well as wave forces. Finite amplitude waves. Laboratory experiments to verify the theoretical developments.

CIEG 678 Transport and Mixing Processes 3
Application of hydrodynamics to mixing and transport processes in the water environment.

CIEG 679 Sediment Transport Mechanics 3
Mechanics and mathematical modelling of sediment transport in unidirectional and oscillatory flow; sediment properties, initiation of sediment movement, bedload and suspended load transport rates, formation of bed forms and flow resistance, erosion and deposition in the vicinity of structures, and practical applications.

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

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

CIEG 682 Nearshore Hydrodynamics 3
The mechanics of waves and currents in the nearshore zone: wave breaking, surf zone dynamics, cross- and longshore currents, turbulence and bottom boundary layers, infragravity and edge waves and nearshore modeling.

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

CIEG 691 Groundwater Hydrology 3
A quantitative analysis of groundwater in the hydrologic cycle. Topics include groundwater movement, Darcy's law, mathematical formulation of groundwater problems, groundwater pollution, salt water intrusion, well hydraulics and unsaturated flow.

CIEG 801 Advanced Topics in Finite Element Analysis 3
Review of elementary aspects of the finite element method. Application of the method to linear and nonlinear one- and three-dimensional problems in applied mechanics. Basic and advanced numerical methods and computer programming techniques appropriate to finite element analyses (includes two to three computational laboratory classes).

CIEG 802 Advanced Steel Design 3
Application of ultimate and elastic design procedures to continuous beams and frames, composite members, statically indeterminate trusses and arches. Projects and special topics focus attention to the basis and limitations of codes and specifications for steel structures.

CIEG 803 Advanced Concrete Design 3
Application of ultimate strength design procedures to continuous beams and frames, composite members, slabs and arches. Projects and special topics focus attention to the basis and limitations of codes and specifications for concrete structures.

CIEG 811 Advanced Structural Dynamics Design 3
Linear and nonlinear dynamic analysis of multiple degree of freedom systems subjected to earthquake, wind and impact loadings; the use of analysis results in design. Computer analysis of complex structural systems; distributed and lumped mass models; wave propagation; random excitations; and structural control.

CIEG 816 Analytical Structural Dynamics 3

CIEG 817 Stability of Structures 3

CIEG 820 Inelastic Behavior of Geomaterials 3
Introduces constitutive laws and numerical methods used to characterize the stress-strain-time behavior of geomaterials. Correlation between laboratory experiments and numerical predictions. Finite element analyses of coupled stress-flow problems (e.g., consolidation), reinforced earth structures and slopes. Discussion of anisotropy, time effects and frictional interfaces.

CIEG 832 Theory of Water Treatment 3
Application of physical, chemical and engineering techniques to water treatment processes: aeration, coagulation, sedimentation, filtration and disinfection. Advanced purification methods including adsorption and demineralization processes.

CIEG 842 Design of Water and Wastewater Treatment Systems 3
Presents design implementation and unit operation of water and wastewater treatment processes. Whenever possible, utilizes computer modelling and computer-aided design principles.

CIEG 851 Civil Engineering Seminar 1

CIEG 856 Research 1-6

CIEG 859 Master's Thesis 1-6
An independent investigation under supervision of a member of the civil engineering graduate faculty.

CIEG 870 Offshore Design 3
Naval hydrodynamics, behavior of submerged and floating bodies, and ship waves. Tsunamis and harbor response.

CIEG 880 Advanced Water Wave Mechanics 3
Development of finite amplitude wave theories such as solitary, conical stokes and stream function. Application to coastal and ocean engineering problems.

CIEG 891 Mechanics of Fluids in Porous Media 3
Physical and mathematical description of flow through porous media; conservation of mass, energy and momentum; Darcy's law; general equations of single and multiphase flow, partially saturated flow, heat and mass transfer, hydrodynamic dispersion, deformation of porous media, elastic, plastic and viscous behavior of actual material and applications to engineering problems.
CISC 101  Computers and Information Systems 3
Introduces general concepts of computer organization, terminology, usage and discusses the impact of computers on society. Introduces word processing, spreadsheets, databases, electronic mail, bulletin boards, windowing systems, networks and the internet, and very simple programming.
RESTRICTIONS: Does not count toward graduation if taken after CISC105 or any other CISC course. Not open to students with credit for ACCT160 or 260, or FREC135.

CISC 105  General Computer Science 3
Principles of computer science illustrated and applied through programming in the high level language C. Programming projects illustrate applications in all areas: business, humanities, social sciences, physical sciences, mathematics. C is the dominant language of systems and applications development on UNIX platforms and PCs.
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.

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: 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, MODULA-2.
PREREQ: A computer programming course.
RESTRICTIONS: Credit for CISC 135 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 computing.
COREQ: MATH115, MATH171 or MATH241
RESTRICTIONS: Requires prior programming experience.

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: CISC181 or CISC210.
COREQ: MATH210 or MATH242.

CISC 260  Machine Organization and Microcomputers 3
Introduction to the basics of machine organization Programming tools and techniques at the machine and assembly levels. Assembly language programming.
PREREQ: CISC181.
RESTRICTIONS: CISC220 recommended as a Prerequisite.

CISC 280  Programming Paradigms 3
Structure and interpretation of computer programs. Procedural and data abstractions (high level). Different paradigms (mind sets) that programmers use: Procedural and functional programming, logic and object oriented programming.
PREREQ: CISC220.
COREQ: MATH241.

CISC 310  Logic and Programming 3
Propositional and predicate logic syntax, semantics; proof methods based on unification and resolution; applications involving reasoning and logic programming.
PREREQ: CISC290 and MATH315.

CISC 320  Algorithms and Advanced Programming 3
Design and analysis of algorithms; worst-case/average-case analysis; proof techniques for correctness and performance of graph algorithms, control abstractions (divide and conquer, greedy method, branch and bound); NP-hard and NP-complete problems.
PREREQ: CISC310 and MATH315.

CISC 360  Computer Architecture 3
Principles and techniques used in the architecture of digital computers. Machine elements and their interaction. Instruction set, issue vs. issue, registers, busses, and switches.
PREREQ: ELEG202 or ELEG210 and ELEG2110, and CISC260.

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: CISC260.
RESTRICTIONS: CISC360 recommended as a Prerequisite.

CISC 366  Independent Study 1-6

CISC 401  Elements of the Theory of Computation 3
General models of computation, formal languages and automata theory, and algorithmic unsolvability.
PREREQ: Course in which student was required to prove theorems.
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 verification techniques, program design is made more effective and product quality (meeting specifications) is enhanced.
PREREQ: 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, completeness, compactness and undecidability. Automated theorem proving also covered.
PREREQ: 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: CISC401/601.
RESTRICTIONS: Credit cannot be received for both CISC409 and CISC609.

CISC 410  Introduction to Numerical Analysis and Algorithmic Computation 3
See MATH426 for course description.

CISC 411  Algorithmic and Numerical Solution of Differential Equations 3
See MATH428 for course description.

CISC 423  Applied Symbolic Computation 3
Introduction to one or more computer algebra systems, algebraic computation applied to problems in applied mathematics, and individual student projects using symbolic computation to solve a problem from student's own discipline. May be cross-listed with MATH131.
RESTRICTIONS: Credit cannot be received for both CISC423 and CISC623. Offered in alternate years.

CISC 426  Simulation of Continuous Systems 3
Computer simulation of systems described in terms of differential equations. Study and use of continuous system simulation languages, analog and hybrid computers.
PREREQ: MATH243, CISC220.
RESTRICTIONS: MATH302 is recommended as a Prerequisite. A student cannot receive credit for both CISC426 and CISC626.

CISC 427  Simulation of Discrete Systems 3
Modeling and computer simulation of systems characterized by stochastic discrete events. Study of use of discrete system 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, CISC310.
RESTRICTIONS: Credit cannot be received for both CISC437 and CISC637.

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CISC 440  **Computer Graphics**  3
Computer graphics technology, two- and three-dimensional systems, graphics software systems, modelling and object hierarchy, and animation
PREREQ: CISC360
RESTRICTIONS: CISC320 recommended. Credit cannot be received for both CISC440 and CISC640

CISC 444  **Parallel and Distributed Applications**  3
Study tools and techniques for programming applications on shared and distributed memory multiprocessors and workstation networks. Development, analysis, testing, and validation of many-processor programs will be covered. Students will put principles into practice on a significant project of their own choosing.
PREREQ: CISC361 and CISC320
RESTRICTIONS: Credit cannot be received for both CISC444 and CISC644.

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: CISC360, CISC361 or CISC663
RESTRICTIONS: Knowledge of probability recommended. Credit cannot be received for both CISC450 and CISC650.

CISC 458  **Applied Computer Networks**  3
Principles of communications as they apply to computer networks. Includes advanced concepts of network design, construction and management
PREREQ: CISC450

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. Multi- computer and multiprocessor architectures. Parallel machines.
PREREQ: CISC360
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 and abstract data types
PREREQ: 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 analysis, parsing and syntax directed translation.
PREREQ: CISC260 and 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 software engineering concepts, methodologies and tools. Requirement analysis, specification, design and implementation of object-oriented software development process. Projects will be presented with several realistic examples and homework projects to cover all aspects of object-oriented lifecycle, from the requirements to coding in C++
PREREQ: CISC220
RESTRICTIONS: Credit cannot be received for both CISC475 and CISC675.

CISC 479  **Topics in Architecture and Software**  3
Contents will vary to coincide with the interests of students and faculty
PREREQ: CISC462/662, CISC663 or CISC631
RESTRICTIONS: Credit cannot be received for both CISC479 and CISC679.

CISC 480  **Computers and the Mind**  3
Application of the computational paradigm to the cognitive sciences. Tentative answers to questions like the following: Is the computer in some important sense a model of the mind? Is there a general concept of cognition independent of its realization in man or machine? May be cross-listed with COGS480

CISC 481  **Artificial Intelligence**  3
Programming techniques for problems not amenable to algorithmic solutions. Problem formulation, search strategies, state spaces, applications of logic, knowledge representation, planning and application areas. May be cross-listed with COGS481
PREREQ: CISC280 and CISC310
RESTRICTIONS: Credit cannot be received for both CISC481 and CISC681.

CISC 485  **Mechtronics**  3
Mechtronics is the intersection 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
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 (meeting specs) is enhanced.
PREREQ: CISC310
RESTRICTIONS: Credit cannot be received for both CISC603 and CISC604.

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 CISC602.

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. Equal importance given to techniques and specific algorithms. Particular topics include advanced data structures, graph algorithms, disjoint set manipulation, sorting and selection, amortized analysis, NP-completeness, and matrix and polynomial multiplication
PREREQ: CISC320 and MATH413

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 MATH413.
RESTRICTIONS: Offered in alternate years. Credit cannot be received for both CISC623 and CISC423.

CISC 626  **Simulation of Continuous Systems**  3
Computer simulation of systems described in terms of differential equations. Study and use of continuous system simulation languages, analog and hybrid computers.
PREREQ: MATH243 and CISC220
RESTRICTIONS: Credit cannot be received for both CISC626 and CISC426.

CISC 627  **Simulation of Discrete Systems**  3
Modeling and computer simulation of systems characterized by stochastic discrete events. Study and use of discrete system 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 current faculty.
RESTRICTIONS: Credit cannot be received for both CISC629 and CISC429.

CISC 633  **Introduction to Computer Instruction**  3
See EDST633 for course description.

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 or CISC437.

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CISC 640  COMPUTER GRAPHICS 3
Computer graphics technology, two- and three-dimensional systems, graphics software systems, modeling and object hierarchy, and animation
PREREQ: CISC360 or CISC642
RESTRICTIONS: Credit cannot be received for both CISC640 and CISC440

CISC 644  PARALLEL AND DISTRIBUTED APPLICATIONS 3
Study tools and techniques for programming applications on shared and distributed memory multiprocessors and workstation networks, Development, analysis, testing, and validation of many-processor programs will be covered. Students will put principles into practice on a significant project of their own choosing
PREREQ: Requires permission of instructor
RESTRICTIONS: Credit cannot be received for both CISC644 and CISC444

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 659  TOPICS IN COMMUNICATIONS, DISTRIBUTED COMPUTING AND NETWORKS 3
Contents vary to coincide with the interests of students and current faculty
PREREQ: CISC650

CISC 662  COMPUTER SYSTEMS: ARCHITECTURE 3
Recent advances in computer architecture and their impact on architectural design, Multi-processor 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: CISC660
RESTRICTIONS: Not open to students with credit for CISC631

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 processes, 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
PREREQ: CISC675 and CISC475

CISC 679  TOPICS IN ARCHITECTURE AND SOFTWARE SYSTEMS 3
Contents will vary to coincide with the interests of students and current faculty
PREREQ: CISC640 and CISC663

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 CISC481
RESTRICTIONS: Credit cannot be received for both CISC681 and CISC481

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

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

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, complexity results, oracle computations and quantifier hierarchies, classification of algorithmically enumerable sets, machine self-reference and priority arguments
PREREQ: CISC601

CISC 805  THEORY OF MACHINE LEARNING 3
Mathematically circumcribes the absolute boundaries of what algorithms can do about learning grammars for languages and programs for functions, Proves results in the recursion-theoretic theory of machine learning, Provides interpretations of results regarding human language learning and philosophy of science
PREREQ: CISC601

CISC 809  ADVANCED TOPICS IN THEORETICAL COMPUTER SCIENCE 3
Contents vary to coincide with the interests of students and current faculty
PREREQ: CISC601

CISC 821  PARALLEL ALGORITHMS 3
Study of design and analysis techniques for parallel algorithms is conducted, Topics include: basic techniques 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, matrices, fields of quotients and modular domains, Key algorithmic problems: GCD, factorization 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 current faculty

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

CISC 851  SYSTEMS MODELING 3
Probabilistic and stochastic modeling, Discrete and continuous parameter Markov chains, Introduction to queueing theory, Open and closed queueing networks, Applications to computer systems and networks
PREREQ: CISC360

CISC 852  COMPUTER NETWORK PERFORMANCE 3
Performance analysis of local area, wide area and interconnected networks, Queuing 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, CMIS/P), Design of management agents and clients, Concepts of performance management, fault management, configuration management and other management applications
PREREQ: CISC650

CISC 854  LOCAL AREA NETWORKS 3
LAN protocols, topologies, transmission media, standards, design and selection, management and current research
PREREQ: CISC650

CISC 856  UPPER LAYER PROTOCOLS 3
Principles and techniques employed in the transport, session, presentation and application layers of the ISO Reference Model and the DoD TCP/IP protocol suite, Examples: ATM, X.400, X.500, FTAM and Virtual terminal
PREREQ: CISC650

CISC 857  INTERCONNECTION OF NETWORKS 3
Overview of WAN, LAN and MAN technologies, Inter-networking technologies: design of bridges, routers and gateways, Internetworking protocols (e.g., TCP/IP), Routing in internetworks, Internetwork performance issues, Interoperability: issues, solutions and limitations, and review of applications supported across the internetworked environments
PREREQ: CISC650

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CISC 859 Advanced Topics in Communications, Distributed Computing Networks 3
Contents vary to coincide with the interests of students and current faculty.
PREREQ: CISC650.

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

CISC 869 Master’s Thesis 1-6

CISC 872 Optimizing and Parallelizing Compilers 3
Static program analysis and transformations for improving run-time performance on scalar, vector, and parallel computer systems. Topics: Interprocedural and interprocedural data flow analysis, alias analysis, dependence analysis, classical optimizations, parallelism-enhancing transformations, register allocation, automatic optimizing compiler generators.
PREREQ: CISC672.

CISC 874 Introduction to Parallel Computing 3
Overview of high performance machine architectures, parallel program performance measurement, different paradigms for achieving parallelism including automatic parallelization and vectorization, fine grain parallelism for high performance workstations, data parallel programming, shared memory and message passing programming, and SPMD versus MIMD, task scheduling.
PREREQ: CISC672 or CISC471.

CISC 879 Advanced Topics in Architecture and Software Systems 3
Contents vary to coincide with the interests of students and current faculty.
PREREQ: CISC652 or CISC663.

CISC 881 Knowledge-Based Systems 3
PREREQ: CISC681.

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

CISC 883 Natural Language Generation 3
Current research directions in generation, models of generation, differences between generation and understanding, text structure and coherence, grammars for generation.
PREREQ: CISC681 and CISC682.

CISC 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 non-physical concepts.
PREREQ: CISC681.

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

CISC 889 Advanced Topics in Artificial Intelligence 3
Contents vary to coincide with the interests of students and current faculty.
PREREQ: CISC681.

CISC 890 Colloquium: Computer Science 0 PF
Weekly lectures by faculty and visiting researchers provide a broad overview of the scope as well as an insight into significant results of current research in computer science.

CISC 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.

CISC 969 Doctoral Dissertation 1-12 PF

COMPARATIVE LITERATURE

CMLT 202 Biblical and Classical Literature 3
See ENGL202 for course description

CMLT 207 Great Writers of the Western World I: 1100-1700 3
Studies writers such as Dante, Chaucer, Rabelais and Cervantes, in translation. May be cross-listed with ENGL211.
PREREQ: ENGL110.

CMLT 208 Great Writers of the Western World II: 1650-1950 3
Studies writers such as Moliere, Voltaire, Goethe, Dostoevski, Thomas Mann and Herman Hesse, in translation. May be cross-listed with ENGL212.
PREREQ: ENGL110.

CMLT 217 Introduction to Film 3
See ENGL217 for course description.

CMLT 218 Introduction to Drama 3
See ENGL208 for course description.

CMLT 220 Introduction to the Novel 3
See ENGL209 for course description.

CMLT 293 Honors Short Course 1
See ARSC293 for course description.

CMLT 311 Twentieth-Century Literature I 3
Major writers of the first half of the century. Non-English language works in translation. May be cross-listed with FLIT311.
PREREQ: ENGL110.

CMLT 312 Twentieth-Century Literature II 3
Major writers since World War II. Non-English language works in translation. May be cross-listed with FLIT312.
PREREQ: ENGL110.

CMLT 314 Introduction to Folklore and Folklife 3
See ENGL314 for course description.

CMLT 316 Classical Mythology 3
See FLIT316 for course description.

CMLT 317 Film History 3
See ENGL17 for course description.

CMLT 318 Studies in Film 3
See ENGL318 for course description.

CMLT 320 Varying Authors and Genres 3
See FLIT320 for course description.

CMLT 321 Medieval Literature and Culture 3
See ENGL321 for course description.

CMLT 322 Topics: Classical Literature in Translation 3
See FLIT322 for course description.

CMLT 330 Varying Authors, Themes and Movements 3
See FLIT330 for course description.

CMLT 341 Theatre/Drama: Classic/Medieval 3
See THEA341 for course description.

CMLT 342 Theatre/Drama: Renaissance to 1700 3
See THEA342 for course description.

CMLT 343 Theatre/Drama: 1700 to 1900 3
See THEA343 for course description.

CMLT 344 Theatre/Drama: 1900 to Present 3
See THEA344 for course description.

CMLT 360 Humanities Colloquium 3
See ARSC360 for course description.

CMLT 361 Literary Criticism and Theory 3
See ENGL361 for course description.

CMLT 365 Studies in Literary Genres, Types and Movements 3
See ENGL365 for course description.

CMLT 366 Independent Study 1-3

CMLT 385 Studies in Literary Criticism and Theory 3
See ENGL385 for course description.

CMLT 390 Honors Colloquium 3
See ARSC390 for course description.
The study of effective assessment and allocation of human and material resources by the designing of plans, elevations, sections and drawing of isometrics and perspectives of individuals and families at different stages in the life cycle.

**CONSUMER STUDIES**

**CNST 114** Clothing in Contemporary Society 3
Introduction to the study of clothing including social psychological influences in personal dressing choice, basic concepts of fashion: structure and operation of the apparel industry, elements of apparel quality and retailing of clothing.

**CNST 200** Consumer Economics 3
Consumer decision making, theory of consumer markets, analysis of consumption activities of individuals and families, interaction of consumers, government and the marketplace.

**CNST 211** Apparel Product Development 3
Basic clothing construction procedures, fitting techniques and methods of evaluation for apparel.

**CNST 213** Twentieth-Century Design: Ethnic Influence 3
Examines African American and other ethnic groups, their cultures and clothing practices and subsequent influences on fashion. Studies individual minority designers and their contributions.

**CNST 214** Costume History Before 1700 3
Costume as a mirror of civilization in Western Europe and the Near East from antiquity through the 17th century. Influence of societal, economic and aesthetic factors upon the development of costume.

**CNST 215** Fundamentals of Textiles I 3
Fundamental concepts related to textile materials. Emphasis on structure/property relationships in fibers and yarns. Includes standards and testing.

**CNST 217** Accounting Practice for Merchandisers 3
Introduction to basic accounting principles used in the retailing of apparel and other fashion products. Emphasis placed on the retail method of inventory, perpetual and periodic systems, LIFO, FIFO, development of gross margin statement and the effects of cash/trade discounts and cumulative mark-on on profitability.

**CNST 218** Fashion Merchandising 3
An overview of the fashion industry which examines the interrelationship between primary, auxiliary and retail fashion markets; trends in fashion retailing, promotion and manufacturing.

**CNST 220** Fundamentals of Textiles II 3
Fundamental concepts of textile materials emphasis on structure/property relationships in cloth forms, and finishing processes (including dye and print application); standards, laws and regulations. It is the second course of a textile sequence.

**CNST 221** Apparel Structures 3
Comparative study of foundation principles and processes of apparel design utilizing clipping, flat pattern, drafting and computer-aided design techniques. Includes development of master patterns. Execution of advanced garment assembly processes.

**CNST 222** Clothing Design and Production Since 1700 3
Clothing design and production in America and Western Europe since 1700. Study of craft skills, growth of ready-to-wear industry, couture and 20th-century manufacturing and fashion centers.

**CNST 225** Architectural Drawing 3
Introduction to the handling of the tools, techniques and terms of architectural drawing and the designing of plans, elevations, sections and drawing of isometrics and perspectives.

**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.

**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** Consumer Movement in Perspective 3
The history, present status and possible future of the consumer movement in the United States examined within the context of the existing economic, political and social environments.

**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 customer 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.

**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.

**CNST 318** Fashion Merchandise Products 3
Examines various types of fashion merchandise including the range of characteristics, sources and manufacturing processes. Emphasis on leather, furs, jewelry, kitchen and home furnishings, and allied merchandise areas.

**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.

**CNST 324** Apparel Design by Draping 3
Exploration of three dimensional methods of apparel design. Design and execution of draped garment structures required.

**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 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.

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CONSUMER STUDIES

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 4
An off-campus supervised and coordinated field study in selected agencies and organizations.
PREREQ: CNST200
RESTRICTIONS: May be repeated once for credit

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
Creates awareness of career opportunities and develop techniques for success in apparel and textile clothing career options.
RESTRICTIONS: APD and FM majors only.

CNST 366 Independent Study 1-6

CNST 400 Controversial Issues in Consumer and Family Behavior 3
Utilizes an economic approach to consumer and family behavior to examine how various economic, social, legal, and corporate policies encourage or discourage family investment in human capital. Issues and their relationship to the development and utilization of human capital within the family unit vary.

CNST 401 Consumer Policy Analysis 3
Analysis of a consumer welfare related market practice issue. Issue may change. Use of management problem-solving tools to understand the issue and develop policies.
PREREQ: ECON151

CNST 415 Topics in Textiles 3
One topic 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. Mark-ups, markdowns, retail method inventory, open-to-buy and vendor negotiations are emphasized.
PREREQ: CNST218, BUAD301, ACCT207 or CNST217, and ACCT260

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 self-feelings, establishes social identities and affects interpersonal encounters.
PREREQ: CNST114, PSYC201 and SOCI201

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 financial management techniques. Primary focus oriented toward financial counseling, financial planning or a combination of the two.
PREREQ: CNST333

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 conceptualization through execution of sample garments for mass production. Further develops skills in computer-aided pattern designing, grading, marker making and data management (e.g., sizing, specifications, operations and costing) includes field trip.
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 Advanced Consumer Economics 3
Application of economic tools to analyze consumer welfare in public and private markets. Efficiency and equity trade-offs, externalities, cost-benefit, program evaluation.
PREREQ: CNST200

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 444 Fashion Presentation 1
Portfolio preparation and fashion show production for apparel design and merchandising majors. Joint, integrated team projects required.
PREREQ: For APD majors: CNST333, CNST365 and CNST424. For FM majors: CNST365, CNST418 and CNST419
RESTRICTIONS: FM and APD senior majors only.

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 global 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 468 Research 1-6

CNST 868 Research 1-6

CNST 869 Master's Thesis 1-6

COMMUNICATION

COMM 200 Introduction to Human Communication Systems 3
An analysis of human communication systems emphasizing the communication strategies used to relate, inform, persuade and manage conflict in personal, nonpersonal and male/female relationships.

COMM 245 Mass Communication and Culture 3
The relationship between media and culture; how media affect culture (i.e., socialization and role modelling); and exploration of new forms of mass communication.

COMM 251 The Development of Verbal Communication 3
Investigation of the physiological, linguistic, psychological and social bases of verbal communication. Application of these insights to communicative disorders and to educational and family settings.

COMM 255 Fundamentals of Communication 3
Introduction to theories in communication with applications. Developing, analyzing and critiquing communication in different settings.
RESTRICTIONS: Not open to Seniors. Not open to communication majors.

COMM 256 Principles of Communication Theory 3
Introduction to theories and research in communication with survey of the areas of the field.
COMM 263 INTERNATIONAL SOCIAL CONDUCT 3
Introduction to basic attitudes toward interpersonal relations and socioeconomic and political responsibilities in various cultures. An experiential course integrating foreign and U.S. students.
RESTRICTIONS: Offered only in winter. Not for major credit.

COMM 301 INTRODUCTION TO COMMUNICATION RESEARCH METHODS 3
The conceptual bases of research methodology; formulating questions, designing, conducting, and interpreting research.
PREREQ: COMM256

COMM 309 INTRODUCTION TO PUBLIC RELATIONS 3
The role of public relations in various settings, including corporations, nonprofit organizations, and educational institutions. Tactics and strategies for writing news releases, designing a public relations campaign and working with the media.
PREREQ: ENGL307.

COMM 311 COMMUNICATION TECHNIQUES 3
A technical approach to the research, organization, compilation and production stages of public relations communications including radio, television, in- and out-of-house publications (newsletters, annual reports, correspondence and news releases) and advertising design.
PREREQ: COMM309 and ENGL307

COMM 312 ORAL COMMUNICATION IN BUSINESS 3
Provides a variety of oral communication skills needed for public presentations, use of visual aids in speeches and extemporaneous speaking. Consists primarily of structured and critiqued student performances.
RESTRICTIONS: Not open to Communication and Communication interest majors.

COMM 325 STUDIO TELEVISION PRODUCTION 3
Television as a mass communication medium. Background, programming, production, and studio procedures. Educational television, broadcasting and closed circuit laboratory observation and practices.

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

COMM 341 THEORIES OF INTERPERSONAL COMMUNICATION 3
Survey of concepts and theories in interpersonal communication. Focuses on dyadic interaction and relationships as created, maintained, and modified through verbal and nonverbal behavior.

COMM 345 LEGAL ISSUES OF THE MASS MEDIA 3
Survey of legal issues affecting the development and performance of the mass media. The foundations of American communications law outlined through the study of First Amendment theory, its origin and development. Legal issues concerning libel, obscenity, copyright and broadcast regulation discussed. May be cross-listed with LEST345. May be cross-listed with LEST345.

COMM 350 PUBLIC SPEAKING 3

COMM 356 SMALL GROUP COMMUNICATION 3
Examines basic group processes, structures and functions. Emphasizes both theory and practical applications.
RESTRICTIONS: Requires permission of instructor.

COMM 366 INDEPENDENT STUDY 1-3

COMM 387 THEORIES OF MASS COMMUNICATION 3
An examination of the foundations and development of theories of mass communication. Specific areas of study include media, society and the individual, media violence, culture, communication theory, personal influence, social learning theory, diffusion theory and general media effects.

COMM 388 TV PRODUCTION PRACTICUM 3 PF
A special topics video/audio course that acts as the production arm of an interdisciplinary project. Intensive work on specific projects such as producing promotional or sales campaigns, video documentaries and radio drama. PREREQ: COMM325.

COMM 409 PUBLIC RELATIONS PLANNING 3
Problems and practices of public relations using case study illustrations. Focuses on assessment of program design and development.
PREREQ: COMM309 and ENGL307

COMM 413 PUBLIC RELATIONS MANAGEMENT 3
Introduction to management tools of the public relations practitioner beyond specific case studies. Discussion of management approaches solely within confines of PR area. Topics: budgeting, managing human resources, approach/philosophy of PR program, charting trends and problems of assessment.
PREREQ: COMM309.

COMM 417 COMMUNICATION AND THE MANAGEMENT OF CONFLICT 3
An overview of communication and the conflict process in face-to-face interaction. Emphasis on theories concerning the structure, analysis, and management of conflict situations.

COMM 418 TOPICS IN MASS COMMUNICATION 3
Topics vary from semester to semester and focus on current directions in mass communication theory and practice including new technologies, politics, broadcast programming and research, advertising, audio production and audience responses to media content. RESTRICTIONS: May be repeated three times for credit when topics vary.

COMM 421 INTERCULTURAL COMMUNICATION: APPLICATIONS IN INTERNATIONAL CONTEXTS 3
Students critically assess current intercultural communication theory and apply that theory to practical situations in various international contexts.
RESTRICTIONS: Requires permission of instructor. Course offered in Madrid, Spain and Costa Rica only.

COMM 424 MEDIA MESSAGE ANALYSIS 3
Examination of methodology used to study media content and effects. Focus on past and ongoing research in broadcast, on-air programming and print media. The method of how to conduct and assess research relating to the mass media.
PREREQ: COMM370
RESTRICTIONS: Requires permission of instructor.

COMM 435 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: COMM25

COMM 438 SPEECH, LANGUAGE AND COMMUNICATION 3
Analysis of theories of meaning, models of language use and acquisition, and the relationship between language and cognition.

COMM 440 TOPICS IN INTERPERSONAL COMMUNICATION 3
Topics vary from semester to semester and focus on significant areas of theory and research in interpersonal communication. Such topics may include nonverbal communication, lifespan communication, and communication in intimate relationships. May be cross-listed with PSYC440.
RESTRICTIONS: May be repeated three times for credit when topics vary.

COMM 442 TOPICS IN ORGANIZATIONAL COMMUNICATION 3
Topics vary from semester to semester and focus on significant areas of theory and research in organizational communication. Such topics may include gender, communication, or interpersonal relations in organizations, such as superior/subordinate relationships. May be cross-listed with PSYC443 and/or WOMS442.
RESTRICTIONS: May be repeated for up to nine credits when topics vary.

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

COMM 452 COMMUNICATION AND PERSUASION 3
An examination of how influence is created and resisted through communication in various settings, including personal relationships, public relations, advertising and political campaigns. Emphasis on contemporary theories of persuasion and attitude change, with applications to the various content areas studied.

COMM 454 CHILDREN AND THE MASS MEDIA 3
Mass media research and theory as they relate to children. Substantive areas include children's use and comprehension of media; content of children's television programming; television and the family; children and advertising; and the media's contribution to social values and roles.

COMM 456 COMMUNICATION IN ORGANIZATIONS 3
Introduction to concepts and research related to communication processes in organizational settings. Both traditional and interpretative approaches are emphasized.

COMM 464 INTERNSHIP 1-3 PF
Practical, on-the-job training in the student's field of interest: i.e., interpersonal, mass media, public relations or organizational communication.
RESTRICTIONS: Requires permission of instructor. COMM major with Junior or Senior status, a 2.75 GPA, and a 2.75 GPA in COMM.

COMM 466 INDEPENDENT STUDY 1-3

COMM 485 ANALYSIS OF FACE-TO-FACE COMMUNICATION 3
An examination of methods for analyzing face-to-face interaction, message construction, and message interpretation.

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

RESTRICTIONS: Open to graduate students only.

COMM 604 COMMUNICATION RESEARCH METHODS - ANALYSIS 3
Introduction to the tools and techniques of data analysis in communication research including descriptive statistics, hypothesis testing, interential statistics, as well as advanced statistical procedures.

RESTRICTIONS: Open to graduate students only.

COMM 609 PUBLIC RELATIONS PLANNING 3
Problems and practices of public relations using case study illustrations. Focus on assessment of program design and development.

COMM 610 ORGANIZATIONAL COMMUNICATION THEORY 3
An examination of major theories of organizations including functionalist paradigm; interpretative 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
Introduction to management tools of the public relations practitioner beyond specific case studies. Discussion of management approaches solely within confines of PR area. Topics: budgeting, managing human resources, approach/philosophy of PR program, charting trends and problems of assessment.

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
Topics vary from semester to semester and include 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 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.

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 632 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
Topics vary from semester to semester and focus on significant areas of theory and research in organizational communication. Such topics may include gender, communication, or interpersonal relationships in organizations, such as superior/subordinate relationships. May be cross-listed with PSYC643.

RESTRICTIONS: May be repeated for up to nine credits when topics vary.

COMM 650 MASS COMMUNICATION EFFECTS 3
Examines the history and nature of research on the effects of the mass media, particularly television, in such areas as attitude change, socialization, role modeling, sex and violence.

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 crosslisted with EDDV657.

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 869 MASTER'S THESIS 1-6

COMPUTER ENGINEERING

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 MSI components.

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


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

PREREQ: CPEG211 and CISC181.

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

PREREQ: CPEG220.

CPEG 323 INTRODUCTION TO COMPUTER SYSTEMS ENGINEERING 3
General purpose and special purpose computer architectures are studied with an emphasis on computers embedded in other systems in addition to conventional computer systems. Principles of digital system design are introduced including an introduction to tools for automated design and the use of programmable logic devices.

PREREQ: CPEG221 and ELEG309.

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

PREREQ: CPEG323.

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

PREREQ: ELEG310.

CPEG 421 COMPILERS 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.

PREREQ: CPEG323 and CISC361.

CPEG 422 COMPUTER SYSTEMS DESIGN II 4
High performance computer systems are studied emphasizing RISC architectures, use of parallelism, multi processor systems, memory caching, shared memory, interprocess communication and high performance interconnects. The laboratory involves the design of high performance computer systems and uses tools for design verification and performance evaluation.

PREREQ: CPEG324 and CISC361.

