Course Descriptions

Accounting (AC)

Courses

AC 201. Introduction to Accounting and Financial World. 3 Credits.
This course is designed strictly for the non-business major. It is a survey course of accounting and financial concepts, including the basic accounting equation, financial statement structure, financial statement analysis, cost structures (fixed/variable/breakeven analysis/overhead), cost systems, an introduction to basic capital markets, working capital management and present value concepts. Whenever possible the materials used in this class will use the context of the individual student’s major area of study or future professional area of employment. 2 lecture hours and 2 laboratory hours.

AC 205. Principles of Accounting-Financial. 4 Credits.
An introduction to accounting principles and theory for the sole proprietorship. The recording of business transactions through the accounting cycle, from journalizing, posting, adjusting, and closing entries through work papers and preparation of financial statements, is studied. Related topics include: internal control, receivables and payables, the control of cash transactions, inventories, depreciation, intangible assets, and payroll accounting. Ethical business practices and client privacy issues are stressed throughout all phases of the course.

AC 206. Principles of Accounting-Managerial. 4 Credits.
The completion of the study of financial accounting and an introduction to and emphasis on managerial accounting. Topics covered include: partnerships, corporations, earnings per share, dividends, bonds payable, the Statement of Cash Flows, the analysis and interpretation of financial statements, the budgeting process and cost accounting concepts. Protection of proprietary information and information security is re-enforced throughout the course. Prerequisite: AC 205.

AC 335. Intermediate Accounting I. 3 Credits.
Building on the foundations of Principles of Accounting the course provides a more in-depth study of accounting theory and practice. Beginning with a brief review of the accounting process, the course delves into the conceptual framework for accounting, the accounting standards setting process, and the hierarchy of accounting pronouncements. The course then explores the components of the financial statement package including such issues as the quality of earnings and the measurement and reporting of unusual, infrequent, and non-operating items; the Statement of Cash flows is also studied in depth. Accounting, reporting, and valuation issues surrounding cash, receivables, inventory and long-term assets are also covered including the impairment of tangible and intangible assets. Prerequisite: A grade of "C" or better in AC 205 and AC 206.

AC 336. Intermediate Accounting II. 3 Credits.
A continuation of the in-depth study of accounting theory and practice begun in Intermediate Accounting I. The course addresses the valuation, accounting, and reporting of both short and long-term investment securities, current and contingent liabilities, notes and bonds payable, and shareholders’ equity. In addition, the accounting for leases, income taxes, pensions, stock-based compensation, earning per share, and accounting changes are also studied. Prerequisite: AC 335 or AC 205 and AC 206 with a grade of "C" or better and permission of the instructor.

AC 419. Taxation I. 3 Credits.
Designed to introduce the student to certain elementary tax concepts: tax rate structure, exemptions, deductible versus non-deductible expenses, depreciation basis, capital gains and losses, tax credits, withholding, and computation of the personal income tax. Within the context of the personal income tax, planning considerations will be stressed as well as legal and ethical issues concerning client confidentiality. Prerequisites: AC 205 and AC 206 with a grade of "C" or better.

AC 428. Auditing. 3 Credits.
A study of the auditing environment, including legal liability and professional ethics begins with the concept of auditing and the auditing profession. Additional topics concerning the audit process, including internal control, evidence, sampling and EDP auditing and specific audit procedures are examined. In addition the nature and types of auditors’ reports are studied. Prerequisites: AC 336 or permission of the instructor. 3 lecture hours.

AC 441. Cost Accounting. 3 Credits.
A study of the basic elements of cost accounting concepts and procedures. Emphasis is on how cost data can be used as management tools. Cost behavior and control, cost-volume-profit relationships, job and process costing, activity-based accounting, budgeting and responsibility accounting, flexible budgeting and standards, income effects of alternative costing methods and cost behavior, costs and the decision process, and philosophy and organization of the master budget are analyzed. Prerequisite: AC 206.

AC 442. Advanced Accounting. 4 Credits.
An advanced course emphasizing accounting theory and practical applications in selected areas. Such areas include: partnerships, branches, business combinations, consolidated financial statements, segment reporting, forecasts, multinational companies, bankruptcy, and accounting for governmental units and other non-profit entities. Prerequisite: AC 336.
Aerospace Studies (AS)

Courses

AS 101. The Foundations of the United States Air Force. 1 Credit.
This is a survey course designed to introduce students to the United States Air Force and Air Force Reserve Officer Training Corps. Featured topics include: mission and organization of the Air Force, officership and professionalism, military customs and courtesies, Air Force opportunities, group leadership problems, and an introduction to communication skills. A mandatory leadership laboratory complements this course by providing cadets with followership experiences. Includes 1 lecture hour and Leadership lab (2 hours) and PT (3 hours). Course Attributes: Not eligible for use as part of the six ROTC credits allowed for degree electives.

AS 102. The Foundations of the United States Air Force. 1 Credit.
This is a survey course designed to introduce students to the United States Air Force and Air Force Reserve Officer Training Corps. Featured topics include: mission and organization of the Air Force, officership and professionalism, military customs and courtesies, Air Force opportunities, group leadership problems, and an introduction to communication skills. A mandatory leadership laboratory complements this course by providing cadets with followership experiences. Prerequisite: AS 101 or equivalent. This requirement may be waived with the approval of the detachment commander. Includes 1 lecture hour and Leadership lab (2 hours) and PT (3 hours). Course Attributes: Not eligible for use as part of the six ROTC credits allowed for degree electives.

AS 201. The Evolution of USAF and Space Power. 1 Credit.
This course focuses on facilitating the transition from Air Force ROTC cadet to Air Force ROTC candidate. Featured topics include: Air Force heritage, Air Force leaders, general aspects of air and space power, introduction to ethics and values, group leadership problems, and continuing application of communication skills. A mandatory leadership laboratory complements this course by providing cadets with their first opportunity for applied leadership experiences. Prerequisite: Must have successfully completed AS 101 and AS 102 (or equivalent) or obtain approval from AFROTC Commander. Includes 1 lecture hour and Leadership lab (2 hours) and PT (3 hours). Course Attributes: Not eligible for use as part of the six ROTC credits allowed for degree electives.

AS 202. The Evolution of USAF and Space Power. 1 Credit.
This course continues its focus on educating and developing Air Force ROTC candidates to become Air Force officers. Featured topics include: Air Force heritage, Air Force leaders, general aspects of air and space power, introduction to ethics and values, group leadership problems, and continuing application of communication skills. A mandatory leadership laboratory complements this course by providing cadets with their first opportunity for applied leadership experiences. Prerequisite: AS 201 (or equivalent) or obtain approval from AFROTC Commander. Includes 1 lecture hour and Leadership lab (2 hours) and PT (3 hours). Course Attributes: Not eligible for use as part of the six ROTC credits allowed for degree electives.

AS 311. Air Force Leadership Studies. 3 Credits.
A study of leadership and quality management fundamentals, professional knowledge, leadership ethics, and communicative skills required of an Air Force junior officer. Case studies are used to examine Air Force leadership and management situations as a means of demonstrating and exercising practical application of the concepts being studied. A mandatory leadership laboratory complements this course by providing advanced leadership experiences in officer-type activities, giving students the opportunity to apply the leadership and management principles discussed in class. Prerequisite: Must pass AS 202 (or equivalent) with a C or better or permission of the Professor of Aerospace Studies. Includes 3 lecture hours and Leadership lab (2 hours) and PT (3 hours). Course Attributes: Not eligible for use as part of the six ROTC credits allowed for degree electives.

AS 312. AF Leadership & Management. 3 Credits.
AS 312 is a continuation of AS 311 on the study of leadership and management fundamentals, professional knowledge, leadership ethics, and communicative skills required of an Air Force junior officer. Case studies are used to examine Air Force leadership and management situations as a means of demonstrating and exercising practical application of the concepts being studied. A mandatory leadership laboratory complements this course by providing advanced leadership experiences in officer-type activities, giving students the opportunity to apply the leadership and management principles discussed in class. Prerequisite: Must pass AS 311 (or equivalent) with a C or better or permission of the Professor of Aerospace Studies. Includes 3 lecture hours and Leadership lab (2 hours) and PT (3 hours). Course Attributes: Not eligible for use as part of the six ROTC credits allowed for degree electives.
AS 411. National Security Affairs/Preparation for Active Duty. 3 Credits.
The course examines the national security process, regional studies, advanced leadership ethics, and Air Force doctrine. Special topics of interest include the military as a profession, officer-ship, military justice, civilian control of the military, preparation for active duty, and current issues affecting the military profession. Within this structure, continued emphasis is given to the refinement of communication skills. A mandatory leadership laboratory complements this course by providing advanced leadership experiences, giving students the opportunity to apply the leadership and management principles of the ROTC program. Enrollment restricted to students pursuing a commission. Prerequisite: AS 312. Includes 3 lecture hours and Leadership lab (2 hours) and PT (3 hours). Course Attributes: May be used as part of the six ROTC credits allowed for degree electives.

AS 412. National Security Affairs/Preparation for Active Duty. 3 Credits.
The course continues the study of the national security process, regional studies, advanced leadership ethics, and Air Force doctrine. Special topics of interest include the military as a profession, officer-ship, military justice, civilian control of the military, preparation for active duty, and current issues affecting the military profession. Within this structure, continued emphasis is given to the refinement of communication skills. A mandatory leadership laboratory complements this course by providing advanced leadership experiences, giving students the opportunity to apply the leadership and management principles of the ROTC program. Enrollment restricted to students pursuing a commission. Prerequisite: AS 411. Includes 3 lecture hours and Leadership lab (2 hours) and PT (3 hours). Course Attributes: May be used as part of the six ROTC credits allowed for degree electives.

Architecture (AP)

Courses

AP 106. Architectural Drafting. 3 Credits.
Techniques of architectural drafting are introduced as basic skills used to describe architectural form. The various graphic tools, techniques, and conventions are presented and the rationale behind their use is explained. In addition to the basic graphic constructions and multi-view projections, the methods of developing architectural plans, elevations, and sections are addressed. This course is primarily intended for students who have had little or no prior introduction to mechanical and architectural drafting. One hour of lecture and three 3-hours of studio per week. 1 lecture hour and 3 studio hours.

AP 111. Fundamentals of Architecture. 4 Credits.
An introduction to the basic principles and skills that constitute the discipline of architecture. A series of two and three-dimensional graphic exercises is used to cultivate an understanding of architectonics, the intentional arrangement of space and enclosure to communicate human values while also introducing graphic techniques for communicating concepts and solutions. One hour of lecture and three 9-hour studios per week.

AP 118. Fundamentals of Architecture II. 4 Credits.
A continuation of the introduction to the fundamental processes and technologies that constitute the discipline of architecture. This course investigates the design process, explores interactive computer graphics (CAD) as a design tool, and culminates with the application of these principles, processes, and skills to an architectural design problem. One hour of lecture and 9 hours of studio per week. Prerequisite: AP 111.

AP 211. Architectural Design I. 5 Credits.
The first in a sequence of design studio courses introducing the processes, judgment, and communications involved in the synthesis of architectural form. Through a focused series of individual and group projects, the influences of the human and physical contexts on form are explored. One hour of lecture and three 4-hour studios per week. Prerequisite: AP 118. 1 lecture hour and 12 studio hours.

AP 212. Architectural Design II. 5 Credits.
Second in a sequence of design studio courses emphasizing the processes, judgment, and communications involved in the synthesis of architectural form. Through a focused series of individual and/or group projects, the influences of functional requirements on form are explored. One hour of lecture and three 4-hour studios per week. Prerequisite: AP 211. 1 lecture hour and 0 to 12 studio hours.

AP 221. Site Development and Design. 3 Credits.
A course that deals with engineering principles and design considerations involved with site design. Earth shaping, drainage, roadway alignment, parking lot layouts, code requirements and environmental factors are studied prior to and after design changes. Two hours of lecture and one 2-hour studio per week. 2 lecture hours and 2 studio hours.

AP 222. Human Issues in Design. 3 Credits.
An introduction to the psychological, sociological, and physical factors that influence the design of architectural space. The fields of anthropometrics, ergonomics, and proxemics are addressed, as well as considerations for barrier-free environments. Three hours of lecture/discussion per week. 3 lecture hours.

AP 225. Introduction to Passive Environmental Systems. 3 Credits.
Through coordinated lectures and demonstrations, the impacts of environmental energies on architectural form are introduced and explored. Emphasis is given to the processes by which the architect orders light, climate, gravity, and sound responses to achieve building geometry. The course also addresses concepts and strategies for responding to environmental hazards, and designing healthy buildings and green architecture. Three hours of lecture. Prerequisite: AP 118, EG 110 or instructor’s permission. 3 lecture hours.
AP 241. Architectural Delineation. 3 Credits.
A studio course in advanced graphic methods. Various rendering techniques, definitive design development, and the principles of construction drawings and architectural detailing are presented and explored through individual projects. One hour of lecture and two 2-hour studios per week. 1 lecture hour and 4 studio hours.

AP 311. Architectural Design III. 5 Credits.
The development of the comprehensive building process as a synthesis of spatial, functional, and contextual concerns with emphases on building systems and materials. Individual and group problems are of a limited and defined scope. One hour of lecture and three 4-hour studios per week. Prerequisites: AP 212 and AP 325. Corequisites: AP 327.

AP 312. Architectural Design IV. 5 Credits.
This fourth course in the design studio sequence continues the development of a comprehensive building design process with problems of complex but limited scope. The synthesis of spatial, functional, and contextual concerns, as directly linked to the understanding and employment of building systems, continues to provide a framework. One 1-hour lecture and three 4-hour studios per week. Prerequisite: AP 311. 1 lecture hour and 12 studio hours.

AP 325. Materials, Construction, and Design. 3 Credits.
An introduction to the processes by which construction materials and systems are evaluated, selected, incorporated, and detailed in building design. Both measurable and immeasurable design responses to environmental energies are explored in soils, concrete, masonry, wood, and metals. Three hours of lecture per week. Prerequisite: AP 225. 3 lecture hours.

AP 327. Active Building Systems I. 3 Credits.
A survey of contemporary mechanical building equipment and systems, including heating, ventilation and air conditioning. Emphasis is placed on comparisons of design parameters, interfaces, and impacts on overall building form. Energy efficiency is addressed. Prerequisites: AP 225 and MA 107. 3 lecture hours.

AP 328. Active Building Systems II. 3 Credits.
A continuation of AP 327, surveying contemporary electrical, lighting, and plumbing equipment and systems. Emphasis is placed on comparisons of design parameters, interfaces, and impacts on overall building form. Energy efficiency and building codes are addressed. Prerequisite: AP 327. 3 lecture hours.

AP 403. Architectural Seminar in History and Theory. 3 Credits.
As both an art and a science, the profession of architecture is continually undergoing change and reassessment. This elective seminar focuses on one or more specific issues and topics regarding the historic and philosophical contexts that influence architecture today. Typically these topics range from the study of specific historic periods or schools of thought regarding design to the diverse trends in current architectural thinking. AP 504 shall require a graduate-level paper or project. This course may be repeated for credit. Three hours of lecture/discussion per week. 3 lecture hours.

AP 406. Architectural Theory. 3 Credits.

AP 411. Architectural Design V. 5 Credits.
Comprehensive problem-oriented design studio offered to fourth year students by various faculty members. The extension of the comprehensive design process includes problems of an expanded scope and large scale, including building complexes and urban design. Individual and group problems emphasize the complex relationships of environmental factors, human concerns, and architectural form. This studio is considered the undergraduate capstone course in the undergraduate portion of the Architecture Program. A design portfolio, covering all seven semesters of studio work and including a written paper, is required to be submitted at the completion of this course. Prerequisite: AP 312. 1 lecture hour and 12 studio hours.

AP 412. Architectural Design VI. 5 Credits.
Elective problem-oriented studios offered to fourth year students by various faculty members. The extension of the comprehensive design process to include problems of expanded scope and large scale, including building complexes and urban design. Individual and group problems emphasize the complex interrelationships of environmental factors, human concerns, and architectural form. One hour of lecture and three 4-hour studios per week. Prerequisite: AP 312. 1 lecture hour and 12 studio hours.

AP 414. Architectural Seminar in Design. 3 Credits.
This elective seminar investigates in a non-studio setting one or more specific concepts, issues, or topics related to architectural design and its associated disciplines, such as urban, landscape, interior, and visual design. AP 514 shall require a graduate level paper or project. This course may be repeated for credit. Three hours of lecture/discussion per week. Prerequisite: approval of instructor. Cross listed with AP 520.

AP 424. Architectural Seminar in Technology. 3 Credits.
As both an art and science, the profession of architecture is continually undergoing change and reassessment. This elective seminar focuses on one or more of the specific issues, topics, or skills related to technologies in architecture today. Typically, these specific semester topics range from advanced materials and construction systems to energy-conserving design; from environmental issues to hands-on building experiences. AP520 shall require a graduate-level paper or project. This course may be repeated for credit. Three hours of lecture/discussion per week. Prerequisites: AP114, AP325, or approval of instructor. Cross listed with AP520.
AP 434. Architectural Seminar in Process. 3 Credits.
As both an art and science, the profession of architecture is continually undergoing change and reassessment. This elective seminar focuses on one or more specific topics regarding the current and future practice of architecture: what architects do, and how they do it. Typically, these topics range from design techniques to office management and from specialties within the practice, to the legal environmental, and social forces that influence it. AP 534 seminar shall require a graduate-level paper or project. This course may be repeated for credit. Three hours of lecture/discussion per week. Prerequisite: instructor’s approval. Cross listed with AP 534.

AP 436. Project Delivery and Documentation. 4 Credits.
Relationships between the formal methods of project delivery and the architectural office form the basic investigation of this course. The project delivery process and the methods of communication and the documentation involved provide a detail study of typical office procedures. The studio component of this course provides practical experience of the typical project delivery process. Documentation is approached as the fundamental means of architectural communication. This communication is multi-layered acting as a foundation for the means of production of contemporary architecture. Various tools will be utilized ranging from computer aided design to conceptual organization schema in both the practice of typical architectural project delivery and the development of new means of communication and production. Two hours of lecture and four hours of studio per week. 2 lecture and 4 studio hours.

AP 455. Special Projects in Architecture. 1-3 Credit.
An execution of a singular project related to architectural design, history/theory, process, or technology selected by the individual student. The course focuses on in-depth independent research, development, and a formal written and/or graphic presentation of an architecturally-related topic not otherwise covered in course offerings. The student must secure a faculty member who will agree to serve as advisor/evaluator for the project. Limited to Architecture majors who have completed at least the first two years of the curriculum. Hours and credits to be arranged. 1 to 3 lecture hours.

AP 456. Senior Project. 4 Credits.

AP 499. Sketching School. 3 Credits.

AP 499L. Adv. Seminar: Sketching. 0 Credits.

Athletic Training (ST)

Courses

ST 310. Upper Extremity Injuries. 3 Credits.
Advanced athletic training course that incorporates areas of assessment/diagnosis, clinical anatomy and biomechanics utilizing evidence-based medicine to provide a comprehensive approach to caring for upper extremity and cervical/thoracic spine injuries. Classroom 3 hours. Prerequisite: SM 220.