CPEG 464 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 systems. Topics include the performance and limitations of VLSI systems, low-level circuit design and system design with the primary 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, criminal law, the police, the courts and corrections, as well as selected issues in criminal justice.

CRJU 120 ILICIT DRUG USE IN AMERICA 3
The nature and extent of illicit drug use in the United States and the sociocultural context. The history and effects of the major drugs of abuse and the social issues of the 1950s through the 1980s that contributed to the increased use of illicit drugs.

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

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

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

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

CRJU 303 JUVENILE DELINQUENCY 3
See SOCI303 for course description.

CRJU 304 CRIMINOLOGY 3
See SOCI304 for course description.

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: CRJU 110.

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 crosslisted with HIST324.

CRJU 330 POPULATION, LAW AND SOCIETY 3
See SOCI330 for course description.

CRJU 332 CRIMINAL VIOLENCE IN AMERICA 3
General overview of various aspects of criminal violence. Including analysis of child abuse, rape, 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. PREREQ: CRJU201.

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

CRJU 345 SOCIOLoGY OF LAW 3
See SOCI345 for course description.

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

CRJU 347 THE JURY: GUILTY OR NOT GUILTY 3
Observations of actual criminal and civil trials, mock jury deliberations of trials; lectures on jury research; films; and meetings with judges, prosecutors and defense attorneys. PREREQ: PSYC347.

CRJU 348 THEORIES OF SOCIAL WORK PRACTICE 3
See SOCI448 for course description.

CRJU 350 WOMEN AND CRIMINAL JUSTICE 3
Reviews historical and contemporary explorations for women's participation in crime and evaluates these explorations in light of current research. Other topics include treatment of women offenders by judicial and correctional systems, women as victims of crime and women as criminal justice personnel. May be cross-listed with WOMS350.

CRJU 355 RACE, CLASS AND CRIME 3
Examines contemporary patterns of race, class and crime through historical interconnections of social, political and economic processes. Addresses the impact of race and class on the arrest, conviction and sentencing of offenders. May be cross-listed with BAMS355.

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 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 emphasis on how gender and race contribute to differential patterns of adjustment to incarceration. Mainly examines how the prisoner subculture contributes to racial conflict, violence and mental health crises among prisoners.

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

CRJU 401 ADVANCED SOCIOLOGICAL METHODS 3
See SOCI401 for course description.

CRJU 411 TECHNIQUES OF DEMOGRAPHIC ANALYSIS 3
See SOCI411 for course description.

CRJU 414 DATA ANALYSIS 3
See SOCI414 for course description.

CRJU 420 CRIMINAL JUSTICE ADMINISTRATION 3
Aids those planning a career as an administrator in the criminal justice system. Topics typically include basic administrative policy and budgetary matters. PREREQ: CRJU110.

CRJU 425 CRIMINAL LAW AND SOCIAL POLICY 3
Analyzes the role of the American judiciary in making social policy and examines the manner in which the courts have adjudicated controversial socio-legal issues. Topics typically include capital punishment, abortion, the right to privacy, search and seizure, the Miranda rule, and freedom of speech and press.

CRJU 428 CORPORATE CRIME 3
See SOCI428 for course description.

CRJU 437 SEMINAR ON CORRECTIONS 3
An in-depth examination of correctional systems including philosophy of punishment, history of punishment, structure and change of correctional settings and programs; and prison reform.

CRJU 446 JUDGING THE JURY 3
Examines and evaluates the institution of the jury. Explores contemporary controversies over the jury by review and analysis of research studies on jury decision making.

CRJU 448 COMMUNITY-BASED TREATMENT 3
See SOCI448 for course description.

CRJU 450 PRISONERS AND THE LAW 3
An examination of the legal rights available to prisoners seeking to challenge their convictions or their conditions of confinement. Emphasis on analyzing the capacity of courts to spur prison reform and the impact of court decisions on American penal practices.

CRJU 454 LAWYER'S ETHICS 3
See SOCI454 for course description.

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CRIMINAL JUSTICE

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 effect on the administration of justice.

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

CRJU 466  INDEPENDENT STUDY  1-6
See SOCI456 for course description

CRJU 490  DRUG ABUSE RESEARCH SEMINAR  3
A concentrated examination of contemporary efforts in the areas of drug abuse legislation, enforcement and research, and how these combine to influence prevention, treatment and control strategies.
PREREQ: SOCIO301

CRJU 495  FIELD EXPERIENCE IN CRIMINAL JUSTICE  4 PF
Practicum involving actual field experience in a criminal justice agency; e.g., low enforcement, courts or correctional agencies. Emphasis on relating the field experience to academic work. May be cross-listed with SOCI495.
RESTRICTIONS: Requires permission of instructor

CENTER FOR SCIENCE AND CULTURE

CSCC 229  THE NATURE OF SCIENCE  3
Introduction to the nature of the scientific enterprise. Uses both theoretical discussion and detailed examples to illuminate how science helps us to understand the world. Topics include scientific method, the role of theory, controversies in science and the relationship between science and culture. May be cross-listed with PHIL229.
PREREQ: Any two science courses or one science course and PHIL203.

CSCC 233  WOMEN, BIOLOGY AND MEDICINE  3
See WOMS233 for course description. May be cross-listed with WOMS233.

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 242  SOCIETY AND THE HEALTH PROFESSIONS  3
Interdisciplinary course on the historical development and character of professional institutions in health care. Material on Asian, European and Latin American societies used for comparison to the health professions in America. May be cross-listed with SOCI242.

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 271  COMPARATIVE MEDICAL SYSTEMS  3
Survey of research on the relationships between traditional and modern medicine in Asian, African and Latin American cultures, including research on the evolution of infectious diseases and their effect on the historical development of Asian, African and American Indian civilizations.

CSCC 310  SOCIOLOGY OF HEALTH CARE  3
See SOCI310 for course description

CSCC 311  HOSPITALS  3
See SOCI311 for course description

CSCC 330  VARYING AUTHORS, THEMES AND MOVEMENTS  3
See FLIT330 for course description

CSCC 341  ETHICS OF ENGINEERING PROFESSION  1
See PHIL341 for course description

CSCC 343  SOCIETY, POLITICS AND HEALTH CARE  3
See POSC343 for course description

CSCC 355  COMPUTERS, ETHICS AND SOCIETY  3
Explores relationships among information technology, society and ethics by examining issues raised by increasingly widespread use of computers. Topics include ethics for computer professionals, computer impact on factory work, office work, personal privacy and social power distribution. May be cross-listed with SOCI355.

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

CSCC 366  INDEPENDENT STUDY  1-6

CSCC 368  LITERATURE AND SCIENCE  3
See ENGL368 for course description

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

CSCC 382  HISTORY OF WESTERN MEDICINE  3
Social and cultural forces that have influenced the development of modern medicine. May be cross-listed with HIST382.
PREREQ: HIST101 or HIST102.

CSCC 385  HISTORY OF BIOLOGICAL IDEAS  3
Historical analysis of the major intellectual and scientific concepts of biology. Development since the mid-19th century that had a direct relationship to modern medical education, infectious diseases and social biology. May be cross-listed with HIST385.

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

CSCC 410  HEALTH SERVICES PRACTICUM AND SEMINAR  4
See SOCI410 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 professionals. Students will not only learn about particular cases, but also use these cases to explore issues of health, disease, physician-patient relationships, interactions among members of the health care team, etc.
RESTRICTIONS: BALS and MPH majors only; at least junior standing

CSCC 481  ISSUES IN PUBLIC HEALTH  1-3
Students will come into contact with children, families, physicians, and other health professionals. Students will not only learn about particular cases, but also use these cases to explore issues of health, disease, physician-patient relationships, interactions among members of the health care team.
RESTRICTIONS: BALS and MPH 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 professionals. Students will not only learn about particular cases, but also use these cases to explore issues of health, disease, physician-patient relationships, interactions among members of the health care team.
RESTRICTIONS: BALS and MPH 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.

EARLY AMERICAN CULTURE

EAMC 602  MATERIAL LIFE IN EARLY AMERICA  3
American domestic environments and decorative arts within social and economic context of 17th and 18th centuries. Critically assesses how objects contribute to the study of everyday life in colonial America.
RESTRICTIONS: Requires permission of instructor.

EAMC 603  HISTORY OF FURNITURE IN AMERICA  3
American furniture from the colonial era to the Civil War. Considers European design sources and stylistic influences. Introduction to bibliography, research tools and methods, familiarization with major classes of objects, analysis of formal and functional changes over time, region and economic level.
RESTRICTIONS: Requires permission of instructor.

EAMC 604  HISTORY OF NINETEENTH-CENTURY AMERICAN INTERIORS  3
Introduction to domestic interiors with emphasis on household technology, interior design, decorative arts and furnishings. Touches on some of the social, political, economic and technological forces that shaped the built environment.
RESTRICTIONS: Requires permission of instructor.

EAMC 605  HISTORY OF THEORIES IN MATERIAL CULTURE  3
Landmark works and recent theoretical approaches to the understanding and interpretation of the man-made environment. Readings draw from a variety of disciplinary frameworks including art history, anthropology, historical archeology, cultural geography, sociology and history. May be cross-listed with ARTH630, HIST630 and/or MSST630.
RESTRICTIONS: Requires permission of instructor.
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: ECON902.

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 POSC105.

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 ECON411 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, servanthood 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 318 ECONOMIC HISTORY OF FRANCE  3
Development of French economic policy from Roman to modern times. Emphasis on origins and influence of the Catholic Church, Colbert, the French Revolution and centralization of economic policy in France.
PREREQ: ECON151.
RESTRICTIONS: ECON332 and ECON433 cannot both count for degree credit.

ECON 322 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: ECON 332 and ECON 433 cannot both count for degree credit.

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.

ECON 344 THE MAKING OF THE EUROPEAN ECONOMY  3
Theory and policy of trade integration, resource mobilization, 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 ECON444 and ECON444.

ECON 348 INDUSTRIAL POLICIES OF FRANCE  3
Comparison of economic policies in France and the U.S. Emphasis on merger, antitrust, regulation and international trade policies. Includes a review of the economic theory of the firm.
PREREQ: ECON151.
RESTRICTIONS: Requires permission of instructor. Offered only during Winter Session in France.
ECON 300 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: ECON 151

ECON 360 Independent Study 1-6

ECON 381 Economics of Human Resources 3
Analysis of labor markets and of the family. Topics include labor supply and demand, human capital, labor market discrimination, the distribution of income and theories of fertility and family structure. Public policy applications stressed.
PREREQ: ECON 151
RESTRICTIONS: ECON 381 and ECON 483 cannot both count for degree credit

ECON 393 Urban Economics 3
Economic problems and issues affecting modern urban society, including land policies, housing, transportation, labor and public activities.
PREREQ: ECON 151

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: ECON 300 or ECON 301

ECON 405 The Planned Economies 3
Theoretical and empirical comparison of market and centrally planned economies. The United States and the Soviet Union are studied.
PREREQ: ECON 300 or ECON 301, and MATH 230

ECON 406 Markets: Information and Uncertainty 3
Investigates impact of cost 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: ECON 300 or ECON 301, and MATH 221 and STAT 202

ECON 408 Economics of Law 3
Effect of legal rules on resource allocation both in and between the public and private sectors. Consider common law, regulation and constitutional rules.
PREREQ: ECON 300 or ECON 301.

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: ECON 300 or ECON 301, and MATH 230
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 interest rates.
PREREQ: ECON 151, ECON 152 and STAT 202.

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: ECON 300 or 301

ECON 419 Economics of the Great Depression 3
Analysis of modern theoretical explanations of the economic downturn of 1929-1933, with implications for understanding current economic problems. Theories considered include those based on monetary contractions, consumption and investment instability and international disturbances.
PREREQ: ECON 303

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: MATH 21, STAT 202 and ECON 152

ECON 423 Econometric Methods and Models II 3
Class discussion and research in advanced economic statistics and applied econometrics
PREREQ: ECON 422

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: ECON 300 or ECON 301, and MATH 21

ECON 430 Advanced Macroeconomic Theory 3
Continuation of intermediate macroeconomic theory. Recent developments in macroeconomic theory are explored in the context of the ongoing debate between the classical equilibrium and Keynesian disequilibrium theorists.
PREREQ: ECON 303

ECON 433 Economics of the Public Sector 3
Role of government in the economic 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 and environmental problems, the negative income tax, urban finance and the national debt.
PREREQ: ECON 300 or ECON 301
RESTRICTIONS: ECON 332 and ECON 433 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: ECON 300 or ECON 301.

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: ECON 300 or ECON 301, and ECON 303

ECON 444 Analysis of European Economic Performance 3
Theory and policy of trade integration, resource mobility, exchange mechanisms, policy coordination, and progress toward monetary union. Visits may be made to business and government agencies where course material is supplemented by presentations of business executives, practicing economists, and financial experts.
PREREQ: ECON 303 and one of ECON 251, ECON 300, ECON 301
RESTRICTIONS: Credit toward degree may not be earned in both ECON 344 and ECON 444

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: ECON 300 or ECON 301, and STAT 202 and MATH 221

ECON 463 The Economics of Regulation 3
Analyzes government regulation of industry and its economic rationale, pricing issues, firm incentives and multiproduct natural monopolies. Discusses the positive theory of regulation and industry studies, with emphasis on efficiency and regulatory reform.
PREREQ: ECON 300 or ECON 301, and MATH 221
RESTRICTIONS: ECON 360 and ECON 463 cannot both count for degree credit

ECON 466 Independent Study 1-6

ECON 471 Futures and Option Markets 4
See FRE471 for course description

ECON 475 Economics of Natural Resources 3
Studies the allocation of natural resources. Applies theory to the problem of misallocations caused by open-access, common property and multiple use, under both free and regulated economies.
PREREQ: ECON 300 or ECON 301.

ECON 477 Benefit-Cost Analysis 3
Studies the proper way to plan, undertake and interpret a benefit-cost analysis. Emphasizes methods of choosing a proper discount rate and handling such problems of income distribution, unemployment, risk and uncertainty, externalities and measurement of nonmarket benefits and costs.
PREREQ: ECON 300 or ECON 301.

ECON 483 Economics of Labor Markets 3
Studies 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: ECON 300 or ECON 301.

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: MATH 221
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 implications of monetary and fiscal policies on national output, economic growth, inflation, interest rates, business capital expenditures, exchange rates, and foreign trade.

ECON 668 RESEARCH 1-3
ECON 670 APPLIED POLICY ANALYSIS 3
See MAST672 for course description

ECON 671 MICROECONOMICS FOR ECONOMIC EDUCATORS 3
Studies supply and demand, theory of price determination in perfectly and imperfectly competitive markets and role of government in the economy. Emphasizes applications such as industrial regulation antitrust policy, the environment and taxation.
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators

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

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

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

ECON 675 ECONOMICS OF NATURAL RESOURCES 3
See MAST675 for course description

ECON 676 ENVIRONMENTAL ECONOMICS 3
See MAST676 for course description

ECON 678 MONETARY AND INTERNATIONAL TRADE THEORIES FOR ECONOMIC EDUCATORS 3
Studies international trade, free trade vs protectionism, cartels, balance of trade and payments, role of the financial sector, and monetary policy
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators

ECON 679 CONTEMPORARY ISSUES FOR ECONOMIC EDUCATORS 3
Emphasizes contemporary economic issues, problems and controversies.
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators

ECON 801 MICROECONOMIC THEORY 3
Analyzes consumer behavior and market demand, production, costs and the theory of the firm; market structures and competition in open and closed markets, general equilibrium theory and welfare economics

ECON 802 MACROECONOMIC THEORY 3
Studies the determination of output, employment, and the price level within classical, neoclassical, and contemporary frameworks; analyzes the effects of fiscal and monetary policy within these alternative frameworks, and examines the determinants of economic growth

ECON 808 U. S. ECONOMIC HISTORY 3
Topics where economic analysis has revolutionized the interpretation of U.S. History will be explored. Topics vary by semester, but may include: the market for immigrant servants; the economics of slavery; the impact of railroads; gender discrimination; the postbellum Southern economic failure
PREREQ: STAT202 or equivalent
COREQ: ECON801

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 different types of policy analyses. Additional topics include uncertainty, time, stability, social choice, core theory, information, public goods, and externalities
PREREQ: ECON801

ECON 812 ADVANCED MACROECONOMIC ANALYSIS 3
This course examines recent research and literature in macroeconomics. Among the topics treated are capital accumulation and economic growth, uncertainty, economic fluctuations, stabilization policy, fiscal policy, monetary and banking policy. This course is 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: STAT202

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

ECON 822 ECONOMETRIC THEORY 3
Applies and modifies statistical techniques to economic data; presents the essentials of econometric theory
PREREQ: STAT202 or STAT31

ECON 823 SEMINAR IN ECONOMETRICS 3
Class discussion and research in advanced economic statistics and applied econometrics
PREREQ: ECON822

ECON 824 TOPICS IN ADVANCED ECONOMETRICS 3
This course will cover limited dependent variables, panel data and time series techniques. Additional or substitute topics may also be covered. This course is intended for doctoral students
PREREQ: ECON822 and ECON823 or Equivalent

ECON 827 ADVANCED PRODUCTION ECONOMICS 3
See FREC827 for course description

ECON 832 PUBLIC FINANCE 3
This course examines recent research and literature in public finance. Among the topics treated are public goods, public choice, externalities and environmental policy, expenditure programs for the poor, social insurance, environmental policy, health insurance, unemployment insurance, cost-benefit analysis, tax incidence, optimal taxation
COREQ: ECON801

ECON 841 INTERNATIONAL TRADE AND DEVELOPMENT 3
Covers the basis of exchange, trade policy, international factor movements and integration. Applies to both historical and current economic development
PREREQ: ECON551 or ECON801 or equivalent

ECON 842 INTERNATIONAL FINANCE AND DEVELOPMENT 3
Continues ECON841. Covers foreign exchange markets, balance of payments, exchange rate systems and international economic policy
PREREQ: ECON552 or ECON802 or equivalent

ECON 846 TOPICS IN ECONOMIC DEVELOPMENT 3
The core will include topics of current interest to economists. Such topics will include labor markets, populations, human capital and income distribution in less developed countries. Additional or substitute topics may also be covered
COREQ: ECON801 (ECON822 is recommended)

ECON 852 MONETARY ECONOMICS 3
Course compares the role of money in various macroeconomic models: transactions demand for money, long term effects of inflation and government deficit finance decisions in intertemporal models, capital theory and the pricing of financial securities as well as theories of the term structure of interest rates
PREREQ: ECON552 or ECON802 or equivalent

ECON 861 INDUSTRIAL ORGANIZATION AND ANTITRUST POLICIES 3
Analyzes industrial markets in terms of structure, competition and performance, with concentration on oligopolistic and differentiated competition, statistical relationships between profits and concentration, entrepreneurship and hierarchy, and innovation. Also discusses government antitrust policies to promote competition
PREREQ: ECON551 or ECON801 or equivalent

ECON 862 ECONOMICS OF REGULATION 3
Economic rationale for government regulation of industries. Regulatory mechanisms to induce optimal behavior. Case studies of transportation, telecommunications and electric utility industries with empirical applications
COREQ: ECON801, ECON822 or equivalent

ECON 868 RESEARCH 1-9
ECON 869 MASTER'S THESIS 1-6
ECON 875 ADVANCED FISHERY ECONOMICS 3
See MAST875 for course description
ECON 877 Advanced Benefit-Cost Analysis 3
Concentrates on the identification and measurement of the benefits and costs of both market and nonmarket activities. Applies benefit-cost principles to realistic problems.
PREREQ: ECON 551
COREQ: ECON 801

ECON 880 Labor Economics 3
Covers topics in labor economics, including labor demand, labor supply, investment in human capital, wage determination, and labor market discrimination. Applications to public policy issues will be stressed throughout.
COREQ: ECON 880, ECON 822 or equivalent

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

ECON 894 Applied Regional Modeling 3
Uses quantitative methods to forecast regional economic phenomena. Methods include regional export base, shift-share, input-output and econometric models. Emphasizes policy simulations.
PREREQ: ECON 822

ECON 964 Pre-Candidacy Study 3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required coursework.
RESTRICTIONS: Not open to students who have been admitted to candidacy.

ECON 969 Doctoral Dissertation 1-12 PF

COUNSELOR EDUCATION

EDCE 330 Helping Relationships 1 PF
Introduction to the core dimensions of counseling and helping relationships: empathy, respect, genuineness, and concreteness. Practice in communicating those levels of the core dimensions that are facilitative to interpersonal functioning.

EDCE 332 Counseling Theories 3
Examination of selected counseling theories from a theoretical, personal, functional, and philosophical point of view.

EDCE 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. Basic focus on the psychology of the individual, relationship skills, conflict management and intimacy.

EDCE 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.

EDCE 640 Professional Seminar in Counseling and Student Affairs 3
Introduction to the history, philosophy, roles, organizational structure, professional ethics, professional standards, and research in counseling and student affairs practice in higher education.
RESTRICTIONS: Open only to majors in Counselor Education.

EDCE 641 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.

EDCE 642 Seminar in Higher Education Administration 3
Overview of administrative and management issues faced by leaders in higher education.

EDCE 643 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.

EDCE 644 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.

EDCE 645 Group Counseling 3
Examination of group work and group counseling in the higher education as well as the school setting. Emphasis on theoretical foundations of group work and group skill training.
RESTRICTIONS: Open only to majors in Counselor Education and School Counseling.

EDCE 646 Theories of Counseling 3
Theories and techniques used in counseling of individuals with personal, social, vocational and educational problems.
RESTRICTIONS: Open only to majors in Counselor Education and School Counseling.

EDCE 647 Multicultural Issues in Counseling 3
Examines the influence of cultural background, including ethnicity, gender, sexual orientation, socioeconomic factors, religious orientation and age on the counseling relationship. Introduction to non-traditional theories and techniques useful with special populations. Emphasis on increased sensitivity towards cultural influences.
RESTRICTIONS: Open only to majors in Counselor Education and School Counseling.

EDCE 649 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.

EDCE 650 Student Development in Higher Education 3
Studies in development of motivation and personality trends in late adolescence and young 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.

EDCE 651 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.

EDCE 652 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 such as, women and depression, self-esteem, anger, eating disorders, abuse, careers and dependency are included.
RESTRICTIONS: Open only to graduate students only.

EDCE 659 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.

EDCE 664 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 major in Counselor Education.

EDCE 666 Special Problem 1-6

EDUCATIONAL DEVELOPMENT

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

EDDY 205 Children's Literature 3

EDDY 210 Introduction to Literature and Literacy Learning 3
Introduces current theoretical perspectives of 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.

EDDY 286 Educational Technology III: 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: EDDY 186

EDDY 305 Reading and Writing in the Primary Grades 3
Focuses on language arts development (reading, writing, listening, and speaking) of kindergarteners through fourth grade children. Explores developmentally appropriate practices. Includes a field experience in kindergarten through fourth grade classrooms.
PREREQ: EDDY 210
EDDV 306 **Emerging Literacy: Young Children Learn to Read and Write**

The nature, acquisition and development of literacy in children to age six. Explores appropriate instructional strategies and resources for use with young children. Field experience in kindergarten.

**Prerequisite:** EDDV 210, EDDV 212 and EDDV 224.

**Restrictions:** For elementary education majors.

EDDV 308 **Curriculum Development in the Primary Grades**


**Prerequisite:** EDDV 210 and EDDV 390.

EDDV 320 **Reading and Writing in the Middle Grades**

Focuses on methods and materials for developing literacy from grades four through eight. Explores practices suited to adolescent development. Includes a practicum in a fourth through eighth grade classroom.

**Prerequisite:** EDDV 305.

**Restrictions:** For elementary education majors.

EDDV 335 **Elementary Curriculum: Mathematics**

Selection and use of appropriate methods and curriculum for teaching arithmetic in grades K-6. Focuses on curriculum materials, teaching strategies, lesson planning and implementation, and the appraisal of pupil achievement. Practicum included.

**Prerequisite:** MATH 252.

EDDV 336 **Elementary Curriculum: Social Studies**

An 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.

**Prerequisite:** MATH 251, MATH 221 and MATH 230.

**Restrictions:** Requires permission of advisor.

EDDV 341 **Elementary Curriculum: Science**

An 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.

**Prerequisite:** HIST 102, HIST 205 or HIST 206; GEOG 102, GEOG 120 or GEOG 203.

EDDV 366 **Independent Study**

EDDV 386 **Educational Technology III: Literacy and Language Arts Lab**

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.

**Prerequisite:** EDDV 186 and EDDV 286.

EDDV 387 **Educational Technology IV: Science, Social Studies, and Math Lab**

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.

**Prerequisite:** EDDV 186 and EDDV 286.

EDDV 400 **Student Teaching**

Full-time extended student teaching experience in public elementary and secondary schools. Students are under the guidance and supervision of the cooperating teacher in the classroom and a University of Delaware supervisor.

**Prerequisite:** EDDV 403.

EDDV 403 **Literature for Adolescents**

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.

**Prerequisite:** EDDV 305 and EDDV 320.

**Restrictions:** Requires permission of instructor.

EDDV 429 **Methods of Teaching Foreign/Second Languages in Elementary Schools**

An introduction to curriculum and appropriate methods for teaching science concepts to middle and high school students (grades 4-8). Activities include review and evaluation of current middle school programs, research on student thinking, instructional materials, teaching strategies and appraisal of student learning.

**Prerequisite:** EDDV 200 and EDDV 621, and EDDV 626.

**Restrictions:** Includes presentations of outdoor teaching units and field trips suitable for class visits.

EDDV 466 **Independent Study**

EDDV 501 **Language Development in the Classroom**

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.

**Prerequisites:** EDDV 100.

EDDV 502 **Childhood Literature**


**Prerequisites:** EDDV 100.

EDDV 503 **Literature for Adolescents**

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.

**Prerequisites:** EDDV 100.

EDDV 504 **School Curriculum: Language Arts**

Focuses on the nature, acquisition and development of oral and written language. Examines language materials and instructional strategies appropriate for use with elementary and middle school students.

**Prerequisites:** EDDV 100.

EDDV 507 **Teaching Writing in the Elementary and Middle School**

Focuses on the development of appropriate instructional programs for elementary and middle school children. Provides information on the writing process, the beginnings of writing, exemplary programs, evaluation of children's writing and functions/forms of writing.

**Prerequisites:** EDDV 100.

EDDV 612 **Ethnic Studies and Multicultural Education**

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.

**Prerequisites:** EDDV 100.

EDDV 620 **Foundations of Reading Instruction**

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.

**Prerequisites:** EDDV 100.

EDDV 621 **Developmental Reading Instruction**

Presentation of reading theories and research as a basis for understanding and evaluating prevalent and newly proposed techniques for developmental reading instruction and assessment. Practical application of that knowledge in creating successful classroom implementation of reading practices critically selected as appropriate for pupils, curriculum and school setting.

**Prerequisites:** EDDV 100.

EDDV 622 **Teaching Reading in Content Areas**

Focuses on instructional strategies to help students learn from content area texts. Includes attention to assessment, test analysis, classroom organization and developing students' independence in reading and remembering text information through improving their vocabularies, text comprehension and study processes.

**Prerequisites:** EDDV 100.

EDDV 624 **Developmental Reading and the Role of the Reading Consultant**

Laboratory course to prepare students to serve as reading consultants. Teaching experience in the Reading Center is required along with visits to different schools to see firsthand how reading consultants operate. The course provides opportunity to study and compare remedial and developmental reading programs.

**Prerequisites:** EDDV 620 or EDDV 621.
EDDV 625 INTRODUCTION TO THE DIAGNOSIS AND CORRECTION OF READING DISABILITIES 3
A basic course for teachers and related professionals. Measurement of reading; factors related to reading disability; methods and materials for correction of problems
PREREQ: EDDV620 or EDDV621

EDDV 626 ANALYSIS OF READING PRACTICUM 3
A practicum, diagnostic course which reviews recent theories of reading and research related to assessment of reading skills and measures of reading achievement. Emphasis on informal approaches to evaluating reading, particularly informal reading inventories. Requires supervised administration of reading measures and preparation of diagnostic reports.
PREREQ: EDDV625

EDDV 627 ADVANCED ANALYSIS OF READING PRACTICUM 3
A practicum, diagnostic course which reviews recent theories and developments related to correlates of reading disabilities including intelligence, cognition, perception, linguistic and social/ emotional adjustment. Requires supervised administration of measures of reading and related areas and preparation of diagnostic reports.
PREREQ: EDDV626

EDDV 628 REMEDIAL READING TECHNIQUES 3
A laboratory course demonstrating corrective and remedial procedures. Opportunity provided for practice in application of specific psychological, pedagogical and psychotherapeutic techniques used with typical problem cases. Often requires practicum work with children at off-campus sites.
PREREQ: EDDV626

EDDV 629 METHODS OF TEACHING FOREIGN/SECOND LANGUAGES IN ELEMENTARY SCHOOLS 3

EDDV 634 TOPICS IN ELEMENTARY SCHOOL MATH 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.

EDDV 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: EDDV634 or MATH252
RESTRICTIONS: Grade of C or better in EDDV634 or MATH252.

EDDV 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: EDDV634 or MATH252.
RESTRICTIONS: Grade of C or better in EDDV634 or MATH252.

EDDV 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.

EDDV 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 of development of science instructional materials and strategies that are consistent with current learning theories.

EDDV 642 TOPICS IN SCIENCE EDUCATION 3
In-depth study of a major problem in science education. Problems to be studied will vary with each offering.
RESTRICTIONS: May be repeated for credit when topics vary.

EDDV 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.

EDDV 644 SOCIAL STUDIES CURRICULUM AND INSTRUCTION 3
Examines 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.

EDDV 645 TOPICS: SOCIAL EDUCATION ISSUES 3
Analyzes selected topics and practices in social education. Reviews research findings, theoretical bases, recent 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.

EDDV 648 MASTER'S PORTFOLIO 1-10
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.

EDDV 657 CHILDREN, TELEVISION, AND EDUCATION 3
See COMM 657 for course description.

EDDV 660 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.

EDDV 681 PROGRAM DESIGN FOR ADULTS 3
Program planning, development and evaluation for adult and continuing education programs; including diagnosis of client needs; effective system of planning, development and evaluation for adult education programs; program scheduling; and budget and resource planning.

EDDV 683 SCHOOL BUSINESS MANAGEMENT 3
A study of the financial and business aspects of school administration.

EDDV 684 ADULT LEARNER 3
A study of values, interests and social roles through the life span. Emphasis on social and psychological development of adult learners; practical implications of aging on the learner studied from the perspective of teachers of adults.

EDDV 686 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.

EDDV 687 HUMAN RESOURCE MANAGEMENT 3
Considers the ways in which organizations accommodate and utilize their human resources. Focuses on personnel management functions such as selection, maintenance and development.

EDDV 689 ADMINISTRATION OF ELEMENTARY AND MIDDLE SCHOOLS 3
Study of administrative practices and procedures in the elementary schools with emphasis on the role of the elementary school principal.

EDDV 690 ADMINISTRATION OF SECONDARY SCHOOLS 3
A study of administrative practices and procedures in secondary school with emphasis on the senior high school principal.

EDDV 691 ADMINISTRATION OF MIDDLE SCHOOLS 3
Studies administrative practices and procedures in the middle school with emphasis on the middle school principal.

EDDV 692 INTRODUCTION TO LEADERSHIP THEORY 3
Studies current research and applications of leadership research to educational administration. Includes some history of leadership studies. Focuses on the application of research in instructional leadership, leadership styles and the development of leadership skills.

EDDV 693 SUPERVISION: PURPOSES AND EFFECTS 3
Investigates research in teaching/learning, the teaching occupation and school structures which shape the purposes and effects of supervision and evaluation in school settings. Particular attention given to the Delaware appraisal process.

EDDV 694 ORGANIZATIONAL MANAGEMENT 3
An introduction to the function and structure of educational organizations. Emphasis on the sociopsychological foundations of management principles dealing with organizational theory and development, decision making, planned change, group process and leadership styles.

EDDV 697 DESIGN AND DEVELOPMENT OF SCHOOL CURRICULUM 3
Theory and practice of curriculum design and development. Specific areas include nature and structure of theory, role of theory in designing and developing school curricula, principles and procedures essential to analysis and solution of curriculum problems.

EDDV 698 INSTRUCTIONAL STRATEGIES FOR ADULTS 3
Examines forms of instruction suited to teaching adults. Attention will be given to the concepts and principles relevant to the selection, application and evaluation of instructional strategies. Topics include characteristics of the adult learner; motivation; socioeconomic, cultural, and psychological factors complicating the educational process; meeting student needs through outside-class resources; counseling strategies; and integrating adults' interests and needs into the curriculum.

EDDV 699 FOUNDATIONS OF ADULT AND POSTSECONDARY EDUCATION 3
Overview of the historical and philosophical foundations of postsecondary education with particular references to the United States. Attention will be given to key people, issues, institutions, movements, public policy and programs within the context of the general intellectual, social, economic, and political environment. The influence of postsecondary education's historical evolution and philosophical roots on contemporary theory and practice will be examined.
EDST 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.

EDST 102 SKILLMOD: 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.

EDST 103 SKILLMOD: STUDY SKILLS 1 PF
Teaches strategies for understanding and remembering college lectures and test material. Strategies include identifying the underlying discourse structure of the field, summarizing, comprehension monitoring and transforming notes into test formats. Students practice on their own course materials.

EDST 104 SKILLMOD: CRITICAL THINKING 1 PF
Teaches strategies of good reasoning in humanities, social sciences and other liberal arts areas. Students learn to become informed thinkers and how to make persuasive arguments, using their own course materials.

EDST 105 SKILLMOD: 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.

EDST 201 EDUCATION IN A MULTICULTURAL SOCIETY 3
Examines the current and historical debates over the role of schools in a democratic, multicultural society. Topics include educational reform, equal opportunity, demographic change, and multicultural education. Attention to the limits and possibilities of transforming schools and, conversely, of using schools to transform society.

EDST 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. May be cross-listed with PSYC202.

EDST 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. RESTRICTIONS: A field experience consisting of interviewing students in area middle schools is required.

EDST 230 INTRODUCTION TO EXCEPTIONAL CHILDREN 3
Focuses on the needs of exceptional children; attention is given to social, emotional, and educational aspects of the classroom teacher's role. Topics include race, ethnicity, gender, sexual orientation, social class, poverty, and language.

EDST 240 PROFESSIONAL ISSUES: PHILOSOPHICAL PERSPECTIVES 3
Introduction to ethical thinking and decision making for the teacher in today's schools. Focus on ethical dilemmas encountered in planning for classroom management, maintaining intellectual freedom, treating students equally, planning for moral or character education, and other professional concerns.

EDST 242 TOPICS: PHILOSOPHY OF EDUCATION 3
See PHIL242 for course description.

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

EDST 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.

EDST 290 HISTORY OF WOMEN AND EDUCATION 3
The development of women's formal schooling and informal educational influences, consequences of male dominance upon women's ability to gain equality in American society, and women's progress towards career enhancement in a society ambivalent about the role of women. May be cross-listed with HIST290 and/or WOMEN290.

EDST 304 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, psychological processes underlying classroom management, and student variability and exceptional students. May be cross-listed with PSYC304.

EDST 305 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. In addition assessment and measurement of instructional outcomes are stressed. May be cross-listed with PSYC305.

EDST 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.

EDST 366 INDEPENDENT STUDY 1-6
Field-based internship in a school working as an assistant with a professional teacher, including tutoring, small-group instruction, grading of instructional materials and limited white-group instruction.

EDST 376 EDUCATION PRACTICUM 1-3 PF
Full-time extended student teaching experience in public secondary schools. Students are under the guidance and supervision of a cooperating teacher in the classroom and a University of Delaware supervisor.

EDST 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.

EDST 431 APPLIED BEHAVIOR ANALYSIS 3
Covers the principles of behavior analysis and a variety of strategies based on these principles that teachers can employ to eliminate inappropriate behaviors and to teach academic skills. Includes explanation of classroom management techniques and systems for children and youth with and without disabilities. Students participate in a behavior analytic field experience in a public elementary school.

EDST 432 CURRICULUM FOR SCHOOL-AGE EXCEPTIONAL CHILDREN 3
Examination of instructional techniques, curricular materials, and progress monitoring for school-aged children with mild disabilities including mental retardation, learning disabilities and social/emotional disturbance.

EDST 433 NON-SCHOOL FACTORS AFFECTING LEARNING IN THE CLASSROOM 3
Focuses on assessment policy and on 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.

EDST 434 EDUCATIONAL ASSESSMENT FOR CLASSROOM TEACHERS 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. May be cross-listed with PSYC305.

EDST 435 EDUCATIONAL EVALUATION 3
Covers the principles of behavior analysis and a variety of strategies based on these principles that teachers can employ to eliminate inappropriate behaviors and to teach academic skills. Includes explanation of classroom management techniques and systems for children and youth with and without disabilities. Students participate in a behavior analytic field experience in a public elementary school.

EDST 436 LITERACY PROBLEMS: ASSESSMENT AND INSTRUCTION 3
Introduces general and special education teachers to the needs of students whose literacy attainments are below expectations. Prepares teachers to use diagnostic assessment as a basis for planning preventive and remedial instruction.

EDST 451 EDUCATIONAL ASSESSMENT FOR CLASSROOM TEACHERS 3
Explores principles and methods for construction and evaluation of student learning assessments, including knowledge, understanding and skills. Presents methods to enhance teacher inquiry into student learning. Considers strengths and limitations of each method in regard to informing teachers' judgments. Discusses implications of assessment policy.
EDST 462 LANGUAGE ACQUISITION 4
The factors which distinguish human language from animal communication, as well as the development of many facets of language (semantics, syntax and phonology). To supplement reading and discussion, students gain research experience by working approximately eight hours per week on the ongoing language acquisition projects. May be cross-listed with UNG462 and/or PSYC462.

EDST 465 MODEL OAS 3
See POSC465 for course description.

EDST 466 INDEPENDENT STUDY 1-6

EDST 469 RESEARCH PROJECT/INTERNSHIP 3
Research and/or field experience under supervision.

EDST 475 SENIOR SEMINAR IN EDUCATION 3
Examination of current problems in education, drawing on newspaper and magazine articles, observation, interviews with local and national educational leaders, and research and policy studies. Students will have an opportunity to apply the knowledge they have acquired about education to selected current educational issues.
PREQ: EDST467.

EDST 476 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 bilingual education programs. The linguistic, psychological, and social experiences of the bilingual. Instructional models and models of bilingual education. May be cross-listed with UNG476.
PREQ: UNG101.

EDST 477 THE STRUCTURE OF ENGLISH 3
Explores current generative linguistic theories and the analysis of English phonology/morphology and syntax in the light of these theories. Contrasting analysis of English and a second language (such as Spanish). May be cross-listed with ENGL477 and/or UNG477.
PREQ: UNG101.

EDST 521 MANUAL COMMUNICATION I 3
A brief overview of deafness for those who may be considering professional careers in serving the hearing impaired and for others who may be interested in a general knowledge of deafness. The course includes basic signs commonly used by the hearing impaired.
PREQ: EDST521.

EDST 522 MANUAL COMMUNICATION II 3
A brief overview of deafness for those who may be considering professional careers in serving the hearing impaired and for others who may be interested in a general knowledge of deafness. The course includes advanced and idiomatic signs commonly used by the hearing impaired.
PREQ: EDST522.

EDST 523 MANUAL COMMUNICATION III 3
In-depth use of manual communication for interpreting and translating for hearing impaired people in various situations of life. Orientation to deafness, finger spelling, basic signs, and a visit to the Stierch School (Delaware's state school for the deaf).
PREQ: EDST522.

EDST 524 INTENSIVE LITERACY INSTRUCTION 3
Training in the methods of teaching reading, writing and reading development in the Reading Study Center, College of Education. The program is called Intensive Literacy, and is useful for beginners, remedials and students learning English as a second language.

EDST 607 EDUCATIONAL RESEARCH PROCEDURES 3
An introduction to quantitative methods in education through study of educational research procedures; for example, measurement, evaluation, experimental and quasi-experimental design, internal and external validity.

EDST 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.

EDST 623 APPLIED HUMAN DEVELOPMENT IN THE SCHOOLS 3
Research and theory in child and 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 IFST23.
PREQ: EDST202 or EDST304.

EDST 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.
PREQ: EDST678, EDST681.

EDST 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.
PREQ: EDST678, EDST681, EDST624.

EDST 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.
PREQ: EDST678, EDST681, EDST624.

EDST 627 MODELS OF INSTRUCTION 3
Study of alternative models of instruction as applied to differing instructional objectives, content and settings.

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

EDST 630 THE PSYCHOLOGY OF CURRICULUM 3
Review of research literature in the developmental psychology of logical, mathematical, physical, biological and social concepts found in elementary and secondary curricula.
PREQ: EDST607.

EDST 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 CSC633.

EDST 634 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 computer use in meeting certain instructional needs and techniques for effective computer-based educational delivery.
PREQ: Introductory course in Instructional Design.

EDST 636 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 EDST304 or EDST305. Requires permission of instructor or enrollment in a Master's Degree Program.

EDST 640 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.
RESTRICTIONS: Not open to students with credit in EDST340.

EDST 641 SOCIAL PHILOSOPHY AND EDUCATION 3
Study of the ideological assumptions of Conservatism, Liberalism, Marxism and the New Left and their expression in American education; and application of social philosophy to the clarification of professional problems.

EDST 642 INTRODUCTION TO TECHNOLOGY IN SPECIAL EDUCATION AND REHABILITATION 3
Introduction to concepts and skills in special education technology including instructional software, augmentative communication systems, assistive devices, interactive video, robotics, artificial intelligence, electronic networks and productivity aids.
PREQ: EDST230 or EDST697.

EDST 643 COMPUTER-ASSISTED INSTRUCTION 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.
PREQ: EDST642, EDST679.

EDST 644 AUGMENTATIVE AND ALTERNATIVE COMMUNICATION 3
Focuses on augmentative and alternative communication systems for persons with disabilities, especially in the elementary, secondary and post-secondary school setting. Topics include assessment of functional communication needs, matching those needs to communication strategies and devices, and evaluation and generalization of communication skills.
PREQ: EDST642.

RESTRICTIONS: Designed for students in the Special Education Technology specialization.
EDST 645 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 course-and-effect, alternate control interfaces to access computers and other aids, human factors principles in the design and configuration of assistive devices, and strategies and devices to improve the interactivity of learning and living environments. Federal policies regarding assistive technology
PREREQ: EDST642

EDST 646 TECHNOLOGY IN VOCATIONAL PREPARATION AND REHABILITATION 3
Focuses on the use of technology to improve the employability and vocational productivity of individuals with disabilities. Topics include assessment of an individual's vocational strengths and weaknesses in relation to job demands, vocational technology applications including assistive technology and workforce modifications.
PREREQ: EDST642

EDST 647 HISTORY OF EDUCATION IN AMERICAN CULTURE 3
Historical foundations upon which to base judgments about American education

EDST 651 SCHOOL-BASED FAMILY ISSUES AND INTERVENTION 3
Provides an ecological view of children in families and the relationships between families and the school system. Topics for study will be the family as a system, differing family shapes in contemporary society, implications of ethnicity for the family/school interface, special families in special circumstances and models of intervention.

EDST 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.

EDST 659 ADVANCED COUNSELING TECHNIQUES 3
Provides students the opportunity to extend and expand skills learned in the Counseling Skills Laboratory course. Focuses on therapeutic procedures applied to treatment of problems faced by children and adolescent clients, including skills in assessment, treatment planning, evaluating outcomes, and termination.
PREREQ: EDST653
RESTRICTIONS: Requires permission of instructor

EDST 660 APPLIED EDUCATIONAL MEASUREMENT 3
Examines elementary statistical methods commonly used in educational measurement and evaluation, measurement principles (reliability, validity) and procedures for test selection. Students receive practice in administering vocational and/or psychoeducational tests, applying computer-assisted interpretation programs and report writing. Assessment instruments for handicapped students critically evaluated.

EDST 663 COUNSELING SKILLS LAB FOR COUNSELORS AND PSYCHOLOGISTS 3
Provides students the opportunity to develop skills necessary for facilitating counseling relationships. Students observe, participate in, and critique a variety of role-playing exercises and actual counseling sessions as a means of mastering particular skills.

EDST 665 ELEMENTARY STATISTICS 3
Provides a conceptual understanding of some useful statistical techniques along with practical computer and statistical skills which will enable the student to be able to answer real-world research questions. Topics include descriptive statistics, regression, exploratory data analysis and hypothesis testing.

EDST 668 SOCIAL PERSPECTIVES ON CAREERS AND COUNSELING 3
Examines major theories of career development within the context of research about human development, occupational requirements and opportunities, and changing work and family roles. Examines both psychological and socioeconomic factors affecting career development as well as common problems facing the handicapped, women, minorities and other special groups.

EDST 669 PRACTICUM IN SCHOOL COUNSELING 1-3
Supervised counseling and guidance experiences in a school setting.
PREREQ: EDST618, EDST660, EDST663, EDST656, EDST651, EDVD674 and EDST677
RESTRICTIONS: Requires contractual arrangement with University and on-site supervisor

EDST 671 PRACTICUM IN SCHOOL PSYCHOLOGY 3-6
Closely supervised experiences in various school and clinical settings. Students have the opportunity to develop and practice skills that must be mastered prior to starting the internship in school psychology.
RESTRICTIONS: Requires permission of instructor

EDST 672 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: EDST681.

EDST 673 SEMINAR IN TRANSITIONAL ISSUES 3
Provides an indepth overview of research and practices related to transition for youth with mild/moderate/severe disabilities. Adult service systems, model secondary programs, the transitional planning process and current issues related to effective transitional practices will be examined.

EDST 674 SECONDARY AND VOCATIONAL PRACTICES IN SPECIAL EDUCATION 3
Introduction and review of current issues and practices in secondary and vocational education as they relate to the education of the handicapped. Focuses on secondary level special education programs and practices, including career preparation, curriculum development and vocational training.

EDST 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). Emphasis on how children in the first three years acquire language. May be crosslisted with LING675 and/or PSY675.

EDST 676 BILINGUALISM AND LANGUAGE 3
Psycholinguistic, sociolinguistic and neurolinguistic approaches to Second Language Acquisition (SLA). General models of first and second language learning. SLA within bilingual education programs. The linguistic, psychological and social experiences of the bilingual. Bilingual instruction and models of bilingual education. May be crosslisted with LING667. May be crosslisted with LING672.

EDST 677 THE STRUCTURE OF ENGLISH 3
Explores current generative linguistic theories and the analysis of English phonology/morphology and syntax in the light of these theories. Contrastive analysis of English and a second language (such as Spanish). May be crosslisted with ENGL677 and/or LING677.

EDST 678 THEORIES OF THE EXCEPTIONAL CHILD 3
Review and discussion of major models and theories that attempt to explain the causation of, and variations in, behavior such as the three mildly handicapping conditions: mental retardation, learning disabilities and behavior disorders. Emphasis on the grouping of theories in such a way as to de-emphasize a categorical position in special education.
PREREQ: EDST620 or EDST697.

EDST 679 METHODS OF INSTRUCTING LEARNERS WITH MILD DISABILITIES 3
Presents techniques and materials associated with effective instruction for students with mild disabilities. Emphasis is placed on general principles of instruction and evaluation of their efficacy.
PREREQ: EDST620 or EDST697 and EDST435 or EDST680.

EDST 680 EDUCATIONAL DIAGNOSIS 3
Current informal and standardized measures are discussed and administered. Students are trained to be effective participants on a child study team and to administer a diagnostic-prescriptive protocol. Students are expected to interpret results from a plannable protocol and to make recommendations for appropriate educational placement.

EDST 681 TECHNIQUES FOR BEHAVIOR CHANGE 3
Focuses on behavioral principles and procedures for promoting the acquisition of new skills, motivating the performance of previously-acquired skills, and reducing the occurrence of inappropriate behaviors. Includes strategies for analyzing the effectiveness of behavioral interventions. Participants design and conduct a behavior-change project in an educational setting.
PREREQ: EDST620 or EDST697.

EDST 682 RESEARCH IN SPECIAL EDUCATION 3
Review of methods and procedures for analyzing and interpreting research studies in special education, and applying this information to questions of importance in the classroom practice. The course assists students to become informed consumers of findings in the special education literature, and to design and interpret action research projects in classroom settings.
PREREQ: EDST607 and EDST681.

EDST 683 CURRICULUM AND METHODS FOR TEACHING THE GIFTED CHILD 3
Focuses on the development of appropriate activities for gifted children. Acquaints students with the theoretical models in use to guide the development of selection of curriculum and methodology for use with gifted and talented children. Practicum experiences included.
PREREQ: EDST679.

EDST 684 EDUCATIONAL DIAGNOSIS II 3
Continuation of EDST680. Educational Diagnosis. Tests used by teachers and educational diagnosticians with exceptional children; the latest aptitude, achievement and speciality tests are discussed, with students administering the latter two types of instruments.
PREREQ: EDST680.

EDST 685 COUNSELING PARENTS OF THE EXCEPTIONAL CHILD 3
Examination of a number of strategies, techniques and methods for teachers to employ in maximizing the interaction with the child, the goal of involving parents in the education of their exceptional child, including those handicapped and gifted.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDST 686</td>
<td>Programming for Gifted Children</td>
<td>3</td>
<td>Focuses on the identification of gifted and talented children and the development of programs to meet their needs.</td>
</tr>
<tr>
<td>EDST 687</td>
<td>Interpretation and Testing of the Exceptional Child</td>
<td>3</td>
<td>Testing procedures include the more esoteric tests that are administered in educational settings. Tests from areas such as the gifted and learning disabilities will be discussed and administered. Major education emphasis on interpretation of test protocol is for placement and programming purposes.</td>
</tr>
<tr>
<td>EDST 688</td>
<td>Internship in School Psychology</td>
<td>3</td>
<td>Supervised experience in school psychology. Provides experience in a variety of areas, including consultation, psychological and educational assessment, counseling, and intervention.</td>
</tr>
<tr>
<td>EDST 690</td>
<td>Vocational Assessment of Exceptional Students</td>
<td>3</td>
<td>Strategies for assessing the vocational interests, aptitudes and job skills of special education students. Teaches use of vocational assessment instruments in developing IEP objectives, vocational training objectives and individual transition plans. Measurement theory, theory of career choice, commercial assessment tools, job analysis and curriculum-based assessment.</td>
</tr>
<tr>
<td>EDST 691</td>
<td>Internship in School Counseling</td>
<td>3-6</td>
<td>On-site experiences in school counseling and guidance. RESTRICTIONS: Requires completion of all coursework with School Counseling Masters Program. Requires contractual arrangement with University and on-site supervisor.</td>
</tr>
<tr>
<td>EDST 692</td>
<td>Social Skills Training for Children</td>
<td>3</td>
<td>Presents a critical examination of methods that have been proposed to teach social skills to children and youth in both classroom and clinical setting. Presents a model for understanding social competence and a rationale for including social skill training in school curricula. May be cross-listed with PSYC692.</td>
</tr>
<tr>
<td>EDST 697</td>
<td>Education of Exceptional Children</td>
<td>3</td>
<td>Historical and philosophical bases 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 and discussion of past and emerging educational practices for exceptional children with emphasis on pedagogical commonalities.</td>
</tr>
<tr>
<td>EDST 808</td>
<td>Internship in Education</td>
<td>3-9</td>
<td>On-the-job experience in one specific area of education (e.g., administration, counseling, media center, etc.) in which such internships are required as a part of graduate degree programs and/or approved certification programs. RESTRICTIONS: Requires permission of department. Credit during any semester varies according to the percentage of time spent in internship. May be repeated for up to nine credits.</td>
</tr>
<tr>
<td>EDST 817</td>
<td>Individual Intelligence Testing</td>
<td>3</td>
<td>Administration and interpretation of major individually administered intelligence tests used in school and child clinical psychology. Five tests will be highlighted: the Stanford-Binet, WISC-R, WPPSI, WAIS-R, and KABC. May be cross-listed with PSYC817. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>EDST 820</td>
<td>Cognition and Instruction I</td>
<td>3</td>
<td>Current approaches to cognitive analysis of school subjects. Topics include theory and research in perception, memory and information processing; and the analysis of models and tasks for school subject matters. RESTRICTIONS: Requires Ph.D. status in Educational Studies or permission of instructor.</td>
</tr>
<tr>
<td>EDST 821</td>
<td>Cognition and Instruction II</td>
<td>3</td>
<td>Current approaches to the analysis of instruction and schooling. Topics include teacher decision making and effectiveness, classroom processes, instructional methods and design, models for schooling, and theories of school-based learning. RESTRICTIONS: Requires Ph.D. status in Educational Studies or permission of instructor.</td>
</tr>
<tr>
<td>EDST 823</td>
<td>Applied Human Development</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>EDST 829</td>
<td>Research on Teaching</td>
<td>3</td>
<td>A survey of scientific studies of classroom teaching. Teacher characteristics, teaching methods, learning environments, models of teaching, research methods and results of recent research.</td>
</tr>
<tr>
<td>EDST 832</td>
<td>Nature of Human Intelligence</td>
<td>3</td>
<td>Definition and measurement of human intelligence; common variables related to intelligence (society, culture, creativity, achievement and problem solving); psychometric structure; development; artificial intelligence; and manipulation of intelligence.</td>
</tr>
<tr>
<td>EDST 836</td>
<td>Instruction and Learning</td>
<td>3</td>
<td>In-depth study of theories of learning and instruction. Emphasis on review of experimental research relevant to the theories and the applications of these theories to educational practice. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>EDST 837</td>
<td>Seminar in Human Development</td>
<td>3</td>
<td>See PSYC804 for course description.</td>
</tr>
<tr>
<td>EDST 840</td>
<td>Research Colloquium in Education</td>
<td>1-3</td>
<td>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.</td>
</tr>
<tr>
<td>EDST 843</td>
<td>Topics in Educational Policy</td>
<td>3</td>
<td>In-depth examination of select topics that reflect the expertise of the instructor, and build on the themes introduced in EDST615, Introduction to Educational Policy.</td>
</tr>
<tr>
<td>EDST 845</td>
<td>Regression Models in Education</td>
<td>3</td>
<td>The use of regression models in education. Topics include simple and multiple regression, regression models for limited dependent variables and path analysis models.</td>
</tr>
<tr>
<td>EDST 848</td>
<td>Seminar in Language Development</td>
<td>3</td>
<td>Covers aspects of semantic, syntactic and phonological development through an examination of current research and theory in the field. Treats the educational implications of language development. May be cross-listed with LING6848.</td>
</tr>
<tr>
<td>EDST 850</td>
<td>Childhood Psychopathology</td>
<td>3</td>
<td>Survey of various developmental and behavioral disorders in childhood. Seminar will examine the issues of diagnosis and treatment from theoretical perspectives. Special emphasis on current major psychological research. May be cross-listed with PSYC845. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>EDST 851</td>
<td>Psychological Assessment of Children</td>
<td>3</td>
<td>Intellectual and personality assessment of children. Offers extensive experience in administering, interpreting and integrating psychological tests, as well as training in report writing and the development of treatment prescriptions. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>EDST 856</td>
<td>Introduction to Statistical Inference</td>
<td>3</td>
<td>Quantitative analysis topics include describing univariate and bivariate data distributions, calculating and interpreting useful summary statistics, the logic of least squares estimation, the rudiments of probability theory, selected probability models and their interrelationships, the logic of null hypothesis testing, interval estimation and selected inferential techniques. RESTRICTIONS: Requires admission to doctoral program.</td>
</tr>
<tr>
<td>EDST 862</td>
<td>Principles of Experimental Design and Educational Measurement</td>
<td>3</td>
<td>Continuation of EDST615. Topics include planned and post-hoc comparisons, multivariate analysis of variance, internal and external validity, quasi-experimental designs, analysis of covariance, Latin squares and incomplete designs. RESTRICTIONS: Requires admission to doctoral program.</td>
</tr>
<tr>
<td>EDST 863</td>
<td>Principles of Educational Evaluation</td>
<td>3</td>
<td>Introduction to the major concepts in educational evaluation as well as its logic, politics, economics, history and future. Focus on both quantitative and qualitative models.</td>
</tr>
<tr>
<td>EDST 865</td>
<td>Educational Measurement Theory</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>EDST 868</td>
<td>Research</td>
<td>1-6</td>
<td></td>
</tr>
<tr>
<td>EDST 869</td>
<td>Master’s Thesis</td>
<td>1-6</td>
<td></td>
</tr>
<tr>
<td>EDST 871</td>
<td>Topics in Research Methodology</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>EDST 872</td>
<td>Advanced Educational Measurement</td>
<td>3</td>
<td>Focuses on theories of measurement with special emphasis on item response theory. The first two classes will be devoted to classical test theory and a conceptual overview of generalizability theory. The remaining class sessions will emphasize item response theory.</td>
</tr>
</tbody>
</table>
EDUCATIONAL STUDIES

EDST 874  INTRODUCTION TO MULTIVARIATE DATA ANALYSIS IN EDUCATION  3
Topics covered are factor analysis, discriminate analysis and multivariate analysis of variance. Emphasis on applications and the use of computer packages.
PREREQ: EDST661

EDST 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 in fact happens when innovations take hold; and how do we explain the frequent discrepancies between intentions and results?

EDST 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 non-normal data.

EDST 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: ED5676, ED6767, ED6768 and ED67681

EDST 880  SEMINAR IN SPECIAL EDUCATION  3
Sources, results of research and a critical examination of selected investigations in special education. Guided practice in summarizing and conducting research in the education of exceptional children.
PREREQ: EDST607, EDST6768, EDST680, EDST681 and EDST682.

EDST 885  ED TECH TOPICS IN EDUCATIONAL STUDIES  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.

EDST 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.

EDST 968  RESEARCH  3-9
To be used by doctoral students engaged in completing requirements for the doctoral portfolio.

EDUC 500  TOPICS: IN-SERVICE EDUCATION  1-6 PF
Review and analysis of research and/or practices of a specific topic. Topics and format will vary depending on the needs of the participants.
RESTRICTIONS: Not intended for students enrolled in a degree program.

EDUC 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.

EDUC 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, Sears Subject Headings, and Dewey Decimal Classification.
PREREQ: EDUC622

EDUC 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.

EDUC 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, services, trends in research in this area.

EDUC 626  DEVELOPMENT OF LIBRARIES IN SOCIETY  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, services, trends in research in this area.

EDUC 627  FOLK LITERATURE IN THE SCHOOLS  3
Explores and evaluates the role of storytelling, the place of folk literature in understanding of world cultures, the role of stories in education, and the use of storytelling in teaching and book talks. Special emphasis will be on folk literature and its uses in the school library media center.

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

EDUC 969  DOCTORAL DISSERTATION  1-12 PF

ENGINEERING TECHNOLOGY

EGGE 132  ENGINEERING GRAPHICS AND ANALYSIS  2
Fundamental concepts of multiview projection drawing and application of drawing conventions. Includes sectional views, dimensioning, pictorial representation, faster specifications and drawings for various engineering disciplines. Computer applications include data storage for computer modeling, plotting routines for computer drawing and an introduction to CAD principles.
COREQ: MATH241
RESTRICTIONS: Additional coreq: a programming language.

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 graphical 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 CISC106
RESTRICTIONS: Requires knowledge of FORTRAN.

EGST 103  LAND AND WATER MANAGEMENT  3
Topics covered are land application of wastes, hazardous waste management, acid rain, nonpoint source pollution, water treatment, wellfields, rainfall, runoff, ground water, erosion control, irrigation and drainage.
RESTRICTIONS: Open to non-majors only.

EGST 105  POWER AND MACHINERY  4
Principles of operation, selection and management of power and machinery units used in agricultural crop production.
RESTRICTIONS: Open to non-majors only.

EGST 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.

EGST 108  UTILITIES  2
Domestic water supply and waste disposal, house wiring, heating systems, and carpentry and masonry practices.
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 113  LAND SURVEYING  2
Principles and application of distance measurement, leveling, mapping, area measurement and earth volume measurement to soil and water conservation, landscaping and construction.

EGTE 125  INTRODUCTION TO BIORESOURCES ENGINEERING TECHNOLOGY  2
An overview of career opportunities in bioresources engineering technology. Examines human interaction with and engineering of biological systems. Design process applied to elementary engineering problems involving the environment and biological and natural resources. Oral presentations and written reports required.

EGTE 165  FRESHMAN SEMINAR  1 PF
Career opportunities in agricultural engineering. AET curriculum information, undergraduate research opportunities, professional concepts and organizations, and faculty and student presentations.

EGTE 209  INTRODUCTION TO COMPUTER-AIDED DRAFTING  3
Use of AutoCad software on computer for drafting, design layout, two dimensional and isometric drafting, creation and modification of entities and attributes and linking with external software for data management and plan presentation. PREQ: EGTE 109.

EGTE 218  FUNDAMENTALS OF HYDRAULIC SYSTEMS  4
Fluid properties, fluids at rest, fundamentals of fluid flow, distribution systems, fluid power systems in agricultural and industrial machines. PREQ: EGTE 111.

EGTE 244  ELECTRICITY FOR ENGINEERING TECHNOLOGY  4
Electrical power systems for buildings, including distribution equipment, motor selection and lighting planning. Laboratory emphasizes control logic and electro-mechanical devices.

EGTE 306  COST ESTIMATING  2
Building components, billing of materials and cost estimating using cost of materials plus labor system. PREQ: EGTE 112.

EGTE 307  BUILDING CONSTRUCTION  1
Practical building experience with emphasis on light frame construction. RESTRICTIONS: Offered only in Winter Session.

EGTE 309  THREE DIMENSIONAL COMPUTER AIDED DRAFTING  2
The creation and modification of three dimensional models for use in computer aided drafting. Allows student to create a visual solid model of an object to be drafted and then create two dimensional take-offs for plotting. Covers methods of rotation, sectioning and coloring for best viewing angles and output. PREQ: EGTE 209.

EGTE 311  FUNDAMENTALS OF THERMODYNAMICS  3

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. PREQ: EGTE 111, EGTE 112 and EGTE 218.

EGTE 328  WASTE MANAGEMENT SYSTEMS  3
Properties of agricultural, food processing and industrial wastes. Wastewater treatment, sludge management and waste utilization. PREQ: CHEM 104, EGTE 111 or EGTE 112.

EGTE 331  MECHANICAL POWER UNITS  4

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, SCRs, triacs, digital logic, number systems, flip flops, shift registers, counters, microprocessors, assembly language programming, A/D conversion and data communications. PREQ: EGTE 244.

EGTE 354  RURAL AND LIGHT INDUSTRIAL BUILDINGS  4
Analysis, design, materials and construction of rural and light industrial buildings. PREQ: EGTE 111, EGTE 112 and EGTE 209.

EGTE 365  JUNIOR SEMINAR  1
Invited speakers, faculty presentations, and oral and written reports required for enrolled students on selected topics in agricultural engineering.

EGTE 366  INDEPENDENT STUDY  1-3

EGTE 401  INTRODUCTION TO QUALITY CONTROL  2
Application of quality and quality control techniques. Topics include lot by lot acceptance, sampling plan systems such as MilSpec105E, quality costs, quality software, total quality management, ISO9000, international quality studies and quality exam preparation. PREQ: STAT 201 or equivalent.

EGTE 402  QUALITY CONTROL APPLICATIONS  2
Fundamentals of quality and quality control. Topics include Pareto diagrams, matrix analysis, Gier displays, Ishikawa, process capability, control charts for variables and attributes, cumulative sum, weighted moving average and exponential weighted moving average. PREQ: EGTE 401, STAT 201 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 calculus and spreadsheets. PREQ: MATH 221 or equivalent, EGTE 112.

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. PREQ: EGTE 111 or EGTE 112. RESTRICTIONS: Only offered in Winter Session.

EGTE 421  BIORESOURCES MANAGEMENT SYSTEMS  4

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. PREQ: MATH 243, PHY 207, and either EGTE 111 or CISC 106.

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. PREQ: EGTE 218, General Physics and EGTE 454.

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. PREQ: EGTE 111 and EGTE 209.

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. PREQ: PHY 202, EGTE 244 or EGTE 344.

EGTE 444  PROGRAMMABLE LOGIC SYSTEMS  3
Designed to teach application of PLC's 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 PLC's. PREQ: EGTE 111, EGTE 344 or equivalent.
ELEG 622  Electronic Materials Processing 3
Theory and current technology of semiconductor fabrication processes, including crystal growth, wafer preparation, lithography, liquid and vapor phase epitaxy, molecular beam epitaxy of ultrathin layers and superlattices, oxide growth, thin-film deposition, diffusion, ion implantation, etching and metallization.

ELEG 624  Fundamental Device Principles 3
Introduces fundamental principles of semiconductor devices and derive the operational characteristics of several important device examples. Topics to be covered include semiconductor basics, equilibrium and nonequilibrium properties, Fermi levels, transport, injection, generation, recombination, p-n junctions bias, Fermi potentials, capacitance, I-V characteristics, bipolar transistors, junction field effect transistors, MOS transistors, ideal MIS structure, microwave and optoelectronic devices.

ELEG 625  Optical Fiber Communications 3
Introduces the fundamental aspect of optical fiber communications as well as some advanced topics, such as all optical communications and networks. Topics to be covered include optical fiber structure, characteristics, and fabrication, light 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 discrete-time signals and systems with emphasis on the frequency domain description of digital filtering and discrete spectrum analysis, fast Fourier transform, z-transform, digital filter design, relationship to analog signal processing.
PREREQ: ELEG305

ELEG 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 MAT365 or MAT368.
RESTRICTIONS: Requires permission of instructor.

ELEG 634  Signals and Systems 3
Reviews basic concepts of discrete and continuous time signals, control systems, and linear algebra. Transforms, sampling, aliasing, linear algebra and systems of equations, matrix factorizations, eigenvalues and eigenvectors, least squares, and the Cayley-Hamilton theorem are studied.
PREREQ: ELEG305 and MATH342 or MATH497 or equivalents.

ELEG 635  Digital Communication 3
Covers the theory and applications of digital communication including source coding dealing with lossless and lossy compression of data such as images and speech, and channel coding dealing with error control techniques to fight noise, and modulation dealing with the efficient transmission of signals over waveforms/channels.

RESTRICTIONS: Familiarity with probability and linear systems required.

ELEG 636  Statistical Signal Processing 3
PREREQ: Undergraduate courses in probability and signals and linear systems.

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 MAT364.

ELEG 642  Special Topics in Electrometrics 3
Optical storage system, laser beam scanning systems, optical fiber transmission characteristics. Fiber optical communication and other advanced systems.
PREREQ: ELEG304.

ELEG 650  Semiconductor Device Design and Fabrication 3
Introduction to the 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-diffusion and P-diffusion, PMOS, metallization, and device and integrated circuit testing.
PREREQ: ELEG305.

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 systems design, computer architecture, and microprocessor based systems.

ELEG 656  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.

ELEG 681  Remote Sensing of Environment 3
See MAST661 for course description.

ELEG 809  Electromagnetic Theory 3
See PHYS809 for course description.

ELEG 810  Electromagnetic Theory 3
See PHYS810 for course description.

ELEG 813  Statistical Mechanics and Thermodynamics 3
See PHYS813 for course description.

ELEG 819  Advanced Topics in Communications 3
Topics discussed from the following areas vary from year to year: information theory; estimation and detection; nonlinear systems with random inputs; optimum modulation and demodulation; and digital communications systems.

ELEG 835  Integrated Optics 3
Discusses basic goals, principles and techniques of integrated optics. Topics include optical wave guides, scattering and absorption, couplers, electro-optic modulators, acousto-optic modulators, semiconductor lasers and optical detectors. Includes applications of optical integrated circuits.
PREREQ: ELEG320 and ELEG340.

ELEG 855  Microwave Devices and Circuits 3
Describes principles of device operation and circuit characteristics for the microwave FET, IMPATT, TRAPATT, Gunn diode, varactor diode, p-n diode, tunnel diode and bipolar transistor. Covers both wave guide circuits and microwave integrated circuits.
PREREQ: ELEG320 and ELEG340.

ELEG 868  Research 1-6
Laboratory study conducted for the purpose of contributing new data and theory in some fields of electrical engineering in which information is lacking. Although supervised, the work will be independent in character to encourage the development of initiative.

ELEG 869  Master’s Thesis 1-6
Laboratory study conducted for the purpose of contributing new data and theory in some fields of electrical engineering in which information is lacking. Although supervised, the work will be independent in character to encourage the development of initiative.

ELEG 964  Pre-Candidacy Study 3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required coursework.
RESTRICTIONS: Not open to students who have been admitted to candidacy.