ST 311. Clinical Education in Athletic Training I. 2 Credits.
Emphasis will be placed on the application of knowledge and skills introduced in BI 216 (Human Anatomy and Physiology), PE 260 (Personal and Community Health), and SM 220 (Care and Prevention of Athletic Injuries). This course will also provide the opportunity for students to further develop clinical proficiencies introduced in preceding courses. Supervised practicum in an athletic training setting. Class meets for 2 hours/week utilizing lecture, demonstrations and hand-on instructional techniques plus Clinical Rotation (average 4 hours/week). Prerequisites: SM 226 and SM 220, PE 260 and BI 216. Open only to declared Sports Medicine-Athletic Training Concentration students.

ST 320. Lower Extremity Injuries. 3 Credits.
Advanced athletic training course that incorporates areas of assessment/diagnosis, clinical anatomy and biomechanics utilizing evidence-based medicine to provide a comprehensive approach to caring for lower extremity, pelvis and lumbar spine injuries. Classroom 3 hours. Prerequisite: SM 220.

ST 321. Clinical Education in Athletic Training II. 2 Credits.
Emphasis will be placed on the application of knowledge and skills introduced in PE 365 (Kinesiology) and ST 310 (Upper Extremity Injuries). This course will also provide the opportunity for students to further develop clinical proficiencies introduced in preceding courses. Supervised practicum in an athletic training setting. Class meets for 2 hours/week utilizing lecture, demonstrations and hands-on instructional techniques plus Clinical Rotation (average 4 hours/week). Prerequisites: ST 310.

ST 410. Clinical Education in Athletic Training III. 3 Credits.
Emphasis will be placed on the application of knowledge and skills introduced in PE 371 (Physiology of Exercise), SM 420 (Therapeutic Modalities) and ST 320 (Lower Extremity Injuries). This course will also provide the opportunity for students to further develop clinical proficiencies introduced in preceding courses. Supervised practicum in an athletic training session. Class meets 2 hours/week utilizing lecture, demonstrations and hands-on instructional techniques plus Clinical Rotation (average 7 hours/week). Prerequisites: ST 321 and ST 320, SM 420 and PE 371.
ST 421. Clinical Education in Athletic Training IV. 3 Credits.  
Emphasis will be placed on the application of knowledge and skills introduced in SM 422 (Therapeutic Exercise) and SM 437 (Senior Seminar I). This course will also provide the opportunity for students to further develop clinical proficiencies introduced in preceding courses. Supervised practicum in an athletic training setting. Class meets for 2 hours/week utilizing lecture demonstrations and hands-on instructional techniques plus Clinical Rotation (average 8 hours/week). Prerequisites: ST 410, SM 422, PE 371 and SM 437.

Biology (BI)

Courses

BI 101. Principles of Biology I. 4 Credits.  
This course is the prerequisite for all biology courses and satisfies general education laboratory science requirements for both majors and non-majors. This course gives an introduction to biochemistry, cell structure, metabolism, and protein synthesis, as well as human anatomy and physiology. Dissection of living and preserved animals is required. Classroom 3 hours, laboratory 2 hours. Offered fall and spring semesters.

BI 102. Principles of Biology II. 4 Credits.  
This course is a prerequisite for most biology courses and satisfies general education laboratory science requirements for both majors and non-majors. This course explores genetics, evolutionary theory, diversity of life on earth, history of life on earth, and ecology. Dissection of preserved animals is required. Classroom 3 hours, laboratory 2 hours. Prerequisite: BI 101 or permission of the instructor. Offered spring semesters.

BI 201. Comparative Vertebrate Anatomy. 4 Credits.  
A study of the origins, structure and functions of the organ systems of representative vertebrates. An attempt is made to correlate form and function in the evolution of the vertebrates. Classroom 3 hours, laboratory 3 hours. Prerequisites: BI 101, BI 102. Offered fall semesters of odd numbered years.

BI 202. Genetics. 4 Credits.  
The physical and chemical basis of inheritance, expression, and interaction of the hereditary units, linkage, and variation. The application of Mendelian principles to plants and animals. Consideration is also given to microbial and viral genetics and genetic engineering. Classroom 3 hours, laboratory 2 hours. Prerequisites: BI 101, BI 102. Offered fall semesters.

BI 203. Introduction to Scientific Method & Bioscientific Terminology. 1 Credit.  
An introduction to the philosophy of science, the scientific method and bioscientific terminology. Analysis of data and interpretation of scientific and science-related popular press articles is stressed. Includes exposure to various forms of scientific communication and data collection and analysis. Prepares the student for the rigors of majoring in the biological sciences. Classroom 1 hour. Prerequisites: Sophomore standing, major in Biology.

BI 215. Human Anatomy and Physiology. 4 Credits.  
This is the first half of a two semester course exploring human anatomy and physiology. It covers cellular metabolism, tissues, and the following body systems: skeletal, muscle, coetaneous, and nervous. Dissection of preserved animals is required. Classroom 3 hours, laboratory 2 hours. Prerequisite: BI 101 or permission of the instructor. Offered fall semesters.

BI 216. Human Anatomy and Physiology. 4 Credits.  
This is the second half of a two semester course exploring human anatomy and physiology. It investigates the following body systems: endocrine, digestive, respiratory, circulatory, lymphatic (including the immune response), urinary, and reproductive. Dissection of preserved animals is required. Classroom 3 hours, laboratory 2 hours. Prerequisite: BI 215 or permission of the instructor. Offered spring semesters.

BI 220. Introductory Microbiology. 4 Credits.  
A survey of the field of microbiology with emphasis on those microorganisms of medical significance. Fundamentals of microbial structure, physiology and control are considered along with the role of pathogenic organisms in the infectious and disease processes. Laboratory exercises are designed to provide facility in visualizing, staining, culturing, enumerating, isolating, maintaining, and identifying micro organisms. Classroom 3 hours, laboratory 2 hours. Prerequisite: BI 101 or permission of the instructor. Offered spring semesters.

BI 240. Environmental and Food Microbiology. 4 Credits.  
A course designed to develop an awareness of the essential role of microbes in maintaining the biosphere and the quality of life of its human inhabitants. The role of microorganisms as degraders, bioremediators and recyclers of essential elements will be presented and reinforced through laboratory exercises. The dependence of humans on microorganisms for health, food transformation, pharmaceutical production and genetic engineering will be explored in lecture and lab. Controversies surrounding the use of biotechnology to produce genetically engineered foods and animals as well as agents for bioterrorism, will be discussed. Classroom 3 hours, laboratory 2 hours. Prerequisites: BI 101, BI 102 or permission of the instructor. Offered even-numbered fall semesters.

BI 253. Foods and Nutrition. 4 Credits.  
A course designed to provide the student with a background in organizational structure and activities that emphasize the physiological basis of nutrition with an analysis of nutritional needs at various age levels. Consideration given to the relationship of nutrition to health and fitness, principles of food selection, metabolism of nutrients, vitamins and minerals, energy balance and obesity, food safety and technology. Classroom 3 hours, Field Experience/Laboratory 2 hours. Prerequisite: BI 101. Offered spring semesters.
BI 260. Orinthology. 4 Credits.
A survey of avian biology and ecology to include evolution, the anatomical and physiological adaptations for flight, migration, behavior, reproduction and identification of birds and their songs. Integrated classroom, laboratory, and field studies will emphasize Vermont birds. Dissection of the pigeon during the spring semester is an integral part of the spring course's laboratory component. The summer course features a nesting study in lieu of dissection. Classroom 3 hours, laboratory 2 hours. Offered spring semesters.

BI 275. Environmental Biology. 4 Credits.
An introduction to the interaction of man and the environment with emphasis on contemporary problems and their possible solutions. Local and global forms of pollution, detrimental environmental practices, and other relationships will be explored in the classroom and the laboratory. Classroom 3 hours, laboratory 2 hours. Prerequisites: BI 101, BI 102 or permission of the instructor. Offered even-numbered spring semesters.

BI 301. Histology. 4 Credits.
A study of the cellular anatomy of the fundamental tissues and organs. May require dissection of living and preserved animals. Classroom, 3 hours, laboratory 2 hours. Prerequisite: BI 101, BI 102 or permission of instructor. Offered even-numbered fall semesters.

BI 302. Embryology. 4 Credits.
A study of the fundamental principles of development through the establishment of the major organs and systems, exemplified in the laboratory by study of representative embryonic forms. May require dissection of living and preserved animals. Classroom 3 hours, laboratory 2 hours. Prerequisite: BI 101, BI 102 or permission of instructor. Offered even-numbered spring semesters.

BI 304. Physiology. 4 Credits.
A study of the comparative physiology of animals. Physical and chemical principles, cell physiology, with emphasis on homeostatic mechanisms and the study of functions of organ systems. May require dissection of living animals. Classroom 3 hours, laboratory 3 hours. Prerequisites: BI 101, BI 102, and 1 year of college chemistry. Offered even-numbered spring semesters.

BI 305. Modern Laboratory Procedures. 4 Credits.
Students are familiarized with the theories and applications of the new technologies that pervade the fields of biotechnology and molecular biology. Laboratory exercises illustrate key concepts and provide hands-on experience in the use of instrumentation essential to modern biologists. Classroom 2 hours, laboratory 4 hours. Prerequisites: BI 101, BI 102 or BI 215, BI 216, and CH 103, CH 104. Offered odd-numbered fall semesters.

BI 306. Cell Biology. 4 Credits.
A molecular level examination of the ultrastructure and function of the cytoplasm, intracellular components, cell membrane, extracellular structures and formation, and excretion of extracellular products. Recent developments in molecular biology will be stressed, including the implications for the biotechnology industry. The laboratory component will include state-of-the-art procedures and will emphasize hands-on experimental techniques. May require dissection of living animals. Classroom 3 hours, laboratory 3 hours. Prerequisites: BI 101, BI 102 and one year of college chemistry. Offered even-numbered fall semesters.

BI 316. Plant Taxonomy. 4 Credits.
A general survey of the taxonomy and evolution of vascular plants, emphasizing herbaceous plants. Recognition of plant families, identification of species, and principles of collecting and preserving are stressed. Classroom 3 hours, laboratory 3 hours. Prerequisite: BI 102 or permission of instructor. Offered even-numbered fall semesters.

BI 325. Invertebrate Zoology. 4 Credits.
A fundamental course designed to give the student a general knowledge of the structure, physiology, life histories, and ecology of the invertebrate animals. Requires dissection of living and preserved animals. Classroom 3 hours, laboratory 2 hours. Prerequisites: BI 101, BI 102. Offered even-numbered fall semesters.

BI 326. Natural History of the Vertebrates. 4 Credits.
A study of the classification, identification, and ecology of the vertebrates with special emphasis on the local fauna. Collection and preservation of organisms is an integral part of the course. Classroom 3 hours, laboratory 3 hours. Prerequisites: BI 101, BI 102. Offered odd-numbered fall semesters.

BI 330. Immunology. 4 Credits.
A course presenting the basic principles of immunology, including antigen-antibody characteristics, the role of the immune system in defense and disease, and the application of fundamental concepts in the development of new technologies and immunodiagnosis. Classroom 3 hours, laboratory 3 hours. Prerequisites: BI 101, BI 102 or BI 215, BI 216, and 1 year of college chemistry. Offered odd-numbered spring semesters.

BI 341. Plant Anatomy. 4 Credits.
[CAB1 (A), CAB2 (B), CAB5 (S)] The anatomy of vascular plants analyzed from an evolutionary viewpoint. Cell structure, tissues, their distribution in roots, stems, leaves and reproductive organs, and plant development are stressed. Classroom 3 hours, laboratory 3 hours. Prerequisite: BI 102 or permission of instructor. Offered odd-numbered spring semesters.

BI 351. Dendrology and Silvics. 4 Credits.
An introduction to major woody plant species in the Northeast, including taxonomic characteristics, life histories, habitat requirements, and economic importance. Classroom 3 hours, laboratory and/or field work 3 hours. Prerequisite: BI 102 or permission of instructor. Offered odd-numbered fall semesters.
BI 360. Pathophysiology. 3 Credits.
The study of human illness with primary emphasis on the pathogenesis of disease, its disruption of normal physiology, and the body’s mechanism for restoring the steady state. The biology of the disease process is examined at the molecular, cellular, tissue, organ, and organ system level. Classroom 3 hours. Prerequisites: minimum “C” grade in BI 215, BI 216 or permission of instructor. Offered fall semesters.

BI 364. Pathophysiology in Sports Medicine. 4 Credits.
The study of human pathology with primary emphasis on the pathogenesis of those pathological states most commonly encountered in sports medicine, their disruption of normal physiology and the body’s mechanism for restoring the steady state (homeostasis). The biology of the disease process is examined at the molecular, cellular, tissue, organ and organ system level. Classroom 3 hours, laboratory 2 hours. Prerequisites: BI 215 & BI 216 with “C” or higher, or permission of instructor. Offered even-numbered spring semesters.

BI 370. Introduction to Neuroscience. 4 Credits.
An interdisciplinary course designed to introduce the structure and function of the mammalian nervous system. Topics include, but are not limited to, neuronal development, sensory and motor systems, chemical control of the brain and behavior, and the underlying mechanisms of neurodegenerative disease. May require dissection of living animals. Classroom 3 hours, laboratory 2 hours. Prerequisites: BI 215 and either BI 216 or permission of BI 216. Offered fall semesters.

BI 401. Senior Seminar. 3 Credits.
This is the capstone course that integrates reading, writing, speaking and critical thinking skills. It includes instruction in scientific writing, use of contemporary scientific biological literature, library research techniques, and requires a major paper considering ethics in science and research. Students will prepare research papers on current topics using primary sources and give oral presentations on their topics to the department faculty. Classroom 3 hours. Prerequisites: senior class standing or permission of the instructor. Offered fall semesters.

BI 402. Evolution. 4 Credits.
This course is designed to introduce the student to Darwinian and Non-Darwinian mechanisms of evolutionary change, a history of life in the context of contemporary biology, and scientific and cultural controversies surrounding this topic. Offered Fall semesters. Classroom: 4 hours. Prerequisites - BI 101, BI 102 and BI 202 or permission of the instructor. This class can fulfill the CAB1 (anatomy) or CAB5 (systematic) requirements.

BI 405. Ecology. 4 Credits.
The interrelationships between living organisms and their total environment are studied through a combination of lecture, laboratory and field studies. Major concepts include ecosystem structure and function, community development, species diversity, succession, interspecific and intraspecific relationships, competition, predation, behavior, population growth and regulation. Collection and preservation of plants and animals may be required. Classroom 3 hours. If taken for four credits also laboratory and/or field work 3 hours. Prerequisites: BI 101, BI 102. Offered fall and spring semesters.

BI 418. Medical Microbiology. 4 Credits.
A study of pathogenic microorganisms including their general characteristics, physiology, pathogenesis, pathology, diagnosis, treatment, immunity, prevention, and control. Laboratory exercises are designed to familiarize students with diagnostic procedures used in the clinical microbiology laboratory. Classroom 2 hours, laboratory 4 hours. Prerequisite: BI 220 or BI 240. Offered even-numbered spring semesters.

BI 424. Woodland Ecology and Management. 4 Credits.
A review of biotic and abiotic factors controlling the forest environment, methods for determining vegetation structure and succession, introduction to major forest associations in the Northeast, and consequences of various harvesting and management techniques. Classroom 3 hours, field studies 3 hours. Prerequisites: BI 351 or BI 316, or permission of instructor. Offered even-numbered spring semesters.

BI 440. Reading and Research. 3,4 Credits.
Independent study under the supervision of a department faculty member. Open to junior and senior majors with permission of instructor. BI 440 may be taken no more than twice, for a maximum of 7 credits. Students requesting this course must have a 3.0 GPA in biology courses or departmental approval. An approved topic, a brief outline of the research to be conducted, and a signature from a biology mentor must be submitted to the department chair before the end of the drop-add period of the enrolled semester.

BI 450. Intership in Biology. 3,4 Credits.
Intership in Biology.

BI 499. Evolution. 4 Credits.

Chemistry (CH)

Courses

CH 100. Introduction to Forensic Science. 4 Credits.
An introductory survey course of Forensic Science/Criminalistics. The course will focus on scientific principles behind the recognition, collection, preservation, analysis, and interpretation of physical evidence found at a crime scene. The emphasis will be put on providing students with an understanding of the capabilities and limitations of forensic science as it is currently practiced. Lecture 3 hours, laboratory 3 hours. Recommended for students not majoring in science and engineering. Offered fall and spring semesters.
CH 103. General Chemistry I. 4 Credits.
Introduction to chemical characteristics and behavior, stressing atomic structure, stoichiometry, chemical equilibrium and kinetics, and descriptive chemistry of important elements. Laboratory includes qualitative and quantitative exercises, and syntheses. Lecture 3 hours, laboratory 3 hours. Credit will not be granted for more than one of the following sequences: CH 103 - CH 104, CH 111 - CH 112, or CH 103 - CH 112. Prerequisites: One year of high school chemistry and a score of 2 or better on the Norwich University Mathematics Placement Test or a "C" or better in MA 103. Offered fall semesters.

CH 104. General Chemistry II. 4 Credits.
Continuation of the study of chemical characteristics and behavior, stressing atomic structure, stoichiometry, chemical equilibrium and kinetics, and descriptive chemistry of important elements. Laboratory includes qualitative and quantitative exercises, and syntheses. Lecture 3 hours, laboratory 3 hours. Credit will not be granted for more than one of the following sequences: CH 103 - CH 104, CH 111 - CH 112, or CH 103 - CH 112. Prerequisites: CH 103. Offered spring semesters.

CH 111. Chemistry and the Chemical World. 4 Credits.
Enter-level chemistry course introducing the non-science major to chemistry's impact upon the modern world. Qualitative interpretation of chemistry's role in areas of societal concern such as natural resources, environmental quality and pollution, and nuclear and alternative energy forms. Laboratory work will include qualitative as well as quantitative investigations. Lecture 3 hours, laboratory 3 hours. Credit will not be granted for more than one of the following sequences: CH 103 - CH 104, CH 111 - CH 112, or CH 103 - CH 112. Recommended for students not majoring in science and engineering. Prerequisite: Score of 1 or better on the Norwich University Mathematics Placement test or successful completion of MA 005. Offered fall semesters.

CH 112. Living Chemistry. 4 Credits.
Introduces practical aspects of organic and biochemistry and will include applied areas of biochemistry, such as drugs and chemical therapy, nutrition and food additives, toxicology, and consumer chemistry. Laboratory emphasis directed toward synthetic and analytical techniques as applied to these areas. Lecture 3 hours, laboratory 3 hours. Prerequisites: CH 111 or CH 103, or one year of high school chemistry taken within last five years, or by permission of the instructor. Credit will not be granted for more than one of the following sequences: CH 113 or CH 112. CH 112 or CH 113 may not be taken for credit after successful completion of CH 205. Recommended for students not majoring in science or engineering. Prerequisites: Score of 1 or better on the University Mathematics Placement Test or successful completion of MA 005.