ELEG 969  Doctoral Dissertation 1-12 PF
ENGLISH

ENGL 202 BIBLICAL AND CLASSICAL LITERATURE 3
Study of Greek, Roman, and Biblical literatures, set in their mythical, historical and cultural contexts, introducing appropriate critical concepts. May be cross-listed with CMLT202 and/or FLLT202.
PREREQ: ENGL110

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, 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 cross-listed with CMLT218.
PREREQ: ENGL110

ENGL 209 INTRODUCTION TO THE NOVEL 3
Representative masterworks of fiction, emphasizing those of Europe and America. May be cross-listed with CMLT219.
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 CMLT207 for course description

ENGL 212 GREAT WRITERS OF THE WESTERN WORLD II: 1650-1950 3
See CMLT208 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 CMLT217.
PREREQ: ENGL110

ENGL 260 HUMANITIES COLLOQUIUM 3
See ARSC260 for description
PREREQ: ENGL110

ENGL 300 TEXTS AND CONTEXTS 3
Explores fundamental questions such as why read literature, what is the relation between literary and "everyday" language, and whether readers make or discover meanings in texts. Examines cultural, historical, and theoretical contexts of a broad range of literary, critical and nontraditional 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

ENGL 305 FICTION WRITING 3
Practice in writing the short story.
PREREQ: ENGL110

ENGL 306 TOPICS IN WRITING 3
Special topics in writing (for example, autobiography, scriptwriting). Variable content.
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 marketing.
PREREQ: ENGL307
RESTRICTIONS: Counts toward English major only as part of journalism concentration.

ENGL 310 COPY EDITING AND LAYOUT 3
Newspaper copy editing, headline writing and layout, with emphasis on practical experience. Explores improvement or updating of news stories by rewriting.
PREREQ: ENGL307
RESTRICTIONS: Counts toward English major only as part of journalism concentration.

ENGL 312 WRITTEN COMMUNICATIONS IN BUSINESS 3
Examines the role of written communication in corporate decision making. Students write memos, letters, proposals and reports that simulate on-the-job communication tasks, and are encouraged to use materials from their fields of specialization.
PREREQ: ENGL110
RESTRICTIONS: Counts toward English major only as part of the concentration in business.

ENGL 314 INTRODUCTION TO FOLKLORE AND FOLKLIFE 3
Traditional forms of folklore with emphasis on modern folklore as it functions in contemporary society. May be cross-listed with CMLT314.
PREREQ: ENGL110

ENGL 315 BALLAD AND FOLKSONG 3
PREREQ: ENGL110

ENGL 316 PEER TUTORING/ADVANCED COMPOSITION 3
See ARSC316 for description

ENGL 317 FILM HISTORY 3
History of American or various foreign national cinemas. Content varies from year to year. May be cross-listed with CMLT317.
PREREQ: ENGL110
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 318 SHORT STORY 3
Special topics such as film genres, major directors and Soviet cinema. Variable content.
May be cross-listed with CMLT318 and/or JWST318.
PREREQ: ENGL110
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 320 THE BIBLE AS LITERATURE 3
Studies the cultural contexts, narrative strategies, poetic forms, and literary archetypes of the Hebrew and Christian scriptures.
PREREQ: ENGL110
ENGL 321 | MEDIEVAL LITERATURE AND CULTURE | 3
Study of selected topics in medieval literature (romance, Chaucer’s contemporaries, drama). Texts usually read in English translations. Emphasis on medieval culture as a European phenomenon. Variable content. May be cross-listed with CMLT321
PREREQ: ENGL110

ENGL 322 | CHAUCER | 3
The Canterbury Tales (in part), Troilus and Criseyde, and some of the shorter poems
PREREQ: ENGL110

ENGL 324 | SHAKESPEARE | 3
Representative histories, comedies and tragedies.
PREREQ: ENGL110

ENGL 325 | RENAISSANCE LITERATURE | 3
Survey of varied literature written in England during the sixteenth and seventeenth centuries, from the age of the Reformation through the English Civil Wars. For example, selected works of Wyatt, Sidney, Spenser, Marlowe, Shakespeare, Jonson, Webster, Herbert, Vaughan, Marvell and Milton
PREREQ: ENGL110

ENGL 326 | TOPICS IN RENAISSANCE LITERATURE | 3
Studies in single writers or groups of writers (e.g., More and Erasmus; Shakespeare and Cervantes; John Donne), or of particular themes (kingship; the family; the sense of self), or of one of the literary genres (e.g., tragedy; the lyric poem; comedy and satire; narrative poetry and prose)
PREREQ: ENGL110

ENGL 328 | MILTON | 3
Milton’s major poetry and selected prose
PREREQ: ENGL110

ENGL 331 | THE AGE OF SATIRE | 3
Dryden, Pope, Swift and their contemporaries.
PREREQ: ENGL110

ENGL 332 | STUDIES IN RESTORATION AND EIGHTEENTH-CENTURY LITERATURE | 3
Studies of selected topics in Restoration and eighteenth-century literature and culture, e.g., the epistolary novel, Restoration and eighteenth-century drama, and women in eighteenth-century literature. Variable content
PREREQ: ENGL110
RESTRICTIONS: May be repeated for credit when topics vary

ENGL 334 | THE EARLY ROMANTICS | 3
Poetry and prose of Blake, Coleridge, Wordsworth, and their associates.
PREREQ: ENGL110

ENGL 335 | THE LATER ROMANTICS | 3
Poetry and prose of Byron, Shelley, Keats and their associates.
PREREQ: ENGL110

ENGL 336 | VICTORIAN POETRY | 3
Tennyson, the Brownings, Arnold, Bronte, and their contemporaries
PREREQ: ENGL110

ENGL 337 | VICTORIAN PROSE | 3
Carlyle, Ruskin, Arnold and their contemporaries
PREREQ: ENGL110

ENGL 338 | VICTORIAN FICTION | 3
Authors may include Dickens, the Brontes, Eliot, Hardy and their contemporaries. May be cross-listed with WOMS337
PREREQ: ENGL110

ENGL 340 | AMERICAN LITERATURE TO THE CIVIL WAR | 3
See EDST358 for course description

ENGL 341 | AMERICAN LITERATURE: CIVIL WAR TO WORLD WAR II | 3
See ARSC360 for course description. May be cross-listed with PHIL360
PREREQ: ENGL110

ENGL 342 | AMERICAN LITERATURE SINCE WORLD WAR II | 3
PREREQ: ENGL110

ENGL 344 | AFRICAN AMERICAN LITERATURE I | 3
Literature by African American writers from the eighteenth century to the Harlem Renaissance. May be cross-listed with BAMS313
PREREQ: ENGL110

ENGL 345 | AFRICAN AMERICAN LITERATURE II | 3
Literature by African American writers from the Harlem Renaissance to the present
PREREQ: ENGL110

ENGL 346 | CULTURAL ISSUES IN AMERICAN LITERATURE | 3
Studies of broad cultural issues as reflected in American literature
PREREQ: ENGL110

ENGL 347 | STUDIES IN AMERICAN LITERATURE | 3
Special topics, ranging from the beginnings to modern 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 South). Variable content
RESTRICTIONS: May be repeated once for credit when topics vary

ENGL 348 | CONTEMPORARY JEWISH-AMERICAN LITERATURE | 3
Lectures and discussions of outstanding contemporary Jewish American novelists, short story writers, and others. May be cross-listed with JWST348
PREREQ: ENGL110

ENGL 349 | INTRODUCTION TO JEWISH SOURCES: TEXT AND INTERPRETATION | 3
This course examines the central texts which form the basis of Jewish thought, religion and culture—the Torah, or Hebrew Bible (in translation) and the interpretive traditions which have evolved to understand it (e.g., Midrash, Rashi, contemporary theology) as sources of uniquely Jewish meanings. May be cross-listed with JWST349

ENGL 351 | INTRODUCTION TO IRISH LITERATURE | 3
Survey emphasizing modern and contemporary writers of various genres such as Yeats, Synge, Joyce, Beckett, Heaney and Boland. Critical reading set in mythic, historic and cultural contexts
PREREQ: ENGL110

ENGL 352 | STUDIES IN NINETEENTH-CENTURY LITERATURE | 3
Special topics in an author or authors, a genre, literary movement, or an idea. Variable content
PREREQ: ENGL110
RESTRICTIONS: May be repeated once for credit when topics vary

ENGL 353 | TWENTIETH CENTURY BRITISH LITERATURE | 3
 Broadly focused study of literature in several genres, including a variety of eras and movements such as turn-of-the-century realism, war poetry, modernism, and post-colonial writing. May be cross-listed with WOMS335
PREREQ: ENGL110

ENGL 354 | MODERNISM | 3
Studies the experimental forms and the politics of a literary movement that involved such writers as T.S. Eliot, Virginia Woolf, James Joyce, and Gertrude Stein
PREREQ: ENGL110

ENGL 355 | KING ARTHUR IN LITERATURE | 3
Study of the historical background and literary treatments of Arthurian characters and themes in English literature
PREREQ: ENGL110

ENGL 356 | STUDIES IN MODERN/CONTEMPORARY LITERATURE | 3
Study of selected topics in 20th Century British, American and world literature, e.g., the contemporary epic novel, post-colonial writing and politics
PREREQ: ENGL110
RESTRICTIONS: May be repeated once for credit when topics vary

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 EDST358 for course description

ENGL 360 | HUMANITIES COLLOQUIUM | 3
See ARSC360 for course description. May be cross-listed with PHIL360

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. May be cross-listed with CMLT365 and/or CSCC365
PREREQ: ENGL110
RESTRICTIONS: Not for major credit

ENGL 366 | INDEPENDENT STUDY | 1-6

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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. Variable content.
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. Variable content.
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. Variable content.
PREREQ: ENGL110

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. Required for concentrations in English, Ethnic and Cultural Studies.
PREREQ: Any two of the following: ENGL 202, ENGL 205, ENGL 206, ENGL 324
RESTRICTIONS: Requires permission of instructor. Required for concentrations in English, 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 genre, 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 historical 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 383 TEACHING COMPOSITION IN SECONDARY SCHOOLS 3
Study of current composition theory, with emphasis on the relationship between theory and classroom practices in the secondary schools.
PREREQ: ENGL110.

ENGL 384 TEACHING ENGLISH IN SECONDARY SCHOOL 3
Approaches to the teaching of grammar, composition and literature. Includes treatment of aims, materials, unit organization, evaluation and teaching techniques.
PREREQ: ENGL110.

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 linguistic approaches. May be cross-listed with LING390

ENGL 391 HONORS COLLOQUIUM 3
See ARSC390 for description. May be cross-listed with JWST390.
PREREQ: ENGL110.

ENGL 398 FILM AND MODERN AMERICAN CULTURE 3
Survey of the main themes in American culture from the Jazz Age through the Cold War as reflected in feature film and popular literature. May be cross-listed with HIST398.
PREREQ: ENGL110
RESTRICTIONS: Cannot be counted toward film studies concentration.

ENGL 404 ADVANCED POETRY WRITING 3
Intensive practice in composition. Group discussion and individual conferences. Wide reference to professional poems as well as models. Emphasis on student competence in traditional prosody as well as exploring free forms.
PREREQ: 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 credits toward graduation. Counts toward English major only as part of journalism concentration.

ENGL 408 SPORTS WRITING 3
Training and covering all major sports including both women's and men's sports. Topics include keeping statistics, game coverage, player profiles, and sports columns.
PREREQ: ENGL307.
RESTRICTIONS: Counts toward the English major only as part of journalism concentration

ENGL 409 TOPICS IN JOURNALISM 3
Special studies and writing in selected kinds of journalism (opinion writing, science journalism or in an aspect of the profession (history of American journalism, ethics of journalism). Variable content.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated once for credit when topics vary. Does not count 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 the 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: Open only to English majors. 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 proposals, 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 communication profession (e.g., ethics of business and technical communication). Variable content.
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 publications 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 416 LITERATURE OF FACT 3
How great and near-great writers have approached the craft of journalism and sometimes turned it into an art.
PREREQ: ENGL110.
RESTRICTIONS: Does not count as part of the journalism concentration.
ENGL 417  Film Theory and Criticism  3
Survey of major theories of film
PREREQ: ENGL17
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 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 CMIT465 and/or WOMS465
PREREQ: ENGL110

ENGL 466  Independent Study  1-6
ENGL 471  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. Variable content
PREREQ: ENGL110
RESTRICTIONS: May be repeated for credit when topics vary

ENGL 472  Studies in the Drama  3
Special topics in an author or authors, a type or types of drama, a period or theme. Variable content
PREREQ: ENGL110
RESTRICTIONS: May be repeated for credit when topics vary

ENGL 473  Studies in Poetry  3
Special topics in a poet or poets, a type or movement, a period or theme. Variable content
PREREQ: ENGL110
RESTRICTIONS: May be repeated for credit when topics vary

ENGL 477  The Structure of English  3
See EDST477 for course description

ENGL 480  Seminar  3
Intensive 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, Hamsingway, Steinbeck), or a genre (e.g., autobiography). Stresses creative writing and literary research. May be cross-listed with CMIT480 and/or WOMS480.

ENGL 481  Seminar in Teaching English  3 PF
Seminar to accompany student teaching in secondary school English. Deals with classroom management, teaching techniques and other professional issues.
PREREQ: ENGL110
RESTRICTIONS: Open only to student teachers in English

ENGL 485  Studies in Literary Criticism and Theory  3
Study of selected topics in literary criticism and critical theory, e.g., narrative theory and the novel, semiotics and literary criticism, and feminist criticism. Variable content.
PREREQ: ENGL110
RESTRICTIONS: May be repeated once for credit when topics vary

ENGL 494  History of the English Language  3
The development of Modern English with emphasis on changes in sounds, inflections, spelling, and vocabulary. Attention also to usage, dialects, attitudes toward language, and cultural history.
PREREQ: ENGL110

ENGL 600  Methods of Research  3
Research methods and problem-solving strategies in literary and cultural studies

ENGL 604  Poetry Writing Workshop  3
Intensive practice in verse composition. Group discussions and individual conferences. Wide reference to professional poems as models. Emphasis on student competence in traditional prosody as well as exploring free forms.
RESTRICTIONS: May be repeated once for credit when topics vary

ENGL 621  Medieval Literature and Culture  3
Survey course will study medieval culture and ideas as expressed in literature (e.g., Beowulf, The Canterbury Tales, The Divina 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 course, intended primarily for students with no previous experience of the period. A wide selection of authors will be studied (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
This survey course covers 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 conventions and proprieties 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
Variable content. Course 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 postcolonial, in addition to British literature

ENGL 639  Studies in Modern/Contemporary Literature  3
Variable content. 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 Realistic period, emphasizing "canonical" works of major authors along with selected "non-canonical" writings
RESTRICTIONS: May be repeated for credit when topics vary

ENGL 651  Irish Literature: Period Studies  3
Variable content. 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. Variable content
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. Variable content
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. Variable content
RESTRICTIONS: May be repeated for credit when topics vary

ENGL 677  The Structure of English  3
See EDST677 for course description

ENGL 680  Seminar  3

ENGL 684  Literary Theory and Criticism  3
Introduction to some of the leading problems in contemporary literary theory, with some attention to their historical precedents
RESTRICTIONS: May be repeated once for credit when topics vary

ENGL 685  Cultural Theory and Criticism  3
A topical introduction to cultural theory, emphasizing different terms such varied topics as semiotics, deconstruction, 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 practice

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
Variable content. Intensive study of literature and language in Old English or Middle English, with attention to history and culture. Recent course titles: Chaucer, Beowulf, The Gawain-Parce, The Age of Langland, The Romance.
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 806 Studies in Renaissance Literature 3
Focuses on one or two authors (e.g., Shakespeare or Spencer), on genres (e.g., narrative verse and prose, the lyric, drama) or on 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, metaphysical, and neo-classical poetry; Jacobean, Caroline, and Restoration drama); or topics and themes (empiricism; skepticism; gender and society; literature of the civil wars; puritan culture).
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 820 Studies in Eighteenth-Century Literature 3
Variable content. Possible course topics include: The Restoration Theatre; English Neoclassicism; The Rise of the Novel; individual writers or groups of writers; applications of theory.

ENGL 830 Studies in Nineteenth-Century Literature 3
Seminar in Romantic and/or Victorian literature with emphasis on selected writers, genres, and/or topics. Possible course topics: women and nature poetry; Dickens; religious doubt; the provincial novel.

ENGL 840 Studies in Twentieth-Century Literature 3
Variable content. Concentrated study of an aspect of Twentieth-Century British, European, American and/or postcolonial literatures. Possible focuses: a genre, a set of writers, cultural issues (e.g., gender, race, the Holocaust, aesthetics vs. politics).

ENGL 844 Seminar: Special Topics in American Literature 3
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 846 Seminar: Special Topics in English Literature 3
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 848 Special Topics in Comparative Literature 3
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
Variable content: e.g., 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, Steiner, and Wharton, with focus on the practice of theory and aesthetic assumptions of current criticism and (2) 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
Variable content. Modern American Novelist (Fitzgerald, Hemingway, Faulkner); modern and postmodern American novelists (Fitzgerald, Hemingway, Faulkner, Bellow, Barth, Heller, Morrison, Pynchon); modernist poetry (Faulk, Eliot, Stevens). Drama of the Absurd.
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 868 Research 3

ENGL 884 Research 3

ENGL 889 Studies in Literary and Cultural Theory 3
Close examination of a single topic or a closely related group of topics (e.g., psychoanalysis and interpretation, genre theory, literary historiography, feminist critique) in textual 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 examination for doctoral students before admission to candidacy or after completion of all required coursework.
RESTRICTIONS: Not open to students who have been admitted to candidacy.

ENGL 969 Doctoral Dissertation 1-12 PF

ENTOMOLOGY AND APPLIED ECOLOGY

ENTO 105 Insects in Our World 3
Insects and their relatives. Principles of insect control as interrelated with ecology and behavior. Recognition of the various insect orders stressed. Small insect collection may be required.

ENTO 165 New Student Seminar 1
Study and careers in entomology and wildlife conservation: opportunities, expectations, duties and preparation, including skills for success in college. Readings, discussions, written and oral assignments, speakers and field trips.
RESTRICTIONS: First term majors.

ENTO 201 Wildlife Conservation and Ecology 3
Natural history of North American wildlife; general principles of ecology; ecological and sociological problems and solutions in wildlife conservation.
RESTRICTIONS: Should precede BISC302.

ENTO 205 Elements of Entomology 3
Lives of insects, emphasizing interactions with humans. Basic insect identification, structure and function, behavior, ecology, evolution, pest control and impact on human society, history and culture.

ENTO 214 Apiculture and Apiculture 2
Scientific study of the life of honey bees, including their biology, behavior and communication; and introduction to techniques of culturing and managing honey bees for honey production and crop pollination.

ENTO 224 Apiology and Apiculture Laboratory 1
Laboratory and field course to complement topics in ENTO214. Bee identification and culture; hive management. Work with bees in an apiary to develop confidence in keeping bee colonies.
PREREQ: ENTO214.
COREQ: ENTO214.

ENTO 300 Principles of Animal and Plant Genetics 3
See ANSC300 for course description.

ENTO 305 Entomology Laboratory 2
Insect structure, physiology, behavior, taxonomy, evolution and ecology studied through field trips, dissection and experiments. Insect collection (with identification to orders) required.
PREREQ: ENTO205.
COREQ: ENTO205.

ENTO 310 Animal and Plant Genetics Laboratory 1
See ANSC310 for course description.

ENTO 318 Taxonomy of Birds 2
Classification of birds. Identification by sight and sound. Emphasis on orders of the world, North American families and species of the region. Indoor labs with one hour of lecture and field trips.

ENTO 325 Wildlife Management 3
Introduction to solving wildlife management problems. Development of management plans with consideration of habitat, human and animal population components.
PREREQ: At least one of the following: BISC302 or ENTO201.
RESTRICTIONS: Requires junior status.

ENTO 366 Independent Study 1-6

ENTO 405 Insect Structure and Function 4
Comparative functional anatomy and evolution of arthropods, especially the Insects. Emphasis on structures and their functions as adaptive responses to selective pressures. Laboratory dissections emphasizing anatomical variation within external and internal systems.
PREREQ: ENTO305.

ENTO 406 Insect Identification - Taxonomy 3
Lecture and laboratory course in the collection, preservation and classification of common insect families.
PREREQ: ENTO305.

ENTO 408 Field Taxonomy 2
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENTO406.
COREQ: ENTO406.
ENTO 410 Ecology of Arthropod Vectors and Parasites 2
Introduction to the ecological relationships among arthropod vector species, disease-causing organisms they transmit, and plant or animal species affected by vectored organisms. In the animal and disease vectors, various types of vectored pathogens in epidemiology of plant and animal diseases.
PREREQ: ENT0105 or ENT0205

ENTO 411 Economic Entomology 3
Principles of managing insect populations to reduce losses caused by insects attacking our food, fiber, buildings, domestic animals and human populations. Diagnostic recognition, control and habits of major economic pest species.
PREREQ: ENT0205

ENTO 418 Avian Biology 2
Birds as adaptive complex. Anatomy, physiology and behavior associated with feeding, thermoregulation, flight, migration, communication and reproduction.
PREREQ: BISC208.
RESTRICTIONS: Requires Junior status.

ENTO 425 Mammalogy 3
PREREQ: ANSC134 or BISC207, and BISC208.
RESTRICTIONS: Requires Junior status

ENTO 426 Aquatic Insects 3
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 430 Close-Up Nature Photography 3
Introduction to the principles of close-up and ultra close-up photography of natural history subjects. Lens and electronic flash systems for biological photography, plus field and indoor techniques. In-class analysis of assigned student slides
RESTRICTIONS: Requires permission of instructor.

ENTO 440 Integrated Pest and Disease Management 3
An introduction to the theory and practice of integrated pest management (IPM), especially as it applies to insects and plant pathogens. Integration of cultural, biological, host resistance and other management strategies to achieve control in an economically and environmentally sound manner. May be cross-listed with PLSC440.
PREREQ: ENT0205 and PLSC303.

ENTO 464 Entomology Field Experience 1-3 PF
Career-related work experience and exploration of potential occupations related to entomology or ecology. Student works with a faculty member to arrange for supervised (usually part-time) employment at a discipline-related site such as a research laboratory, pest control firm, museum, pesticide company or nature center
RESTRICTIONS: Maximum of six credits may count toward B.S. degree, three credits toward major.

ENTO 465 Seminar 1
Development and presentation of a talk on an aspect of a student-selected topic. Presentation in the format of a scientific symposium and written conference report. Proper selection, design, production and use of computer generated visual aids
RESTRICTIONS: Requires Senior status.

ENTO 466 Independent Study 1-6

ENTO 468 Research 1-6

ENTO 501 Natural History for Teachers 3
Background knowledge, methods and materials for teaching basic concepts of ecology, environmental problems and field natural history, particularly as applicable to Delaware. Includes outdoor studies in field, forest, stream and estuarine environments.

ENTO 601 Insect Physiology 4
Physiology and biochemistry of major organs and tissues of insects. Laboratory demonstrates basic tools of insect physiology through original and classical experiments.
PREREQ: ENT0305

ENTO 602 Larval Taxonomy 3
Lecture-laboratory course treating the collection, preservation and classification of the immature stages of common holometabolous insect families.
PREREQ: ENT0305

ENTO 605 Insect Structure and Function 4
Comparative functional anatomy and evolution of arthropods, especially insects. Emphasis on structures and their functions as adaptive responses to selective pressures. Laboratory dissections emphasizing anatomical variation within external and internal systems.
PREREQ: ENT0305

ENTO 606 Insect Identification - Taxonomy 3
Lecture and laboratory course in the collection, preservation and classification of common insect families.
PREREQ: ENT0305

ENTO 608 Field Taxonomy 2
The collection, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0605

ENTO 611 Economic Entomology 3
Principles of managing insect populations to reduce losses caused by insects attacking our food, fiber, buildings, domestic animals and human populations. Diagnostic recognition, control and habits of major economic pest species.
PREREQ: ENT0205

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: BISC302 and ENT0305, or BISC637

ENTO 615 Research Techniques in Ecology 3
Design and execution of ecological research using insects and plants as models. Execution of class and individually designed field projects.
PREREQ: BISC302

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 taxa, 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 2
Birds as adaptive complex. Anatomy, physiology and behavior associated with feeding, thermoregulation, flight, migration, communication and reproduction.
PREREQ: BISC208.

ENTO 619 Principles of Biological Control of Insects 3
Principles of biological control of insects. Consideration given to procedures and techniques (e.g., foreign exploration) and related aspects (e.g., insect pathology and insect resistance in crop plants).
PREREQ: ENT0305

ENTO 620 Behavioral Ecology of Insects 3
Advanced treatment of selected topics in the ecology of insect behavior. Original research project.
PREREQ: BISC302 and ENT0406 or ENT0606.

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, or CHEM321 and CHEM322.

ENTO 625 Mammalogy 3
PREREQ: ANSC134 or BISC207, and BISC208.
RESTRICTIONS: Requires Junior status.

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: ENT0305
RESTRICTIONS: Requires Junior status.

ENTO 630 Close-Up Nature Photography 3
An introduction to the principles of close-up and ultra close-up photography of natural history subjects. Lens and electronic flash systems for biological photography, plus field and indoor techniques. In-class analysis of assigned student slides.
RESTRICTIONS: Requires permission of instructor.

ENTO 640 Integrated Pest and Disease Management 3
An introduction to the theory and practice of integrated pest management (IPM), especially as it applies to insects and plant pathogens. Integration of cultural, biological, host resistance and other management strategies to achieve control in an economically and environmentally sound manner. May be cross-listed with PLSC640.
PREREQ: ENT0205 and PLSC303.

ENTO 803 Writing Research Proposals 1
Conception, design and composition of M.S. and Ph.D. research proposals for professional grant agencies in the biological sciences.
ENTOMOLOGY AND APPLIED ECOLOGY

ENTO 865  Seminar 1  Development and presentation of a talk on an aspect of a student-selected topic. Presentation in the format of a scientific symposium and written conference report. Proper selection, design, production and use of computer generated visual aids. Assist with logistics of symposium organization.
RESTRICTIONS: Required of first-year graduate students

ENTO 888  Topics in Entomology and Applied Ecology 1 PF  A seminar with lectures on a variety of topics related to entomology and wildlife biology.

FINANCE

FINC 201  Introduction to Investments 3  Principles and theory of investments. The nature and analysis of investments. Investment opportunities and management of investment portfolios.
RESTRICTIONS: Not open to Business Administration, Finance or Accounting degree candidates

FINC 311  Principles of Finance 3  Management techniques and information related to the financial function of business firms, covering capital budgeting, working capital management, cost of capital, capital structure analysis, and short and long-term financing.
PREREQ: ACCT 208

FINC 312  Intermediate Financial Management 3  The role of the financial manager in the business firm. Analytical methods and procedures of financial management. Text and cases.
PREREQ: FINC 311.
RESTRICTIONS: Requires a grade of C or better in FINC 311.

FINC 313  Financial Markets 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: FINC 311.

FINC 392  Seminar on International Financial Management 3  Seminar at an overseas location on selected topics in international financial management. Combines lectures and visits to local organizations. Research paper.
PREREQ: FINC 311.
RESTRICTIONS: Used only as a professional elective for BSBA Finance candidates.

FINC 407  Securities Analysis 3  An analysis of components of security evaluation and the establishment of investment standards and policies.
PREREQ: FINC 313.
RESTRICTIONS: Requires a grade of C or better in FINC 313.

FINC 850  Financial Administration 3  An introduction to the fundamental concepts of the finance function with an emphasis on decision-making techniques relevant to financial and nonfinancial managers. Topics include valuation, risk and return, capital budgeting, cost of capital, financial analysis and planning, and working capital management.
PREREQ: ACCT 808.

FINC 851  Corporate Financial Analysis 3  Examines major policy-making areas in corporate finance and the impact of alternative policies on the value of the firm. Emphasis is placed on strengthening financial decision-making skills. Advanced topics include capital investment policy, financing and capital structure policies, dividend policy, and corporate control.
PREREQ: FINC 850.

FINC 852  Investment Analysis and Portfolio Management 3  Examines the role and functioning of securities markets, security valuation techniques, and the theory and practice of portfolio management.
PREREQ: FINC 850.

FINC 853  International Financial Management 3  Examines the financial management of multinational firms and the interrelationships between financial planning and the international economic environment. Topics include direct investment theory, capital budgeting, financing trade and investments, risk management, and working capital management. ECON 842 is recommended as a prerequisite.
PREREQ: FINC 850.

FINC 854  Special Topics in Finance 1-3  Examines selected topics of current interest in various areas of finance, including corporate financial management, investment analysis and portfolio management, or financial institutions and markets.
PREREQ: FINC 850.

FINC 855  Financial Institutions and Markets 3  Examines the nature, purpose, and management of financial institutions and markets.
PREREQ: FINC 850.

FINC 859  Seminar in Finance 3  Emphasis is on financial research and the application of alternative research methods to a project or current interest. Involves individual inquiry, written communication of results, and presentation of findings by each student.
PREREQ: Six credit hours of graduate work in finance.
RESTRICTIONS: Requires 24 M.B.A. credit hours.

FOREIGN LANGUAGES AND LITERATURES

FLT 100  Essential Foreign Language: Language 1 PF  Basic, practical vocabulary and idiomatic expressions for beginners in the Foreign Language (e.g., French, Spanish, Chinese, Bulgarian, Hungarian) during Winter or Summer Session abroad.
RESTRICTIONS: Open only to students who have never studied the language or who have had less than two years in high school. Not for major credit. Taught abroad only.

FLT 105  Modern Language I - Elementary 4  Various modern languages outside normal departmental offerings, e.g., Korean, Modern Greek. An introduction to the language and a development of speaking, listening, reading and writing skills through the use of basic texts. Language laboratory work as needed.

FLT 106  Modern Language II - Elementary/Intermediate 4  Completion of the basic modern language. Increasing mastery of the basic skills (speaking, listening, reading and writing).
PREREQ: FLT 105.

FLT 107  Modern Language III - Intermediate 4  Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty.
PREREQ: FLT 106.
RESTRICTIONS: Satisfies Arts and Science foreign language requirement.

FLT 202  Biblical and Classical Literature 3  See ENG 202 for course description.

FLT 240  Research in Foreign Languages and Literatures 1-3  Seminar presents the wide range of research activities possible in the field of foreign languages and literatures and currently being pursued by faculty members in French, German, Italian, Russian, Spanish and Classics. Each week a different faculty member will explain his/her research interests and discuss them with the class.

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FLT 311 Twentieth-Century Literature I 3
See CMIT 311 for course description.

FLT 312 Twentieth-Century Literature II 3
See CMIT 312 for course description.

FLT 316 Classical Mythology 3
Cosmological myths and heroic sagas in the literature and art of Greece and Rome. The influence of the mythology in later art and literature. May be cross-listed with CMIT 316.

RESTRICTIONS: Open to first-year students.

FLT 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 CMIT 320 and/or WOM 320.

RESTRICTIONS: May be repeated for credit when topics vary.

FLT 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 CMIT 322.

RESTRICTIONS: May be repeated for credit when topics vary.

FLT 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.

FLT 325 Topics: German 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.

FLT 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. May be cross-listed with WOM 326.

RESTRICTIONS: May be repeated for credit when topics vary.

FLT 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.

FLT 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. May be cross-listed with WOM 328.

RESTRICTIONS: May be repeated for credit when topics vary.

FLT 329 Topics in Italian Literature in Translation 3
Study of the works of one or more outstanding authors or of a special theme. Course taught in English.

RESTRICTIONS: May be repeated for credit when topics vary.

FLT 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 CMIT 330, CSCC 330 and/or WOM 330.

RESTRICTIONS: May be repeated for credit when topics vary.

FLT 360 Humanities Colloquium 3
See ARSC 360 for course description.

FLT 366 Independent Study 1-6

FLT 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.

RESTRICTIONS: May be repeated for credit when topics vary.

FLT 380 Topics: Japanese Culture in Translation 3
Special topics in Japanese culture. Course taught in English. Topics vary and are announced in registration booklet.

RESTRICTIONS: May be repeated for credit when topics vary.

FLT 403 Romance Languages Lexicography 3
See LING 403 for course description.

FLT 421 Methods of Teaching Foreign Languages 3
Description, discussion and analysis of techniques pertinent to the teaching and learning of foreign languages. Emphasis on contributions of contemporary linguistic science. Includes demonstrations by experienced FLES teachers, peer-analysis of video-taped model lessons prepared by participants, and an introduction to testing, materials, and course design.

RESTRICTIONS: May be cross-listed with LING 421.

FLT 422 Language Syllabus Design 3
Study of approaches to language syllabus design and materials development including grammatically sequenced, situational, functional and verbal strategy approaches; simplification, standardization, textbook evaluation and adaptation, and design and implementation of learning units for second language, special purpose and bilingual learners.

RESTRICTIONS: May be cross-listed with LING 422.

FLT 424 Second Language Testing 3
See LING 424 for course description.

FLT 429 Methods of Teaching Foreign/Second Languages in Elementary Schools 3
This course familiarizes students with appropriate teaching methods and techniques for the elementary foreign language classroom. It includes demonstrations by experienced FLES teachers, peer-analysis of video-taped model lessons prepared by participants, and an introduction to testing, materials, and course design.

RESTRICTIONS: May be cross-listed with EDDV 429.

FLT 466 Independent Study 1-6

FLT 520 Interactive Language Teaching 3
See LING 520 for course description.

FLT 521 Methods of Teaching Foreign Languages 3
Description, discussion and analysis of techniques pertinent to the teaching and learning of foreign languages. Emphasis on contributions of contemporary linguistic science. Includes demonstrations and practical exercises.

RESTRICTIONS: May be cross-listed with LING 521.

FLT 522 Language Syllabus Design 3
Study of approaches to language syllabus design and materials development, including grammatically sequenced, situational, functional and verbal strategy approaches; community approaches to language learning; teaching reading, writing, culture; applications of technologies to foreign language classrooms.

RESTRICTIONS: May be cross-listed with FLT 522.

FLT 523 Theoretical and Practical Issues in Foreign Language Pedagogy 3
Graduate assistants enrolled in this course will study current perspectives on foreign language instruction and have extensive hands-on experience with the implementation of effective language teaching strategies. Emphasis will be given to the enhancement of students' proficiency in class planning, syllabus design and materials preparation.