CH 204. Quantitative Analysis. 4 Credits.
A course on the general principles and laboratory practices of quantitative analysis, applied principally in colorimetric and volumetric determinations. Studies of theory and practical procedures associated with gravimetric analysis, potentiometric titrations, and use of pH-meters. Lecture 3 hours, laboratory 6 hours. Prerequisites: CH 103, CH 104. Offered spring semesters of odd numbered years.

CH 205. Survey of Organic Chemistry. 4 Credits.
An introduction to the covalent compounds of carbon. Laboratory work involves elementary manipulation of organic laboratory equipment, preparation and identification of typical organic compounds, and the characteristics of the major functional groups. Lecture 3 hours, laboratory 2 hours. Prerequisites: CH 103 - CH 104. Offered fall semesters of odd numbered years.

CH 214. Communication in Chemistry. 1 Credit.
This course illustrates the organization of the chemical literature, the efficient search of the literature and a formal introduction to scientific writing. Offered fall semesters of even years.

CH 225. Organic Chemistry I. 4 Credits.
An introduction to the study of carbon compounds; preparation and identification of typical compounds. Lecture 3 hours, laboratory 3 hours. Prerequisites: CH 103 - CH 104 or by petition. Offered fall semesters.

CH 226. Organic Chemistry II. 4 Credits.
A continuation of the study of carbon compounds; preparation and identification of typical compounds. Lecture 3 hours, laboratory 3 hours. Prerequisite: CH 225. Offered spring semesters.

CH 314. Instrumental Methods. 3 Credits.
A course on the Theory of Modern Instrumental Methods. Lecture 3 hours. Prerequisites: CH 204 required, CH 327 - CH 328 recommended. Offered spring semesters of even numbered years.

CH 315. Analysis Laboratory. 1 Credit.
A course that provides upper class laboratory experience in chemical methods of measurement and analysis. Laboratory 3 hours. Prerequisite: CH 204. Offered spring semesters of even numbered years.

CH 324. Biochemistry I. 4 Credits.
A course on the chemical phenomena and energy effects in life processes. Topics include structure and function of biomolecules, metabolism (catabolism and anabolism), photosynthesis and recombinant DNA technologies. Lecture 3 hours, laboratory 3 hours. Prerequisites: CH 103 - 104, and either CH 205 or co-requisite of CH 226. Offered even numbered spring semesters.
Course Descriptions

CH 325. Biochemistry II. 4 Credits.
A continuation of the study of the chemical phenomena and energy effects in life processes. Topics include structure and function of biomolecules, metabolism (catabolism and anabolism), photosynthesis and recombinant DNA technologies. Lecture 3 hours, laboratory 3 hours. Prerequisite: CH 324. Offered even numbered fall semesters.

CH 327. Physical Chemistry I. 3 Credits.
A course on the physical properties and structure of matter; general principles and theories of chemical interaction. Major areas studied are chemical applications of thermodynamics; phase equilibria; electrochemistry; reaction kinetics; description of electronic structure of atoms and molecules. Lecture 3 hours. Prerequisites: CH103-104; co-requisite; MA224 and college physics (recommended). Offered even numbered fall semesters.

CH 328. Physical Chemistry II. 3 Credits.
A continuation of the study of the physical properties and structure of matter; general principles and theories of chemical interaction. Major areas studied are chemical applications of thermodynamics; phase equilibria; electrochemistry; reaction kinetics; description of electronic structure of atoms and molecules. Lecture 3 hours. Prerequisite: CH 327. Offered odd numbered spring semesters.

CH 337. Physical Chemistry Laboratory I. 1 Credit.
Laboratory investigations with written formal reports on the physical properties and chemical behavior of substances. Laboratory 3 hours. Prerequisite or co-requisite: CH 327. Offered even numbered fall semesters.

CH 338. Physical Chemistry Laboratory II. 1 Credit.
Laboratory investigations with written formal reports on the physical properties and chemical behavior of substances. Laboratory 3 hours. Prerequisite or co-requisite: CH 328. Offered odd numbered spring semesters.

CH 413. Chemistry Seminar. 1 Credit.
Part of a capstone experience that provides individual assignments, written reports, oral reports, and class discussions on chemical topics of current interest. Reading, writing, speaking and critical thinking skills are emphasized. Lecture 1 hour. Prerequisites: CH 225 - CH 226, CH 327 - CH 328.

CH 421. Chemical Synthesis and Examination I. 3 Credits.
A capstone experience in which organic, inorganic and compounds of biological interest are synthesized and examined with respect to purity and properties. The objectives are to develop an integrated perspective on the general field of chemistry and to develop proficiency in practical laboratory procedures and in reporting results. Laboratory and occasional lectures 8 hours. Prerequisites or co-requisites: CH 225 - CH 226, CH 327 - CH 328. Offered fall semesters.

CH 422. Chemical Synthesis and Examination II. 3 Credits.
A capstone experience in which organic, inorganic and compounds of biological interest are synthesized and examined with respect to purity and properties. The objectives are to develop an integrated perspective on the general field of chemistry and to develop proficiency in practical laboratory procedures and in reporting results. Laboratory and occasional lectures 8 hours. Prerequisites or co-requisites: CH 225 - CH 226, CH 327 - CH 328. Offered spring semesters.

CH 425. Thesis. 1-3 Credit.
This course allows the student to conduct research on a project approved by the faculty of the chemistry and biochemistry programs. The student can be expected to perform the necessary experiments, organize and interpret the data and to communicate the results of the project with a comprehensive report. Prerequisites: CH 225 - CH 226. Co-requisites: CH 327 - CH 328, CH 438. Permission of the program faculty is also required. The student may re-enroll in CH 425 for up to 6 credits.

CH 438. Advanced Inorganic Chemistry. 3 Credits.
A course on the chemistry of the elements: properties, characteristics, and behavior. Lecture 3 hours. Prerequisites: CH 327 - CH 328. Offered fall semesters of odd numbered years.

CH 439. Advanced Organic Chemistry. 3 Credits.
An advanced and thorough development of topics introduced in CH 225 - CH 226. Lecture 3 hours. Prerequisites: CH 225 - CH 226. Offered fall semesters of even numbered years.

CH 450. Topics in Chemistry. 3 Credits.
A course in which a selected limited topic in advanced chemistry is covered in depth. Offered on occasion. Prerequisite: permission of the instructor.

Chinese (CN)
Courses

CN 111. Beginning Chinese I. 6 Credits.
An intensive course providing an introduction to the Mandarin language, including both traditional Chinese characters and the Pinyin transliteration system. In this course, speaking proficiency (including familiarization with Chinese tones), aural comprehension, vocabulary acquisition, reading and writing of Chinese characters are brought to a level enabling students to use the language actively in everyday situations. Classroom 6 hours, laboratory 2 hours. Not open to students who have successfully completed CN 205 or higher.

CN 112. Beginning Chinese II. 6 Credits.
A continuation of CN 111, with continued emphasis on each of the language skill areas—speaking, listening, vocabulary, reading and writing. Classroom 6 hours, laboratory 2 hours. Prerequisite: CN 111 or equivalent NU placement. Not open to students who have successfully completed CN 205 or higher.

CN 205. Intermediate Chinese I. 3 Credits.
A course providing aural-oral practice in Chinese, in which students enter into full discussion of topics that include abstract themes and cultural perspectives; includes the expanded use of syntactical structures, the reading of sophisticated material, composition, and the viewing of selected Chinese films and documentary materials from Chinese-language television. Taught entirely in Chinese. Classroom 3 hours, laboratory 1 hour. Prerequisite: CN 112, NU language placement exam, or permission of the instructor.

CN 206. Intermediate Chinese II. 3 Credits.
A course providing aural-oral practice in Chinese, in which students enter into full discussion of topics that include abstract themes and cultural perspectives; includes the expanded use of syntactical structures, the reading of sophisticated material, composition, and the viewing of selected Chinese films and documentary materials from Chinese television. Taught entirely in Chinese. Classroom 3 hours, laboratory 1 hour. Prerequisite: CN 205 or the equivalent, NU language placement exam. 3 lecture hours.

CN 301. Advanced Chinese I. 3 Credits.
Oral and written practice of the language through class discussions of selected Chinese texts. Selective review of grammar, especially of the more difficult and subtle aspects, designed to facilitate an idiomatic and fluent use of the language. Classroom 3 hours. Prerequisite: CN 206, NU placement, or permission of instructor.

CN 302. Advanced Chinese II. 3 Credits.
Oral and written practice of the language through class discussions of selected Chinese texts. Selective review of grammar, especially of the more difficult and subtle aspects, designed to facilitate an idiomatic and fluent use of the language. Classroom: 3 hours. Prerequisite: CN 301, NU placement, or permission of instructor.

CN 321. Chinese Literature, Culture and Society I 1911-1949. 3 Credits.
Introduction to major currents in Chinese social, literary, and cultural history from 1911 to 1949. Taught in Chinese. Prerequisite: CN 206 or a 300-level course, NU placement, or permission of instructor.

CN 322. Chinese Literature, Culture and Society II 1949-Present. 3 Credits.
Introduction to major currents in Chinese social, literary, and cultural history from 1949 to present. Taught in Chinese. Classroom: 3 hours. Prerequisite: CN 206 or a 300-level course, NU placement, or permission of instructor.

CN 331. Advanced Chinese Composition and Conversation (I). 3 Credits.
A study of original Chinese journalistic texts to elevate students’ Chinese language proficiency in writing and composition, oral reports and discussion, reading and comprehension, and in Chinese-English/English-Chinese translation. Prerequisite: CN 206 or a 300-level course (may be taken concurrently), NU language placement test, or permission of the instructor. 3 lecture hours.

CN 332. Advanced Chinese Composition and Conversation (II). 3 Credits.
A study of original Chinese literary texts to elevate students’ Chinese language proficiency in writing and composition, oral reports and discussion, reading and comprehension, and in Chinese-English/English-Chinese translation. Prerequisite: CN 206 or a 300-level course (may be taken concurrently), NU language placement test, or permission of the instructor. 3 lecture hours.

CN 365. Chinese Literature, Culture and Society III: 221 BCE-1911. 3 Credits.
A survey of representative Chinese classical works – novels, short stories. Prose, poetry, and traditional operatic dramas – during Qin Dynasty (221-226 BCE), Han Dynasty (960-1279), Yuan Dynasty (1271-1368), Ming Dynasty (1368-1644) and Qing Dynasty (1644-1911). Lectures, readings, discussions and written reports in Chinese. Prerequisite: CN 206 or a 300-level course (may be taken concurrently), NU language placement test, or permission of the instructor. 3 lecture hours.

CN 366. Chinese Literature, Culture and Society IV: Beginning-221 BCE. 3 Credits.
A survey of Chinese literary, historical and philosophical writings, legends. Folklore, myth, songs, and poems from Zhou Dynasty (1045 BCE-256 BCE), Shang Dynasty (1600 BCE-1046 BCE), Xia Dynasty (2100 BCE-1600 BCE) and before. Lectures, readings, discussions and written reports in Chinese. Prerequisite: CN 206 or a 300-level course especially CN 365, NU language placement test, or permission of the instructor. 3 lecture hours.
Civil Engineering (CE)

Courses

CE 211. Surveying. 3 Credits.
A course in the theory and practice of plane surveying. Horizontal and vertical control, design of circular and parabolic curves, tachometry, construction surveys and earthwork quantities are covered in lecture. Fieldwork presents the practical applications of lecture material with the use of transits, tapes, levels, electronic distance measuring devices and theodolites. Classroom 2 hours, laboratory 3 hours. Prerequisite: MA 107.

CE 214. Site Development and Engineering. 4 Credits.
A course that teaches the tasks and considerations involved in environmentally sound land development. Road design and its interaction with development sites will be presented. Other topics covered include contours, drainage utilities, cut and fill, and aesthetic considerations. Codes and legal requirements will also be covered. CADD (Computer Aided Drawing and Design) software specific to Civil Engineering work will be introduced and employed extensively on student projects.

CE 220. Introduction to Environmental Technology. 4 Credits.
A study of the fundamentals of environmental control technology. The course covers the topics of air pollution, water pollution, solid and hazardous wastes, and radioactive wastes. Noise pollution and control are also covered. The generation and treatment of wastes along with their effects on the environment are included in the course. The laboratory includes the basic methods of measuring pollution. Three Credits: Classroom 3 hours. Four Credits Classroom 3 hours, laboratory 2 hours. Prerequisite: CH 103 or CH 111. Not open to engineering students.

CE 318. Soil Mechanics. 3 Credits.
An introduction to the engineering properties of soil: soil classification; soil structure and mineralogy; water flow through soils; compressibility and consolidation; shear strength. Laboratory testing of soils and soil exploration. Offered to allow students from other institutions to transfer 3 credit equivalent courses.

CE 321. Materials Laboratory. 1 Credit.
A laboratory course in the application of basic mechanics of materials principles to cement, aggregate, concrete, steel and wood. Operation of various types of testing machines and gauges. Tests of tension, compression, flexure, torsion, impact, shear, hardness and fatigue. Laboratory observations, analysis, interpretation and reports. Classroom 1 hour, laboratory 2 hours. Corequisite: EG 301 or CE 351.

CE 322. Fluid Mechanics Laboratory. 1 Credit.
A laboratory course in which the principles of fluid mechanics are applied to civil engineering problems. The design and implementation of a laboratory research study, the analysis of data, the presentation of results, and the development of engineering conclusions are integral parts of this course. Lab topics include hydrostatics, pipeflow, open channel flow, flow measurement, and resistance to flow. Classroom 1 hour, laboratory 2 hours. Prerequisite or concurrent enrollment: EG 303.

CE 328. Soil Mechanics. 4 Credits.
An introduction to the engineering properties of soil: soil classification; soil structure and mineralogy; water flow through soils; compressibility and consolidation; shear strength. Laboratory testing of soils and soil exploration. Classroom 3 hours, laboratory 2 hours. Prerequisite: EG 301 or permission of the instructor.

CE 332. Engineering Hydrology. 3 Credits.
A study of the location, movement, and distribution of the waters of the earth for practical applications to society. This course includes the study of the engineering aspects of precipitation, evaporation, infiltration, streamflow and flood and drought prediction. The application of hydrological statistics and computer applications are stressed. Classroom 3 hours. Prerequisite: EG 303 or permission of the instructor.

CE 348. Structural Analysis. 4 Credits.
A course on the analysis of statically determinate and indeterminate beams, frames and trusses. Topics include loads to buildings, shear and moment diagrams, influence lines and classical methods of analysis. Computer applications are introduced using a general frame analysis program. The use of analysis in the overall design process is stressed using a semester-long project. Classroom 4 hours. Prerequisite: EG 301.

CE 351. Statics and Mechanics of Materials. 4 Credits.
A study of elementary, primarily two-dimensional engineering mechanics. Fundamental concepts and basic laws of statics, force systems, structures, and support reactions for loading patterns. Stress-strain relationships to forces: concepts and applications. Consideration of engineering materials and their suitability in various structures and mechanisms. Classroom 4 hours. Prerequisite: MA 107 and PS 201. Not open to engineering students.

CE 399. Intro to Transportation Eng. 3 Credits.

CE 419. Foundation Engineering. 3 Credits.
A course on the use of soil properties to determine bearing capacity and settlement of shallow and deep foundations. Design of earth and earth supporting structures. Classroom 3 hours. Prerequisite: CE 328 or permission of the instructor.
CE 421. Sanitary Engineering. 4 Credits.
Sources, quantities and constituents of water and wastewater are examined and their interaction with the environment is stressed. Design of chemical, physical and biological treatment facilities according to current practice is stressed. The laboratory develops standard methods of chemical, physical and biological examination and analysis. Classroom 3 hours, laboratory 3 hours. Prerequisites: EG 303 and CH 104.

CE 422. Water and Wastewater Treatment. 3 Credits.
A study of physical, chemical and biological processes for water and wastewater treatment. The course emphasizes the evaluation of unit processes and the design of water and wastewater treatment facilities. Classroom 3 hours. Prerequisite: CE 421.

CE 432. Solid and Hazardous Waste Engineering. 3 Credits.
A course on the state-of-the-art techniques for disposal of solid and hazardous waste material. Aspects covered will be system design, public health protection, and environmental protection. Classroom 3 hours. Prerequisites: CH 104 and junior or senior status in engineering or science.

CE 433. Groundwater Hydrology. 3 Credits.
A course that covers the basic principles of groundwater flow and modeling, its development as a water source, prevention of groundwater contamination and contaminated groundwater remediation. Classroom 3 hours. Prerequisite: CE 328 or permission of the instructor.

CE 441. Transportation Engineering. 3 Credits.
The planning, design, and construction of transportation systems to meet the mobility requirements of society while considering economic, environmental, and societal constraints. System maintenance and administration are also included. Classroom 3 hours. Prerequisite: CE 211 or permission of the instructor.

CE 442. Design of Metal Structures. 3 Credits.
An introduction to the design of metal structures using the LRFD-AISC code as the basis. Topics include design of tension, compression and bending members; bolted and welded connections. Classroom 3 hours. Prerequisite: CE 348.

CE 444. Reinforced Concrete Design. 3 Credits.
An introduction to the design of reinforced concrete members under bending, shear and axial loadings according to ACI 318R code requirements. Topics also include one-way slabs, footings and retaining walls and an introduction to pre-stressed concrete. Use of the computer as a design tool is introduced. Classroom 3 hours. Prerequisite: CE 348.

CE 450. Air Pollution Control. 3,4 Credits.
A course presenting sources of air pollution and the effect on the environment, the measurement of air pollutants, modeling of air pollutant dispersion, and design of control measures. Use of manual monitoring techniques and physical and chemical fundamentals to measure air quality. Course may be taken for three credits without the lab. Classroom 3 hours, laboratory 3 hours. Prerequisite: EG 206.

CE 451. Air Pollution Control Equipment Design. 3 Credits.
This course builds on and amplifies material studied in CE 450. Properties of air pollutant emissions and thermodynamics, fluid mechanics and heat transfer principles are utilized to design air pollution control equipment. Several major design projects are undertaken by student teams; interim and final design reports are required. In addition, a module on air quality modeling is included. Classroom 3 hours. Prerequisite: CE 450.

CE 452. Introduction to Air Pollution Control. 3 Credits.
A course presenting sources of air pollution and the effect on the environment, the measurement of air pollutants, modeling of air pollutant dispersion, and design of control measures. Classroom 3 hours, laboratory 3 hours. Prerequisite: EG 206.

CE 453. Air Pollution Measurement Lab. 1 Credit.
Use of manual monitoring techniques and physical and chemical fundamentals to measure air quality. Laboratory 3 hours. Corequisite: CE 452.

CE 455. Structures I. 3 Credits.
This course builds directly on the material learned in CE 351 and is specifically directed to the study of the response of structural systems to various loadings. Gravity and lateral loads as well as load combinations on a structure are developed using appropriate building codes. The response of the structural system to imposed loading is studied by classical and computer analysis techniques. Finally, this course introduces the students to the design of simple steel structures that meet the appropriate building code. Classroom 3 hours. Prerequisite: CE 351. Not open to engineering majors.

CE 456. Structures II. 3 Credits.
This course is intended to introduce the students to and develop an understanding of, structural design of wood, concrete and masonry. Particular attention will be given to failure modes of the member types and materials. Each of the principal member types, beam and column as well as connections, will be studied and members designed to meet the appropriate code. Classroom 3 hours. Prerequisite: CE 455. Not open to engineering majors.

CE 457. Wood, Steel, and Concrete Structures. 4 Credits.
This course builds directly on the material learned in CE 351 and is specifically directed to the study of the response of structural systems to various loadings. Gravity and lateral loads as well as load combinations on a structure are developed using appropriate building codes. The response of the structural system to imposed loading is studied by classical and computer analysis techniques. This course introduces the students to applications - the design of simple structures of wood, steel, concrete and other materials that meet the appropriate building code. Classroom 4 hours. Prerequisite CE 351. Not open to engineering majors.
CE 458. Structural Issues for Construction. 3 Credits.
This course is intended to introduce the students to structural building applications, and to develop knowledge and comprehension of structural design of steel, wood, concrete, and masonry. Particular attention will be given to concrete members, concrete form design requirements, steel connections, failure modes of the member types and materials. Detailed construction issues with each material will be emphasized. Each of the principal member types, beam and column as well as connections, will be studied and members designed to meet the appropriate code. Lecture 3 hours. Prerequisites: CE 455 or CE 457. Not open to engineering majors.

CE 460. Construction Management. 3 Credits.
A course on the organization, scheduling and management of the construction project utilizing CPM and PERT. Survey of management functions by which construction is authorized, purchased, supervised, accomplished, inspected and accepted, including labor management relations and site design. Classroom 3 hours. Prerequisite: MA 107.

CE 464. Specifications and Estimating. 1 Credit.
A laboratory in plan reading, quantity analysis and cost estimating of Civil Engineering projects. Students will be exposed to standard formats for specifications and estimating. Students will write sample specifications and will gain experience in construction estimation. Laboratory 3 hours. Prerequisites: CE 211 and CE 460.

CE 475. Senior Project Planning. 1 Credit.
Each student will work with a mentor and together will define and analyze a project so that an efficient design can be completed. The project scope will be developed, tasks will be laid out, and a schedule to complete the project will be created. All of this will be presented orally and in written form in a project proposal. Prerequisite: Senior status. Corequisite: CE 460.

CE 480. Senior Design. 3 Credits.
A capstone course in civil engineering. This course builds on and integrates the engineering concepts developed in prior course work into the complete design of a major civil engineering project. The course will require a written and an oral presentation of the completed design to include, where appropriate, plans and specifications. Prerequisites: CE 328, CE 348, and CE 421, or departmental approval.

CE 490. Advanced Topics. 4 Credits.
A course that provides instruction in an area of the instructor’s special competence and student interests. Advanced topics would be presented in such areas as air pollution control, water and wastewater treatment, bioremediation, and nuclear radiation. Offered as the occasion demands. Prerequisite: senior standing.

CE 499. Applied Soils and Foundations. 4 Credits.

Common Engineering (EG)

Courses

EG 043. Conference. 0 Credits.
A scheduled weekly conference hour with the faculty and senior engineering students for discussions of topics such as placement, professional registration, professional ethics, and professional growth after graduation. The course includes a substantial writing component on ethics. A grade of satisfactory (S) is required for graduation. Classroom 1 hour. Prerequisite: senior standing.

EG 044. Conference. 0 Credits.
A scheduled weekly conference hour with the faculty and senior engineering students for preparation of the Fundamentals of Engineering (FE) exam. The student must take the FE exam to receive a satisfactory grade in this course. EG 044 is not required if the student has already passed the FE exam. Classroom 1 hour. Prerequisite: senior standing.

EG 109. Introduction to Engineering i. 3 Credits.
An introduction to engineering, the concepts of engineering design and the non-technical aspects of engineering. The concepts of graphical communication skills to depict engineering designs using computer aided drawing will be covered. Students will perform design projects to incorporate the technical and the non-technical aspects of design into projects. Classroom 2 hours; laboratory 3 hours.

EG 110. Introduction to Engineering II. 3 Credits.
A continuation of EG 109 to include an introduction to engineering computing through the design of algorithms to solve engineering problems. The design projects will be coordinated with mathematics and science courses being taken concurrently by the students to reinforce the material learned in those courses. Design projects will include the technical and non-technical aspects of engineering design. Prerequisite: EG 109 or permission of the instructor. Classroom 2 hours; laboratory 3 hours.

EG 111. Fundamentals of Engineering I. 3 Credits.
An introduction to engineering and the concepts of engineering design. Includes an introduction to graphical communication skills used in engineering through the use of sketching and computer-aided design (CAD) on personal computers. The concepts of orthographic and isometric drawings are stressed and extended to include sections and dimensions. The use of spreadsheets in engineering is also included. This course is open only to students in an Engineering major or those with permission of the Engineering Division Head. Classroom 2 hours, laboratory 3 hours.
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EG 112. Fundamentals of Engineering II. 4 Credits.
A continuation of the concepts of engineering design. Includes an introduction to engineering computing through the design of algorithms using structured techniques that employ a high-level engineering computer language. This course is open only to students in an Engineering major or those with permission of the Engineering Division Head. Classroom 3 hours, laboratory 2 hours.

EG 201. Engineering Mechanics (Statics, Dynamics). 3 Credits.

A course in elementary engineering mechanics. Vector notation. Force systems, moments, equilibrium, the free body diagram. Friction, simple frames, trusses, beams, centroids, and second moments. Kinematics: rectilinear and curvilinear motion; translation and rotation; relative motion. Kinetics: force, mass, and acceleration; impulse and momentum; work and energy. Elementary vector calculus. Classroom 3 hours. Prerequisites: EG 201 and MA 122.

EG 203. Materials Science. 3 Credits.
An introduction to the science of materials based on the physics and chemistry of their internal structures. The effects of structure on the properties and behavior of metallic, polymeric, ceramic, semiconductor, and composite materials. Classroom 3 hours. Prerequisite: CH 103.

EG 206. Thermodynamics I. 3 Credits.
A study of the fundamental concepts and laws of thermodynamics and of the properties of pure substances, with applications to engineering processes and operations. Classroom 3 hours. Corequisite: MA 122.

EG 301. Mechanics of Materials. 3 Credits.
A course on the concepts of stress and strain; effect of loads; analysis of plane stress and strain; deformations of beams, shafts, and axial members; buckling and combined stresses. Classroom 3 hours. Prerequisite: EG 201.

EG 303. Fluid Mechanics. 3 Credits.
A study of fluid properties and their significance. Fundamental mechanics of compressible and incompressible fluid motion with application to engineering problems. Topics include resistance of fluids in laminar and turbulent flow; open-channel flow; fluid statics; dimensional analysis and similarity. Classroom 3 hours. Prerequisite: MA 122; Prerequisite or concurrent enrollment: EG 206 or permission of the instructor.

EG 447. Special Projects (Technical Elective). 1-6 Credit.
A report on an approved engineering design project or topic area to meet the specific objectives of a student in a particular area of study. Limited to students who have organized plans and/or projects that can be related to their engineering interests. Hours and credits to be arranged. Prerequisite: permission of the curriculum department chair and advisor.

EG 450. Professional Issues. 3 Credits.
A course to prepare the engineering student for the non-technical aspects of the engineering profession. Topics covered include engineering registration, ethical responsibilities, malpractice and legal responsibilities, and the business aspects of the engineering profession. Classroom 2 hours. Recitation 2 hours. Prerequisites: junior or senior status.

Communications (CM)

Courses

CM 109. Introduction to Mass Media. 3 Credits.
The mass media are so pervasive in contemporary society that students in many disciplines will find this course valuable. It provides a comprehensive overview of the development of such media as newspapers, magazines, books, radio, television, film, recordings and the Internet. In addition, it introduces students to issues of regulatory control, audience analysis, media ethics and international mass communications.

CM 207. Journalism I: News Gathering. 3 Credits.
This course covers the fundamentals of news gathering, reporting and writing on assignment. Students learn to evaluate how the media relate events. The course also treats such issues as the right to privacy, the risks of libel, and the ethical contexts of gathering information.

CM 208. Journalism II: Advanced News Gathering and Design. 3 Credits.
This course continues CM 207 and concentrates on in-depth and investigative reporting, interviewing and feature writing, as well as basic newspaper layout and design. Students explore the patterns of thinking and feeling that enable the reporter to make sound observations and judgments. Prerequisite: CM 207 or permission of instructor.

CM 209. Broadcast Writing. 3 Credits.
This course acquaints the student with the theory and practice of writing for broadcast media. Students are introduced to writing styles used in radio, television, and film. They also learn about news gathering, documentary techniques, and dramatic writing. Prerequisite: CM 109 or permission of instructor.
CM 211. Broadcasting Techniques. 3 Credits.
This course develops critical perspectives on television programming and introduces students to the complexities of dramatic and non-dramatic programming, including serials, series, sitcoms, docudramas, documentaries, and news stories.

CM 271. Television Production. 4 Credits.
An introduction to electronic field production (EFP), electronic news gathering (ENG), and multi-camera studio production with a special-effects switcher. This course is a required course for communications majors. Students will learn how to use professional camera equipment and to construct a news feature segment on the Avid media Composer editing suite platform. Classroom 3 hours, laboratory 3 hours. Offered spring and fall semesters.

CM 303. Advertising. 3 Credits.
A course designed to introduce students to a special area or current topic in communications. Course material varies each semester. Analytical writing required. Prerequisite: permission of instructor.

CM 304. Principles and Practices of Corporate Communications. 3 Credits.
An analysis of the theory and practice of public relations, its functions in organizations, and its role in society. Students apply course material to public relations program planning and management by working individually and in groups on case-study projects. Prerequisite: CM 109 or permission of instructor.

CM 307. Digital Video Production. 3 Credits.
A survey of advertising practices and advertising campaigns. Students analyze the visual and verbal properties of successful advertising, discovering the key elements of creative strategy and design.

CM 351. Radio Production. 3 Credits.
This course, a continuation of CM 211, is designed for students interested in developing their broadcast production skills as well as their understanding of the entire range of issues associated with radio work. In addition to discussing the most recent cable, satellite, and computer broadcast applications, the course emphasizes work on voice and diction, interviewing, radio news gathering and editing, cultural and public affairs programming, and commercial production. Prerequisite: CM 211 or permission of the instructor.

CM 390. Topics in Communications. 3 Credits.
This course develops critical perspectives on television programming and introduces students to the complexities of dramatic and non-dramatic programming, including serials, series, sitcoms, docudramas, documentaries, and news stories.

CM 391. Advanced Television Production. 3 Credits.
This course draws on skills learned in CM 271: Television Production. Students gain confidence in their abilities, explore advanced techniques, and learn how to become working members of a professional production team. Advanced areas of instruction include an introduction to the SONY BetacamSP and the development of skills necessary to function as an assistant editor (logging, digitizing, and rendering effects). This is the first in a track of advanced digital technology courses that must be completed in sequential order.

CM 392. Documentary Television Production. 3 Credits.
In this course, students learn the basic fundamentals of traditional long-form documentary production. Early units emphasize research skills, including letters, telephone contacts and archival research. Later units cover on-camera interviewing, logging and organization of footage into off-line drafts. Students learn the functions of the assistant editor on major projects. This is the second in a track of advanced digital technology courses that must be completed in sequential order. Prerequisite: CM 391.

CM 393. Non-linear Digital Television. 3 Credits.
Emphasizes the principles of non-linear post-production. Through discussion, practical exercises and demonstrations, students analyze the differences between linear and non-linear editing systems, the potential and limitations, of digital technology. Students digitize and organize footage, edit sync and non-sync material and assist in the development of sophisticated finished projects for professional portfolios. This is the third in a track of advanced digital technology courses that must be completed in sequential order. Prerequisite: CM 392.

CM 407. Senior Communications Seminar. 3 Credits.
A required course for Communications majors, designed to provide students up-to-date information about the fields of radio, television, journalism, advertising, public relations, public information, wire services and the Internet. Special applications of these fields in business, the military, politics, law, and other professions will be considered. As part of this capstone course, seniors will be required to present and analyze before an audience of department faculty and/or other faculty, a portfolio of prior work. Prerequisite: senior status or permission of instructor.

CM 408. Communications Internship. 3 Credits.
A course designed to combine practical work experience with college-level study in such communications areas as radio, television, advertising, film, journalism, and public relations. Normally, students are required to find their own internship location and must provide their own transportation. Prerequisite: senior status or permission of instructor.
CM 436. Communications Law and Ethics. 3 Credits.
A survey of laws pertaining to journalism, broadcasting, and advertising, emphasizing ethical problems facing journalists and media specialists. Students study the history of press freedom and control and explore First Amendment issues such as the right to privacy; obscenity; and libel. Special emphasis will be placed on media ethics. Prerequisite: CM 109 or permission of instructor.

CM 491. Media Composer Techniques. 3 Credits.
An introduction to the basic technology and aesthetic possibilities of the Avid Media Composer (the industry non-linear post-production standard). As producers and editors, students lead teams of assistants in creating long-form projects. The course combines instructor-led discussion, hand-on demonstration and mentoring assistance. This is the fourth in a track of advanced digital technology courses that must be completed in sequential order. Prerequisite: CM 393.

CM 492. Advanced Media Composer Techniques. 3 Credits.
This course prepares students for professional careers as Media Composer producers and editors. It includes an introduction to mediabase management and stresses speed and efficiency of organizing and editing material using Media Composer software, multiple digital audio tracks, and image compositing. Students create a finished program by course completion. This is the fifth in a track of advanced digital technology courses that must be completed in sequential order. Prerequisite: CM 491.

CM 493. Media Composer Graphics and Effects. 3 Credits.
This course includes a study of the basics in designing multi-layered and multi-nested titles, graphics and effects using the Pinnacle 3D Effects Module. Exercises help students learn to create both real-time and rendered effects. Topics include preparing and importing graphics, creating and using alpha matte keys, the use of Adobe Photoshop and third party packages, creating and saving effects templates and short-cuts and tips for maximum quality and optimal render time. This is the sixth in a track of advanced digital technology courses that must be completed in sequential order. Prerequisite: CM 492.

CM 494. Advanced Media Composer Effects and Graphics. 3 Credits.
Features use of advanced graphics software and broadening of skills learned in CM493: Media Composer Graphics and Effects. Students design complex program openings utilizing 3D templates, mattes, chroma keys, advanced nesting and title features. Third party packages utilized include Adobe After-Effects, BlueIce and Arrel BorixFX. This is the seventh in a track of advanced digital technology courses that must be completed in sequential order. Prerequisite: CM 493.

CM 495. Systems Configuration and Media Data Management. 3 Credits.
Offers an overview of systems configuration and maintenance as well as media data-base management to minimize systems downtime and maximize Media Composer productivity. Laboratory work and role-playing give students practical experience. Topics include SCSI, storage, hardware and software troubleshooting, signal flow, systems integration and issues involving external peripheral devices. Features a practicum conducted at Avid Technology. This is the eighth in a track of advanced digital technology courses that must be completed in sequential order. Prerequisite: CM 494.

Computer Engineering (CP)

Courses

CP 431. Network Security. 3 Credits.
Topics include security for networked and internetworked computer systems. It examines secrecy, integrity, and other information assurance objectives in terms of high level policy and presents security services used to address those requirements. Selection and management of cryptographic algorithms and keys to achieve network security objectives will be addressed. Network security architectures, including public key infrastructures and their use of directory services, are examined in terms of systems able to insure that critical security functions are protected from unauthorized modification, are correct, and are always invoked. Access control in networked systems is examined. A review of past and current security architectures will be conducted. Topics include security peripherals for cryptography and authentication, the cascade problem, guards and filters. Laboratory will be used to introduce students to a variety of security-related technologies including discretionary access controls, mandatory access controls in both low and high assurance systems, identification and authentication protocols and database technology in trusted systems. Classroom 3 hours.

Engineering Management (EM)

Courses

EM 101. Intro Construction Project Mgt. 3 Credits.
This course provides a broad overview of the managerial, technological and physical processes that are involved in the creation of the built environment. It specifically focuses on understanding the issues in the management of a construction project. (Prerequisites: none. 3 credit-hours - 2 hours lecture and 3 hours lab).

EM 299. Test course. 4 Credits.
EM 301. Project Management. 3 Credits.
The course covers the principles and practices of project management with particular emphasis on issues related to engineering and construction projects. Students will learn the principles of project management within the firm and in an environment characterized by inter firm relationships. 3 hours of class time per week.

EM 302. Supply Chain Management. 3 Credits.
The course covers the principles and practices of supply chain management with particular emphasis on issues related to engineering and construction projects. Students will learn the principles of supply chain management and purchasing in an environment characterized by inter firm relationships. 3 hours of class time per week.

EM 320. Construction Productivity. 3 Credits.
This course focuses on the planning and execution of the construction of vertical and horizontal construction projects. The course emphasizes the means and methods associated with heavy civil projects, earthwork, and the construction of the project’s structural elements. Equipment selection and methods will be a major focus. (Prerequisites: Junior standing, 3 credit-hours lecture).

EM 399. Seminar. 3 Credits.
EM 401. Pre-Construction Mgt. 3 Credits.
EM 402. Construction Management Practices. 3 Credits.
A capstone and practicum course in construction management engineering that explores the processes of management as applied to actual construction projects. Topics will be reviewed in the seminar and students will work in teams to review how these topics were applied in an actual construction project and to design a construction management plan for a proposed project during laboratory. Two 1.5 hours seminar periods and a 3 hour laboratory per week. Prerequisite: CE 460.

EM 405. Preconstruction Planning. 3 Credits.
This course addresses the initial phases of the building creation process. It focuses on addressing the owner’s design and construction needs and the delivery of value to the owner. Business development, estimating, planning and presentation skills are emphasized. A Design/Build model is employed to encompass the full spectrum of architecture, engineering and construction (AEC) requirements. Classroom 3 hours. Prerequisites: EM 302.

EM 410. Pre-Construction Mgt. 3 Credits.

Criminal Justice (CJ)

Courses

CJ 101. Introduction to Criminal Justice. 3 Credits.
A general survey of the principles, system, and process of criminal justice. Introduction to conceptions and definitions of crime, criminal law, and due process. Examination of the organization and operation of the three basic components of the criminal justice system -- the police, the courts, and corrections -- individually and in relationship to one another. Offered in fall semesters.

CJ 102. Substantive Criminal Law. 3 Credits.
This course presents the development of criminal law in the United States and discusses its principles, sources, distinctions, and limitations. The following topics are covered in detail: criminal liability; offenses against persons, property, public peace and public justice; preparatory activity crimes; and defenses available to those charged with criminal activity. Offered spring semester.

CJ 201. Criminology. 3 Credits.
This course covers the various biological, psychological, and sociological types of theory that have been offered to explain the incidence of crime in society. Various types of crime, including violent, property, corporate, political and victimless crime, methods of studying crime, and characteristics of criminals are also examined. Offered spring semesters.