RESTRICTIONS: Graduate students only.

FLT 624 Second Language Testing 3
See LING 624 for course description.

FLT 629 Methods of Teaching Foreign/Second Languages in Elementary Schools 3
This course familiarizes students with appropriate teaching methods and techniques for the elementary foreign language classroom. It includes demonstrations by experienced FLES teachers, peer-analysis of video-taped model lessons prepared by participants, and an introduction to testing, materials, and course design.

RESTRICTIONS: May be cross-listed with EDDV 629.

FLT 655 Topics in Foreign Language Pedagogy 3
Topics in foreign language pedagogy. May include, among others, proficiency-oriented approaches; communicative approaches; community approaches to language learning; teaching reading, writing, culture; applications of technologies to foreign language classrooms.

RESTRICTIONS: May be repeated for credit when topics vary.

FLT 660 Humanities Colloquium 3
See ARSC 660 for description.

FLT 692 Weekend Short Course 1
Short weekend course in language, literature, and/or civilization, or in professional studies. Topics vary.

RESTRICTIONS: May be repeated for credit when topics vary.

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FOOD SCIENCE

FOSC 166 SPECIAL PROBLEM 1-3
FOSC 201 FOOD PRINCIPLES 2 Principles of food selection and preparation as related to the chemical and physical properties of food. Includes the composition and structure of foods, functional properties of ingredients, and methods to maintain desirable quality (sensory and nutritional) attributes of food. Coreq: FOSC211.

FOSC 211 FOOD PRINCIPLES LABORATORY 1 Chemical and physical principles of food and preparation studied in selected laboratory experiments. Food components examined include the sensory, nutritional and functional aspects of proteins, lipids and carbohydrates. Coreq: FOSC201.

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 2 Composition, structure and functional properties of food and fundamentals of commercial food processing, including thermal processing, freezing, dehydration and ionization. May be cross-listed with ANSC305. Prereq: FOSC201, FOSC211 and CHEM213.

FOSC 306 FOOD SCIENCE LABORATORY 1 Laboratory study of ingredient manipulation, food processing and preservation techniques including introductory food analytical quality measurements. May be cross-listed with ANSC306. Coreq: FOSC305.

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 365 SEMINAR ON FOOD SCIENCE 1 Focuses on food supplies in meeting specialized needs, new processing methods, introduction to analytical methods and computer applications in food processing.

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 I 4 Covers the rationale and history of food processing; organizing unit operations; the maintenance of food quality including food palatability and nutritive value; separation technology including basic operations, size reduction, mixing, filtration, concentration and crystallization; and preservation methods including fresh food storage, low temperature and high temperature methods. May be cross-listed with ANSC409. Prereq: FOSC428.

FOSC 410 FOOD PROCESSING II 4 Incorporates and unifies the principles of food chemistry, microbiology, engineering and processing; nutrition, sensory analysis and statistics in a product development project using problem solving and critical thinking skills. Discussions on processing include drying, additives, aspers, modified atmospheres, fermentation, irradiation, emulsification, and extraction. Food safety including laws, regulations, and GMPs are incorporated. May be cross-listed with ANSC410. May be cross-listed with ANSC410. Prereq: FOSC409 and FOSC428.

FOSC 428 FOOD CHEMISTRY 4 Composition of food materials, reaction mechanisms leading to deterioration; and interaction of food components to form desirable products, pigments, characterizations of food polymers. Effect of physical and chemical factors on the structure and functionality of food. May be cross-listed with ANSC428. Prereq: CHEM214 and CHEM321.

FOSC 429 FOOD ANALYSIS 4 The application of instrumentation: UV/ViS, FTIR and Fluorescence Spectrophotometry, Chromatography (TLC, LC, GC and HPLC), Electrochemistry, and Enzyme Assays for the determination of food constituents and additives. Official AOAC and AAC methods utilized. May be cross-listed with ANSC429. Prereq: CHEM216.

FOSC 439 FOOD MICROBIOLOGY 4 The role and significance of microorganisms in foods with particular reference to food spoilage, preservation, fermentation, sanitation and poisoning. Current methodology used in the microbiological examination of foods. Prereq: BISC371.

FOSC 445 FOOD ENGINEERING TECHNOLOGY 4 Engineering fundamentals for processing of food materials, including applied thermodynamics and heat transfer principles and operations. May be cross-listed with EGET445. Prereq: EGET311, MATH222, and PHYS202. Restrictions: Not open to majors in mechanical or chemical engineering.

FOSC 446 FOOD PROCESSING ENGINEERING TECHNOLOGY 4 Selected unit operations of importance to the food processing industry including evaporation, dehydration and distillation. Emphasizes the role that properties of food take in constraining the application of classical unit operations analyses. Prereq: FOSC445. 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 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: BISC371 or FOSC399.

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.

FOSC 609 FOOD PROCESSING I 4 Covers the rationale and history of food processing; organizing unit operations; the maintenance of food quality including food palatability and nutritive value; separation technology including basic operations, size reduction and screening, mixing, filtration, concentration and crystallization; and preservation methods including fresh food storage, low temperature and high temperature methods.

FOSC 610 FOOD PROCESSING II 4 This capstone course incorporates and unifies the principles of food chemistry, microbiology, engineering and processing; nutrition, sensory analysis, and statistics in a product development project using problem solving and critical thinking skills. Discussions on processing include drying, additives, aspers, modified atmospheres, fermentation, irradiation, emulsification, and extraction. Food safety including laws, regulations and GMPs is incorporated.

FOSC 628 FOOD CHEMISTRY 4 Composition of food materials, reaction mechanisms leading to deterioration; interaction of food components to form desirable and undesirable products, pigments, characterization of food polymers. Effect of physical and chemical factors on the structure and functionality of food. Prereq: CHEM321 and CHEM214.

FOSC 629 FOOD ANALYSIS 4 The application of instrumentation: UV/VIS, FTIR and Fluorescence Spectrophotometry, Chromatography (TLC, LC, GC and HPLC), Electrochemistry, and Enzyme Assays for the determination of food constituents and additives. Official AOAC and AAC methods utilized. May be cross-listed with ANSC629. Prereq: CHEM216.
FOOD AND RESOURCE ECONOMICS

FOSC 630  FOOD CARBOHYDRATES  3  
Examination of simple and complex carbohydrates in food systems. Examines both the chemistry and structural implications of each carbohydrate class, as well as discussing their industrial and nutritional aspects. Special emphasis on simple sugars, artificial sweeteners, starch, pectin, gums and mucilages.

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: BSCI371

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

FOSC 646  FOOD PROCESSING ENGINEERING TECHNOLOGY  4  
Selected unit operations of importance to the food processing industry including evaporation, dehydration and distillation. Emphasizes the role that properties of food take in constraining the application of classical unit operations analyses.  
PREREQ: FOSC645  
RESTRICTIONS: Not open to majors in mechanical or chemical engineering.

FOSC 649  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 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: BSCI371 or FOSC439

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 670  MODERN FOOD PACKAGING  3  
Covers modern techniques of food packaging, including critical issues associated with new food processing techniques and their packaging requirements. Typical topics are aseptic, modified-atmosphere and retort pouch packaging, as well as the relationship of the food chemistry to the packaging material.

FOSC 671  PACKAGE PRODUCT INTERACTIONS  3  
Fundamentals of permeation along with the effect of structural order on permeation and the physicochemical nature of the penetrant. Principles and prediction of flavor sorption. Factors affecting shelf-life of packaged foods, shelf-life prediction and the extension of shelf-life by modified atmosphere techniques.  
RESTRICTIONS: Requires permission of instructor

FOSC 686  RESEARCH  1-6

FOSC 689  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 structure and importance of the industry will be discussed.

FREC 125  ELEMENTARY AGRICULTURAL ECONOMICS: APPLICATIONS  1  
Analysis of producer behavior, output, profits and input demands; and evaluation of alternative capital investments.  
PREREQ: FREC135  
COREQ: FREC150 and FREC135

FREC 135  INTRODUCTION TO DATA ANALYSIS  3  
Introduction to computer systems, with an emphasis on microcomputer systems, and their use to process and analyze data. Emphasis on application programs used in agricultural sciences including spreadsheets, graphics, database management, electronic communications and word processing.

FREC 150  ECONOMICS OF AGRICULTURE AND NATURAL RESOURCES  3  
Introduction to economic and management principles and their applications to agriculture, including agribusiness, natural resources and the environment.  
RESTRICTIONS: Not open to juniors and seniors

FREC 153  AGRICULTURAL SALESMAINSHIP  3  
Principles and techniques of effective personal selling of agricultural products and services. Development of skills necessary to organize, deliver and refine sales presentations.

FREC 201  RECORDS AND ACCOUNTS  3  
Introductory course. Emphasis on concepts and principles and the uses of accounting for control and decision-making purposes.  
RESTRICTIONS: Designed for non-business and non-accounting majors

FREC 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 312  FOOD RETAILING AND PRODUCT MANAGEMENT  3  
Major topics include: consumer market environment, population characteristics, food retail marketing and financial strategies, product merchandising planning, new product development strategies, site location analysis, management and human resource development.  
PREREQ: FREC150 or ECON151

FREC 335  ADVANCED DATA MANAGEMENT  3  
Advanced use of microcomputer systems and application software used in Agricultural Sciences.  
PREREQ: FREC135

FREC 345  STRATEGIC SELLING AND BUYER COMMUNICATION  3  
Application of strategic selling techniques to actual selling situations. Focus on technical and personal sales involves extensive use of videos, case problems, sales presentations and traveling with sales professionals.

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

FREC 366  INDEPENDENT STUDY  1-6

FREC 403  AGRICULTURAL PRODUCTION ECONOMICS  3  
Economic principles applied to the operation of the firm with emphasis on resource allocation and production efficiency. Application of analytical techniques and programming models used in the analysis and planning of a business.  
PREREQ: FREC150 or ECON151

FREC 404  FOOD AND FIBER MARKETING  3  
System approach to food and fiber marketing analysis: consumer, retail, processor, wholesaler and farm level. Domestic and foreign demand and supply and analysis; pricing, marketing costs, food safety, market power and its sources. Physical distribution, and structure of the food and fiber marketing system.

FREC 405  MANAGEMENT AND LEADERSHIP DEVELOPMENT  3  
Exposes students to 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 406  AGRICULTURAL AND NATURAL RESOURCE POLICY  3  
Agricultural and natural resource policy formation, effects of policy on resource allocation and economics of alternative programs. Analysis of effects of various programs on producers, consumers and taxpayers, especially contemporary issues and market failures.  
PREREQ: FREC150 or ECON151

FREC 408  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 survey research techniques; forecasting methods including exponential smoothing, trend analysis and regression analysis; aggregate production planning; just-in-time inventory management and materials requirement planning.

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

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-
ples 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
financial strategies, management structure and legal forms of small businesses, etc.
Involves case studies and writing a business plan.
RESTRICTIONS: Requires permission of instructor.

FREC 435 MICROCOMPUTER USE IN AGRICULTURAL ECONOMICS 3
Microcomputer systems and their use and application in contemporary agricultural eco-
nomics problems.
PREREQ: FREC135

FREC 444 ECONOMICS OF ENVIRONMENTAL MANAGEMENT 3
Review of benefit-cost analysis and welfare theory; techniques for evaluating environmen-
tal 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 464 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
Oral and written reports in the subdisciplines of food and resource economics.

FREC 466 INDEPENDENT STUDY 1-6

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

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

FREC 608 RESEARCH METHODS 3
Experimental design and plot plans, collection, analysis and presentation of data in agricul-
tural and biological research.

FREC 615 ADVANCED PRICES AND STATISTICS 3
Statistical tools used in agricultural economics research. Introduction to econometric spec-
ifications, estimation and interpretation.
PREREQ: FREC408

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

FREC 801 APPLIED DEMAND AND MARKETING ANALYSIS 3
Deals with research techniques and procedures in applied economics with focus on
empirical applications of economic theory and econometric tools in consumer demand
and marketing analysis.

FREC 803 PRODUCTION ECONOMICS 3
Economic theory applied to operation and planning of an enterprise, including factor
demand and product supply aspects. Discussion of I/F and production function models.
PREREQ: FREC608

FREC 806 RESEARCH TECHNIQUES AND PROCEDURES 3
Planning research projects with emphasis on methods of collecting and analyzing data,
and the presentation of results. A problems course. May be cross-listed with ORES806.
PREREQ: FREC608

FREC 810 INTERNATIONAL AGRICULTURAL TRADE SPECIAL TOPICS 3
Advanced theory, issues and policies in international agricultural trade emphasizing
international finance and agriculture, agricultural trade and development, empirical and
methodological issues and international marketing 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 evaluation,
hypothesis testing and control of firm-level technological and production problems. May
be cross-listed with ECON827 and/or ORES827
PREREQ: ECON801 and an econometrics/statistics course
RESTRICTIONS: Requires permission of instructor.

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

FREC 869 MASTER'S THESIS 1-6

FRENCH

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

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, and writing
skills through the use of basic texts. Language laboratory as needed.

FREN 106 FRENCH II - ELEMENTARY/INTERMEDIATE 4
Completion of basic French. Increasing mastery of the basic skills of speaking, listening,
and writing.
PREREQ: FREN105
RESTRICTIONS: Two to three years of high school French acceptable in lieu of prerequisite.

FREN 107 FRENCH III - INTERMEDIATE 4
Review of grammar, continued practice in speaking and writing, and reading texts of
average difficulty.
PREREQ: FREN106.
RESTRICTIONS: Four years of high school French acceptable in lieu of prerequisite.
Course satisfies Arts and Science foreign language requirement.

FREN 111 INTERMEDIATE FRENCH I 3
Review of grammar; increasing mastery of the basic skills of speaking, listening, and writing.
PREREQ: FREN102 or FREN106
RESTRICTIONS: Three years of high school French acceptable in lieu of prerequisite.

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 prerequisite.
Course satisfies 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
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FREN 205 FRENCH CONVERSATION 3
Practical use of French by means of oral reports and discussions. Emphasis on improvement of basic conversational skills. Grammar review where appropriate, and/or some written work.
PREREQ: 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 aural language skills.
PREREQ: FREN107 or FREN112.
RESTRICTIONS: Taught in France.

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

FREN 208 CONTEMPORARY FRANCE 1 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: SHORT STORY 3
Reading and discussion of short story. Frequent compositions. Grammar review where appropriate.
PREREQ: FREN200 with a minimum grade of C or FREN107 with a minimum grade of A- or FREN112 with a minimum grade of A.

FREN 212 FRENCH READING AND COMPOSITION: THEATRE 3
Reading and discussion of some major works in French theatre. Frequent compositions. Grammar review where appropriate.
PREREQ: FREN200 with a minimum grade of C or FREN107 with a minimum grade of A- or FREN112 with a minimum grade of A.

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: One 200-level course taught in the French language.

FREN 255 FRENCH POLITICS IN THE PRESS 3
Explores topics in contemporary French politics as expressed in the news media. Emphasis on current events related to the internal and external politics 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.

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: FREN201 or FREN202, 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: FREN201 or FREN202, and any 200-level course taught in the French language.

FREN 305 ADVANCED FRENCH CONVERSATION 3
Focuses on current issues and is based primarily on French video cassettes.
PREREQ: FREN205 and any other 200-level course.

FREN 306 PRACTICAL ORAL/WRITTEN EXPRESSION 3
Strengthens grammar and vocabulary skills in preparation for advanced courses. Class exercises include oral exposures, discussion of articles and videos, textual analysis and compositions.
PREREQ: Any two 200-level French courses conducted in French.
RESTRICTIONS: 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 two 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 FREN250.

FREN 355 SPECIAL TOPICS: 3
Explores an area of special interest in French literature or culture studies.
RESTRICTIONS: Taught abroad.

FREN 366 INDEPENDENT STUDY 1-3
PREREQ: Any two 200-level French courses.

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 403 HISTORY AND EVOLUTION OF THE FRENCH LANGUAGE 3
The development of the French language from Vulgar Latin through Old and Middle French to Modern French. Phonology, morphology and syntax, illustrated through selected texts.
PREREQ: Any two 300-level French courses.

FREN 406 ADVANCED FRENCH LITERATURE 3
Grammatically structured syntax with special attention given to technical vocabulary and discourse, e.g., business, law, science and agriculture.
PREREQ: Any 300-level French course.
RESTRICTIONS: Course taught abroad only.

FREN 411 GREAT AUTHORS I: 1100-1750 3
Selected readings of master authors and works from the Middle Ages to the Age of Enlightenment. Authors may include Villon, Rabelais, Montaigne, Moliere, Corneille, Mme de Lafayette, Montesquieu, Voltaire and others.
PREREQ: Any two 300-level French literature courses.

FREN 412 GREAT AUTHORS II: 1750-PRESENT 3
Selected readings of master authors and works from the dawn of Romanticism to the present. Authors may include 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 Moliera, Montaigne and others.
PREREQ: Any two 300-level French literature courses.

FREN 427 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 428 SEVENTEENTH-CENTURY FRENCH POETRY AND PROSE 3
Representative novelists, poets, critics and moralists from Descartes and Pascal to La Fontaine, Boileau, Mme de La Fayette and others.
PREREQ: Any two 300-level French literature courses.

FREN 441 THE EIGHTEENTH CENTURY: THE AGE OF VOLTAIRE 3
Novels, plays, essays and poetry of such authors as Montesquieu, Marivaux, 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 Chatelet.
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 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, Ionesco, 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, Perec, Tournier, Duras, Ponge, Bonnefoy, Jacotet and Barthes.
PREREQ: Any two 300-level French literature courses

FREN 453 CONTEMPORARY FRENCH CIVILIZATION: 1958-PRESENT 3
Culture, customs and political and economic life in France since 1958.
PREREQ: Any two 300-level French courses.

FREN 455 SELECTED AUTHORS, WORKS AND THEMES 3
Works of one or more outstanding authors or on a special theme.
PREREQ: Two 300-level French literature courses.
RESTRICTIONS: May be repeated for credit when topics vary.

FREN 466 INDEPENDENT STUDY 1-3
A basic course with emphasis on developing reading comprehension.
RESTRICTIONS: Designed for graduate students in other disciplines who have had little or no previous experience with French.

FREN 603 HISTORIAN AND EVOLUTION OF THE FRENCH LANGUAGE 3
The development of the French language from Vulgar Latin through Old and Middle French to Modern French. Phonology, morphology and syntax, illustrated through selected texts.

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 Pleiade, Montaigne and others.

FREN 637 SEVENTEENTH-CENTURY FRENCH THEATRE 3
Growth of French dramatic literature before 1715 and analysis of the principal plays of Corneille, Racine and Moliere.

FREN 638 SEVENTEENTH-CENTURY FRENCH POETRY AND PROSE 3
Representative novelists, poets, critics and moralists from Descartes and Pascal to La Fontaine, Boileau, Mme de La Fayette and others.

FREN 641 THE EIGHTEENTH CENTURY: THE AGE OF VOLTAIRE 3
Novels, plays, essays and poetry of such authors as 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 Cheriier.

FREN 645 NINETEENTH-CENTURY FRENCH NOVEL 3
The novel from Romanticism to Naturalism. Chateaubriand, Balzac, Stendhal, Flaubert, Zola and others.

FREN 646 NINETEENTH-CENTURY FRENCH POETRY AND THEATRE 3
Poets and dramatists representative of Romanticism, Realism and the Symbolist movement.

FREN 651 TWENTIETH-CENTURY FRENCH LITERATURE: THE AGE OF ANXIETY AND THE ABSURD 3
Main trends from Gide, Celine and Malroux to Camus and Beckett, including Surrealism, Existentialism and the Theatre 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, Perec, Tournier, Duras, Ponge, Bonnefoy, Jacotet 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. Variable content. Emphasizes preparation of seminar presentations and term papers.
RESTRICTIONS: May be repeated for credit when topics vary.

GEOGRAPHY

GEOG 101 PHYSICAL GEOGRAPHY 3
An interdisciplinary introduction to individual and group behavior in relation to development and energy exploitation, worldwide.

GEOG 102 HUMAN GEOGRAPHY 3
Introduction to the geographic regions of the world and the changing relationships between regions. Emphasis 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 120 WORLD REGIONAL GEOGRAPHY 3
Introduction to the geographic regions of the world and the changing relationships between regions. Emphasis is given to 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 201 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 206 PHYSICAL GEOGRAPHY: TOPOGRAPHY-SOILS 3
Basic processes responsible for the development, modification, distribution and variety of landforms and soils.

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. Special problems of micrometeorology.

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 227 HISTORICAL GEOGRAPHY OF EUROPE 3
Cultural and historical factors that have shaped the geographic patterns of modern Europe.

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**  
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**  
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**  
History, design and use of maps as tools for effective communication of geographic ideas.

GEOG 272 **Map and Air Photo Interpretation**  
Analysis of maps, aerial photos and selected remote sensing techniques to interpret physical and cultural environments. Includes measurement of phenomena on air photos, photogrammetry and maps, and cartometrics.

GEOG 310 **Social Geography**  
The environment is defined, arranged and experienced differently by different social groups. Examines the geographical settings of minorities - ethnic groups, women, children, elderly and the homeless - and the ways institutions, media and political processes affect the spatial location and place experiences of these groups.

GEOG 320 **Water and Society**  
Study of the physical occurrence and distribution of water in all parts of the hydrologic cycle; introduces the nature of human demands for water, the possibilities of obtaining additional supplies and the difficult legal, economic and political questions of management of water resources.

GEOG 325 **Urban Geography**  
Spatial relationships of urban areas, focusing on the structure of towns, the organization of urban space and the external relationships of cities.

GEOG 328 **Transportation Geography**  
Geographical factors in the development of transportation and influences of transportation innovations on spatial patterns of settlement and regional growth.

GEOG 329 **International Migration**  
See POSC329 for course description.

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

GEOG 340 **Behavioral Geography**  
Human behavior in large-scale environments. The psychological, physiological and cultural variables that mediate in human-environment relationships.

GEOG 342 **Biolimnology**  
Influences of weather and climate on animals, plants and humans, and their distributions; adaptation to normal and extreme environments; and environmental measurement and interpretation. PREREQ: GEOG330 and GEOG250

GEOG 343 **Climatic Geomorphology**  
Influence of climate and vegetation elements on rock weathering and soil erosion rates. Landform assemblages and surface materials produced under present and past climatic regimes. PREREQ: GEOG206, GEOG105 or GEOG107.

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

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

GEOG 351 **Urban Climatology**  
Emphasis on the modification of climate produced by cities. Discusses both theoretical and empirical approaches to the study of urban climates. PREREQ: GEOG250 and GEOG255.

GEOG 357 **Paleoclimatology**  
A survey of earth's climatic history, with emphasis on the methods used to reconstruct that history and the relevance of past climate changes as indicators of the sensitivity of the current climate. PREREQ: GEOG101 or GEOG152 or GEOG220.

GEOG 366 **Independent Study**  
1-6

GEOG 370 **Production Cartography**  
Design and construction of professional-quality maps using computer and photographic darkroom techniques. Emphasis on multi-color maps for publication. PREREQ: GEOG270.

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

GEOG 380 **Western Landscapes of America**  
Major themes in the exploration, settlement and evolution of western cultural landscapes. Impact of the West upon landscape styles and culture of America.

GEOG 390 **Honors Colloquium**  
See ARSC390 for description.

GEOG 412 **Physical Climatology**  
Energy and moisture exchange between the atmosphere and land surface for characteristic natural and human-modified environments. PREREQ: MATH241 and GEOG250.

GEOG 420 **Atmospheric Physics**  
Introduction to energy and moisture flows in the atmosphere at small scales. Includes atmospheric thermodynamics, cloud physics and radiation. PREREQ: GEOG220 and MATH242.

GEOG 422 **Resources, Development and the Environment**  
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 discussion and debate on sustainable development policies.

GEOG 423 **Atmospheric Dynamics**  
Investigates atmospheric motion in a quantitative manner. Expands basic conservation laws to derive the equations of atmospheric motion and to develop the concepts of vorticity and circulation. Discusses atmospheric wave motion and general circulation. PREREQ: MATH242 and GEOG220. COREQ: MATH243.

GEOG 425 **Internal Structure of the City**  
Theoretical and practical approaches to an understanding of changing land uses within urban areas. PREREQ: GEOG325.

GEOG 428 **Issues in Land Use and Environmental Planning**  
Examines theory and contemporary practice in land use and environmental planning with emphasis on creating an integrative framework that balances development demands for urban, suburban, and agricultural land against the needs to conserve and enhance environmental and cultural resources.

GEOG 430 **Conservation Forest Ecosystems**  
Evaluation of human impact upon North American forests, concentrating on physical and biotic features that should be considered to maximize forest productivity. PREREQ: GEOG230.

GEOG 438 **World Cities in Comparative Perspective**  
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.

GEOG 440 **Visual Landscapes**  
Social and behavioral science approaches to the study of human responsiveness to natural and urban visual environments. Implications for design, impact assessment and planning. PREREQ: GEOG240 or GEOG340.

GEOG 441 **The Ecology of Crime**  
See CRJU455 for course description.

GEOG 445 **Method and Theory in Geography**  
The nature of geography, its history, methodology and applications in research and societal problems. A preprofessional course.

GEOG 448 **Culture and Environment**  
Importance of attitudes toward nature in several cultural traditions. Processes in the formation of cultural landscapes, urban and rural. The city as a cultural-geographic environment.

GEOG 450 **Proseminar in Environmental Science**  
Discussion of the history and state of environmental science as well as its relation to current environmental problems. Survey of research topics and methodologies in the current scientific literature. May be cross-listed with BISC450 and/or GEO450. RESTRICTIONS: Open to senior Environmental Science majors only, or requires permission of instructor.

GEOG 451 **Microclimatology**  
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 SYNOPTIC CLIMATOLOGY 3
Physical processes involved with development and transportation of weather systems, including relationships between upper atmospheric flow and surface weather phenomena, synoptic evaluation of air masses, synoptic techniques for environmental analysis.
PREREQ: GEOG220

GEOG 454 NEW EUROPE: CULTURE, GEOGRAPHY, MIGRATIONS 3
Post-Soviet Europe is examined in terms of emerging economic, cultural, and ethnic configurations; tensions between national and supra-national territories; the role of mass media in ethnic, political, and ethnic spheres; processes of transformation in former Soviet states; dynamics of regional cooperation on environmental issues.

GEOG 455 WATER BUDGET AND ENVIRONMENTAL ANALYSIS 3
The development of the climatic water budget and its use in understanding problems in hydrology, agriculture, forestry, urban planning, and the distribution of environmental systems. Evaluation of the influence of different human activities on the factors of the water budget.

GEOG 460 WOMEN IN INTERNATIONAL DEVELOPMENT 3
See SOC1460 for course description.

GEOG 462 ENVIRONMENTAL SURVEY OF ENVIRONMENTAL ANALYSIS 3
Introduction to environmental remote sensing and computer methods necessary for drawing maps with the aid of a digital computer.
PREREQ: GEOG230

GEOG 467 ADVANCED ENVIRONMENTAL 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, structured, and manipulated in GIS. GIS methods are applied to cadastral geographical, environmental, and land planning problems.
PREREQ: GEOG250 and GEOG270 or GEOG372 or GEOG470.

GEOG 472 INTRODUCTION TO ENVIRONMENTAL REMOTE SENSING 3
Introduction to the basic physics, techniques and theory of remote sensing in geography and environmental science. Digital image processing of satellite imagery and its incorporation into geographic information systems is emphasized. A set of computer-based laboratory exercises will be required.
PREREQ: GEOG250 and GEOG272.

GEOG 505 ATMOSPHERIC AND OCEANIC ENVIRONMENTS 3
Survey of atmospheric and oceanic environments includes the physical background, from composition and solar forcing, through the distributions of energy and moisture fluxes on the planet. Human modifications and responses to atmospheric and oceanic environments are also considered.
PREREQ: MATH242 and PHYS201.
RESTRICTIONS: Open to Environmental Science graduate students.

GEOG 560 PRELUDE TO GEOGRAPHY 1
Introduction to contemporary American geography, especially its research and educational frontiers. Also emphasizes theoretical and practical considerations in formulating, carrying out and evaluating geographic research. Students 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 612 PHYSICAL CLIMATOLOGY 4
Energy and moisture exchange between the atmosphere and land surface for characteristics of 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 620 ATMOSPHERIC PHYSICS 3
Introduction to energy and moisture flows in the atmosphere at small scales. Includes atmospheric thermodynamics, cloud physics and radiation.
PREREQ: MATH242 and GEOG220.
COREQ: GEOG250.

GEOG 622 RESOURCES, DEVELOPMENT AND THE ENVIRONMENT 3
Focuses on food, resources, energy and population issues in relationship to economic development and the global environment. The main objective is to engage students in discussion and debate on sustainable development policies. May be cross-listed with UAPP622.

GEOG 623 ATMOSPHERIC DYNAMICS 3
Investigates atmospheric motion in a quantitative manner. Expands basic conservation laws to derive the equations of atmospheric motion and to develop the concepts of vorticity and circulation. Discusses atmospheric wave motion and general circulation.
PREREQ: MATH242 and GEOG220.
COREQ: MATH243.

GEOG 625 THE INTERNAL STRUCTURE OF THE EARTH 3
Theoretical and practical approaches to an understanding of the changing land uses within urban areas.
PREREQ: GEOG325.

GEOG 626 ISSUES IN LAND USE AND ENVIRONMENTAL PLANNING 3
Examines theory and contemporary planning in land use and environmental planning with emphasis on creating an integrative framework that balances development demands for urban, suburban, and agricultural land against the needs to conserve and enhance environmental and cultural resources. May be cross-listed with UAPP626.

GEOG 630 CONSERVATION FOREST ECOSYSTEMS 3
Evaluation of the human impact upon North American forests, concentrating upon the physical and biotic features that should be considered to maximize forest productivity.
PREREQ: GEOG230.

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 640 VISUAL LANDSCAPES 3
Social and behavioral science approaches to the study of human responsiveness to natural and urban visual environments. Implications for design, impact assessment and planning.
PREREQ: GEOG240 or GEOG480.

GEOG 645 MAPPING AND THEOLOGY IN GEOGRAPHY 3
The nature of geography, its history, methodology and applications in research and societal problems. A preparatory course.

GEOG 647 HISTORY OF ENVIRONMENTAL IDEAS 3
Key environmental ideas are examined as expressions of culture, from Classical Antiquity to the present. Particular emphasis is placed on expressed culture-nature relationships (e.g., Grand Design, environmental and/or cultural determinism, nature-culture dichotomies, humanism versus ecologism).
RESTRICTIONS: Open to graduate students in Environmental Science.

GEOG 648 CULTURE AND ENVIRONMENT 3
Importance of attitudes toward nature in several cultural traditions. Processes in the formation of cultural landscapes, urban and rural. The city as a cultural-geographic environment.

GEOG 649 ENVIRONMENT AND SOCIETY 3
Considers the relationships between environmental and social processes from theoretical, philosophical, and methodological perspectives of geography. Examines the ethical and contextual implications implied in framing environmental questions and posing solutions.
RESTRICTIONS: Open to graduate students in Environmental Science.

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 SYNOPTIC CLIMATOLOGY 3
The physical processes involved with the development and transportation of weather systems. Selected topics include relationships between upper atmospheric flow and surface weather phenomena, synoptic evaluation of air masses and synoptic techniques for environmental analysis.
PREREQ: GEOG220.
GEOG 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?

GEOG 110 Evolution and Extinction 3
Origins, evolution and extinction of major groups of organisms as reflected by the earth's fossil record. Mass extinctions, both ancient and modern (anarthropogenic) Humans' role in the global ecosystem

GEOG 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.

GEOG 144 Evolution and Earth History 3
History of the Earth and its biota: origin and extinction of major groups of organisms during the Earth's history.

GEOG 203 Mineralogy and Crystallography 3
Principles of crystallography and crystal growth, the properties of minerals, mineral occurrence and association, and systematic mineralogy. Identification, including X-ray diffraction.

GEOG 204 Properties of Rocks and Minerals 4
Principles of crystal symmetry, techniques of polarized light microscopy, including mineral identification, and examination of thin sections. Petrography covering the accessory, electrical and magnetic properties of rocks and minerals.

GEOG 233 The Ice Ages and Human Chronology 3
Quaternary climatic fluctuations and the effects of continental glaciation. Evidences on origin of the ice ages: major geomorphic forms produced, evolutionary crisis and extinction of the major mammals and the ascendency of humans.

GEOG 234 Earth Resources and Ecology 3
The geologic origin and occurrence of fuels, metals, building and industrial minerals, and water; the geology, economics and politics of resource extraction and utilization; the disposal of wastes; mineral pollution; and the bearing capacity of the environment.

GEOG 243 Rocks and Minerals 3
The major types of rocks and minerals, including their origin, distribution, crystalline form, chemistry, occurrence and identification. Mineral aesthetics. Gems and gemstones.

GEOG 245 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 man, and their potential control.

GEOG 301 Systematic and Evolutionary Paleontology 3
Classification of fossils, organic evolution, paleoecology; and application to geologic principles.

PREREQ: GEOI107.
COREQ: GEOI303.

GEOG 303 Sedimentology 3
Texture, composition and provenance of sedimentary rocks. Sediment transport and deposition; major types of sedimentary environments. Paleoecology and biologic influences on sediment distribution and production.

PREREQ: GEOI203

GEOG 304 Stratigraphy 3

PREREQ: GEOI203, GEOI301 and GEOI303.

GEOG 305 Structural Geology 3
Major classes of rock structures and their origins. Descriptive, kinematic, and dynamic examination of rock structures. Geologic stress, strain and mechanisms of strain. Large-scale structural features of the crust. Onogenic belts.

PREREQ: GEOI107, GEOI203 and mathematics through trigonometry.

GEOG 366 Independent Study 1-3

GEOG 402 History of the Earth 3
A barrow. The course will also explore the possible connection between meteorite impacts and mass extinctions. Did an asteroid kill off the dinosaurs?

PREREQ: GEOI105 or GEOI107, and count towards graduation.

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GEOL 403 Regional Geology of North America 3
Stratigraphic, structural and petrologic features of the geologic provinces of North America. Generalized geologic evolution of each region. Major geologic features of selected other continents
PREREQ: GEOL304

GEOL 405 Introduction to Research 2
Undergraduate research carried out under the supervision of the staff. Written report required. RESTRICTIONS: May be repeated once if project warrants it

GEOL 407 Inorganic and Metamorphic Petrology 3
PREREQ: GEOL204

GEOL 411 Quantitative Geomorphology 3
Analysis of geomorphic processes and landforms using a quantitative approach. Topics include fluvial processes and morphology, evolution and morphometry of drainage basins, slope development, coastal landforms and beach processes.
PREREQ: GEOL107 and GEOL303

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.

GEOL 413 Fundamentals of Well Logging 3
Theory and interpretation of most commonly used geophysical logs; and description of logging tools, their uses and limitations. Emphasis on groundwater exploration and well development. Calculation and use of formation factor in determining water quality.

GEOL 414 Quaternary Geology and Geochronology 3
Survey of the stratigraphy and chronology of marine and terrestrial records and theories of climatic change. Studies of the stratigraphy of significant Quaternary successions throughout the world and their correlation and absolute dating.
PREREQ: GEOL107

GEOL 415 General Geomorphology 3
Description and classification of landforms, their relationships to geologic structures and processes, and their histories and rates of change.

GEOL 420 Petroleum Geology 3
The origin and distribution of the world’s petroleum resources. Geologic and geophysical techniques applied to the search for oil.
PREREQ: GEOL303, GEOL304 and GEOL305.

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, training, legislation, regulation and professionalism emphasizing the role of the geologist and the educated citizen.
PREREQ: GEOL303, GEOL304, and GEOL305

GEOL 428 Hydrogeology 3
PREREQ: GEOL107 AND GEOL303

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 paleoclimatology.
PREREQ: GEOL304.

GEOL 432 Recent Sedimentary Environments 3
Recent environments of deposition in the Delaware coastal area. Emphasis on field and laboratory techniques applied to sedimentation processes, the classification of sediments and their structures and sediment facies patterns.
PREREQ: GEOL303
RESTRICTIONS: Course taught at Lewes

GEOL 434 The Geology of Coasts 3
Erosional, depositional and tectonic processes; morphology and classification, and geologic history of the coastal areas of the world.
PREREQ: GEOL303

GEOL 446 General Geochemistry 3
Chemical principles applied to geologic processes and environments. Thermochemistry of mineral equilibria; mineral stability at high temperature and pressure. Radiocarbon and methods of geochronology. The geochronology of the earth.
PREREQ: GEOL107 and CHEM103

GEOL 450 Preseminar in Environmental Science 3
See GEOG450 for course description

GEOL 451 Geophysical Field Methods 3
Applied course that investigates various methods of geophysical data collection in the field. Data sets to be gathered, reduced and analyzed include seismic reflection and refraction, gravity, magnetics and resistivity.
PREREQ: GEOL453 and GEOL454
COREQ: GEOL453 and GEOL454.

GEOL 452 Plate Tectonics and Geophysics 3
Study of the fundamental theory of plate tectonics including historical development, kinematics and the morphology and structure of the major types of plate boundaries. Examination of the structure and processes occurring within the earth’s interior.

GEOL 453 Elementary Geophysics I 3
PREREQ: MATH242, PHYS201 and PHYS202.

GEOL 454 Elementary Geophysics II 3
Gravity and the shape of the earth, and theories of isostasy. Geomagnetism, magnetization of rocks and paleomagnetism. Gravity and magnetic surveys and interpretations. Electrical and radioactive surveying and well logging.
PREREQ: MATH242, PHYS201 and PHYS202.

GEOL 460 Field Geology in the Western States 3-6
PREREQ: GEOL107, GEOL203 and GEOL304.
RESTRICTIONS: Three-and six-credit options require separate report.

GEOL 466 Independent Study 1-3

GEOL 501 Environmental Geology 3
PREREQ: GEOL107
RESTRICTIONS: Open only to environmental science graduate students.

GEOL 603 Regional Geology of North America 3
Stratigraphic, structural and petrologic features of the geologic provinces of North America. Generalized geologic evolution of each region. Major geologic features of other selected continents.

GEOL 607 Inorganic and Metamorphic Petrology 3

GEOL 609 Dynamic Processes in Sedimentation 3
Introduction to open channel hydraulics, wave theory and sediment transport. Origin and hydrodynamic interpretation of sedimentary structures and bedforms. Paleohydrology and digital simulation of sedimentary systems.

GEOL 610 Introduction to Groundwater Modeling 3
Principles of numerical modeling of groundwater flow and contaminant transport. Applications and limitations of commonly used computer models.
PREREQ: GEOL107 or GEOL428

GEOL 611 Quantitative Geomorphology 3
An analysis of geomorphic processes and landforms using a quantitative approach. Topics include fluvial processes and morphology, evolution and morphometry of drainage basins, slope development, coastal landforms and beach processes.

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.

GEOL 613 Fundamentals of Well Logging 3
Theory and interpretation of most commonly used geophysical logs; description of logging tools; their uses and limitations. Emphasis on groundwater exploration and well development; calculation and use of formation factor in determining water quality.

GEOL 614 Quaternary Geology and Geochronology 3
Survey of the stratigraphy and chronology of marine and terrestrial records and theories of climatic change. Studies of the stratigraphy of significant Quaternary successions throughout the world and their correlation and absolute dating.

GEOL 615 General Geomorphology 3
Description and classification of landforms, their relationships to geologic structures and processes, and their histories and rates of change.
GEOL 600 PETROLEUM GEOLOGY 3
The origin and distribution of the world's petroleum resources. Geological and geophysical techniques applied to the search for oil.

GEOL 621 ENVIRONMENTAL AND APPLIED GEOLOGY 3
The application of geologic principles to matters of environmental concern. Discussion, examples, techniques and case histories in water supply, waste disposal, zoning and land use, mining, legislation, regulation and professionalism emphasizing the role of the geologist and the educated citizen.

GEOL 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 632 RECENT SEDIMENTARY ENVIRONMENTS 3
Recent environments of deposition in the Delaware coastal area; emphasis on field and laboratory techniques applied to sedimentation processes, the classification of sediments and their structures, and sediment facies patterns. May be cross-listed with MAST625.

RESTRICTIONS: Course taught at levels.

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 STAT657 for course description.

GEOL 805 PETROLOGY OF SEDIMENTARY ROCKS 3
Genesis, classification, interpretation and significance of sedimentary rocks.

GEOL 806 MICROPALEONTOLOGY 3
Paleontology and paleoecology of major groups of microfossils with emphasis on Foraminifera and Ostracoda. Application of micropaleontology to stratigraphic problems, environmental analysis and paleoclimatic changes.

GEOL 811 STRATIGRAPHY 3
The nature of geologic time and its record; the interpretation of the time relationships of rock masses.

GEOL 812 GEODYNAMICS 1
Study of the dynamic processes within the earth, including studies in mountain building, rock mechanics and deformation, rifts, sedimentary basin formation, heat flow and mantle convection.

GEOL 813 PLATE TECTONICS 1
Study of the fundamental theory underlying modern geology and geophysics. Areas of interest addressed may include the historical development of plate tectonic theory, the kinematics and driving forces of plate motion and the geomorphology and structure of plate boundaries.

GEOL 814 GEOCHEMICAL STRATIGRAPHY 1
Studies in correlation and age assignment using chemical, elemental and isotopic analysis of sediments, rocks and fossils.

GEOL 815 HOLOCENE EPOCH GEOMORPHOLOGIES 1
Sedimentologic and stratigraphic principles applied to the determination of paleogeographies of historical and archaeological landscapes.

GEOL 816 ANALYTICAL MINERALOGY 1
Use of such techniques as TEM, XRD, SEM, microprobe, and computer modelling and refinement in current mineralogical research, with examples.

GEOL 817 IMPACT EVENTS AND STRATIGRAPHY 1
Impact cratering and shock metamorphism. Recognition of impact ejecta in the stratigraphic section based on shock metamorphic effects and geochemical anomalies. Possible correlations between major impact events and climatic changes, extinctions and geomagnetic reversals as recorded in the rock record.

GEOL 818 TOPICS IN PALEOBIOLOGY 1
Fields of active "cutting edge" research in paleobiology; topics vary according to instructor preference.

GEOL 819 TECTONIC FRAMEWORK OF NORTH AMERICA 1
Major theories of the evolution of North America, and examination of the evidence for and against them.

GEOL 820 TOPICS IN GEOMORPHOLOGY 1
Detailed analysis of the origin of specific landforms.

GEOL 821 GEOLOGY AND PUBLIC POLICY 1
Roles of geology and geologists in matters of public policy. Case histories and current events illustrating interactions of science and government.

GEOL 831 TECTONICS OF THE WORLD'S OCEAN BASINS 3
Geologic evolution of the ocean basins; study of the geophysical parameters, dimension and processes of mid-ocean ridges, deep-sea trenches and continental margins; and deduction as to origin of ocean basin features.

GEOL 832 COASTAL SEMINAR 1
Analysis of modern concepts of coastal research and their applications to studies of the evolution of coastal sedimentary environmental systems.

GEOL 868 RESEARCH 1-9
Enables students to begin planning work and research before admission to dissertation candidacy and GEO699.

GEOL 869 MASTER'S THESIS 1-6

GEOL 872 ADVANCED MICROPALEONTOLOGY 3
Taxonomy, morphology and biostratigraphy of selected phyla of microfossils. PRE REQ: GEO686.

GEOL 964 PRE-CANDIDACY STUDY 3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examination 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
GRMN 107 GERMAN III - INTERMEDIATE 4
Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty.
PREREQ: GRMN106
RESTRICTIONS: Four years of high school German acceptable in lieu of prerequisite.
Satisfies Arts and Science foreign language requirement.

GRMN 111 INTERMEDIATE GERMAN I 3
Review of grammar. Increasing mastery of the basic skills of speaking, listening, reading and writing.
PREREQ: GRMN102 or GRMN106
RESTRICTIONS: Three years of high school German acceptable in lieu of prerequisite.

GRMN 112 INTERMEDIATE GERMAN II 3
Continued practice in speaking and writing, reading texts of average difficulty, grammar review as needed.
PREREQ: GRMN111
RESTRICTIONS: Four years of high school German acceptable in lieu of prerequisite.
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.
PREREQ: GRMN102
RESTRICTIONS: Not intended for students who have already taken a 300 or 400 level course in German.

GRMN 205 GERMAN CONVERSATION 3
Practical use of German by means of oral reports and discussions. Emphasis on improvement of basic conversational skills. Grammar review where appropriate, and/or some written work.
PREREQ: GRMN107 or one 200 level German course.
RESTRICTIONS: Prerequisites require minimum grade of B. Not intended for students who have already taken a 300 or 400 level course in German.

GRMN 206 CULTURE THROUGH CONVERSATION 3
Discussion of topics drawn from contemporary German life. Designed for students who wish to broaden their knowledge of German culture while improving their oral and aural language skills.
PREREQ: GRMN107

GRMN 207 CONTEMPORARY AUSTRIA I 3
An introduction to contemporary Austria, its culture, its people, their way of life and the issues facing them.
RESTRICTIONS: Taught abroad only, in both English and German. Not for major credit. Does not satisfy foreign language requirement.

GRMN 208 CONTEMPORARY GERMANY I 3
An introduction to contemporary Germany, its culture, its people, their way of life and the issues facing 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 COMPOSITIONS: SHORT FICTION 3
Reading and discussion of 20th-century German short stories and novellas. Several short compositions. Grammar review where appropriate.
PREREQ: GRMN200, GRMN205 or GRMN206
RESTRICTIONS: Not intended for students who have already taken a 300 or 400 level course in German.

GRMN 212 GERMAN READING AND COMPOSITIONS: DRAMA 3
Reading and discussion of some major 20th-century German plays. Several short compositions. Grammar review where appropriate.
PREREQ: GRMN200, GRMN205 or GRMN206.
RESTRICTIONS: Not intended for students who have already taken a 300 or 400 level course in German.

GRMN 240 GERMAN CULTURE AND TECHNOLOGY 3
Introduction to the language and conventions of technology, including a survey of the history, organization and social context of science and technology in Germany.
PREREQ: GRMN107.

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: GRMN107.

GRMN 255 GERMAN POLITICS IN THE PRESS 3
Explores topics in contemporary German politics as expressed in the news media. Emphasis on current events related to the internal and external politics of Germany. Focus 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 GRMN200, GRMN205, GRMN206, GRMN211, GRMN212 or GRMN250.

GRMN 306 PRACTICAL ORAL/Written EXPRESSION 3
Strengthens grammar and vocabulary skills in preparation for advanced courses. Class exercises include oral exposés, 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, prose and drama from the 18th to the mid-19th century.
PREREQ: GRMN211 or GRMN212.

GRMN 312 INTRODUCTION TO GERMAN LITERATURE II 3
Masterpieces of poetry, prose and drama from the mid-19th century to the present.
PREREQ: GRMN211 or GRMN212.

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: GRMN211 or GRMN212.

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: GRMN211 or GRMN212.
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: GRMN211 or GRMN212.
RESTRICTIONS: May be repeated for credit when topics vary.

GRMN 366 INDEPENDENT STUDY 1-3

GRMN 403 HISTORY OF THE GERMAN LANGUAGE 3
Evolution of the German language from its Indo-European origins through Old and Middle High German. Phonology, morphology and syntax, illustrated through selected texts.
PREREQ: Any two 300-level German courses.

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, Droste-Huelshoff, Grillparzer, Hebbel, Keller, Siller, Storm and Nietzsche] from the end of Romanticism to Naturalism.
PREREQ: Any two 300-level German courses.

GRMN 442 FROM NATURALISM TO EXPRESSIONISM 3
Major literary currents from the 1880's to the 1920's. The drama from Hauptmann to Kaisen; the poetry of Hofmannthal, Rilke, Losker-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.
PREREQ: IFST 270 and EDST 230

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: FST 270 and EDST 230

HUMAN RESOURCES, EDUCATION AND PUBLIC POLICY

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 TO 1648 3
Principal political, economic, cultural and social developments in world history from origins to 1648, relating the past to the present. Course gives equal weight to the history of Asia, Africa, the Americas and Europe.

HIST 104 WORLD HISTORY: 1648 TO THE PRESENT 3
Principal political, social, economic and cultural developments in world history from 1648 to the present, relating the past to the present. Course gives equal weight to the history of Asia, Africa, the Americas and Europe.

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

HIST 131 ISLAMIC NEAR EAST: 1500-PRESENT 3
Considers the traditional make-up of the Middle East and charts the emergence of the region in its present form through the sixteenth and twentieth centuries.

HIST 132 HISTORY OF AFRICA 3
Introductory course on African history south of the Sahara, from the earliest times to 1914. Introduces major themes in African history: pre-colonial African political, social and economic institutions; slavery and African organizations; slave trade and colonialism. May be cross-listed with BAMS 134.

HIST 133 INTRODUCTION TO LATIN AMERICAN HISTORY 3
Introduction to Latin American history from the preconquest period to the present.

HIST 134 HISTORY OF AFRICA 3
Introductory survey of African history south of the Sahara, from the earliest times to 1914. Introduces major themes in African history: pre-colonial African political, social and economic institutions; diversity in African political organizations; slave trade and colonialism. May be cross-listed with BAMS 134.

HIST 135 EAST ASIAN CIVILIZATIONS: CHINA 3
A survey of major aspects of Chinese civilization, relating the past to the present.

HIST 136 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 1665. Themes and approach vary with the instructor.

HIST 210 WAR AND SOCIETY 3
Relationship between warfare, with its constantly mutating technology, and social change. Survey from replacement of the professional by the mass army to the contemporary substitution of machinery for soldiers.

HIST 216 INTRODUCTION TO MATERIAL CULTURE STUDIES 3
See ANTH 316 for course description.

HIST 220 THE AMERICAN CIVIL RIGHTS MOVEMENT 3
This is a team-taught, interdisciplinary, large-enrollment course on the history of the American Civil Rights Movement. In addition to dealing with the crucial years from about 1954 to 1970, the course goes backward and forward into the larger history of American race relations. May be cross-listed with BAMS 220.

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 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. Stress 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, ghettos and camp life, the Einsatzgruppen, resistance, the politics of rescue and the art and literature of the Holocaust. May be cross-listed with JWST 254.
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.

The development of principal patterns of American religious, social and scientific thought over the course of American history.

The lives of American people in their everyday surroundings from settlement through the civil war.

An examination of current events within the context of historical forces.

The development of principal patterns of American religious, social and scientific thought before 1865.

The development of principal patterns of American religious, social and scientific thought after 1865.

Study of how images have shaped attitudes toward race and ethnicity in American culture from the colonial era to the present. Visual materials include works of fine art, folk art, photographs, cartoons, motion pictures and popular literature. May be cross-listed with WOMS293.

Study of the Constitutional Convention, its goals, compromises and opponents. Explores the political discussion over ratification of the Constitution, the continued presence of unresolved economic and social crises, and the rise of an opposition to the Federalists from the ranks of American society.

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.

Study of the lives of American workers in their everyday surroundings from settlement through the early stages of industrialization. Focus on the impact of American industrialization: rise of the factory system, emergence of an industrial work force, role of cities and immigrants, westward migration, transformation from slavery to freedom in the south, reform movements, family life and population change, and social and political conflict.

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, transformation from slavery to freedom in the south, reform movements, family life and population change, and social and political conflict.

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

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

Review of native societies from the colonial era to the present. May be cross-listed with WAMS331.
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 burial practices 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 partici-
pant; use of ancient authors in translation, artistic representations and secondary litera-
ture. 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, com-
plemented by visits to museums and appropriate historic sites.
RESTRICTIONS: Taught abroad only.

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.

HIST 345 EUROPE IN THE REFORMATION ERA: 1517-1648 3
Religion in the realms of thought and action during the rise of "modern" Western civiliza-
tion: the scientific revolution, the Reformation, the Counter-Reformation and their impact
on the behavior and perceptions of men by 1650.

HIST 346 AGE OF LOUIS XIV 3
The culture, society and politics of 17th-century France, centered upon the biography of
Louis XIV. Emphasis on growth of absolute monarchy in France and the implications for
all of Europe.

HIST 347 THE FRENCH REVOLUTION AND NAPOLEON 3
Emphasis on personalities in the Revolution - Louis XIV, Robespierre and Napoleon - and
the clash of social forces.

HIST 348 HISTORY OF SPAIN: 1479-PRESENT 3
History of Spain from the unification of the crowns of Aragon and Castile in 1479 to the
present. Emphasis on the rise and decline of the Spanish empire, expansion into the
New World, and the obstacles for political, social and economic modernization since 1715.

HIST 349 HISPANIC SOCIETIES: 1492-PRESENT 3
A comparative social history of the Hispanic world. Topics include the social and cultural
developments in Medieval and Renaissance Spain, the formation of Latin American colo-
nial society, and the struggle for modernization in contemporary Spain and Latin America.

HIST 350 EUROPE IN THE NINETEENTH CENTURY 3
History of European civilization from the end of the Napoleonic wars to World War I.
Topics include Romanticism and realism; the Industrial Revolution; the clash of religion
and science; the development of nationalism, socialism and imperialism; and the coming
of World War I.

HIST 351 EUROPE IN CRISES: 1919-1945 3
Europe from the Paris Peace Conference to the end of World War II, with emphasis on the
breakdown of traditional institutions in an age of totalitarianism, economic depre-
sion and world conflict.

HIST 352 CONTEMPORARY EUROPEAN SOCIETY 3
A comprehensive survey and analysis of the evolution and structure of postwar society,
with particular emphasis on current social and cultural developments.
RESTRICTIONS: When taught abroad, course focuses on the host country.

HIST 353 MODERN GERMANY: 1770-1919 3
German political, socioeconomic, and cultural history from 1770 to the end of the First
World War.

HIST 354 GERMANY IN THE TWENTIETH CENTURY: 1914 TO PRESENT 3
German political, socioeconomic and cultural history from Bismarck to Hitler.

HIST 355 EARLY MODERN INTELLECTUAL HISTORY 3
Examines the major development in thought from around 1600 to 1800. Questions con-
sidered are the nature of political order and justice, the character of the good life and
morality, the relation between faith and reason, and the development of histori-
ical reason and theories of the fine arts. Readings will be in Milton, Locke, Voltaire,
Rousseau and others.

HIST 356 MODERN EUROPEAN INTELLECTUAL HISTORY 3
Philosophical and political thought from English Romanticism and German Classicism
through Existentialism. Reading from Hegel, Marx, Kierkegaard, Nietzsche and Thomas
Mann.

HIST 357 RUSSIAN HISTORY TO 1801 3
Political, socioeconomic and cultural developments in Russia to 1801. Russian trends and
developments.

HIST 358 RUSSIAN HISTORY: 1801-1917 3
Political, socioeconomic and cultural developments in Russia in the 19th century.

HIST 359 SOVIET RUSSIA: 1917-1990 3
Political, socioeconomic and cultural developments in the Soviet Union from 1917 to
1990.

HIST 360 HUMANITIES COLLOQUIUM 3
See ARSC 360 for course description.

HIST 361 EUROPEAN BUSINESS HISTORY: 1850-PRESENT 3
Topics include the rise of the modern corporation; the relationships between business
and government and business and labor; the role of business overseas, including the
colonies and the present Third World; and comparison with the way business has oper-
ated in America, Japan and the Soviet Union.

HIST 366 INDEPENDENT STUDY 1-6

HIST 368 MODERN CHINA 1600-1920S 3
The history of China from the rise of the Manchus to the collapse of their dynasty and the
decadence of the republic. Topics include the reform tradition, Opium War and imperial-
ism, modernization, the rise of modern Chinese nationalism, and revolution.
RESTRICTIONS: Not open to freshmen.

HIST 369 CHINA SINCE 1900 3
History of China from the fall of the last dynasty to present. Topics include the collapse
of the ancient regime, the Republican revolution, warlordism and imperialism, rise of mod-
ern nationalism, Chiang Kai-shek and Mao Zedong, post-1949 China and the Deng
Xiaoping era.
RESTRICTIONS: Not open to freshmen.

HIST 370 HISTORY OF MODERN JAPAN 3
History of Japan from 1600 to 1952 with special emphasis on domestic forces of
change, impact of the West, Japanese imperialism and militarism, the dilemma of
change and Japan's place in the modern world.

HIST 371 POSTWAR JAPAN 3
Traces the emergence of contemporary Japan in its cultural and social spheres. Emphasis
is on analysis of the historical significance of postwar Japanese culture. Our investiga-
tions explore everyday life as depicted in literature, film, journalism, memoirs and histori-
cal writings.

HIST 372 POPULAR CULTURE IN URBAN JAPAN 3
Explores the theory and practice of popular culture as manifested in the history of urban
Japan from the seventeenth to the twenty-first century. Topics include entertainments,
sports, mass media, tourism, fashion, consumerism, sex and gender. Discussion format,
with intensive reading and writing.
RESTRICTIONS: Not open to first year students.

HIST 373 MODERN IRELAND: 1534-PRESENT 3
Anglo-Irish relations, the emergence and victory of Irish nationalism and the historical
roots and subsequent development of the Ulster problem.

HIST 374 HISTORY OF ENGLAND TO 1715 3
Political, constitutional, social and economic development to 1715.

HIST 375 HISTORY OF ENGLAND: 1715 TO THE PRESENT 3
Rise and decline of a global power; the transformation of an oligarchy into a democra-
cy, and the consequences of industrialization and urbanization.

HIST 376 ENGLISH LEGAL AND CONSTITUTIONAL HISTORY 3
Surveys the history of English legal and constitutional development from the Saxons to
the ancient regime, the Republican revolution, warlordism and imperialism, rise of mod-
en nationalism, Chiang Kai-shek and Mao Zedong, post-1949 China and the Deng
Xiaoping era.

HIST 377 RADICALISM AND REVOLUTION: ISLAMIC MOVEMENT/ MODERN MIDDLE EAST 3
Addresses the background, historical development and present state of Islamic funda-
mentalist movements.
HIST 378 NATIONALISM IN THE MODERN MIDDLE EAST 3
This course focuses on the ideology of nationalism in an attempt to explain the emergence of the modern countries in the Middle East.

HIST 379 HISTORICAL ARCHAEOLOGY OF THE EASTERN UNITED STATES 3
See ANTH379 for course description.

HIST 380 HISTORY OF THE ARAB-ISRAELI CONFLICT 3
Explores the roots and the historical complexity of the Arab-Israeli conflict. Topics include: the origins of Zionism, the nature of traditional Arab/Ottoman society in the 19th century, the relationship between the early Zionists and indigenous Arab populations of Palestine, the creation of a Jewish society, the rise of Palestinian nationalism, and the protracted search for coexistence between Jews and Arabs.

HIST 381 UTOPIAS 3
A critical examination of man's perennial interest in shaping the ideal society and forecasting events to come.

HIST 382 HISTORY OF WESTERN MEDICINE 3
See CSCC382 for course description.

HIST 383 HISTORY OF SCIENCE AND MEDICINE I 3
The maturation of scientific ideas and methodology from prehistoric times to the Renaissance and their application in medicine and technology.

HIST 384 HISTORY OF SCIENCE AND MEDICINE II 3
Development of science and medicine from the scientific revolution to the mid-20th century.

HIST 385 HISTORY OF BIOLOGICAL IDEAS 3
See CSCC385 for course description.

HIST 387 TECHNOLOGY IN WESTERN CIVILIZATION I 3
Examines the religious, aesthetic, military, political and economic origins of Western technology from prehistoric times to the Renaissance. Emphasis on the agricultural and urban revolutions, metallurgical discoveries, Greek and Roman engineering, diffusion of technology and the role of the Medieval Church.

HIST 388 TECHNOLOGY IN WESTERN CIVILIZATION II 3
Examines technology and society from the Renaissance to 1950. Emphasis on Renaissance engineering; the Industrial Revolution in England, Germany and the United States; the role of modern warfare in technological development; and the rise of a technical elite in society.

HIST 389 AMERICAN TECHNOLOGY 3
The development of American technology and industry from the discovery of America to the present.

HIST 390 HISTORY OF MODERN SOUTHEAST ASIA 3
Covers major social, cultural, political, economic and military developments in Southeast Asian history from approximately 1500 to the present, including ethnic groups, traditional civilizations, colonization, nationalism and communism, impact of the Pacific War, the "Vietnam Conflict," the Kampuchean Crisis and recent developments.

HIST 393 HISTORY OF MODERN VIETNAM 3
Covers major social, cultural, political, economic and military developments in Vietnamese history from approximately 1500 to the present, including traditional civilization, colonization, nationalism and communism, the Indochina Wars (among them the "Vietnam Conflict"), the Kampuchean Crisis, and life under the Socialist Republic of Vietnam since 1976.

HIST 394 AFRICA SINCE 1960 3
Deals with current political, economic and social problems and progress found in Africa. Historical analysis of the emergence and development of these problems, issues and achievements. Links the present to the past for factual historical analysis.

HIST 395 PAN AFRICANISM 3
Traces the rise, development and varied expressions of the drive towards the liberation and unity of black people on the continent (Africa) and in the diaspora. Covers liberation struggles in Africa and the Civil Rights movement in the United States. May be cross-listed with BAM5395.

HIST 397 HISTORY OF SOUTH AFRICA 3
Surveys the complex historical development of the South African society. Topics include African resistance to white expansion, wars of resistance, the impact of agricultural and labor laws on African societies, tensions in white society, Africaners in power since 1948, and African struggles for freedom.

HIST 398 FILM AND MODERN AMERICAN CULTURE 3
See ENGL398 for course description.

HIST 403 HISTORY, PHILOSOPHY, FUNCTIONS AND FUTURE OF MUSEUMS 3
See MSTM403 for course description.

HIST 411 SEMINAR IN AMERICAN HISTORY 3
Topics vary. May include topics such as "History of the West," "History of the South," or "Ethnicity in American History.

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 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 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 ANTH4454.

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 464 FIELDWORK IN HISTORY 3
Selected students serve as interns on a few carefully chosen historical projects with organizations outside the University.

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 vary. Topic 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 topics such as "The Holocaust," "The Cold War" or "Hitler's Germany." 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 481 SEMINAR IN MILITARY HISTORY 3
Selected topics in military history. Civil-military relations, the interrelationship of strategy and politics, the development of strategic theory, the impact of new weapons on military institutions.

HIST 489 SEMINAR IN COMPARATIVE HISTORY 3
Topics vary, but all compare some aspect of American or European history or Western 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 experience.

HIST 601 UNITED STATES HISTORIOGRAPHY 3
Introduces changing interpretations of United States history and examines the development of the American historical profession.
HIST 602 European Historiography 3
Introduces changing interpretations of various aspects of European history.

HIST 603 Historiography of Technology 3
Introduces major historiographic issues and examines the development of this subfield of history.

HIST 604 History and Philosophy 3
Survey of major historians from the Bible and Herodotus through the 19th century, together with some of the most influential philosophers of history.

HIST 605 History of Theories in Material Culture 3
See EAMC605 for course description.

HIST 606 Issues in American Material Culture 3
See EAMC606 for course description.

HIST 607 Readings in American Material Life 3
Readings in monograph and serial publications pertaining to American Material Life. Topics include landscape, architecture, work, department, family and religion. Emphasis is on recent literature. Discussion and interpretation of authors’ arguments. Review of material life historiography. Emphasis on broad synthesis of material culture literature. May be cross-listed with MSTS607.

HIST 611 Seminar in American History 3
Topics vary. May include topics such as “History of the West,” “History of the South” or “Ethnicity in American History.”

HIST 614 The American Suburb 3
See UAPP614 for course description.

HIST 616 The American Family 1608-1900 3
Seminar on the changing shape and function of the American family and its relationship to Old World structure.

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 but also the social and cultural history of that period.

HIST 625 U.S. Social and Cultural History: 1700-1860 3
Reading seminar on social and cultural changes 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 on social and cultural developments in the United States in the period during which it became a mature industrial nation, from 1850-1929.

HIST 630 Twentieth-Century Latin American Revolutions 3
Examines revolutionary change and obstacles to revolutionary change in Latin America. External and internal processes 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: 1860-Present 3
Reading seminar on major works of interpretation that illustrate the changing modes by which historians have viewed American political, economic and cultural past from the Civil War to 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 UAPP634 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 641 Technology and Civilization I 3
The religious, aesthetic, military, political and economic origins of Western technology from prehistoric times to the Renaissance and the interplay of technology and culture.

HIST 642 Technology and Civilization II 3
Technology and society from the Renaissance to 1950. An exploration of the impact of technology on culture while at the same time examining how culture shapes technology.

HIST 643 History of Science and Medicine 3
Scientific thought and practice from antiquity to 1620, with emphasis on relation of science to the cultures in which it is pursued: Egypt and Mesopotamia, Greece and Rome, the Islamic countries, the Middle Ages in Europe and the Renaissance.

HIST 644 History of Science and Medicine 3
Science in the West 1620-1950, beginning with the Scientific Revolution. The ties of science to culture, particularly technology, medicine and institutional configurations. Development of the major biological and physical sciences.

HIST 645 Things in History 3
The world of things made by humans forms the basis for a seminar in the historical interpretation of artifacts. Each session of the class devoted to the handling, use, analysis and interpretation of a representative artifact.

HIST 646 Industrial Revolution of Europe 3
The origins and spread of rapid, sustained economic growth since 1750.

HIST 647 Social History of Medicine 3
The relationships of medicine and its allied health sciences to social and political issues in the West over the last two hundred years.

HIST 648 American Science and Technology 3
The development of science and technology in America, from the Colonial Period to the 1950’s.

HIST 649 Studies in Science, Technology and Medicine 3
Topics vary. May include topics such as “The American System,” “History of Chemistry” or “History of Engineering.”

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 653 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 654 Vernacular Architecture
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 658 Historical Editing 3
Background and principles of historical editing with emphasis on student projects in primary source material.

HIST 659 United States Urban History 3
The process of urbanization in America with special emphasis on the Philadelphia-Wilmington area.

HIST 660 Humanities Colloquium 3

HIST 663 Historical Archaeology and the Public 3
See ANTH663 for course description.

HIST 671 Studies in Medieval History 3
Topics vary. Topics may include: Europe in the 10th Century, Europe in the 11th Century, and Women in Europe to 1600.

HIST 673 Studies in Early Modern European History 3
Topics vary. May include such topics as “Renaissance Humanism,” “Women in Europe, 1100-1600” or “Rome and Religion.”

HIST 674 Studies in English History 3

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HIST 675 SEMINAR IN MODERN EUROPEAN HISTORY 3
Topics vary, May include topics such as "The Holocaust," "The Cold War" or "Hitler's Germany."

HIST 677 STUDIES IN LATIN AMERICAN HISTORY 3
Topics may include history of Mexico, history of the Caribbean or slavery in the New World. Topics will vary.

HIST 679 STUDIES IN ASIAN HISTORY 3
Topics vary. May include topics such as "History of Southeast Asia," "20th-Century China" or "Japan in the 20th Century."

HIST 681 STUDIES IN MILITARY HISTORY 3
Selected topics in military history. Civil-military relations, the interrelationship of strategy and politics, the development of strategic theories and the impact of new weapons on military institutions.

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 MIST 804 for course description.

HIST 805 RESEARCH AND WRITING SEMINAR: AMERICA 1860-PRESENT 3
Original research and writing on subjects in American history after 1860. Evaluation of sources, interpretation of evidence and presentation of research papers. Emphasis on professional standards of criticism.

HIST 806 RESEARCH AND WRITING SEMINAR: HAGLEY MUSEUM AND ARCHIVES 3
Original research and writing on a variety of subjects based on research materials available at the Hagley Museum and Library. Evaluation of sources, interpretation of evidence and presentation of research papers. Emphasis on professional standards of criticism.

HIST 809 RESEARCH AND WRITING SEMINAR: STUDIES IN COMPARATIVE HISTORY 3
Topics vary, but all compare some aspect of American with European history or Western with non-Western history.

HIST 868 RESEARCH 1-9 PF

HIST 869 MASTER'S THESIS 1-6

HIST 964 PRE-CANDIDACY STUDY 1-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.

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

HIST 969 DOCTORAL DISSERTATION 1-12 PF

HEALTH, PHYSICAL EDUCATION AND RECREATION

HPER 105 FOUNDATIONS OF RECREATION AND LEISURE STUDY 3
Study of the history, theory and philosophy of recreation and leisure services. Nature of the play experience, influence of leisure on society and a survey of the range of leisure services in the public, private, voluntary, military and commercial sectors.

HPER 120 PHYSICAL EDUCATION 1
Introduces knowledge and skills in physical activity. The program is geared toward life sports and allows for selection.