CJ 209. Methods of Social Science Research. 4 Credits.
An examination of the methodological foundations of the social sciences; the logic and technique of empirical inquiry; the nature of social facts, the operationalization of concepts, and the construction of hypotheses; research designs including surveys, interviews, experiments, observation, and evaluation; the organization and analysis of data; graph and table construction and interpretation; the common problems of empirical social research; and research ethics. Emphasis given to criminal justice applications. The lab part of the course instructs students how to use and apply SPSS and other relevant software. Cross-listed with SO 209. Offered fall semester. Classroom and Laboratory 4 hours.

CJ 300. Topics in Criminal Justice. 3 Credits.
Selected topics offered on occasion.

CJ 301. Criminal Procedure. 3 Credits.
This course addresses the legal procedure connected with arrest, search and seizure, identification and questioning, bail setting, indictments, and plea bargaining. Offered fall semesters.
CJ 304. Juvenile Delinquency. 3 Credits.

CJ 305. Juvenile Justice. 3 Credits.
A general survey of the philosophy, system and process of juvenile justice. Examination of the social and legal control of juvenile delinquency by the police, courts and corrections, as well as by private agencies. Emphasis on the distinctions in philosophy, law, jurisdiction, organization and terminology between the juvenile justice system and the adult criminal justice system. Offered every other year.

CJ 306. Victimology. 3 Credits.
An examination of the role of the victim in crime and the treatment of the victim by the criminal justice system. Instruction in the use of victimization data in determining crime rates and in developing prevention programs. Review of victim assistance, restitution and compensation programs. Offered every other year.

CJ 307. Social Control and Crime Prevention. 3 Credits.
The course will focus on crime prevention as a method of social control and will examine processes of social control as social and institutional sources of crime prevention. Examination of personal defense, environmental, situational, community, and social models of crime prevention. Offered every other year.

CJ 308. The Police. 3 Credits.
A general survey of American policing and police organizations. Examination of the history of the police and the police idea, as well as structural, cultural, and social psychological analyses of police organizations. Coverage of the topics of police socialization, behavior, and discretion; routine and specialized operations; community policing; and police misconduct, accountability and change in policing.

CJ 310. The Courts. 3 Credits.
An analysis of America’s courts, and the courtroom work group with particular attention given to the dual role of the courts in adjudicating cases and interpreting the U.S. and state constitutions.

CJ 312. Corrections. 3 Credits.
An analysis of the development and present structure of the correctional process in America, including detailed examinations of the operational problems of correctional institutions, probation and parole practices and other community-based correctional alternatives. Offered spring semesters.

CJ 314. Restorative Justice. 3 Credits.
This course presents a new paradigm of community justice as an alternative to the retributive model. The course examines and contrasts restorative approaches and traditional punitive responses to crime. Topics include mediation, victim-offender reconciliation, reparation for harm done to victims and the community and offender re-integration into the community. Offered every other year. Prerequisite: CJ 101 or permission of instructor. 3 lecture hours.

CJ 320. Drugs and Society. 3 Credits.
This course focuses on the interrelationships between drugs and the social order. Issues considered include: the nature and effects of legal and illegal drugs; the determinants of drug effects, especially the social determinants; the history of drug prohibition; drug addiction and drug treatment; and drug policy. Cross-listed with SO 320. Offered every other year.

CJ 330. Terrorism. 3 Credits.
In this course, students examine the critical issues of domestic and international terrorism. The phenomenon of terrorism is analyzed from varying theoretical and empirical perspectives. Topics include terror organizations/networks, ideology, motives, tactics, and propaganda. Attention is also given to terrorism research trends, current events, and future implications. Offered annually. Prerequisite: CJ 101 or permission of instructor.

CJ 341. Cyber Law and Cyber Crime. 3 Credits.
The course includes extensive discussion of the legal constraints, both civil and criminal, that underlie acceptable behavior using computers and networks today. Prerequisites: IS 120 or IS 130 and CJ 201 or permission of instructor. Offered in fall semesters.

CJ 400. Independent Study. 3 Credits.
An opportunity for qualified upperclass students to engage in an intensive research program in fields of interest not satisfactorily covered by regular course offerings. Periodic conferences will be required. Prerequisite: written consent of the instructor to a specific project presented by the applicant. Offered only to criminal justice majors with a cumulative quality point average of 2.5 or better and who have grades averaging 3.0 or better in prior course work in criminal justice. Offered on occasion.

CJ 402. Law and Society. 3 Credits.
An analysis of various theoretical perspectives on the nature, courses, organization and operation of law and legal systems. Emphasis will be placed on law creation, conflict resolution, the legal profession, and the role of law in social change. Cross listed with SO 402. Offered every other year.
CJ 403. Criminal Justice Administration. 3 Credits.
An introduction to the principles of public administration as they are applied in the operation of criminal justice agencies. This course will emphasize how such topics as organization, decision making, leadership style, personnel policy, planning, and budgeting are specifically adapted by criminal justice administrators to meet the needs of their agencies. Simulations will be used extensively as a tool for mastering administrative principles. Prerequisite: CJ 101 or permission of instructor. Offered every other year.

CJ 405. Internship. 3 Credits.
This elective course permits an upper-level student to participate directly in the criminal justice process by serving as an aide to agencies involved in the process. This offering is subject to the availability of such internships. Open only to junior and senior criminal justice majors, and to senior criminal justice minors on availability. Offered fall, spring and summers.

CJ 410. Senior Seminar. 3 Credits.
A course dedicated to intensive research and analysis of major issues in criminal justice. Emphasis will be placed on critical thinking and evaluation of topics previously discussed during the student’s academic career in the criminal justice program. Attention will also be given to professional development topics, ethics and criminal justice policy. Prerequisite: criminal justice major and senior standing. CJ 410 meets capstone requirement. Offered spring semesters.

CJ 421. Comparative Criminal Justice Systems. 3 Credits.
This course examines how countries other than the United States deal with the problem of crime and its control. It begins from the classic approach of a critical analysis of the history and development of the world’s great legal traditions, and the role and structure of the criminia justice systems inside those traditions. Prerequisite: CJ 101. Offered every other year. 3 credits hours.

CJ 422. Civil Liability in the Criminal Justice System. 3 Credits.
This course examines the civil law that governs criminal justice agencies. As representatives of the government, Criminal Justice agencies must adhere to the Constitution and other State and Federal laws. When they fail to do so, the aggrieved party has the right to sue. This course explores the major state and federal liability theories that govern the management and daily operations of the police and correctional facilities. In addition, this course draws on your previous police, corrections and law courses to explore management issues related to civil liability. Prerequisite: CJ 101, CJ 102, CJ 301. Offered every other year. 3 credits hours. Open only to juniors and seniors.

CJ 423. Evidence. 3 Credits.
The course is an in-depth examination of the rules governing the admissibility or exclusion of evidence at trial. Subjects include competency of witness, direct and cross-examination of witnesses, the rule against hearsay and its exceptions, expert and lay opinion testimony, privileged communications, relevancy, procedural considerations, judicial notice, burden of proof, presumptions, form and type of objections, authentication, the best evidence rule and the use of demonstrative and scientific evidence. Prerequisites: CJ 101 and CJ 102. Offered every other year. 3 credit hours. Open only to juniors and seniors.

CJ 424. Murder: Our Killing Culture. 3 Credits.
This course provides a comprehensive examination of the nature and extent of both the common and unusual forms of murder in the United States. The class examines characteristics, trends, and the theoretical explanations of homicide as well as the prediction and prevention of various kinds of murder. The impact of murder on homicide survivors is also examined as well as the use of murder as entertainment in our culture. The course is designed to give students greater insight into serial, spree and mass murder, intrafamilial homicide, murder in the workplace, profiling and stalking. Although emphasis is placed on the sociological determinants of murder, psychological and biological factors are also examined. Prerequisite: CJ 101 or permission of instructor. Offered every other year. 3 credits hours. Open only to juniors and seniors.

CJ 425. Domestic Violence. 3 Credits.
This course provides a comprehensive examination of the nature and extent of domestic violence in the United States. Theoretical perspectives used to explain intimate violence are examined as well as the social factors that are related to patterns of intimate and family abuse. The course discusses domestic violence from a historical and global perspective and is designed to provide students with a greater understanding of the impact of domestic abuse on victims/survivors and society as a whole. Topics including child and elder abuse; the criminal justice system's response to domestic abuse; intervention, well as related crimes such as sexual assault and intrafamilial homicides. Prerequisite: CJ 101 or permission of instructor. Open only to juniors and seniors. Course is offered every other year. 3 credit hours. Open only to juniors and seniors.

CJ 442. Introduction to Computer Forensics. 4 Credits.
This course provides the student with an ability to perform basic forensic techniques and use appropriate media analysis software. Knowledge of the security, structure and protocols of network operating systems and devices will be covered as students learn to gather evidence in a networked environment and to image and restore evidence properly without destroying its value. The student will learn and practice gaining evidence from a computer system while maintaining its integrity and a solid chain of custody. Within the laboratory, the student will gain hands-on experience in the use of current investigative tools. Classroom 3 hours, laboratory 2 hours. Prerequisites IS 228 and CJ 341. Offered in spring semesters.

Economics (EC)
Courses

EC 106. The Structure and Operation of the World Economy. 3 Credits.
This course will introduce students to the operation of the world economy. Emphasis will be on the identification and description of economic concepts such as tariffs, multinational companies, stock markets, debt, international trade balances and international banking. These concepts will be developed utilizing examples from current world economic conditions. This course fulfills General Education Requirement #5: an understanding of economic institutions that are characteristic of human societies. Prerequisite: This is a freshman course-permission of instructor required for any exception.

EC 201. Principles of Economics (Macro). 3 Credits.
Description and analysis of the American economic system in terms of basic economic concepts and the determination of national income and its fluctuation. This course fulfills General Education Requirement #5: An understanding of economic institutions that are characteristic of human societies. Prerequisite: one semester of college mathematics.

Study of the composition and pricing of national output, distribution of income and the pricing of productive factors, international aspects of trade, and the problems of growth. This course fulfills General Education Requirement #5: An understanding of economic institutions that are characteristic of human societies. Prerequisite: one semester of college mathematics.

EC 300. Topics in Economic History. 3 Credits.
This course will focus on the progress and development of economic institutions of industrialized nations. These institutions, such as private property, free markets, financial intermediation and discretionary fiscal policy, will be discussed in a historical perspective. Prerequisites: EC 201 and EC 202. Offered in the spring odd years.

EC 301. Intermediate Price Theory. 3 Credits.
A study of the economic behavior of consumers and producers and their interrelationship in a market economy. Emphasis is on the application of economic theory and the tools of analysis to price determination and market behavior. Welfare economics and other modern analytical techniques are also introduced. Prerequisites: EC 201, EC 202 and either MA 108 or MA 121.

EC 302. National Income Analysis. 3 Credits.
The theory and policies of determining national income, achieving economic stability and maintaining economic growth. Attention is given to leading post-Keynesian and Monetarist economists’ interpretation of current economic conditions. Prerequisites: EC 201, EC 202, and either MA 108 or MA 121.

EC 304. Labor Economics. 3 Credits.
Operation of labor markets from theoretical and policy perspectives. Topics include: human capital theory, the impact of labor unions and public policy issues relevant to collective bargaining, unionism, wages and income. Prerequisites: EC 201 and EC 202. Offered in the spring even years.

EC 310. Money and Banking. 3 Credits.
The principles and institutions of money, banking and finance as they influence the performance of the economy. The major topics covered are the nature of money, commercial banking and financial institutions, central banking, monetary theory, monetary policy, inflation and the international monetary system. Prerequisites: EC 201, EC 202 and QM 213 or permission of the instructor.

EC 331. Business and Government. 3 Credits.
A study of the institutional relationships between business and government, with stress upon public policies toward business and the role of government in fostering competition. Emphasis is placed upon the economic effects of the antitrust laws through outside readings and analysis of landmark court decisions. Other topics covered are concentration and mergers, restrictive business practices, monopoly and oligopoly. Prerequisites: EC 201 and EC 202. Offered in the fall even years.

EC 403. Comparative Economic Systems. 3 Credits.
The study of major economic systems. Theories of capitalism, socialism and communism and their implementation by major nations are discussed. Prerequisites: EC 201 and EC 202. Offered in the spring odd years.

EC 406. Public Finance. 3 Credits.
An investigation of the effects of government expenditures and revenues on the efficiency of resource allocation and the equity of the income distribution. Topics covered include public goods, externalities, benefit-cost analysis, the structure of major taxes and expenditure and tax incidence. Prerequisites: EC 201 and EC 202. Offered in the fall even years.

EC 419. International Economics. 3 Credits.
International trade and the theory of comparative advantage. Special attention is given to free world trade and economic development in other countries and groupings as in the European Common Market. Prerequisites: EC 201 and EC 202. Offered in the fall odd years.

EC 421. History of Economic Thought. 3 Credits.
Development of economic thought with emphasis upon the evaluation of economic theory as it has developed in response to problems of society. Prerequisites:EC 201 and EC 202. Offered in the fall odd years.

EC 499. Seminar in Economics and Finance. 3 Credits.
A capstone economics course designed to integrate the students’ undergraduate studies in economics, management, accounting, information systems and finance. Prerequisite: senior standing and permission of instructor.
Education (ED)

Courses

ED 101. Foundations of Education I. 1 Credit.
This is a one-credit course that is offered during the first semester of the freshman year and introduces teacher education licensure candidates to the teaching profession. Topics include teacher characteristics, demands of the profession, self assessment, the nature of teaching, and an introduction to the development of the professional portfolio. Offered in the Fall.

ED 102. Foundations of Education II. 1 Credit.
Observations of children and adolescents in day care, preschool, and the public schools. 1 lecture hour.

ED 201. Foundations of Education III. 1 Credit.
This course examines the historical and sociological aspects of education including the impact of the family, the community, and economic and cultural influences. Offered in Spring. 1 lecture hour.

ED 202. Foundations of Education IV. 1 Credit.
This course examines the historical and philosophical aspects of education. Offered in Spring. 1 lecture hour.

ED 232. Curriculum and Methods of the Elementary School Subjects. 4 Credits.
An examination of the curriculum and teaching strategies associated with the subjects taught in the elementary school, including mathematics, science, social studies, health, physical education, and the fine arts. Knowledge and research in child growth and development are used as a guide for determining the curriculum materials and procedures that are suitable for children. Students work with children to develop curriculum and teach lessons in the elementary school. Required for elementary teacher licensure candidates. A Practicum of 30 hours will be done during this course. Usually offered in the spring semester.

ED 234. Learning and Teaching Strategies. 4 Credits.
This course includes an overview of the most commonly used strategies in elementary and secondary classrooms. Topics include planning, instructional objectives, media and computer applications, common learning strategies (lecture, discussion, cooperative learning, role playing, questioning, discovery learning) evaluation and assessment of learning. Secondary teacher licensure candidates prepare units and lessons in their fields of study applying specific methods and materials of the subject area. All students participate in microteaching situations. Required for elementary and secondary teacher licensure candidates. Twelve hours of classroom observation are required in this course. Offered in Fall.

ED 351. Methods of Teaching Science to Elementary Students. 3 Credits.
This course examines objectives, methods, and content in elementary science instruction. Emphasis will be on student preparation, teaching and carrying out science activities. These activities will be ready for classroom use. National standards, Vermont Framework, and Vermont Grade Cluster Expectations will be the basis for the content and for the appropriateness of content at different grade levels. This course cannot be used to meet the general education laboratory levels. Prerequisite ED 234. Ten hours of practicum is required and development of portfolio continues. A service-learning component is also offered to all students.

ED 360. Language Arts and Teaching Reading in the Elementary School. 4 Credits.
A study of language development and reading, including an introduction to traditional instructional methodologies of reading and a study of the whole language approach to the language arts. Students will have opportunities to apply theory in various settings. Required for elementary teacher licensure candidates. Prerequisite: ED234. Twelve hours of classroom observation are required in this course. A service Learning component is also attached to this course which will provides students an opportunity to work in the community in the context of literacy. Development of portfolio continues.

ED 363. Reading and Writing in the Content Area. 4 Credits.
A course designed to familiarize content area teachers with the theories and practices of reading and writing in specific disciplines. Students will examine the developmental nature of the reading and writing processes and design discipline-specific materials. Students work as tutors at the secondary and college levels. Required of secondary teacher licensure candidates. Prerequisite: ED 234. A Practicum of 30 hours will be done by Secondary track students during this course. Offered in Spring.

ED 368. Curriculum & Methods in Secondary Subjects. 4 Credits.
An examination of the curriculum and teaching strategies associated with the subjects taught in the secondary school, including English, mathematics, science, and social studies. Students will learn about the general methods for teaching at the Middle/High school level, but will concentrate on their area of content concentration in both their practicum and final project. Knowledge and research in child growth and development is used as a guide for determining the curriculum materials and procedures that are suitable for secondary education students. Students work with adolescents, develop curriculum, and teach lessons in the Middle/High School. Students will keep a reflective journal of all their experiences in the practicum. Required for Teacher Education Licensure secondary track. A Practicum of 30 hours will be required in this course. Offered in the fall. Development of a portfolio continues.

ED 403. Problems in Education. 1-3 Credit.
In this course students are involved in individual investigation, survey, or a project related to education. Offered on Demand.
ED 404. Problems in Education. 1-3 Credit.
In this course students are involved in individual investigation, survey, or a project related to education. Offered on Demand.

ED 425. Student Teaching. 12 Credits.
In this course there is a full-time student teaching assignment. This course may be taken only as a part of the teacher education licensure program. This is a capstone course for teacher education Licensure students. Offered every semester. 14 lecture hours. A service-learning component is embedded in this course.

ED 432. Curriculum and Methods of the Elementary School. 4 Credits.
An examination of the curriculum and teaching strategies associated with the subjects taught in the elementary school, including mathematics, science, social studies, health, physical education, and the fine arts. Knowledge and research in child growth and development are used as a guide for determining the curriculum materials and procedures that are suitable for children. Students work with children to develop curriculum and teach lessons in the elementary school. Required for elementary teacher licensure candidates. A Practicum of 30 hours will be done during this course. Usually offered in the spring semester.

Electrical Engineering (EE)

Courses

EE 200. Engineering Programming. 3 Credits.
Introduction to a high level programming language such as C/C++. Topics include structure and organization of a computer program, variables and basic data types, flow of control, functions, file I/O, arrays and strings, computer memory, CPU and pointers, user defined structures, computer algorithms, modular design and documentation. Introduction to object oriented programming concepts. This course is offered once a year.

EE 204. Electrical Circuits I. 3 Credits.
A study of principles and methods of analysis of electric circuits with both direct and time varying sources in the steady state. KCL, KVL, mesh and nodal techniques. Network theorems are developed and applied to the analysis of networks. Energy storage elements. First order and second order circuits with forced and natural responses. Sinusoidal analysis, complex numbers, phasor diagrams. Power; average effective, and complex power in single phase systems. Classroom: 3 hours. Corequisite: MA 122.