HPER 121 WATER SAFETY INSTRUCTION 2
Prepares students with the skills and knowledge to teach people to swim and be safe in and around water. Topics covered: basic water safety, swimmer strokes, advanced lifesaving skills, first aid, artificial resuscitation, teaching techniques, lesson plans, unit plans and practical teaching experience.

RESTRICTIONS: Requires current Red Cross Advanced Lifesaving Certificate.

HPER 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 effective leadership skills.

RESTRICTIONS: Requires aerobic dance experience and permission of instructor.

HPER 132 SCUBA 2
Prepares students with the skills and knowledge necessary to continue their training for open water Scuba certification.

HPER 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 physical education majors.

HPER 138 LIFEGUARD TRAINING INSTRUCTOR 2

RESTRICTIONS: Current certification in First Aid, CPR and Lifeguard Training.

HPER 140 FUNDAMENTAL SKILLS ANALYSIS 2
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. Health and Physical Education majors only.

HPER 141 SKILLS, TECHNIQUES AND KNOWLEDGE OF OUTDOOR EDUCATION AND FLAG FOOTBALL 1
Provides the opportunity to develop skill and techniques, learn methods and acquire knowledge of designated outdoor recreation skills and flag football. Emphasis on developing readiness for presenting such activities in group settings.

HPER 142 SKILLS, TECHNIQUES AND KNOWLEDGE OF BEGINNING SWIMMING/DIVING 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.

RESTRICTIONS: Open to majors only in Spring and Fall.

HPER 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, covering skills and knowledge in gymnastics activities including the balance beam, uneven bars, vaulting horse, tumbling, parallel bars and rings.

HPER 144 SKILLS, TECHNIQUES AND KNOWLEDGE OF VOLLEYBALL AND SELF DEFENSE 1
Provides the opportunity to develop skills and learn methods and techniques. Emphasis on developing readiness for presenting such activities in public school settings.

RESTRICTIONS: Open to majors only.

HPER 150 MOVEMENT EDUCATION FOR CHILDREN 3
Introduction to the elements of movement, understanding and appreciation of basic movement as it applies to skillful use and development of the individual's body. Provides the opportunity for individual and group creativity.

RESTRICTIONS: Open to majors only in Fall and Spring.

HPER 164 PRACTICUM IN RECREATION AND PARKS 3 PF
Offers an opportunity to gain initial experience with a leisure service agency. Much of the laboratory time devoted to observing and/or assisting in leisure programs, and visiting other leisure service agencies.

RESTRICTIONS: For freshmen or sophomores.

HPER 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.

HPER 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 PEH, PES and RPAD majors only.
HPER 214  WEILNESS: A WAY OF LIFE  
Principles of personal and public health including present and future problems of environmental control. Includes health services, health education and healthy school environment.
RESTRICTIONS: Open to majors only in Fall

HPER 215  OBSERVATION AND ASSISTING IN SCHOOL  
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.

HPER 216  PRACTICUM IN TEACHING  
Practical teaching experience. Student is assigned to lifetime sports activity courses and assists in conducting the course.
RESTRICTIONS: Requires permission of department.

HPER 220  ANATOMY AND PHYSIOLOGY  
Structure and function of the human body: skeletal, muscular, circulatory, respiratory, nervous, endocrine, digestive and urinary systems. A foundation course for all areas of physical education and athletics.
RESTRICTIONS: Open to majors only.

HPER 225  OFFICIATING RECREATIONAL SPORTS  
Theory and practice of officiating recreational sports. Introductory as a lifetime activity, emphasis is placed on practical experience with the intramural program. Minimal classroom time. Offered excellent leadership training.
RESTRICTIONS: Meets one half of a semester. Spring sports: basketball and softball.

HPER 235  PROFESSIONAL TRANSITIONS  
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.

HPER 242  SKILLS, TECHNIQUES AND KNOWLEDGE OF LACROSSE AND FIELD HOCKEY  
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.
RESTRICTIONS: Open to PEH and PES majors only.

HPER 243  SKILLS, TECHNIQUES AND KNOWLEDGE OF SOFTBALL AND TRACK AND FIELD  
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.
RESTRICTIONS: Open to HPE and PES majors only.

HPER 244  SKILLS, TECHNIQUES AND KNOWLEDGE OF SOCCER AND BASKETBALL  
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.
RESTRICTIONS: Open to majors only.

HPER 245  INTRODUCTION TO COMMERCIAL RECREATION SERVICES  
Focuses on the establishment, organization, management and marketing of various commercial recreation services. Areas addressed include travel and tourism, entertainment services, leisure services in the outdoor environment, hospitality/food services and retail outlets.

HPER 246  TECHNIQUES FOR MEN’S LACROSSE  
Practical experience in advanced techniques and strategies of men’s lacrosse.
RESTRICTIONS: Offered in Winter only.

HPER 247  TECHNIQUES FOR WOMEN’S LACROSSE  
Practical experience in advanced techniques and strategies of women’s lacrosse.
RESTRICTIONS: Offered in Winter only.

HPER 250  MOTOR DEVELOPMENT  
RESTRICTIONS: Open to HPE majors only.

HPER 251  SKILLS, TECHNIQUES AND KNOWLEDGE OF RHYTHMS AND DANCE  
Preparation of physical education teachers. Provides the opportunity to develop skills, learn methods and techniques and acquire knowledge of the above activities. Emphasis on developing readiness for presenting such activities in public school settings.

HPER 252  SKILLS, TECHNIQUES AND KNOWLEDGE OF ARCHERY, GOLF, AND BOWLING  
Provides the opportunity to develop skills and learn methods and techniques. Emphasis on developing readiness for presenting such activities in public school settings.
RESTRICTIONS: Open to HPE and PES majors only.

HPER 253  SKILLS, TECHNIQUES AND KNOWLEDGE OF PHYSICAL CONDITIONING  
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.
RESTRICTIONS: Open to majors only.

HPER 254  SKILLS, TECHNIQUES AND KNOWLEDGE OF GYMNASTICS II  
An advanced level course in skills, techniques and knowledge of apparatus and tumbling.
PREREQ: HPER 143.

HPER 255  SKILLS, TECHNIQUES AND KNOWLEDGE OF RACQUET SPORTS  
Preparation of physical education teachers. Provides opportunity to develop skills, learn methods and techniques and acquire knowledge of racquetball, tennis, badminton and pickleball. Emphasis on developing readiness for presenting such activities in public school settings.

HPER 256  TAPING TECHNIQUES  
Learn accepted and approved taping/wrapping and splinting techniques which are NATA certified and accepted as standard measured by First Aid and CPR requirements.

HPER 260  LEISURE SERVICE PROGRAMMING  
An understanding of the program fields in relation to programming principles, objectives, structural organization and program evaluation. Purposes and values of a comprehensive range of recreation offerings and considerations necessary to provide a broad range of activities to all segments of the population.
PREREQ: HPER 105 and HPER 270.
RESTRICTIONS: Open to RPAD majors only.

HPER 263  LEADERSHIP PRACTICUM  
Students work under the auspices of an appointed professional to develop leadership skills in fitness activities.

HPER 265  PROGRAM AND LEADERSHIP FOR FITNESS MANAGEMENT  
Provides an understanding of the systems approach to programming including objectives, planning, implementation and evaluation. Application of these principles to the fitness profession with special reference to the principles and practices of leadership roles.

HPER 270  RECREATION LEADERSHIP  
An understanding of the dynamics of group interaction and the theories, principles and practices of leadership. Review of research in leadership and group dynamics. Study of and practical experience with techniques and methods working with individuals and groups in the recreation setting. Includes 15 hours of approved practical experience.
PREREQ: HPER 105.
RESTRICTIONS: Open to RPAD majors only.

HPER 276  PERSONAL COMPUTERS IN HEALTH, PHYSICAL EDUCATION AND RECREATION  
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.

HPER 300  ISSUES IN PHYSICAL ACTIVITY STUDIES AND SPORTS  
Compares professional issues and social forces to various philosophic systems. Examines personal beliefs, values and assumptions for the purpose of developing and/or refining a professional philosophy and a professional plan of action.
RESTRICTIONS: Open to junior and senior HPE and PES majors only.

HPER 305  FUNDAMENTALS OF ATHLETIC TRAINING  
The organization and administration of an athletic training program and the prevention, diagnosis and treatment of athletic injuries, including physical therapy, taping and training room. First aid, safety measures and prevention of injuries.
PREREQ: HPER 220.

HPER 314  METHODS AND MATERIALS IN HEALTH EDUCATION  
Focuses on health education in the school curriculum. Curriculum content and organization of materials for instructional purposes represents the primary thrust.
PREREQ: HPER 315 and HPER 325.
RESTRICTIONS: Junior status, upper division clearance, minimum GPA of 2.50, major index of 2.75 and completion of all skill courses.

HPER 315  METHODS AND MATERIALS IN DRUG EDUCATION  
Prepares 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: HPER 214.

HPER 318  SPECIAL RECREATION  
Emphasis on the delivery and value of special recreation participation opportunities for members of special population groups, and particularly by persons with disabilities.
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.

RESTRICTIONS: Open to majors only

HPER 320 PRINCIPLES OF STRENGTH/CONDITIONING
Addresses scientific basis of strength and conditioning based on principles related to biomechanics, exercise physiology, injury prevention techniques and anatomy. Emphasis on program design, energy systems, advanced lifting techniques, nutrition, plyometrics, ergogenic aids and effects of strength training on the cardiovascular system.

RESTRICTIONS: Open to physical education majors

HPER 321 ADVANCED PRINCIPLES OF STRENGTH AND CONDITIONING
Provides greater scope and depth of strength and conditioning principles than the prerequisite. Concentrates more on the physiological, neutral and biomechanical principles as applied to strength and conditioning. The lab affords hands-on experience and extensive breakdown of basic and advanced weight training techniques.

RESTRICTIONS: Must be in the strength and conditioning concentration. Requires junior status

HPER 322 WEIGHT ROOM SAFETY AND DESIGN
Provides students with a background in both weight room safety (conduct, rules, regulations) and weight room design (custom-built, multi-station, size, spacing, budget).

RESTRICTIONS: Must be in strength and conditioning concentration. Requires junior status

HPER 323 THEORIES AND APPLICATION OF PROGRAM DESIGN
Provides theoretical principles in developing strength and conditioning programs based on physical, physiological and neutral concerns. These programs are individual in design and entail detailed calculations of volume, intensity and tonnage.

RESTRICTIONS: Must be in strength and conditioning concentration. Requires junior status

HPER 324 MEASUREMENT AND EVALUATION
Measurement and evaluation of physical skills and knowledge as related to physical education. Includes descriptive statistics, knowledge tests, grading, physical performance tests and tests of sports skills.

RESTRICTIONS: Open to HPE and PES majors only

HPER 325 HUMAN SEXUALITY: METHODS AND MATERIALS
Designed to develop content knowledge and present teaching methodologies relative to all facets of human sexuality. Emphasis will be on the process of integrating information into effective age-specific educational strategies.

RESTRICTIONS: Physical Education and Health majors or permission of instructor

HPER 330 MENTAL HEALTH
Explores variety of ways to promote positive mental health. Development of self-esteem, stress management techniques, personality and emotional development. Grieving process, conflict resolution and communication skills, and mental illnesses will be addressed.

RESTRICTIONS: Open to HPE majors only

HPER 332 HEALTH BEHAVIOR THEORY AND ASSESSMENT
Provides and understanding and application of health behavior theory to program development and evaluation. Emphasis is also placed on skills and competencies necessary for programming and evaluation including needs assessment, research, communication and team process.

RESTRICTIONS: Must be in the Fitness Management Concentration

HPER 341 PRINCIPLES OF OUTDOOR RECREATION
Presents an orientation to the field of outdoor recreation. Attention given to heritage, trends, resources, economics, management approaches, ecological and educational goals and ethics toward an outdoor natural environment. Laboratory section involves participation and skill development in a variety of outdoor recreation activities.

RESTRICTIONS: Open to HPE and PES majors only

HPER 342 SURVEY IN ADAPTIVE PHYSICAL EDUCATION AND RECREATION
Study of prevalent abnormalities found in a general population including causes, prevention, care and treatment. Methods of screening students for determination of these disabilities are presented as a laboratory experience.

RESTRICTIONS: Open to HPE and PES majors only

HPER 350 BASIC CONCEPTS IN KINESIOLOGY
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.

RESTRICTIONS: Open to majors only

HPER 353 SEMINAR IN EXERCISE PHYSIOLOGY
Prepares students in the Exercise Physiology Concentration with the planning of employment and/or advanced degree opportunities. Includes in-depth resume and cover letter writing, interviewing techniques, and personalized career inventory and career exploration projects.

RESTRICTIONS: Must be in Exercise Physiology Concentration. Requires junior status

HPER 354 SEMINAR
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

HPER 355 FIGURE SKATING PRACTICUM
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 ISU and USFSA. Extensive study and work in the basic badge programs of the ISU and USFSA.

RESTRICTIONS: Open to figure skating science students only

HPER 356 FIGURE SKATING PRACTICUM II
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

HPER 360 PSYCHOLOGY OF COACHING
Lectures involving the psychology of coaching team sports. Emphasis on information concerned with the psychology of team sports and/ or the principles of individual differences.

HPER 361 COACHING VOLLEYBALL
Study of the methods and skill techniques involved with coaching participants in the sport of volleyball. Emphasis on organizing and administering this activity in a school program.

RESTRICTIONS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course.

HPER 362 COACHING BASEBALL
Study of the methods and skill techniques involved with coaching the sport of baseball. Emphasis on organizing and administering this activity in a school program.

RESTRICTIONS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course.

HPER 363 COACHING TENNIS
Study of the methods and skill techniques involved with coaching participants in the sport of tennis. Emphasis on organizing and administering this activity in a school program.

RESTRICTIONS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course.

HPER 365 COACHING BASKETBALL
Study of the methods and skill techniques involved with coaching participants in the sport of basketball. Emphasis on organizing and administering this activity in a school program.

RESTRICTIONS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course.

HPER 368 COACHING TRACK AND FIELD
Study of the methods and skill techniques involved with coaching participants in the sport of track and field. Emphasis on organizing and administering this activity in a school program.

RESTRICTIONS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course.

HPER 370 PRACTICUM IN METHODS OF ELEMENTARY PHYSICAL EDUCATION
Emphasis on clinical experience activity in the public school setting. Consider organization and supervision of elementary physical education programs and includes curriculum planning, selection of materials and related teaching techniques.

RESTRICTIONS: Junior status, upper division clearance, minimum gpa of 2.50, major index of 2.75 and completion of all skill courses

HPER 371 OUTDOOR ADVENTURE LEADERSHIP
Introduces recreation leadership in outdoor adventure activities. Attention directed toward conceptual and technical aspects of adventure programs.

HPER 372 COACHING SWIMMING AND DIVING
Study of the methods and skill techniques involved with coaching participants in the sport of swimming and diving. Emphasis on organizing and administering this activity in a school program.

RESTRICTIONS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course.
HEALTH, PHYSICAL EDUCATION AND RECREATION

HPER 373 CoACHING FOOTBALL
Study of the methods and skill techniques involved with coaching participants in the sport of football. Emphasis on organizing and administering this activity in a school program.
REQUIREMENTS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course.

HPER 374 Coaching Women’s LACROSSE
Study of the methods and skill techniques involved with coaching participants in the sport of women’s lacrosse. Emphasis on organizing and administering this activity in a school program.
REQUIREMENTS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course.

HPER 375 Coaching WRESTLING
Study of the methods and skill techniques involved with coaching participants in the sport of wrestling. Emphasis on organizing and administering this activity in a school program.
REQUIREMENTS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course.

HPER 376 Coaching Soccer
Study of the methods and skill techniques involved with coaching participants in the sport of soccer. Emphasis on organizing and administering this activity in a school program.
REQUIREMENTS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course.

HPER 377 Coaching Field Hockey
Study of the methods and skill techniques involved with coaching participants in the sport of field hockey. Emphasis on organizing and administering this activity in a school program.
REQUIREMENTS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course.

HPER 378 Coaching Softball
Study of the methods and skill techniques involved with coaching participants in the sport of softball. Emphasis on organizing and administering this activity in a school program.
REQUIREMENTS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course.

HPER 379 Coaching Men’s LACROSSE
Study of the methods and skill techniques involved with coaching participants in the sport of men’s lacrosse. Emphasis on organizing and administering this activity in a school program.

HPER 380 Practicum in Methods of Secondary Physical Education
Emphasis on clinical experience activity in the public school setting. Considers organization and supervision of secondary physical education programs and includes curriculum planning, selection of materials and related teaching techniques.
COREQ: HPER370.
REQUIREMENTS: Junior status, upper division clearance, minimum gpa of 2.50, major index of 2.75 and completion of all skill courses.

HPER 381 Adventure Challenge Education
An introduction to adventure challenge education and it’s 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.

HPER 390 Principles of Coaching
Introduce students to the general philosophy and methods of coaching. To recognize and use communication skills, teaching skills, sport psychology and manage team related responsibilities and relationships including risk management.

HPER 395 Sport Medicine Pharmacology
Provides Athletic Training majors with an understanding of the origin, chemistry, effects and uses of medications commonly used in Sports Medicine. Major topics covered will include pharmacokinetics, indications, contraindications, adverse reactions, management of overdose, pharmacology, iatropharmacology, drugs affecting skeletal muscle, pain and inflammation.
REQUIREMENTS: Admission to the B.S. In Athletic Training or permission of instructor.

HPER 403 Practicum in Adapted Physical Education 3-9 PF
Experience working with special children in a physical education setting. Clinical experiences may include work with a particular group of disabled children (e.g. mentally retarded) or several different groups of disabled children (e.g. mentally retarded, visually or hearing impaired or orthopedically handicapped). Variable time involvement up to a maximum of 14 weeks.
PREREQ: HPER342.
REQUIREMENTS: Open to physical education majors only.

HPER 404 Organization, Administration, Recreation and Leisure Service
Study of administrative practices in recreation and parks including legal aspects, principles of planning and operation of parks and facilities, financial and business procedures, public relations, personnel practices and evaluations.
PREREQ: HPER105, HPER260, and HPER270.

HPER 405 Program Development in Athletic Injury Rehabilitation
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.
REQUIREMENTS: For students in the athletic training curriculum.

HPER 407 Prevention and Recognition of Athletic Injuries
Procedures for preventing, diagnosing, treating and rehabilitating athletic injuries. Emphasis on early detection of both the nature and extent of injury.
PREREQ: HPER480 and HPER481 or HPER420.

HPER 409 Therapeutic Modalities
Provides both theory and clinical experience in the use of the most common types of therapeutic modalities utilized in sports medicine.
REQUIREMENTS: For students in athletic training education curriculum.

HPER 416 Practicum in Strength and Conditioning 1 PF
Assign students laboratory experience in the DFH or BBC weight rooms or campus fitness centers. Direct working experience with varsity athletic teams in teaching techniques, program writing, flexibility routines and conditioning routines.
REQUIREMENTS: Must be in Strength and Conditioning routines. Requires senior status.

HPER 420 Functional Human Anatomy
Anatomical individuality, functional significance and human performance interpretations involved through the consideration of muscular, skeletal and nervous system. Laboratory experience emphasizes the meaning and significance of musculoskeletal movements and utilizes preserved human specimens, models, x-rays, dry biological materials and other aids.
PREREQ: HPER220.

HPER 424 Sport Sociology
Studies the issues surrounding sport and its impact on society.Provokes thought and argument on critical issues in sport sociology relative to the interrelationship between sport and society.

HPER 425 Athletics and Sport Psychology
Introduces topics relevant to sport psychology and coaching. Material covered is applicable to specific situations that occur between athletes, coaches and sport-related individuals. Presents a survey of recent sport psychological techniques and experiments.

HPER 426 Biomechanics of Sport
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.
REQUIREMENTS: Open to HPE and PES majors only.

HPER 430 Physiology of Activity
Study of integration of the body systems in performance of exercise, work and sports activities. Performance of exercise activities by the human body under environmental stress situations.
PREREQ: HPER220.
COREQ: HPER431.

HPER 431 Physiology of Activity Laboratory
Laboratory experiences include the measurement of physiological parameters under exercise conditions.
COREQ: HPER430.

HPER 432 Basic Exercise Prescription
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: HPER430.
REQUIREMENTS: Open to HPE and PES majors only.

HPER 434 Exercise Test Technology
Emphasizes American College of Sports Medicine objectives for cardiac rehabilitation exercise physiological certificate. Basic electrocardiography, exercise physiology, stress test administration, medications, report preparations, program considerations and facilities development.
REQUIREMENTS: Open to HPE and PES majors only.

HPER 440 Strategies for Athletic Peak Performance
Preparation of methods and techniques for the mental preparation necessary to attain athletic peak performance. Provides experiential activities in the areas of relaxation, visual imagery, motor behavior rehearsal, hypnosis, stress reduction and concentration techniques.

HPER 445 Concepts of Physical Fitness Testing
Combines both practical and theoretical aspects of physical fitness training. Special reference made to aging, youth fitness, diabetics, asthmatics and obese individuals.
PREREQ: HPER265, HPER430, HPER431 and HPER422.

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HEALTH, PHYSICAL EDUCATION AND RECREATION

HPER 448 ORGANIZATION AND ADMINISTRATION 3
Information for prospective certified athletic trainers on organization and administration of athletic training programs as identified by the NATA. Topics include record keeping, purchasing and maintenance of equipment and facilities and policies and procedures for the operation of an athletic training program.

RESTRICTIONS: Admission to B.S. in Athletic Training

HPER 449 ADVANCED TOPICS IN SPORTS MEDICINE 3
Exposure to a variety of medical specialists and allied health professionals including physical therapists, dentists, nurses and specialists in orthopedics, neurology, cardiology, pediatrics, internal medicine, ophthalmology and physical medicine.

RESTRICTIONS: Admission to B.S. in Athletic Training

HPER 450 FACILITY AND PARK MANAGEMENT 3
Study of the principles and procedures involved in planning for parks and recreation resources, land acquisition and utilization, maintenance of park and recreation areas, facilities and equipment.

PREREQ: HPER 105 and HPER 2270

HPER 451 EXERCISE TESTING/PRESRIPTION 3
Methods of evaluating cardiovascular function through graded exercise tests as well as principles of exercise prescription. Theoretical as well as practical covering of administrative aspects of testing, metabolic calculations, a variety of testing protocols, basic exercise physiology and exercise prescription.

HPER 452 PRINCIPLES OF FITNESS MANAGEMENT 3
Concepts in general management principles including organizational structure, personal management and budgeting. Specific reference made to the Health Fitness industry addressing promotion and marketing, facility development and risk management.

PREREQ: HPER 265

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

HPER 455 FIGURE SKATING PRACTICUM III 3
Concentration on advanced teaching/coaching techniques related to the skill required in the figure skating science degree program.

RESTRICTIONS: Open only to majors in the figure skating science degree program

HPER 456 FIGURE SKATING PRACTICUM IV 3
Direct involvement in the teaching/coaching of beginner elite national and world competitors under the supervision of Ice Skating Development Center professional staff.

RESTRICTIONS: Open only to majors in the figure skating science degree program

HPER 460 COACHING/PERFORMANCE PRACTICUM 2 PF
Practical coaching/performance experience in a scholastic/clinical setting with the season chosen corresponding to each student's interest. The student must keep a daily log of methods and experiences and choose and appropriate project. Observations will be made by the minor coordinator and the cooperating supervisor.

PREREQ: HPER 390, HPER 2270, HPER 310 and HPER 320

RESTRICTIONS: Junior status or higher

HPER 460 INTERNSHIP 2 PF

HPER 465 TEACHING SEMINAR IN THE HEALTH AND PHYSICAL EDUCATION 3
Examines the role of the health and physical education teacher in the elementary and secondary schools. The seminar provides a forum for analyzing and discussing topics of interest to professionals and includes participation of professionals from the school community.

COREQ: EDDV 400

RESTRICTIONS: Open to PEH majors only. Conducted in a public school setting

HPER 475 TEACHING HEALTH IN THE ELEMENTARY SCHOOL 3
Examines the importance of teaching health in the elementary school. Present content and teaching strategies proven effective for teaching health at the elementary level. Also discusses how to incorporate health instruction into other subject areas.

RESTRICTIONS: Open to elementary education majors only

HPER 480 PRACTICUM IN ATHLETIC TRAINING I 3
Supervised work in athletic training to be conducted in the training room facilities. Three hours per week spent discussing detailed anatomy, mechanics, diagnosis, treatment, prevention and rehabilitation of specific injuries. Other emphasis on supervised practical work.

PREREQ: One course in each of the following areas: physiological anatomy, first aid and athletic injuries, biomechanics or kinesiology

RESTRICTIONS: Requires permission of instructor

HPER 481 PRACTICUM IN ATHLETIC TRAINING II 3
Extensive application of training methods in a setting of practical work supervised by the athletic training staff and University physicians.

PREREQ: HPER 480

RESTRICTIONS: Requires permission of instructor

HPER 485 WOMEN IN SPORTS 3
Contemporary view of women in the world of sports. Emphasis on biological, sociological, psychological, historical and legal aspects.

HPER 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.

HPER 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: HPER 265, HPER 430 and HPER 432

HPER 601 RESEARCH METHODS 3
Emphasis on procedures for designing experimental research studies including choice of subjects, group design, choice of proper instrumentation, statistical design, formulation of experimental group programs and technical writing for proposals and publication.

HPER 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.

HPER 604 SPORTS IN AMERICA: A HISTORICAL PERSPECTIVE 3

HPER 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. Includes a series of case studies and planning/实施ing a rehabilitation program for a specific injury.

RESTRICTIONS: For students in the athletic training curriculum

HPER 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.

HPER 610 SEMINAR: TEACHING LIFETIME ACTIVITIES 3
Focuses on five lifetime sports, including archery, badminton, bowling, golf and tennis. Discusses methods of teaching the skill, 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

HPER 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.

HPER 628 PHOTOGRAPHY IN SPORT 3
Discusses design and operation principles of photogenic systems with emphasis on use and application in sport activities. Deals primarily with black/white film and color slides. Extensive darkroom experiences provided.

HPER 629 SPORT PSYCHOLOGY SKILLS TRAINING 3
Predominantly in field setting with University athletes and students. Emphasis on research and design 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.

HPER 635 SEMINAR IN TEACHING PHYSICAL EDUCATION 3
Major goal is educational instructional improvement in elementary and secondary setting. Students critique psychological research and study methods of systematic observation of instruction and analysis of effective teaching behavior. Examines pedagogical trends, current issues and teaching methods.

HPER 640 CREATIVE DANCE FOR CHILDREN 3
Focuses on creative dance for elementary school children. Course content will include theory related to the structure and content of creative dance lessons ideas and techniques for planning lessons will be included.
HOTEL, RESTAURANT AND INSTITUTIONAL MANAGEMENT

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 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 280 PROPERTY MANAGEMENT 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 field as applied to hotel operations, non-commercial and recreational food service, and facilities management. Emphasizes processes of site audits, proposal construction, the bidding procedure and the development of management systems.

HRIM 313 PRINCIPLES OF GAMING MANAGEMENT 3
An overview of gaming management and how it relates to hospitality management. Topics include history of gaming in the U.S., social and legal aspects, licensing, organization, credit issues, marketing, and Title 31 of the Bank Security Act.

HRIM 316 CROSS CULTURAL ETIQUETTE AND PROTOCOL 3
Introduces students to a range of manners and decorum required to effectively work with and offer services to international visitors and associates. Various levels of treatment accorded domestic and international dignitaries within specific types of events and accommodations in the hospitality industry are also discussed.

HRIM 320 HOTEL, RESTAURANT AND GENERAL FOOD SERVICE PURCHASING 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. Field trips to suppliers.

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, technical operations, and as well as labor, food and energy cost containment.

HRIM 322 LABORATORY IN QUANTITY FOOD SERVICE MANAGEMENT 2
Laboratory experience in quantity food production, service and management. Applications in safety, sanitation, technical operations, and quality and cost controls in a quantity food service environment.

HRIM 366 INDEPENDENT STUDY 1-6
Prerequisites: FOSC201 and NTDT200.

HRIM 380 MANAGEMENT OF LODGING OPERATIONS 3
Management of front desk, housekeeping, maintenance, security and conference operations.

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: NTDT201.
HRIM 382 MANAGERIAL ACCOUNTING AND FINANCE IN THE HOSPITALITY INDUSTRY 3
Generation and analysis of quantitative information for planning, control and decision making by managers at various levels. Use of timely and relevant information as a vital tool in management.
PREREQ: ACCT200 or both ACCT207 and ACCT208

HRIM 466 INDEPENDENT STUDY 1-6

HRIM 480 HUMAN RESOURCES MANAGEMENT IN THE HOSPITALITY INDUSTRY 3
Techniques and philosophies of personnel management as applied to various types of hospitality operations. Motivation, attitude formation, and job satisfaction. Case studies related to theories of organizational behavior and industrial psychology.

HRIM 481 MARKETING IN THE HOSPITALITY INDUSTRY 3
Application of marketing principles in hotel, restaurant and institutional management settings. Development of marketing strategies in both profit and non-profit hospitality operations.

HRIM 482 LAW OF INNKEEPING 3
Introduction to the laws relating to hotel, restaurant and institutional operations
PREREQ: ACCT352

HRIM 487 MANAGEMENT SYSTEMS IN THE HOSPITALITY INDUSTRY 3
Principles of systems analysis applied to the hospitality industry. Organization of the operation and subsystems of a property. Case studies and simulations apply economic and management principles
PREREQ: HRIM380.

HRIM 488 HOTEL, RESTAURANT AND INSTITUTIONAL MANAGEMENT PRACTICUM I 1-4
Structured experience in a hospitality industry environment. At least 40 hours per credit hour in planned activities associated with the management and operation of a subsystem of a hospitality property.
RESTRICTIONS: Requires proof of 800 hours paid work experience in the food service and lodging industry

HRIM 489 HOTEL, RESTAURANT AND INSTITUTIONAL MANAGEMENT PRACTICUM II 1-6
Structured experience in a hospitality industry environment. At least 40 hours per credit hour in planned activities associated with the management and operation of a hospitality property.
PREREQ: HRIM488

HUMAN RESOURCES

HURE 165 SEMINAR 1 PF

HURE 380 METHODS OF INSTRUCTION 3
Identification, selection and evaluation of developmentally appropriate strategies and resources for instruction in formal and non-formal Home Economics/Family Life educational setting.

HURE 401 INTERDISCIPLINARY GEROONTOLOGY 3
Considers theoretical and practical approaches to the dimensions of aging. Emphasis on the provisions of material and human resources to meet the basic needs of food, shelter, clothing and income adequacy. Relevant community programs and government services will be studied.

HURE 601 INTERDISCIPLINARY GEROONTOLOGY 3
Considers theoretical and practical approaches to the dimensions of aging. Emphasis on the provisions of material and human resources to meet the basic needs of food, shelter, clothing and income adequacy. Relevant community programs and government services studied.

HURE 650 RESEARCH METHODS 3
Evaluation of existing research reports, articles and monographs, development of data collection techniques, analysis and presentation of data pertaining to child, family and community populations, elements of statistical analysis, evaluation and selection of research designs, preparation of a research/project proposal

INDIVIDUAL AND FAMILY STUDIES

IFST 202 FOUNDATIONS OF FAMILY STUDIES 3
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 3
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 3
The study of social/emotional, cognitive and psycho-social development in infancy, early and middle childhood. Emphasis on the child’s development as it occurs in the family context. Directed observation in the University’s Laboratory Preschool.

IFST 222 EARLY CHILDHOOD CURRICULUM I 2
Principles underlying values in and guidance of young children’s play, creative activities and curriculum content. Selection and use of appropriate materials, with emphasis on preschool and kindergarten settings
PREREQ: IFST221
COREQ: IFST224

IFST 224 EARLY CHILDHOOD CURRICULUM II: PRACTICUM 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

IFST 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; controversial issues; theories and program models; ethical and legal issues; emerging careers; public policy and advocacy. Program observations and interviews.
PREREQ: IFST221 or IFST201

IFST 230 EMERGING LIFE STYLES 3
Interdisciplinary approach to the processes stereotyping masculine and feminine behaviors in issues of women’s and men’s liberation; and an analysis of the present opportunity structure for individual choices.

IFST 235 SURVEY IN CHILD AND FAMILY SERVICES 3
Introduces the scope of human service agencies focusing on the needs of children and families
PREREQ: IFST101

IFST 236 INFANTS AND TODDLERS: DEVELOPMENT AND PROGRAMS 3
Study of the infant and toddler with emphasis on interrelated growth patterns and processes, appropriate curriculum and stimulation, and the effects of prenatal and perinatal conditions on future development.
PREREQ: IFST221

IFST 238 INTRODUCTION TO HUMAN SEXUALITY 3
Exploration of historical, physiological and interpersonal aspects of sexuality. Explores factual information and discusses significance of this information for personal lives.

IFST 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 PSYC270 and/or SOC270.

IFST 275 HUMAN DEVELOPMENT THROUGH THE ARTS 3
Introduction to issues in Individual and Family Studies as viewed through literature, film and other media. Specific genre will vary. Content matched with current and/or classic readings from social sciences. Life span perspective.

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

IFST 328 INTRODUCTION TO THE RESEARCH PROCESS 3
Exposure to the research process through attending and critiquing research presentations, reading and reviewing scholarly papers, and development of a variety of research skills, such as instrument design, coding and data entry. Students’ work will contribute to the development of a professional portfolio.
PREREQ: IFST201 and IFST202.