EE 215. Fundamentals of Digital Design. 4 Credits.
An introductory course on formal design techniques for combinational and sequential logic circuits. Topics include combinational logic networks, minimization techniques, registers, synchronous sequential neworks, and control units. Applications of the concept developed in the classroom will be implemented in the laboratory. Classroom 3 hours, laboratory 2 hours.

EE 240. Electrical Concepts and Applications. 3 Credits.
A course on the theory and application of electrical devices and circuits. Discussions include magnetic circuits, transformers, electric machines, diodes, bipolar transistors, and field effect transistors. Integrated circuits are introduced. Digital switching circuits are treated, including logic gates, flip-flops, and counters. Operational amplifiers and their major applications are studied. Offered to qualified students not majoring in Electrical Engineering. Classroom 2 hours, laboratory 3 hours. Prerequisite: EE 204.

EE 242. Digital Systems Design. 4 Credits.
Topics are hierarchical design methods, design and debugging of digital hardware, determination of circuit behavior, control and timing, machine organization, control unit implementation, and interface design. A hardware design language will be used and students will acquire design experience implementing digital hardware. Classroom 3 hours, laboratory 2 hours. Prerequisite: EE 215.

EE 303. Electromagnetic Field Theory I. 3 Credits.
Maxwell’s Equations are developed from the experimental laws of electric and magnetic fields. Topics involving electric fields include Gauss’s Law, divergence, energy, potential, conductors, dielectrics, and capacitance. Topics involving magnetic fields include the Biot-Savart Law, Ampere’s Law, magnetic forces, magnetic materials, and inductance. Maxwell’s Equations are used to describe wave motion in free space and in dielectric media. Classroom 3 hours. Prerequisites: MA 223, EE 204.

EE 314. Elements of Electrical Engineering. 4 Credits.
A course on the theory and application of electrical devices and circuits. Topics that are appropriate for discussion include dc circuits, single-phase and three-phase ac circuits, amplifiers, transducers, transformers, and electric machines. Offered to qualified students not majoring in Electrical Engineering. Classroom 3 hours, laboratory 3 hours. Prerequisite: MA 122.

EE 321. Embedded Systems. 4 Credits.
The use of computing devices in embedded applications is introduced. Computer organization topics include the arithmetic logic unit, timing and control, memory, serial and parallel I/O ports, and the bus system. Programs are written and run in assembly language and higher-level languages. Additional topics include peripheral interface control, interrupts, cross assembly and applications. Classroom 3 hours, laboratory 2 hours. Prerequisite: EG 110 or IS 130.
**Course Descriptions**

**EE 325. Computer Architecture and Operating Systems. 3 Credits.**
Machine architecture - machine performance relationships, computer classification, and computer description languages. Consideration of alternative machine architectures. Software influences on computer design. Topics include digital logic, VLSI components, instruction sets, addressing schemes, memory hierarchy ache and virtual memories, integer and floating point arithmetic, control structures, buses, RISC vs. CISC, multiprocessor and vector processing (pipelining) organizations. Examples are drawn from Pentium and Sparc microcomputers. The primary focus is on the attributes of a system visible to an assembly level programmer. This course also introduces the fundamentals of operating systems. Topics include concurrency, scheduling, memory and device management, file system structure, security, and system performance evaluation. Lecture 3 hours. Offered once per year.

**EE 350. Linear Systems. 3 Credits.**
This course provides the foundations of signal and system analysis. Linear, time-invariant, causal, and BIBO stable analog and digital systems are discussed. System input-output descriptions, convolution and the impulse response are covered. Additional topics include singularity functions, Fourier and Laplace circuit analysis, circuit transfer functions, Bode plots, ideal filters, and real filters including Butterworth, Chebyshev, and Elliptic. Discrete topics include the transform, difference equations, FIR and IIR filters, the bilinear transformation, the DTFT, the DFT, and the FFT. Classroom 3 hours. Prerequisite EE 356.

**EE 356. Electrical Circuits II. 3 Credits.**
This course is a continuation of Electric Circuits I (EE 204). The complete solutions of linear circuits by Laplace transforms are developed. The concepts of frequency response, resonance, network functions, two port networks including hybrid parameters are studied in depth. The concepts of transformers, power, coupled circuits, multi-phase circuits, and Fourier series are introduced. Computer-based circuit simulation is used throughout. Classroom 3 hours. Prerequisite: EE 204.

**EE 359. Electrical Engineering Laboratory. 1 Credit.**
Implementation, analysis, and design of electric and electronic circuits involving resistors, inductors, capacitors, diodes, bipolar transistors, MOS transistors, operational amplifiers and filters. Study and practice in the use of standard electrical engineering laboratory instrumentation. Laboratory 2 hours. Prerequisite: EE 215; corequisites: EE 356, EE 357.

**EE 366. Electronics II. 4 Credits.**
This course is a continuation of Electronics I (EE 357). Analog and digital circuits are discussed. Analog topics include frequency response, real world applications of operational amplifiers, power amplifiers, filters, oscillators and A/D and D/A converters. Digital electronic building blocks are discussed, including flip-flops, counters, coding and decoding circuits and memory. Classroom 3 hours, laboratory 2 hours. Prerequisites: EE 357, EE 359.

**EE 373. Electrical Energy Conversion. 4 Credits.**
A course on principles of energy conversion in electromechanical devices and machines. Analysis of transformers, polyphase synchronous and asynchronous machines, single phase fractional horsepower machines, and DC machines. Classroom 3 hours, laboratory 2 hours. Prerequisite: EE 356; corequisite: MA 224.

**EE 399. EE Topics. 3 Credits.**

**EE 3XX. Electrical Engineering. 4 Credits.**

**EE 411. Microprocessor-Based Systems. 4 Credits.**
This course deals with organization, operation and design of systems where the microprocessor controls special interfaces to non-standard devices and responds to external events in a timely fashion. Topics include interface of special purpose peripherals, data structures, control structures, program and data organization and real time operating systems. Application to communications, automated measurement, process and servo control are discussed. Classroom 3 hours, laboratory 2 hours. Prerequisites: EE 215, CP 321.

**EE 459. Power Systems Analysis. 3 Credits.**
This course presents the foundations of electric power systems analysis after an initial review of single and three-phase power, complex power and transformers. Topics include per unit quantities, generators, transmission line models, transformer models, short-circuit analysis, load flow, and power systems economics. Lecture: 3 hours. Prerequisites: EE 356 and EE 373. Offered once per year.

**EE 463. Communication Systems. 4 Credits.**
Analog transmission of information signals by communication systems is analyzed. The component parts of transmitters and receivers including AM/FM modulators, filters, detectors and decoders are discussed. Mathematical concepts include the Fourier Series, Fourier Transform, dirac delta function and sinc function. Signal classification and digital modulation techniques such as ASK, FSK, PSK, PAM and QAM. Classroom 3 hours, laboratory 2 hours. Prerequisites: EE 356, EE 357, EE 359.

**EE 468. Solid State Materials. 3 Credits.**
Solid state materials, physics of electronic devices and integrated circuit design are studied. Topics include silicon crystal properties, diffusion, implantation, lithography and circuit fabrication. Device models are derived for junction diodes, bipolar and MOS transistors. Classroom 3 hours. Prerequisites: EE 303, EE 357.
EE 478. Control Systems. 3 Credits.

EE 486. Digital Signal Processing. 3 Credits.
An introductory level course that discusses the conversion of analog signals to discrete time signals. Emphasis will be on the processing of discrete signals using both time-domain and frequency-domain analysis. These techniques will be applied to the design of digital filters. Classroom 3 hours. Prerequisite: EE 350 or instructor’s permission.

EE 487. Digital Signal Processing Lab. 1 Credit.
Implementation analysis and design of digital signal processing functions and techniques. Study and practice in the use of software and hardware platforms used for digital signal processing applications. Laboratory: 3 hours. Prerequisite: EE 350. Co-requisite: EE 486. This course is offered once a year.

EE 490. Advanced Topics. 3 Credits.
A course that provides advanced study in an area of the instructor’s special competence. Courses that have been offered in the past include Power System Stability, Electrical Communications II, Microwave Theory and Techniques and Digital Systems. Offered as the occasion demands. Classroom 3 hours. Prerequisite: senior standing.

EE 491. Electrical System Design I. 3 Credits.
Introduction to design problems. Application of concepts of electrical engineering to a capstone design project. The first of a two-semester sequence, this course focuses on the problem statement, specification, preliminary design, design review and approval stages of the design processes, the design process involves exploring alternate solutions and design optimization and simulation. Economic constraints and human factors are considered in the design process. The course requires nine hours per week of directed reading, research and experimentation. Prerequisite: seventh semester standing and permission of the instructor.

EE 494. Electrical System Design II. 3 Credits.
This course is the second in the two-semester capstone design project sequence. It focuses on the final stages of the design process-finalized design, implementation and testing. A written project report and an oral presentation to students and faculty is required. Nine hours per week of directed readings, research, and experimentation. Prerequisite: EE 491.

English (EN)

Courses
EN 005. Basic English. 3 Credits.
A review of the fundamentals of composition designed to raise the student’s command of English to the college level. Required for those whose tests and records demonstrate weakness in diction, spelling, grammar, punctuation and organization. Offered fall semester only. Students assigned to EN 005 must successfully complete the course before enrolling in EN 101. This course will not meet any degree requirements and cannot be used as an elective.

EN 101. Composition and Literature I. 3 Credits.
EN 101 is devoted chiefly to the principles of written organization, exposition, argumentation, and research.

EN 102. Composition and Literature II. 3 Credits.
EN 102 provides, through an extension and intensification of the methods and approaches of EN 101, an introduction to fiction, poetry, drama, and film. Prerequisite: EN 101.

EN 105. English as a Foreign Language I. 3 Credits.
A course for intermediate non-native speakers of English that stresses writing, reading, speaking, listening improvement and provides an introduction to the social and cultural values of the English-speaking world.

EN 106. English as a Foreign Language II. 3 Credits.
A course for advanced non-native speakers of English that stresses writing, reading, speaking, listening improvement and provides an introduction to the conduct, organization and reporting of library research. Prerequisite: EN 105.

EN 107. Composition and Literature for Foreign Nationals I. 3 Credits.
A course for advanced non-native speakers of English that parallels the content and structure of EN 101. The student and instructor will meet in conference to assess the student’s progress in the course. Prerequisite: EN 106 or permission of instructor.
EN 108. Composition and Literature for Foreign Nationals II. 3 Credits.
A course for advanced non-native speakers of English that parallels the content and structure of EN 102. The student and instructor will meet in conference to assess the student's progress in the course. Prerequisite: EN 107 or permission of instructor.

EN 112. Public Speaking. 3 Credits.
A practical course in the fundamentals of public address and speech analysis.

EN 201. World Literature I. 3 Credits.
A course that examines representative works of world literature up to the mid-seventeenth century. Texts are explored in their historical, cultural, and social contexts. EN 201 is not a prerequisite for EN 202. Prerequisite: EN 102 or EN 108. 3 lecture hours. Offered every semester.

EN 202. World Literature II. 3 Credits.
A course that examines representative works of world literature from the mid-seventeenth century to the present. Texts are explored in their historical, cultural, and social contexts. Prerequisite: EN 102 or EN 108. 3 lecture hours. Offered every semester.

EN 203. Advanced Composition. 3 Credits.
A course designed to move beyond the fundamentals of writing studied in EN 101 and EN 102 and to develop the student's abilities as a writer through the composition and analysis of extended essays on a variety of topics, employing a range of rhetorical approaches.

EN 204. Professional and Technical Writing. 3 Credits.
A course that teaches the theory and practice of communicating on the job. Instruction addresses written, visual, and oral technical communication. Assignments involve students in practical, collaborative and technologically informed learning modeled upon realities of the work place.

EN 205. World Literature for Foreign Nationals I. 3 Credits.
A course in reading and writing for non-native speakers of English, which parallels EN 201. Assignments examine masterpieces of world literature and include study of the Greco-Roman, Judeo-Christian, Asian, African, and New World traditions up to the mid seventeenth century. Texts are explored in their historical, social, and cultural contexts. The student and instructor will meet in conference to assess student's progress in the course. EN 205 is not a prerequisite for EN 206.

EN 206. World Literature for Foreign Nationals II. 3 Credits.
A course in reading and writing for non-native speakers of English, which parallels EN 202. Assignments examine masterpieces of world literature and include study of the European, Asian, African, and New World traditions up to the mid seventeenth century. Texts are explored in their historical, social, and cultural contexts. The student and instructor will meet in conference to assess student's progress in the course. EN 205 is not a prerequisite for EN 206.

EN 210. Modern Short Story. 3 Credits.
A study of the short story genre through reading, discussion, and written analysis of selected modern stories. The course also addresses the history of the short story and the nature and uses of literary art.

EN 220. Children's Literature. 3 Credits.
A course familiarizing students with the range and history of children's literature. Students revisit beloved classics as well as significant contemporary works, analyzing literary value.

EN 225. Survey of British Literature I. 3 Credits.
An overview of British literature from the Anglo Saxons to the late-eighteenth century in their historical and cultural contexts, with attention to the development of the English language. May include texts in Middle English. Selections may include sermons, chronicles, and letters as well as fiction, poetry, and drama. Provides a foundation for upper-level study in the discipline and is required for English majors. Prerequisite: EN 102 or EN 108. 3 lecture hours. Offered every fall.

EN 226. Survey of British Literature II. 3 Credits.
An overview of British literature from the Romantics to the present in their historical and cultural contexts. May include non-fiction as well as fiction, poetry, and drama. Provides a foundation for upper-level study in the discipline and is required for English majors. Prerequisite: EN 102 or EN 108. 3 lecture hours. Offered every spring.

EN 227. Survey of American Literature I. 3 Credits.
An overview of colonial and post-Revolutionary writing in its historical and cultural contexts, including the work of European explorers and native peoples in the eighteenth and early nineteenth centuries. Selections may include letters, travel narratives, and political documents as well as fiction, poetry, and drama. Provides a foundation for upper-level study in the discipline and is required for English majors. Prerequisite: EN 102 or EN 108. 3 lecture hours. Offered every fall.

EN 228. Survey of American Literature II. 3 Credits.
An overview of American writing from the Civil War to the present in its historical and cultural contexts. Selections may include non-fiction as well as fiction, poetry, and drama. Provides a foundation for upper-level study and is required for English majors. Prerequisite: EN 102 or EN 108. 3 lecture hours. Offered every spring.
EN 239. Introduction to Theater. 3 Credits.
A course that provides a basic introduction to theater as an art form and as an academic discipline. Topics of study include a survey of theater history; an analysis of the different forms of drama, including representative plays; and an introduction to the performance aspects of acting, directing, and theatrical design.

EN 240. Technical Aspects of Theatrical Design. 3 Credits.
A course that provides instruction in all phases of the construction of scenery, costumes and in lighting production, together with an introduction to the design of these elements.

EN 241. Acting and Directing. 3 Credits.
A course that introduces the basic techniques of acting and directing, including instruction in the relationship of the actor to the other actors on the stage. Extensive use is made of improvisation and theater games. Directing instruction gives the student practice in the solution of directorial problems through the staging of scenes, tableaux and pictorial dramatizations.

EN 242. Play Production. 1-3 Credit.
A course that provides study and performance of theater and play production techniques as well as rehearsal and presentation of a full-scale dramatic production. Students may choose to audition to act in a play or to work on one of the technical support crews. Three accumulated hours will comprise one 3-credit for free elective use only.

EN 244. The Literature of Leadership. 3 Credits.
A survey of major literary texts dealing with the theme of leadership. Differing examples and ideals of leadership are related to the philosophical assumptions and cultural values of the authors and civilizations represented by each work. Both advocacy and critique of these ideals are examined; contrasts among them emphasize the ethical implications of leaders' decisions. Topics include relationships among leadership, religion, and philosophy; leadership and technology; the role of coercion or political/economic power; and the potential conflicts of leadership and individual freedom.

EN 245. Science Fiction Literature. 3 Credits.
A study of representative readings in science fiction literature centered on novels and short fiction from the late-nineteenth century to the present with a focus on how these works develop major themes associated with the genre. Prerequisites: EN 102 or EN 108. 3 lecture hours.

EN 250. Crime in Literature. 3 Credits.
A course in which students read and discuss works of literature that explore the ethical, social and philosophical implications of criminal behavior and society's response to it.

EN 251. Literature of the Sea. 3 Credits.
A study of literature about life at sea, especially during times of crisis. The course examines attitudes toward solitude, comradeship and the ocean's beauty and power. Moral and physical qualities needed by a ship's officers and crew are also discussed. Readings are drawn from world literatures, ancient and modern.

EN 270. Military Literature. 3 Credits.
A study of men and women in war and the military service, their ideals, experiences, and strategies as seen in foreign and American military literature of the 19th and 20th centuries.

EN 272. Veterans' Literature and Writing. 3 Credits.
In this course, students read a selection of works by veterans to explore how soldier-writers have given voice to their military experiences and to reflect on how writers have depicted war and the military experience. These texts will serve as models to students as they develop personalized writing projects, either critical or creative, over the course of the semester. This course is open to anyone who is currently serving, or has served, in any branch of the military. This course fulfills a literature, writing or humanities requirement. Prerequisite: EN 102 or EN 108 and instructor permission.

EN 282. Literary Methods. 3 Credits.
Literary Methods serves as an introduction to scholarship in the discipline of English. To begin, students will examine the evolution and current state of English literary study as a discipline, learn how a literary text becomes an object of study, and identify a secondary text and the kinds of methodologies at work in them. Students themselves will then engage in the practice of literary research and analytical writing by focusing on one text in English and its respective body of criticism. Course work will comprise gathering and analyzing primary and secondary sources, enhancing close reading skills, and performing substantive piece of research. Auxiliary critical writing exercises might include an annotated bibliography or a literature review. Required for the English major and minor. Prerequisites: EN 102 or EN 108. 3 lecture hours.

EN 292. Am Ethnic Lit & Cultural Lit. 3 Credits.
The purpose of this course is two-fold: to acquaint the student with the writings of representative ethnic groups in America in terms of their contributions to American literature and culture in general; and to familiarize the student with both the problems of minority groups in integration and with the solutions which have been offered to these problems by the minority representatives themselves. The course will offer material form as many minority groups as time allows. Prerequisite: EN 102 or EN 108. 3 lecture hours.

EN 299. Topics in English Studies. 3 Credits.
Topics vary. Designed as a Humanities elective for non-majors. Prerequisite: EN 102 or EN 108. Course may be repeated for credit with a different topic. 3 lecture hours.
EN 306. Creative Writing. 3 Credits.
A course designed for those who wish to explore their own writing. Attention will be given to specific problems in the writing of fiction, poetry, drama and other literary forms.

EN 307. The History of the Motion Picture. 3 Credits.
A study of the development of the motion picture from a technological curiosity to a powerful, pervasive vehicle for art and argument.

EN 308. The Motion Picture Director. 3 Credits.
A study, through readings and viewings of representative films, of the work of three great motion picture directors: Emphasized their contributions to the art of the motion picture and their statements as artists viewing their own times.

EN 310. The Art of the Motion Picture. 3 Credits.
A study of cinema art direction, photography, editing, writing and acting. Classes involve lecture, discussion, readings in film criticism and the viewing of selected films.

EN 311. American Film Comedy. 3 Credits.
A study of representative American film comedies from a variety of standpoints: generically (as manifestations of comic tradition); culturally (as examples of satire and social criticism); aesthetically (as products of cinematic and literary techniques); historically (as parts of an evolving tradition). Representative films include works by Keaton, Chaplin, the Marx Brothers, W. C. Fields, Jerry Lewis, Stanley Kubrick, Woody Allen and others.

EN 320. Literature of the Third World. 3 Credits.
A study of the literature of developing nations. The course emphasizes works that reveal a country’s distinctive religious, social, economic, political institutions and the challenges that confront them. Topics to be discussed may include colonialism: the struggle for national identity: the impact of modern technologies on traditional values: tensions between military power and democratic processes: and the clash between the wealthy and the poor,.

EN 333. The Plays of Shakespeare. 3 Credits.
EN 334. The Plays of Shakespeare. 3 Credits.
A study of selected mature comedies, problem plays, tragedies and romances.

EN 350. History of the English Language. 3 Credits.
This course will trace the linguistic, material, and cultural development of the English language from its North Germanic beginnings to its current status as a global lingua franca, with special attention to the early British forms. We will attend to the structure of language (e.g., lexicon, syntax, phonetics) as well as to its socio-political aspects (e.g., migration, class, codification). Students will be asked to read, analyze, and contextualize texts in Old, Middle, and Early Modern English. Required for the English Major. Fulfills Gen. Ed. Humanities requirement but will not serve as literature elective. Prerequisite: EN 102 or EN 108.

EN 372. English Romantic Literature. 3 Credits.
A study of major Romantic literature, including selected novels of the period.

EN 375. Victorian Literature. 3 Credits.
A study of major Victorian literature, including selected novels of the period. Writers may include Tennyson, Browning, Rossetti, Wilde, and Dickens. Prerequisite: EN 102 or EN 108. 3 lecture hours. Usually offered annually.

EN 376. Modern British Literature. 3 Credits.
A study of British literature from about 1900 through World War II. Writers may include Conrad, Woolf, Lawrence, and Joyce. Prerequisite: EN 102 or EN 108. 3 lecture hours. Usually offered annually.

EN 377. Recent British Literature. 3 Credits.
A study of British writing since World War II. Writers may include Rushdie, Sparks, Lessing, and McEwan. Prerequisite: EN 102 or EN 108. 3 lecture hours. Usually offered annually.

EN 391. Major Writers of the American Renaissance. 3 Credits.
A study of important American writers of fiction and non-fiction of the middle nineteenth century, including Hawthorne, Melville, Emerson, Thoreau, Poe, Fuller, and Douglass. Prerequisite: EN 102 or EN 108. 3 lecture hours. Offered alternate years.

EN 392. American Poetry 1890 - Present. 3 Credits.
A detailed study of modern American poetry from Robinson and Frost to the present. Prerequisite: EN 102 or EN 108. 3 lecture hours.

EN 393. Major American Social Realists. 3 Credits.
A study of the literary record of the American social, cultural, and psychological experience at home and abroad in the works of such writers as Howells, James, Wharton and Cather.

EN 394. American Short Story Writers. 3 Credits.
A study of the major artists and innovators of the genre, from Poe and Irving to Cheever, Updike and beyond.
EN 395. Major 19th Century American Poets. 3 Credits.
A brief glance at Colonial and Revolutionary poets, with a more extended analysis of writers such as Poe, Longfellow, Lowell, Whitman, Dickinson, and Lanier. Prerequisite: EN 102 or EN 108. 3 lecture hours. Usually offered every other year.

EN 396. American Novelists, 1920-1940. 3 Credits.
A study of the novels of writers such as Hemingway, Faulkner, Ellison, Larsen, Yezierska, and Steinbeck. Prerequisite: EN 102 or EN 108. 3 lecture hours. Usually offered every other year.

EN 397. Writers of Contemporary American Fiction. 3 Credits.
A course emphasizing the fiction of writers such as Updike, Oakes, Cheever, Alexie, Angelou, Pynchon, and O’Connor. Prerequisite: EN 102 or EN 108. 3 lecture hours. Usually offered every other year.

EN 398. American Dramatists from 1918 to the Present. 3 Credits.
A study of American plays, including musical comedy and the experimental theater of the fifties and sixties, by such authors as O’Neill, Anderson, Rice, Odets, Wilder, Williams, Miller, Shepard, Howe, and Albee. Prerequisite: EN 102 or EN 108. 3 lecture hours. Usually offered every other year.

EN 399. Topics in English Studies. 3 Credits.
Topics vary. Designed as an elective for majors and advanced non-majors. Prerequisite: EN 102 or EN 108. Course may be repeated for credit with a different topic. 3 lecture hours.

EN 406. Major Figure Seminar. 3 Credits.
A seminar that focuses on the work of a single author and allows depth of study and research.

EN 420. Thematic Seminar-Literature. 3 Credits.
A seminar that explores a topic of interest in the Humanities.

EN 425. Directed Study In Literature. 3 Credits.
A course in which a student of demonstrated ability works with a faculty mentor in a well-defined area in Literature within the competence of the department faculty. Emphasis will be on student initiative, guided reading, and consultations with the mentor. Prerequisite: permission of the instructor and the department curriculum committee.

EN 450. Senior Seminar. 3 Credits.
The required capstone course for the major. EN 450 measures students’ ability to distinguish periods of English and American literature; to analyze a work in relation to one of several specified intellectual contexts; and to demonstrate competence in the practice of at least two critical approaches. Students are encouraged to bring to the senior paper written for courses completed earlier in the major. Two essays (one of which fulfills the university requirement for a senior paper outlining ethical standards based on life experience) and a major oral presentation to faculty members from both within and outside the English department— are required. Pre-requisite: senior status as an English major or minor or permission of the instructor. *May be repeated once, on a different topic, for a maximum of 6 credits.

Environmental Science (ES)

Courses

ES 130. Introduction to Environmental Law. 3 Credits.
Major Federal pollution regulation schemes, environmental economics, risk analysis, relevant common law, and constitutional and procedural issues are introduced. Vermont Environmental Law is addressed, as is a survey of the extensive and often novel regulatory approaches of the state of Vermont. The course introduces the law pertaining to environmental issues such as population, economic growth, energy, and pollution. Environmental problems are defined and alternative approaches for dealing with them are examined. Existing statutory efforts such as the National Environmental Policy Act, the Clean Air Act, and the Resource Conservation and Recovery Act are analyzed. Does not fulfill a science requirement. Three lecture hours per week. Offered Spring of even numbered years.

ES 251. Sophomore Seminar Environmental Science. 1 Credit.
This course introduces the fundamentals of scientific investigation and communication. A research project introduces the Scientific Method, while reading and comprehension of scientific literature is coupled with instruction in and application of technical and scientific writing. Other forms of scientific communication, including poster and oral presentations, are addressed. Students learn the appropriate techniques for displaying and interpreting scientific data. Students may not earn credit for both ES 251 and GL 251. Offered Fall semester.

ES 270. Fundamentals of Environmental Science. 4 Credits.
This lab science course investigates the atmosphere, hydrosphere, lithosphere, and pedosphere and their interrelations as well as the affect they have on humans and the role that humans play in large-scale change within these spheres. Subjects include modern climate principles and global climate change, water as a natural resource, natural hazards such as landslides, earthquakes and volcanoes, soil nutrient loss and erosion, sustainable agriculture, and other topics related to natural-human interactions. Prerequisite, one introductory Geology lab science. Offered Fall semester of even numbered years.
ES 399. Junior Topics. 4 Credits.

ES 450. Directed Study in Environmental Science. 4 Credits.
A capstone project carried out under the direction of a faculty member and in coordination with others taking this course. A laboratory and/or field component of the project will generate new data on an expanding base, and an environmental science report will be prepared based in part on the results of that work. Prerequisite: permission of the instructor. Credit cannot be received both for this course and GL 450. Offered fall semesters.

ES 451. Environmental Seminar. 3 Credits.
A capstone course offered in a seminar format with required reading, writing, and group participation. Designed to provide an integrating experience with sufficient flexibility to pursue individual interests. This course also includes oral and poster presentations of senior research projects and examination of codes of ethics in the environmental sciences. Classroom 3 hours. Prerequisite: junior or senior standing and permission of the instructor. Credit cannot be received both for this course and GL 451. Offered spring semesters.

Finance (FN)

Courses

FN 311. Corporate Finance. 3 Credits.
Development of the basic theoretical framework for decision-making in financial management, emphasizing the time-value of money and the analysis of cash flows. Areas of concentration are financial institutions and markets, financial statement analysis, the role of time value in finance, bond and stock valuation, capital budgeting decision process, risk and return analysis, cost of capital and dividend policy. Prerequisites: AC 206 or AC 201, EC 202, QM 213 or permission of the instructor.

FN 407. Corporate Finance II. 3 Credits.
Special topics in financial management including: international managerial finance, mergers and acquisitions, hybrid and derivative securities, working capital management, short-term and long-term financing, financial planning, leverage analysis and capital structure theory. Prerequisites: QM 213, FN 311. Offered in the spring-odd years.

FN 412. Investments. 3 Credits.
Methods of security analysis and portfolio management, including the current theoretical literature and thought. Discussion and analysis of current events and their implications for stock price behavior. Prerequisites: QM 213, FN 311. Offered in the spring-even years.

Fine Arts (FA)

Courses

FA 201. History/Theory of Architecture I. 3 Credits.
This course explores the architecture of different cultures from around the world beginning with the earliest evidence of human habitation and ending with the arrival of the renaissance. It examines the development of domestic, civic, and religious sites, as well as towns and settlements. The course explores major cultural, social, technological, and ideological influences on built environments, as well as examines the history, the context, and the form of notable examples. Three hours of lecture per week. Preference given to architecture majors. Note: Students who successfully complete this course may not take FA 221.

FA 202. History/Theory of Architecture II. 3 Credits.
This course explores the architecture of different cultures from around the world focusing on Western architecture from the Renaissance to the 19th century. It examines the development of domestic, civic, and religious sites, as well as towns and settlements. The course explores major cultural, social, and technological influences on built environments, as well as looks at the history, the context, and the form of notable examples. It additionally examines the developing ideologies of prominent practitioners. Three hours of lecture per week. Preference given to Architecture majors.

FA 221. History of Visual Arts I: Prehistoric to 1350. 3 Credits.
These courses provide an opportunity to develop an understanding of well-made artifacts by addressing quality or artistic value in terms of form and content. Students are acquainted with the principal periods of Western art by a study of outstanding examples of architecture, sculpture, painting, and the minor arts, ranging from prehistoric times to the present. First semester: formal vocabulary; prehistoric art to the medieval international style. Second semester: Renaissance to the present. Three hours of lecture per week.

FA 222. History of Visual Arts II: 1350 to the Modern Era. 3 Credits.
These courses provide an opportunity to develop an understanding of well-made artifacts by addressing quality or artistic value in terms of form and content. Students are acquainted with the principal periods of Western art by a study of outstanding examples of architecture, sculpture, painting, and the minor arts, ranging from prehistoric times to the present. First semester: formal vocabulary; prehistoric art to the medieval international style. Second semester: Renaissance to the present. Three hours of lecture per week.
FA 240. History of American Art. 3 Credits.
A survey of American architecture and art from colonial times to the present. Emphasis is placed on the rise and development of the arts in the United States and the changing nature and functions of art in American society. European influences and Native American contributions will be noted. Three hours of lecture per week.

FA 250. Topics in Art. 3 Credits.
Topics vary each semester, focusing on past and current issues in art related to historical style, art and the social context, aesthetic theory, tradition and innovation in media, and the role of art and the artist as an agent of communication in our time. This course may be repeated for credit. Three hours of lecture per week.

FA 260. Art Appreciation. 3 Credits.
This course is introductory in nature and focuses on varied ways to appreciate art: the role of the viewer, the purposes and functions of art, the creative process, materials and technology available to the artist, the relationship of art to culture Western and non-Western), and issues of art style and meaning. Three hours of lecture per week.

FA 308. History/Theory of Architectural III. 3 Credits.
This course presents a survey of architecture from approximately the mid eighteenth century through to the early 1930s, focusing on the rise and early development of the modern movement. It integrates the historic aspects of the key examples of architecture and urban design from this era with the theoretical ideas that generated the built form. Included in the course content is a discussion of the new programs, new social/economic/political organizations and new construction materials and methodologies that drove the search for new forms to represent the new ideas of the modern industrialized era. Prerequisite: FA 202. 3 lecture hours.

FA 309. History/Theory of Architectural IV. 3 Credits.
This course presents a survey of architecture from approximately the 1930s to the present day focusing on the various evolutionary paths of architectural development, including the codification of the international style and the subsequent challenges to the modern dogma into eras of mid and late modernism, expressionism, nationalism, organicism, brutalism, regionalism, postmodernism, deconstructivist architecture, and into the integration of the digital in design and manufacture of built works. Each evolutionary stance is discussed through analysis of the key works integrating the historic aspects with the theoretical ideas that generated the architectural works. Prerequisite FA 308. 3 hours of lecture.

French (FR)

Courses
FR 111. Beginning French I. 6 Credits.
The main purpose of this intensive course is to lead students to communicate in French at a basic level, to appreciate the French-speaking world, and to develop cultural awareness. In a highly interactive environment, students learn to understand, speak, read, and write French. French-language films, videos, and musical presentations in lab sessions are selected to reinforce the cultural material discussed in class, improve speaking and listening skills, and address differences in nonverbal communication. Not open to students who have successfully completed FR 205 or higher. Classroom 6 hours, laboratory 2 hours.

FR 112. Beginning French II. 6 Credits.
A continuation of FR 111 in which language skills are brought to a level enabling students to participate more fully in general conversation, to read more sophisticated passages, and to write with a firmer command of syntactical structures. Cultural competency is further developed. Classroom 6 hours, laboratory 2 hours. Prerequisite: FR 111, NU language placement, or equivalent. Not open to students who have successfully completed FR 205 or higher.

FR 150. Topics Course. 3 Credits.
Specialized topics relating to French and Francophone culture, literature, business practices, or language. Topic will be indicated in the schedule of classes. This is an introductory-level course. Course may be repeated for credit if the topic differs. May be taught in French or English; see schedule of classes. (When taught in English, this course may not count towards fulfilling the foreign-language requirement.) Classroom: 3 hours; laboratory varies with topic of course.

FR 205. Intermediate French I. 3 Credits.
A course providing aural-oral practice in French, in which students enter into full discussion of topics that include abstract themes and cultural perspectives; includes the expanded use of syntactical structures, the reading of sophisticated material, composition, the viewing of selected French and Francophone films and documentary materials from French-language television. Taught entirely in French. Classroom 3 hours, laboratory 1 hour. Prerequisite: FR 112, NU language placement, a score of 500 on the CEEB French Reading Test, or permission of the instructor.
FR 206. Intermediate French II. 3 Credits.
A course providing aural-oral practice in French, in which students enter into full discussion of topics that include abstract themes and cultural perspectives; includes the expanded use of syntactical structures, the reading of sophisticated material, composition, the viewing of selected French films and documentary materials from French television. Taught entirely in French. Classroom 3 hours, laboratory 1 hour. Prerequisite: FR 205 or the equivalent, NU language placement, score of 500 on the CEEB French Reading Test, or permission of the instructor.

FR 250. Topics Course. 3 Credits.
Specialized topics relating to French and Francophone culture, literature, business practices, or language. Topic will be indicated in the schedule of classes. This is an intermediate-level course. Course may be repeated for credit if the topic differs. May be taught in French or English; see schedule of classes. (When taught in English, this course may not count towards fulfilling the foreign-language requirement.) Classroom: 3 hours; laboratory varies with topic of course.

FR 311. Advanced French I. 3 Credits.
A continuation of grammar review at the advanced level; further development of oral expression through discussion and formal presentations. An introduction to the analysis of Francophone literature and film; an overview of major events, including cultural and scientific developments affecting French thought. Students will prepare written work in a workshop atmosphere in which rewriting and collaboration are encouraged in order to teach self-correction. Readings, lectures, discussions, student presentations, written work entirely in French. Classroom 3 hours, laboratory 1 hour. Prerequisites: FR 206, NU language placement, or permission of the instructor.

FR 312. Advanced French II. 3 Credits.
A continuation of grammar review at the advanced level; further development of oral expression through discussion and formal presentations. An introduction to the analysis of Francophone literature and film; an overview of major events, including cultural and scientific developments affecting French thought. Students will prepare written work in a workshop atmosphere in which rewriting and collaboration are encouraged in order to teach self-correction. Readings, lectures, discussions, student presentations, written work entirely in French. Classroom 3 hours, laboratory 1 hour. Prerequisites: FR 206, NU language placement, or permission of the instructor.

FR 321. A Survey of French Literature I. 3 Credits.
An introduction to French Literature. Lectures, reading, discussion in French. Includes an historical survey of French civilization comprising developments in art, music, philosophy and science. Readings in French literature from the Middle Ages to 1789, from the chivalrous medieval epic to the philosophes of the Enlightenment and expression of the egalitarian ideal of the revolution. Readings, lectures, discussions, student presentations, written work entirely in French. Prerequisites: FR 206, or a 300-level course (may be taken concurrently), NU language placement, or permission of the instructor.

FR 322. A Survey of French Literature II. 3 Credits.
An introduction to French Literature. Lectures, reading, discussion in French. Includes an historical survey of French civilization comprising developments in art, music, philosophy, the technology of warfare and the sciences. Readings in French literature from Romanticism to literature of the Absurd and beyond. Readings, lectures, discussions, student presentations, written work entirely in French. Prerequisites: FR 206, or a 300-level course (may be taken concurrently), NU language placement, or permission of the instructor.

FR 327. French Literature of the Twentieth Century I. 3 Credits.
A study of French literature (novel) from the latter part of the 19th century to the present day. Topics of study include concurrent developments in the other art forms and in the sciences; the impact of the World Wars on Francophone authors and artists. Readings, lectures, discussions, student presentations, written work in French. Prerequisites: FR 206, or a 300-level course (may be taken concurrently), NU language placement, or permission of the instructor.

FR 328. French Literature of the Twentieth Century II. 3 Credits.
A study of French literature (poetry, theater, and film) from the latter part of the 19th century to the present day. Topics of study include concurrent developments in the other art forms and in the sciences; the impact of the World Wars on Francophone authors and artists. Readings, lectures, discussions, student presentations, written work in French. Prerequisites: FR 206, or a 300-level course (may be taken concurrently), NU language placement, or permission of the instructor.

FR 331. Advanced French Composition, Conversation, and Translation I. 3 Credits.
A course in French stylistics, translation, oral reports and discussions in French. Prerequisites: FR 206, or a 300-level course (may be taken concurrently), NU language placement or permission of instructor.