IFST 329 ADOLESCENT DEVELOPMENT 3
Physical, intellectual and socio-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: EDST202 or IFST201.
IFST 338  SEXUALITY IN CONTEMPORARY SOCIETY  3
A multidisciplinary approach to controversial human sexuality issues which examines
and addresses societal solutions to these controversies

IFST 339  ADULT DEVELOPMENT AND AGING  3
Examines developmental processes, lifespan changes, transitions and stage-related
issues of early, middle and late adult life. Explores concepts, theories, historical
trends and empirical studies during these life periods; integrates theories with practi-
cal applications
PREREQ: EDST202 or IFST201

IFST 340  EARLY CHILDHOOD CURRICULUM II  3
History, research and practical issues in the organization and operation of early child-
hood programs with emphasis on preschool and kindergarten settings; integrating and
adapting the curriculum, facilities, equipment and instructional strategies to the needs of
young children
PREREQ: IFST222 and IFST224
RESTRICTIONS: Includes field experiences

IFST 346  DELIVERY OF HUMAN SERVICES  3
Presents approaches to interviewing and working with individuals and families in a vari-
ety of community-based human service settings. Discusses prevention, advocacy and
empowerment strategies of community intervention. Explores professional and ethical
issues in providing family and community services.
PREREQ: IFST101 and IFST235

IFST 347  HUMAN SERVICE DELIVERY SYSTEMS  3
Focuses on organizational and work related issues, including program development, net-
working, fund raising, administrative procedures and program evaluation. Basic skills
required for the development, delivery and administration of a wide range of human ser-
vice programs including preventive interventions for families and individuals.
PREREQ: IFST101 and IFST235

IFST 364  FIELD EXPERIENCES IN INDIVIDUAL AND FAMILY
STUDIES  2-4
Provides opportunities to work/participate in human service agencies, business and
industry, as well as formal and non-formal educational settings
RESTRICTIONS: May be repeated for up to nine credit hours

IFST 365  SEMINAR  1-3

IFST 366  INDEPENDENT STUDY  1-12

IFST 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: HURE380

IFST 390  HONORS COLLOQUIUM  3
Topics vary within the Individual and Family Studies content; often multidisciplinary. May
be cross-listed with WOMS390

IFST 401  FOUNDATIONS OF HUMAN SEXUALITY  3
A multidisciplinary study of human sexuality focusing on the implications for individuals
and for society of the biological, psychological and sociocultural determinants of human
sexuality. This course deals with sexually explicit material. May be cross-listed with
WOMS401. May be cross-listed with WOMS401

IFST 403  CONCEPTS IN GERONTOLOGY  3
Theories and practices of gerontology, with emphasis on their relationships to the elderly
and their needs for the development of resources
PREREQ: EDST202 or IFST201

IFST 405  IMPACT OF AGING ON THE FAMILY  3
Psychological, physical and financial impact of aging persons on younger family mem-
biers; increased interdependence and dependency, and family adjustment, both positive
and conflicting

IFST 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 pro-
cedures, directed observation and participation in a hospital setting.
PREREQ: IFST222 and IFST224

IFST 422  FAMILY RELATIONSHIPS  3
Interpersonal relationships and problems in marriage, courtship, and the family in contem-
porary society.
PREREQ: IFST202

IFST 428  EDUCATIONAL RESEARCH AND ISSUES IN HUMAN
RESOURCES  3
Introduction to the research process through study of a problem identified by analysis of
clinical experiences; an in-depth examination of selected current educational concerns.
RESTRICTIONS: Requires permission of instructor.

IFST 430  TEACHING FAMILY LIFE  3
Selection, presentation and evaluation of subject matter and materials essential to under-
standing relationships within the family. Emphasis on needs, interests and abilities of sec-
ondary school students. May be cross-listed with WOMS430.
PREREQ: IFST221 and IFST422

IFST 435  EARLY CHILDHOOD PROGRAMS FOR CHILDREN WITH
EXCEPTIONALITIES  4
Philosophy, organization and operation of programs for young children with exception-
alities; development and adaptation of curriculum, materials, facilities and equipment.
Clinical experience with children and programs.
PREREQ: EDST230 and IFST340.

IFST 438  LEADERSHIP DEVELOPMENT IN HUMAN SEXUALITY  3
Seminar/practicum for organizing and leading discussion groups in human sexuality.
Trains group leaders to facilitate effective communication skills and responsible sexual
decisions. Integrates research and theories with individual and family life experiences.
PREREQ: IFST238 or IFST401
RESTRICTIONS: Requires permission of instructor. For undergraduate teaching assistants only.

IFST 440  EARLY CHILDHOOD ADMINISTRATION, LEADERSHIP
AND ADVOCACY  3
Organization and administration of programs for young children. Development of effec-
tive strategies for leadership and advocacy. Consideration of personnel, facilities, regu-
lations, quality programming and business management.
PREREQ: IFST340

IFST 445  PARENT RESOURCES  2
Emphasis on techniques in working and communicating with parents, understanding par-
et-child relationships and effectively utilizing parent, teacher, home, school and commu-
ity resources
PREREQ: IFST101.
COREQ: IFST459 or EDDV400.

IFST 449  INTERNSHIP IN COMMUNITY SERVICES  3-9 PF
On-the-job experience in a community and family service agency.
RESTRICTIONS: Requires permission of instructor

IFST 450  TECHNOLOGY IN EARLY CHILDHOOD  3
Developmental appropriate uses of technology in early childhood and early childhood spe-
cial education. Operation of computer and adaptive devices, evaluation of software and
curriculum development. Includes a practicum using technology in appropriate environments.
PREREQ: IFST222 and IFST224

IFST 452  ASSESSMENT OF YOUNG CHILDREN  3
Focuses upon the issues in, and techniques of the assessment of physical, socio-emotion-
al, 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 PSYC450.
PREREQ: IFST221 or PSYC452.

IFST 459  CHILD DEVELOPMENT PRACTICUM  1-9 PF
Supervised student teaching experience
PREREQ: IFST335, IFST452 and IFST470.
RESTRICTIONS: Requires permission of instructor.

IFST 460  WOMEN IN INTERNATIONAL DEVELOPMENT  3
See SOC460 for course description.

IFST 463  ATYPICAL INFANT AND TODDLER  3
Sensory, motor, affective and psychosocial development in infancy and toddlerhood.
Observation and participation with infants. Early diagnosis, assessment and treatment
strategies for disabilities of the infant and toddler period.
PREREQ: IFST221 and IFST236.

IFST 465  SEMINAR  1-3 PF

IFST 466  INDEPENDENT STUDY  1-12

IFST 470  FAMILIES AND CHILDREN AT RISK  3
Deals with social-emotional considerations of disabilities and risk factors upon the devel-
opment of children and families over the life course. Includes information on family
assessment and systems, changing demographics and at-risk families. Includes some clin-
ical counseling skills.
PREREQ: IFST221 or PSYC325.

IFST 475  TOPICS IN INDIVIDUAL AND FAMILY STUDIES  1-3
Selected topics focusing on current issues affecting families from an interdisciplinary and
global perspective.
RESTRICTIONS: Prerequisites vary by topic and instructor

IFST 480  IFST SENIOR SEMINAR  1-3
Discussion-oriented and problem-centered with emphasis on the role and contributions of
the individual to the profession and society.

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### INDIVIDUAL AND FAMILY STUDIES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFST 601</td>
<td>Development through the Lifespan</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>Basic Concepts in Gerontology</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 605</td>
<td>Impact of Aging on the Family</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>Skills Development in Individual and Family Studies</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>Seminar in Community Development and Nonprofit Leadership</td>
<td>3</td>
<td>See UAPP 607 for course description.</td>
</tr>
<tr>
<td>IFST 608</td>
<td>Poverty, Neighborhoods and Community Development</td>
<td>3</td>
<td>See UAPP 608 for course description.</td>
</tr>
<tr>
<td>IFST 610</td>
<td>The Hospitalized Child</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>Evaluation Practices</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 621</td>
<td>Family Studies</td>
<td>3</td>
<td>Critical analysis of selected topics and readings in family studies. Empirical and theoretical perspectives relevant to the study of family relationships, developmental issues and trends in family life.</td>
</tr>
<tr>
<td>IFST 623</td>
<td>Applied Human Development in the Schools</td>
<td>3</td>
<td>See EDST 623 for course description.</td>
</tr>
<tr>
<td>IFST 630</td>
<td>Teaching of Family Life</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>Program Planning and Development</td>
<td>3</td>
<td>Foundations of program planning and development including models and rationales, methods, techniques and program assessment as they relate to the organization and administration of formal and non-formal educational programs as well as community programs.</td>
</tr>
<tr>
<td>IFST 638</td>
<td>Adolescence and Youth: Theories</td>
<td>3</td>
<td>A critical review of the theories pertaining to personal, physical and socio-emotional development of the period from early adolescence through youth by an examination of significant research.</td>
</tr>
<tr>
<td>IFST 639</td>
<td>Curriculum Practices</td>
<td>3</td>
<td>Reviews foundations of curriculum and instruction as they relate to the origin and administration of educational programs in community and family agencies and institutions; curriculum development experiences for adult and adolescent learning with emphasis on concept and task analysis.</td>
</tr>
<tr>
<td>IFST 641</td>
<td>Infant Development and Stimulation</td>
<td>3-6</td>
<td>Cognitive, social, emotional and motor development from conception to two years, with implications for home and group care. Concurrent observation of infants required.</td>
</tr>
<tr>
<td>IFST 642</td>
<td>Leadership in Human Services</td>
<td>3</td>
<td>Examination of how leaders influence and control the direction and effectiveness of human service agencies and institutions. Focuses on trends, issues, theories and research on leadership with emphasis on the unique concerns of women.</td>
</tr>
<tr>
<td>IFST 643</td>
<td>Programming for Young Children with Special Needs</td>
<td>3</td>
<td>Theories, philosophies, organization and evaluation of programs, both mainstreamed and self-contained for young exceptional children. Emphasis on the multidimensional role of teachers. Focuses on working with parents individually and in groups and on child advocacy.</td>
</tr>
<tr>
<td>IFST 650</td>
<td>Computers in Early Childhood</td>
<td>3</td>
<td>Integration of microcomputers into the early childhood, developmental curriculum. Considers theoretical rationale, operation of computers, selection of software and curriculum development. Includes a practicum with young children using microcomputers. PREREQ: Early childhood course work. RESTRICTIONS: Early childhood experience acceptable in lieu of prerequisites.</td>
</tr>
<tr>
<td>IFST 651</td>
<td>Advanced Child Development</td>
<td>3</td>
<td>Theoretical approaches in psychosocial development in children; and influences on development of self-concept, sex-role behavior, moral development and prejudice.</td>
</tr>
<tr>
<td>IFST 655</td>
<td>Measurement Techniques for Children and Families</td>
<td>3</td>
<td>Construction and analysis of developmental ratings, behavioral coding procedures, interviews, questionnaires, tests and sociometric measures appropriate for studying the behavioral development of children and families through the life cycle.</td>
</tr>
<tr>
<td>IFST 656</td>
<td>Supervision: Functions and Techniques</td>
<td>3</td>
<td>Functions and principles of effective supervision in family agencies and educational and business settings; focuses on commonalities of skills, techniques and training.</td>
</tr>
<tr>
<td>IFST 658</td>
<td>Readings in Individual and Family Studies</td>
<td>3</td>
<td>Emphasis on either infancy, early and/or middle childhood, adolescence, adulthood, gerontology and/or specialized topics in family studies. Emphasis may vary by semester.</td>
</tr>
<tr>
<td>IFST 660</td>
<td>Teaching of Life Span Development</td>
<td>3</td>
<td>Strategies and techniques for effective teaching of life span development at the post-secondary level, including observation, teaching opportunities and mentorships with faculty.</td>
</tr>
<tr>
<td>IFST 662</td>
<td>Curriculum Analysis in Early Childhood</td>
<td>3</td>
<td>Examination and evaluation of curriculum designs.</td>
</tr>
<tr>
<td>IFST 663</td>
<td>Atypical Infant</td>
<td>3</td>
<td>Sensory, motor and psychosocial development in infancy. Observation and participation with infants. Early diagnosis and assessment of developmental disabilities.</td>
</tr>
<tr>
<td>IFST 665</td>
<td>Seminar</td>
<td>1-3</td>
<td>See course description for details.</td>
</tr>
<tr>
<td>IFST 666</td>
<td>Research</td>
<td>1-6</td>
<td>See course description for details.</td>
</tr>
<tr>
<td>IFST 669</td>
<td>Supervised Field Experience and Study</td>
<td>1-6</td>
<td>Supervised work with children and/or families in a community setting. RESTRICTIONS: Credit may be distributed over more than one semester.</td>
</tr>
<tr>
<td>IFST 815</td>
<td>Research Issues and Designs</td>
<td>3</td>
<td>Examination of issues in design, sampling, measurement and analysis techniques applicable to research in family studies. PREREQ: One graduate-level method and design course.</td>
</tr>
<tr>
<td>IFST 828</td>
<td>Trends and Issues in Individual and Family Studies</td>
<td>3</td>
<td>Historical and theoretical frameworks for understanding current issues in research, policy development and practice in individual and family studies. Selected topics identified and analyzed for past and future contribution to the field of study.</td>
</tr>
<tr>
<td>IFST 850</td>
<td>Child and Family Theory</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>IFST 855</td>
<td>Family Processes</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>IFST 860</td>
<td>Diversity in Family Structures</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>IFST 865</td>
<td>Advanced Seminar in Family Studies</td>
<td>1-3</td>
<td>Varying special interest topics in family studies. Topics usually are presented from an interdisciplinary perspective. RESTRICTIONS: Requires permission of instructor. May be repeated for credit as topic varies.</td>
</tr>
<tr>
<td>IFST 868</td>
<td>Research</td>
<td>1-6</td>
<td>See course description for details.</td>
</tr>
<tr>
<td>IFST 869</td>
<td>Master's Thesis</td>
<td>1-6</td>
<td>See course description for details.</td>
</tr>
<tr>
<td>IFST 870</td>
<td>Family Crisis and Coping</td>
<td>3</td>
<td>Examines the research that focuses on families and individuals in crisis situations. Focuses on theories of understanding the differential impact of crisis as well as techniques to cope with the situations. Uses a developmental life span perspective.</td>
</tr>
</tbody>
</table>

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ITALIAN

ITAL 875  The Family and the Life Span  3
Theory, research and methodological issues in the study of individuals and families over the life span. Definitional issues; individual differences in normative and non-normative experiences; transitions and change; and sources of influence on development. Intensive study of topics illustrating the interaction of individual and family development.

ITAL 880  Families and Institutions  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 885  Theory, Computers and Children  3
Students participate in building a sound theoretical and pedagogical foundation for 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 the theoretical foundation building.

ITAL 964  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.

ITAL 969  Doctoral Dissertation  1-12 PF

ITALIAN

ITAL 101  Elementary Italian I  3
Introduction to the Italian language and development of speaking, listening, reading and writing skills through the use of basic texts. Language laboratory as needed.

ITAL 102  Elementary Italian II  3
Completion of basic Italian.

ITAL 105  Italian I - Elementary  4
Introduction to the Italian language and development of speaking, listening, reading and writing skills through the use of basic texts. Language laboratory as needed.

ITAL 106  Italian II - Elementary/Intermediate  4
Completion of basic Italian. Increasing mastery of the basic skills of speaking, listening, reading and writing.

ITAL 107  Italian III - Intermediate  4
Review of grammar, continued practice in speaking and writing, reading texts of average difficulty.

ITAL 111  Intermediate Italian I  3
Review of grammar. Increasing mastery of the basic skills of speaking, listening, reading and writing.

ITAL 112  Intermediate Italian II  3
Continued practice in speaking and writing, and reading texts of average difficulty, grammar review as needed.

ITAL 200  Italian Grammar Review  3
Systematic review of fundamental aspects of Italian grammar. Study of special problem areas. Some conversational practice.

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.

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 aural language skills.

ITAL 208  Contemporary Italy I  3
An introduction to contemporary Italy, its culture, its people, their way of life and the issues confronting them.

ITAL 211  Italian Reading and Composition: Short Fiction  3
Reading and discussion of Italian short stories. Several short compositions. Grammar review where appropriate.

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.

ITAL 250  Introduction to Business Italian  3
Familiarizes students with characteristics of business Italian (vocabulary, technology, terminology and syntactical patterns) and aspects of the Italian business community.

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.

ITAL 306  Practical Oral/Written Expression  3
Offered abroad only. Designed to strengthen skills in grammar and vocabulary in preparation for advanced courses offered in second part of the semester. Class exercises include oral exposes, discussion of articles and videos, textual analysis and compositions.

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.

ITAL 310  Survey of Italian Literature  3
Development of Italian literature from its origins to the mid-17th century. Study and discussion of representative works.

ITAL 311  Survey of Italian Literature  3
Development of Italian literature from the mid-17th century to the present. Study and discussion of representative works.

ITAL 325  Italian Civilization and Culture  3
A survey of the major cultural, social and political developments in Italy from the 15th century to the present.

ITAL 355  Special Topics  3
Explores an area of special interest in Italian literature or cultural studies. Topics vary and will be announced in the registration booklet.

ITAL 366  Independent Study  1-3

ITAL 401  Advanced Italian Grammar and Stylistics  3
Introduction to the various written and spoken styles of contemporary Italian from colloquial to formal. Exercises in writing and speaking, with special emphasis on the grammatical structure of the Italian language. Some translation.

ITAL 403  History of the Italian Language  3
Development of the Italian language from its Latin origins. Examination of the questions of the historical development of the language, especially in the Middle Ages. Study of the evolution of Italian as a Romance language.

ITAL 406  Advanced Italian Language  3
Grammatical structure and stylistics with special attention given to technical vocabulary and discourse, e.g., business, law, science and agriculture.

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ITALIAN

ITAL 455  Selected Authors, Works and Themes  3
Works of one or more outstanding authors or on a special theme.
PREREQ: ITAL310 and ITAL311
RESTRICTIONS: Can be repeated for credit when topics vary. May be offered jointly with ITAL455.

ITAL 466  Independent Study  1-3

ITAL 467  Advanced Italian Grammar and Stylistics  3
Introduction to the various written and spoken styles of contemporary Italian from colloquial to formal. Exercises in writing and speaking, with special emphasis on the grammatical structure of the Italian language. Same translation

ITAL 468  History of the Italian Language  3
Development of the Italian language from its Latin origins. Exposition of the questione della lingua; linguistic analysis of old Italian texts; and the effects of social, political, and cultural factors on usage influences from and on other languages.
RESTRICTIONS: May be offered jointly with ITAL403.

ITAL 465  Selected Authors, Works and Themes  3
Seminar on works of one or more outstanding authors or of a special theme.
RESTRICTIONS: Can be repeated for credit when topics vary. May be offered jointly with ITAL455.

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: JAPN105
RESTRICTIONS: Two to three years of high school Japanese acceptable in lieu of prerequisite.

JAPN 107  Japanese III - Intermediate  4
Development of aural, oral, reading, and writing skills at the intermediate 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: JAPN106
RESTRICTIONS: Four years of high school Japanese acceptable in lieu of prerequisite. Satisfies the Arts and Science foreign language requirement.

JAPN 200  Japanese Grammar and Composition  3
Further study of Japanese grammar, Kanji characters and reading and writing skills for communication.
PREREQ: JAPN107.

JAPN 205  Japanese Conversation  3
Practical use of Japanese by means of oral reports on a variety of topics including family, school, and work life. Emphasis on improvement of conversational skills for social situations which require different politeness levels, as well as grammatical and written competence.
PREREQ: JAPN107
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: JAPN107
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 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: JAPN200, JAPN205, JAPN206.

JAPN 340  Technical Japanese I  3
Introduction to technical Japanese vocabulary and Kanji reading.
PREREQ: Two of the following: JAPN200, JAPN205, JAPN206.

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: JAPN200, JAPN205, JAPN206.

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: JAPN200, JAPN205, JAPN206.
RESTRICTIONS: May be repeated for credit when topics vary.

JAPN 366  Independent Study  1-3
PREREQ: Two of the following: JAPN200, JAPN205, JAPN206.

JAPN 440  Technical Japanese II  3
Further study in the reading and writing of technical Japanese, including the translation of technical writings.
PREREQ: JAPN340.

JAPN 455  Selected Authors, Works and Themes  3
Works of one or more outstanding authors or on a special theme.
PREREQ: Two 300-level Japanese courses.
RESTRICTIONS: May be repeated for credit when topics vary.

JAPN 466  Independent Study  1-3
PREREQ: One 300-level Japanese course.

JEWISH STUDIES

JWST 105  Hebrew I - Elementary  4
See HEBR105 for course description.

JWST 106  Hebrew II - Elementary/Intermediate  4
See HEBR106 for course description.

JWST 107  Hebrew III - Intermediate  4
See HEBR107 for course description.

JWST 208  Introduction to Jewish Philosophy  3
See PHIL208 for course description.

JWST 254  Jewish Holocaust: 1933-1945  3
See HIS254 for course description.

JWST 318  Studies in Film  3
See ENGL318 for course description.

JWST 348  Contemporary Jewish-American Literature  3
See ENGL348 for course description.

JWST 349  Introduction to Jewish Sources: Text and Interpretation  3
See ENGL349 for course description.

JWST 380  Women Writers  3
See ENGL380 for course description.

JWST 382  Studies in Multicultural Literature in English  3
See ENGL382 for course description.

JWST 435  Sociology of American Jewry  3
See SOCI435 for course description.

LATIN

LATN 100  Individualized Elementary Latin  1-6
Self-paced, computer-assisted individual study of fundamentals of Latin. No formal classroom component. Content identical to LATN101/102.
RESTRICTIONS: May be repeated for up to six credits. Maximum of six credits of LATN100, LATN101 or LATN102 may be counted toward graduation.

LATN 101  Elementary Latin I  3
Course for beginners.

LATN 102  Elementary Latin II  3
Completion of basic Latin.
PREREQ: LATN101.
RESTRICTIONS: One year of high school Latin acceptable in lieu of Prereq.
LEGAL STUDIES

LEST 301 INTRODUCTION TO LEGAL STUDIES 3
Introduces legal studies as a multidisciplinary field.
LING 358 Linguistics and Language Arts 3
See EDST358 for course description.

LING 365 Undergraduate Seminar in Linguistics 3
Topics vary. Emphasis is on writing papers of significant length on two separate topics in linguistics.
PREREQ: LING101

LING 366 Independent Study 1-3

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 403 Romance Language Lexicography 3
Introduction to the place of the dictionary in learning, teaching, and translating languages. Information concerning the planning, compiling and evaluating of dictionaries written in French, Spanish, Italian and Portuguese. History of Romance-language lexicography and its typology, including both monolingual and bilingual dictionaries. May be cross-listed with FLIT403.

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.

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.

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 FLIT421 for course description.

LING 422 Language Syllabus Design 3
See FLIT422 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 FLIT424.

LING 426 Theory and Techniques of Interpretation 3
Overview of simultaneous and consecutive interpretation in theory and practice. Topics include translation vs. interpretation, linguistic and extralinguistic components, task analysis, the bilingual interface of source and target languages, models of memory as well as cognitive aspects of text and information processing.

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 440 Structure of French 3
Survey of the sound system of contemporary French, together with major grammatical elements, lexis and derivational processes. Dialect variation in French-speaking countries, and the extension of French outside of France as a second language. Phonological and grammatical analyses of French.
PREREQ: LING101 or equivalent.

LING 450 Structure of Italian 3
Formal analysis of the phonology, morphology and syntax of contemporary Italian. Discussion of major dialects and regional variations of the standard language. Sociolinguistic profile of major contemporary Italian speech communities.
PREREQ: LING101 or equivalent.

LING 460 The Structure of German 3
Linguistic description of the phonology, morphology and syntax of contemporary German. Analysis of major regional and stylistic varieties of the spoken language, and exercises in transcription.
PREREQ: LING101 or equivalent.

LING 462 Language Acquisition 4
See EDST462 for course description.

LING 466 Independent Study 1-3

LING 470 Structure of Chinese 3
Survey of the major structural features of Mandarin Chinese. Topics include phonology, compounding, aspect, word order, the "ba-bei" construction, interrogative and negative sentences, covers and the serial verb construction.
PREREQ: LING101 or equivalent.

LING 476 Second Language Acquisition and Bilingualism 3
See EDST476 for course description.

LING 477 The Structure of English 3
See EDST477 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 492 History of Linguistics 3
The history of linguistic thought from Panini through the 20th century. Emphasis on the continuity of trends and issues in the development of linguistic science.

LING 495 The Structure of Japanese 3
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 FLIT621 for course description.
LING 622  LANGUAGE SYLLABUS DESIGN  3
See FL1622 for course description.

LING 624  SECOND LANGUAGE TESTING  3
Study of the principles and techniques of second-language testing, including measure-
ment of the four skills and of communicative competence. Bilingual measures. Discrete
point versus integrative or pragmatic measures. Practice in item construction and analy-
sis. May be cross-listed with FL1624.

LING 626  THEORY AND TECHNIQUES OF INTERPRETATION  3
Overview of simultaneous and consecutive interpretation in theory and practice. Topics
include: translation vs. interpretation, linguistic and extralinguistic components, task anal-
ysis, the bilingual interface of source and target languages, models of memory as well as
cognitive aspects of text and information processing.

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 667  EXPERIMENTAL COURSE  1-6

LING 675  LANGUAGE ACQUISITION  4
See EDST675 for course description.

LING 676  SECOND LANGUAGE ACQUISITION AND BILINGUALISM  3
See EDST676 for course description.

LING 677  THE STRUCTURE OF ENGLISH  3
See EDST677 for course description.

LING 680  INTRODUCTION TO SOCIOLINGUISTICS  3
Theories (e.g., variation theory), research and methods of analysis of the interrelation-
ships of language and society. Particular attention paid to application of sociolinguistic
research to the solution of educational problems of various groups.

LING 691  SEMANTICS I  3
Introduction to linguistic theories of meaning. Survey of the semantic issues in reference,
ambiguity, presupposition and implicature. Selected linguistic phenomena (e.g., tense,
aspect, predication and thematic roles). Some elements of formal semantics.
PREREQ: LING101 or equivalent.

LING 692  SEMANTICS II  3
A continuation of LING691. Focuses on such topics as formal semantics, including Man-
ague grammar, the interface between semantics and pragmatics, negation, quantifica-
tion, conjunction, etc.
PREREQ: LING691.

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 social and historical factors, language atti-
tudes, 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 teach-
ing the pronunciation, grammar and vocabulary of American English. Devising and pre-
senting 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 Profi-
cient (LEP) students. Topics include issues in bilingual education, theories of L2 acquisi-
tion, LEP educational models, integrating language and content instruction, documen-
tation 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 804  LINGUISTIC PRINCIPLES OF TRANSLATION  3
Translation as linguistic science rather than literary art. Contrastive analysis, stylistics and
lexical problems such as neologisms and matching of levels of speech. Supervised work
in translation of texts of various types. Relating conceptual construction of various linguis-
tic theories [e.g., systemic linguistics, transformational-generative grammar, mean-
ing-text model theory] to the realities of language translation.

LING 808  LECTIONOGRAPHY AND LEXICOLOGY  3
Seminar course in linguistic principles in the compilation of dictionaries. Theoretical con-
tributions of different schools of linguistics to problems of lexicography and the contribu-
tion of working lexicographers to linguistic data. The relationship of lexicography to
translation. A linguistic evaluation of lexicographical theory.

LING 820  ADVANCED STUDIES IN ESL METHODOLOGY  3
Discussion of current issues in second language acquisition and their impact on class-
room methods. Design of experimental research on ESL/FRL classroom activities. Formu-
lation of principles for second language instruction.

LING 824  SEMINAR IN SECOND LANGUAGE TESTING  3
Analysis of major issues in second language testing, including latent trait measurement,
problems of ascertaining validity and calibrating items and interactive testing. Special
emphasis on current research in oral/reading proficiency testing, the testing of small
student groups, and on the introspective vs. the interactive testing research methods.
PREREQ: LING624.

LING 830  SYNTAX III  3
In-depth investigation of syntactic universals and recent developments in the theory of
syntactic. RESTRICTIONS: May be repeated for credit when topics vary.
PREREQ: LING630.

LING 831  TOPICS IN SYNTAX  3
Current topics in syntactic theory, problems in the syntactic analysis of specific
languages. RESTRICTIONS: May be repeated for credit when topics vary.

LING 848  SEMINAR IN LANGUAGE DEVELOPMENT  3
See EDST848 for course description.

LING 850  LINGUISTICS AND WRITING  3
Survey of writing systems, problems of text structuring, documentation and assessment of
writing.

LING 851  LINGUISTIC FIELD METHODS  3
Development of skills and techniques in various kinds of field analysis. Use of native
informed sources. 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. Top-
ics 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. Top-
ics 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. Top-
ics 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. Top-
ics may include phonology, morphology, syntax and semantics.
RESTRICTIONS: May be repeated for credit when topics vary.

LING 861  TOPICS IN PHONOLOGY  3
Detailed examination of one or more current (controversial) issues in phonological
theory.
PREREQ: LING608.
RESTRICTIONS: May be repeated for credit when topics vary.

LING 862  ACQUISITION OF PHONOLOGY  3
Development of phonology in normal children from babbling stage through acquisition of
phonemes and basic phonological rules of a language. Examination of data from a vari-
ety of languages, focusing on language specific and universal phenomena.
PREREQ: LING608.

LING 863  PROJECTS IN ACOUSTIC PHONETICS  3
The course begins with a brief review of the articulatory, acoustic, and perceptual char-
acteristics of speech and computer-based laboratory instrumentation. The remainder of
the course is reserved for conduct of research projects in acoustic phonetics, speech
analysis, or speech synthesis. Projects will be suggested by the instructor, however, stu-
dents may (with instructor's approval) choose a project of their own design.
PREREQ: LING667.

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 model and paradigmization process, natu-
ral versus formal second language acquisition, and adult-versus-child acquisition.

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LING 681  SOVIET PSYCHOLOGY LINGUISTICS I  3
Study of the theories of Vygotsky, Luria, Leont'ev and others. Basic concepts in Soviet the-
ory: activity, zone of proximal development and regulation

LING 682  SOVIET PSYCHOLOGY LINGUISTICS II  3
Advanced problems in Soviet theory of language learning. Non-Soviet extensions of the
theory. Application of theory to second-language acquisition.
PREREQ: LING681

LING 689  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
LING890

LING 694  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

LING 696  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 603  THE AMERICAN FRONTIER: FACT AND FICTION  3
Uses novels, films and more traditional sources of information to examine the role of
the frontier in shaping American attitudes and values.
RESTRICTIONS: Open to majors only

MALS 610  FORCE, CONFLICT AND CHANGE  3
From antiquity to the present, the use of force and the resolution of conflict have been
among humanity's enduring preoccupations. Examines ideas about these issues, and
associated questions such as the meaning of "heroism" and "just war."
RESTRICTIONS: Open to majors only

MALS 611  DOCUMENTARY: JOURNALISM AND FILM  3
Explores non-fiction narratives, both in print and on film. 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, 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 614  THE FRENCH REVOLUTION: IDEAS, INTERPRETATIONS AND
Dissent  3
Examines ways in which the French Revolution of 1789-1815, with all its complex events
and movements, has been perceived and conceptualized by contemporaries, commenta-
tors and professional scholars. In-depth study of its literature to see how human beings
invented concepts and interpretations to make sense of the French Revolution.
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 rational-
im 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 616  ON THE NATURE OF GOOD AND EVII: INQUIRIES IN
LITERATURE, PSYCHOLOGY AND RELIGION  3
Focuses on novels and plays that explore the definition of good and evil in Judaeo-Christi-
ung culture. Students will read these literary works in conjunction with essays by psychol-
agnost and theologians who discuss the concept of good and evil from a variety of
perspectives.
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 618  STUDIES IN THE HISTORY OF ART  3
Selected topics in the history of art. Focuses on art in the context of cultural and social
history for an advanced audience of non-specialists.
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 addi-
tion to financial limitations, constraints are imposed by societal norms of what are
acceptable topics and procedures for research. Focus on the philosophical basis of sci-
ence as well as consequences to society of the scientific revolution.
RESTRICTIONS: Open to majors only

MALS 647  PHILOSOPHY OF TECHNOLOGY  3
See PHIL647 for course description

MALS 648  ENVIRONMENTAL ETHICS  3
See PHIL648 for course description

MALS 660  HUMANITIES COLLOQUIUM  3

MALS 869  MASTER'S THESIS  1-6

MALS 879  SYNTHESIS PROJECT  3-6

MATERIALS SCIENCE

MASC 302  MATERIALS SCIENCE FOR ENGINEERS  4
Crystal binding and structure; energetics and structure of lattice defects; elasticity, plastic-
ity, and fracture; phase equilibria and transformations; relations of structure and treat-
ment to properties; structures of inorganic and organic polymers; and electronic and
magnetic properties

MASC 366  INDEPENDENT STUDY  1-6

MASC 406  CORROSION AND PROTECTION  3
How structural materials degrade by interaction with their environments. High-temperature
oxidation and sulfidation of alloys. Electrochemical attack on alloys by electrolytes in
relation to metalurgical structure. Stress corrosion cracking. Aggressive environments
Testing and control methods.
PREREQ: Physical chemistry

MASC 446  SENIOR RESEARCH  1-6
Student will research general areas of Materials Science and/or Engineering under the
direction of a member of the Materials Science Faculty or other faculty in science or
engineering subject to the approval of the Materials Science Chair.
RESTRICTIONS: Open to seniors only. Science background required

MASC 466  INDEPENDENT STUDY  1-6

MASC 601  STRUCTURE AND PROPERTIES OF POLYMER MATERIALS  3
Measurement and control of the microstructure and properties of solid polymers. Struc-
ture generation, structure-property models and effects of processing on properties. May
be cross-listed with CHEG601.
PREREQ: MASC302

MASC 602  STRUCTURE OF MATERIALS  3
Fundamentals of crystallography. Crystal structure analysis by X-ray and electron diffrac-
tion. Characterization of materials by optical microscopy, scanning and transmission
electron microscopy. Simplified approach to image theory and diffraction theory.
PREREQ: MASC302

MASC 603  ANALYTICAL TECHNIQUES IN MATERIALS SCIENCE  3
Laboratory course in optical microscopy, X-ray diffraction, scanning and transmission
electron microscopy, electron diffraction. X-ray fluorescent and microanalysis. Auger
analysis and other spectroscopic techniques
PREREQ: MASC302 and MASC602
COREQ: MASC602

MASC 604  PHASE TRANSFORMATIONS  3
Introduction to thermodynamic functions: enthalpy, entropy and free energy. Fick's first
and second laws of diffusion. Liquid/solid and solid/solid phase equilibria and transfor-
mations. Nucleation and growth. Massive and martensitic transformations. Phase trans-
formations in polymers, ceramics and electronic materials
PREREQ: MASC302

MASC 606  CORROSION AND PROTECTION  3
Degradation of structural materials through interaction with their environment. High tem-
perature oxidation and sulfidation. Electrochemical attack on alloys and its relation to
metallurgical structure. Stress corrosion cracking. Testing and control methods. Localized
corrosion. Deterioration of advanced materials.
PREREQ: MASC302