FR 332. Advanced French Composition, Conversation, and Translation II. 3 Credits.
A course in French stylistics, translation, oral reports, and discussions in French. Prerequisites: FR 206, or a 300-level course (may be taken concurrently), NU language placement or permission of instructor.

FR 350. Topics Course. 3 Credits.
Specialized topics relating to French and Francophone culture, literature, business practices, or language. Topic will be indicated in the schedule of classes. This is an advanced-intermediate to advanced-level course. Course may be repeated for credit if the topic differs. May be taught in French or English; see schedule of classes for prerequisite. (When taught in English, this course may not count towards fulfilling the foreign-language requirement.) Classroom: 3 hours; laboratory varies with topic of course.
FR 415. Seminar: Topics in French Literature. 3 Credits.
Study of a particular author, theme, genre, or literary movement, including cultural themes. Offered as occasion demands. Topic varies each year these courses are offered. Prerequisites: FR300-Level course or permission of instructor.

FR 421. Reading and Research on a Topic in French Literature and Civilization. 3 Credits.
A report on an approved project of original research in French literature or civilization under the direction of a department member. Limited to students who have demonstrated aptitude for independent work. May be scheduled either or both semesters. Prerequisites: FR300-Level course, permission of the department chair and course instructor.

Freshman Triad (FT)

Courses
FT 001. Freshman Triad. 1 Credit.
A seminar in which first year students are introduced to university life, its purpose, development and traditions, while developing skills for academic success and life-long learning. The mechanisms employed in this course include reading, writing assignments, discussions, visits to resource and research centers, and visits by speakers. 1 lecture hour.

Geography (GE)

Courses
GE 104. Introduction to Geography. 3 Credits.
A survey of man's occupancy of the earth, his cultures and economies, their distribution and spatial relationships.

GE 300. Topics in Geography. 3 Credits.
Select topics offered on occasion.

Geology (GL)

Courses
GL 110. Introduction to Geology. 4 Credits.
An introduction to Earth's internal and external physical processes, its materials and landforms, and the connection between natural phenomena and humans. Topics include: minerals, rocks, water and natural resources; plate tectonics, mountain building, volcanism, earthquakes, slope failure and related hazards; rivers and flood management; erosion, soil degradation, desertification and sustainable agriculture; sea-level rise, coastal and wetland erosion and shore zone management. Discussion of human interaction with the Earth will range from local policy to global economic decisions. Offered fall and spring semesters. Classroom 3 hours, laboratory 2 hours.

GL 111. Oceanography. 4 Credits.
A basic survey of the physical, chemical, and geologic character of the world's oceans. Topics include patterns of energy exchange, chemical cycles, geological environments within the sea, and evolution of ocean basins. Classroom 3 hours, laboratory 2 hours. Offered spring semester only.

GL 156. Historical Geology. 4 Credits.
The origin and history of the earth and the evolution of life as disclosed by the rock and fossil record. The laboratory work consists of the study of fossils and geologic maps, plus field trips. Classroom 3 hours, laboratory 2 hours. Offered spring semester only.

GL 199. Geology Elective. 4 Credits.

GL 251. Sophomore Seminar in Geology. 1 Credit.
This course introduces the fundamentals of scientific investigation and communication. A research project introduces the Scientific Method, while reading and comprehension of scientific literature is coupled with instruction in and application of technical and scientific writing. Other forms of scientific communication, including poster and oral presentations, are addressed. Students learn the appropriate techniques for displaying and interpreting scientific data. Students may not earn credit for both ES 251 and GL 251. Offered Fall semester.

GL 253. Geomorphology. 4 Credits.
A course on the origin and evolution of topographic features by geological processes acting upon various earth materials and geological structures. Classroom 2 hours, laboratory and/or field work 4 hours. Prerequisite: GL 112, GL 153 or GL 156. Offered spring of even-numbered years.
GL 257. Sedimentation. 4 Credits.
A course that provides the analysis and interpretation of sedimentary rocks, sedimentary processes and environments of deposition. Classroom 2 hours, laboratory and/or field work 4 hours. Prerequisite: GL 112, GL 153 or GL 156. Offered fall of even-numbered years.

GL 258. Stratigraphy. 4 Credits.
A study of the description and correlation of layered rocks and the interpretation of the stratigraphic record based on examples from North America and Europe. Classroom 2 hours, laboratory and/or field work 4 hours. Prerequisite: GL 112, GL 153 or GL 156. Offered spring of odd-numbered years.

GL 260. Projects in Geology. 1-4 Credit.
A course that provides a geological field or laboratory project on a topic chosen by mutual consent of the student and the instructor. A written report is required. Prerequisites: GL 153 or GL 156 and permission of the instructor.

GL 261. Field Geology. 4 Credits.
A study of the techniques used in the measurement of large and small scale geologic structures. Emphasis is placed on field recognition of features such as bedding, cleavage, folds, faults and their use in geologic mapping. Classroom 2 hours, laboratory 4 hours. Prerequisite: GL 153 or permission of the instructor. Offered fall of even-numbered years.

GL 262. Structural Geology. 4 Credits.
A course that provides the analysis and interpretation of patterns in the structural features of the Earth’s crust. Topics include the genesis of tectonic features, analysis of strain in rocks, the interpretation of multiply-deformed rocks, and modeling of faults and fractures. Classroom 3 hours, laboratory 3 hours. Prerequisite: GL 261 or permission of the instructor. Offered spring of odd-numbered years.

GL 263. Mineralogy. 4 Credits.
Introductory crystallography and crystal chemistry are used to explain the properties of minerals. Each of the major mineral groups is studied in the laboratory with a focus on developing competency in the identification of the ore minerals and the rock-forming minerals. Development of an understanding of mineral associations is emphasized and field trips allow opportunity to improve these skills. Classroom 2 hours, laboratory 4 hours. Prerequisite: GL 153 or permission of the instructor. Offered fall of odd-numbered years.

GL 264. Petrology. 4 Credits.
Following an introduction to optical identification of the rock-forming minerals using the polarizing microscope, the mineralogy and textures of common rocks are studied by means of thin sections. The genesis of these rocks is explained through a study of the physical and chemical systems they represent. Classroom 2 hours, laboratory 4 hours. Prerequisite: GL 263. Offered spring of even-numbered years.

GL 265. Glacial Geology. 4 Credits.
A study of the origin and development of glaciers, interpretation of Pleistocene glacial features with emphasis on New England. Classroom 2 hours, laboratory and/or field work 4 hours. Prerequisite: GL 112, GL 153 or GL 156. Offered fall of odd-numbered years.

GL 399. Junior Topics. 4 Credits.

GL 450. Directed Study in Geology. 4 Credits.
A capstone course in which there is preparation of a geological report based on a project of original research involving field, laboratory, or library study or some combination of these. Conference schedules will be determined by the nature of the project and the student's schedule. Prerequisite: permission of the instructor. Offered fall semesters as needed. Student cannot receive credit for this course and ES 450.

GL 451. Geology Seminar. 3 Credits.
A capstone course for fourth-year students designed to review advanced geological concepts in a seminar format. The course also includes oral and poster presentations of senior research projects, and examination of codes of ethics in the geological sciences. Prerequisite: Senior Geology major or permission of the instructor. Offered spring semester as needed. Student cannot receive credit for this course and ES 451.

German (GR)

Courses

GR 111. Beginning German I. 6 Credits.
An intensive course providing an introduction to the German language, in which speaking proficiency, aural comprehension, vocabulary acquisition, reading and writing are brought to a level enabling students to use the language actively in everyday situations. Not open to students who have successfully completed GR 205 or higher. Classroom 6 hours, laboratory 2 hours.

GR 112. Beginning German II. 6 Credits.
A continuation of German 111, in which language skills are brought to a level enabling students to participate more fully in general conversation, to read more sophisticated passages, and to write with a firmer command of syntactical structures. Classroom 6 hours, laboratory 2 hours. Prerequisite: GR 111 or equivalent. Not open to students who have successfully completed GR 205 or higher.
GR 150. Topics Course. 3 Credits.
Specialized topics offered relating to culture, literature, business practices, language or linguistics. Topic will be indicated in the schedule of classes. May be repeated for credit as topics vary. May be taught in German or English; see schedule of classes. (When taught in English, this course may not count towards fulfilling the foreign language requirement.) Classroom: 3 hours.

GR 205. Intermediate German I. 3 Credits.
A sequence that provides aural-oral practice in German, in which students are enabled to enter into full discussion of topics that include abstract themes; review and expanded use of syntactical structures; intensive and extensive reading; and composition. Classroom: 3 hours, laboratory: 1 hour. Prerequisite: GR 112, NU placement, or a score of 500 on the CEEB German Reading Test.

GR 206. Intermediate German II. 3 Credits.
A sequence that provides aural-oral practice in German, in which students are enabled to enter into full discussion of topics that include abstract themes; review and expanded use of syntactical structures; intensive and extensive reading; and composition. Classroom 3 hours, laboratory 1 hour. Prerequisite: GR 205 or the equivalent, NU placement exam or score of 500 on the CEEB German Reading Test.

GR 250. Topics Course. 3 Credits.
Specialized topics offered relating to culture, literature, business practices, language or linguistics. Topic will be indicated in the schedule of classes. May be repeated for credit as topics vary. May be taught in German or English; see schedule of classes. (When taught in English, this course may not count towards fulfilling the foreign language requirement.) Classroom: 3 hours.

GR 321. Survey of German Culture I: From the Beginnings to 1848. 3 Credits.
Introduction to major currents in German social, political and cultural history from the time of the Roman Empire until the Revolution of 1848. Taught in German. Prerequisite: GR 206 or equivalent.

GR 322. Survey of German Lit I: From the Beginnings to 1848. 3 Credits.
Introduction to major texts and literary figures from the Roman Era until the Revolution of 1848, including, among others, Tacitus, Charlemagne, the courtly poets, Luther, the literary Baroque, Lessing, Goethe, Schiller, Kleist, the brothers Grimm, Buchner and Heine. Taught in German. Prerequisite: GR 206 or equivalent.

GR 323. Survey of German Culture II: 1848 to 1945. 3 Credits.
Introduction to major currents in German social, political, and cultural history from the evolution of 1848 through Bismarck and German unification to World War I, the Weimar Republic, and the period of Fascism and the Holocaust. Taught in German. Prerequisite: GR 206 or equivalent.

GR 324. Survey of German Literature II: 1848 to 1945. 3 Credits.
Introduction to major texts and literary figures from the first unification of Germany until the end of World War II, including Nietzsche, Hofmannsthal, Rilke, Thomas Mann, Katka, Brecht, and others. Taught in German. Prerequisite: GR 206 or equivalent.

GR 325. Survey of German Culture III: 1945 to the Present. 3 Credits.
Introduction to major currents in German social, political, and cultural history of the Germanies and Austria, post-war to post-wall: the period of Allied occupation followed by the economic miracle of the 1950s and 60s, radicalism and upheaval in the late 60s and 70s, and finally, the rise and fall of the Berlin Wall, culminating in the uneasy co-existence between East and West that has prevailed since re-unification. Taught in German. Prerequisite: GR 206 or equivalent.

GR 326. Survey of German Literature III: 1945 to the Present. 3 Credits.
Introduction to major texts and literary figures active since the end of World War II, including Borchert, Boll, Celan, Bachmann, Frisch, Durrenmatt, Grass, Christa Wolf, Peter Schneider, Jurek Becker and others. Taught in German. Prerequisite: GR 206 or equivalent.

GR 350. Topics Course. 3 Credits.
Specialized topics offered relating to culture, literature, business practices, language or linguistics. Topic will be indicated in the schedule of classes. May be repeated for credit, as topics vary. The number ascribed to the course will reflect the level of the material under study as well as the level of proficiency expected of the student. May be taught in German or English; see schedule of classes. (When taught in English, this course may not count towards fulfilling the foreign language requirement.) Classroom: 3 hours.

GR 415. Seminar on a Topic in German Literature and Culture. 3 Credits.
A study of a particular author, theme, genre, or literary movement, including cultural themes. Offered as occasion demands. Topic varies each year these courses are offered.

GR 421. Reading and Research in German Literature or Civilization. 3 Credits.
A report on an approved project of original research in literature or civilization under the direction of a department member. Limited to students who have demonstrated aptitude for independent work. May be scheduled either or both semesters. Prerequisite: permission of the department chair.

History (HI)
Courses

HI 107. The History of Civilization I. 3 Credits.
A survey providing a global perspective of the history of human cultures and institutions from earliest times to 1500 CE, focusing on Europe, Asia, and Africa. The course offers an active and participatory environment to the study of history through discussions, simulations, study of primary sources, and research assignments. Open only to first year students or by permission of department. Offered annually.

HI 108. The History of Civilization II. 3 Credits.
A survey of major world civilizations that provides a global perspective of the development of the modern world from 1500 to the present. The course offers an active and participatory environment to the study of history through discussions, simulations, study of primary sources, and research assignments. Open only to first year students or by permission of department. Offered every semester.

HI 121. American History Survey I. 3 Credits.
A survey of American history from the Age of Discovery to 1877. American institutions ranging from political and economic to social and cultural will be examined. Open only to freshmen and sophomores. Offered every semester.

HI 122. American History Survey II. 3 Credits.
A continuing survey of multiple facets of American Civilization as presented in HI121, focusing on the period from the close of political Reconstruction in 1877 to the present. The maturation of democratic institutions and the emergence of the United States as a world power will also be examined. Open only to freshmen and sophomores. Offered every semester.

HI 201. Ancient Greece and Rome. 3 Credits.
A survey of Greek and Roman civilizations from the origins of the polis to the fall of the Western Roman Empire. Prerequisite: Sophomore standing or higher. Usually offered annually.

HI 202. The Middle Ages: Europe 500 - 1500. 3 Credits.
The history of Europe from the fall of the Roman Empire to 1500. The class examines the major political, economic, social, and cultural trends in the development of a distinctive European civilization, built primarily on Christian, Greco-Roman, and Germanic foundations. Prerequisite: Sophomore standing or higher. Usually offered annually.

HI 209. Historical Methods. 3 Credits.
This course introduces students to the methods, techniques and conventions of historical research and writing, including such skills as identifying, understanding, analyzing and interpreting primary and secondary sources, compiling bibliographies, citing sources, and understanding historiography. In addition, this course approaches the issue of ethics through a discussion of the ethical responsibilities of historians, including a discussion of plagiarism. Required for all history majors. Open to sophomore history majors only or by permission of department chair. This course does not fulfill the General Education History requirement. The course must be completed by the end of the junior year. Offered annually in the fall semester.

HI 211. Early East Asian Civilizations. 3 Credits.
This broad, historical survey course is about the civilizations and cultures of East Asia and the people that lived in them until the immediate post-Mongol conquest period. The core of the course will cover the areas that include modern Japan, China and Korea with reference to the inner Asian steppes. This lecture based course will be supplemented by primary source readings and discussion on Chinese and Japanese cultures, art and political philosophy. Prerequisite: Sophomore standing or higher. Usually offered annually.

HI 212. Modern East Asian Civilizations. 3 Credits.
This is a broad historical survey of the transformation of societies and states in East Asia from traditional empires to modern nation states. Rather than an exhaustive survey of facts and dates, this course is designed to introduce students to key questions in modern East Asian history. This lecture based course will be supplemented by primary source readings and discussion on Chinese and Japanese culture and politics. Prerequisite: Sophomore standing or higher. Usually offered annually.

HI 214. History of the Middle East. 3 Credits.
This course is a survey of a historically vital region. It will include an overview of the area known as the “Cradle of Civilizations and Monotheism,” as well as the rise of the Islamic Caliphate, the rise and fall of the Ottoman Empire, and the late 19th and 20th Centuries European imperialism and colonialism. The greatest emphasis, however, will be on the modern period. In order to fully comprehend the contemporary situation, it is necessary to include an historical examination of the cultural and religious diversity, as well as the political complexity of the people and states which comprise the so-called Middle East. Prerequisite: Sophomore standing or higher. Offered in the spring semester.

HI 215. VT Regional Material Culture. 3 Credits.
This course encompasses the history of sub-Saharan Africa from approximately 1800 to the end of the so-called “Cold War.” It is a comprehensive introduction to the numerous and diverse cultural, political, and economic entities comprising this complex area of the world. The central themes of the course, however, will be the related phenomena of the Trans-Atlantic Slave Trade, European colonialism, and western neo-colonialism and their varying impact upon the different regions.
HI 223. Europe's Age of Revolution. 1500-1800. 3 Credits.
This course traces Europe's path from medieval to modern by examining a series of political, intellectual, and technological revolutions between 1500 and 1800. Topics will include the Reformation, Scientific Revolution, Enlightenment, American and French Revolutions, and the Industrial Revolution, all discussed within the broader context of cultural change, social reform, and technological development. Prerequisite: Sophomore standing or higher. Offered annually.

HI 224. Modern European History. 3 Credits.
This course examines the political, military, and social history of Europe in the nineteenth and twentieth centuries. The nineteenth century witnessed remarkable changes in European society and politics. It was an age of romantics and reactionaries, liberals and imperialists, revolutionaries and racists, nationalists and irrationalists. At the beginning of the twentieth century, Europe dominated the world. However, two world wars, the rise and fall of fascism and communism, the concept of superpowers, and the growth of mass consumer society destroyed the old European hegemony and led to a new and evolving idea of "Europe". Prerequisite: Sophomore standing or higher. Offered alternate years.

HI 227. Modern British History, 1688 - Present. 3 Credits.
The history of the British Isles from the "Glorious Revolution" of 1688 to the region's current struggles with maintaining national identity at the dawn of the twenty-first century. Emphasis will be on the decline of the monarchy, the establishment of parliament as a truly representative body, and the rise and fall of the British Empire. Prerequisite: Sophomore standing or higher. Offered alternate years.

HI 228. Norwich University History. 3 Credits.

HI 235. Military History I. 3 Credits.
This course provides an examination of the major issues evident in the study of military affairs from the dawn of time to the present day. Using a modular approach, this course will explore the following topics: mobile warfare, urban warfare, child soldiers, war in the air, civilians in the path of war, women in war, and the unintended consequences of warfare. Prerequisite: Sophomore standing or higher. Offered every semester.

HI 236. Military History II. 3 Credits.
This course provides an examination of the major issues evident in the study of military affairs from the dawn of time to the present day. Using a modular approach, this course will explore the following topics: the origins of war, total war, soldiers in war, military theory, insurgency & counterinsurgency warfare, military revolutions, and static warfare. Prerequisite: Sophomore standing or higher. Offered every semester.

HI 260. Topics in History. 3 Credits.

HI 303. Colloquium in Ancient History. 3 Credits.
A reading and writing intensive course, emphasizing historical research and analytical skills. Possible topics include, but are not limited to, the development of historical writing, the Roman Empire, women in antiquity, pagans and Christians, etc. Prerequisite: C or better in one 200 level history course or instructor permission. May be repeated for credit with a different topic. Offered annually.

HI 304. Colloquium in Medieval History. 3 Credits.
A reading and writing intensive course, emphasizing historical research and analytical skills. Possible topics include, but are not limited to, the Crusades. medieval Christianity and medieval women. Prerequisite: C or better in one 200 level history course or instructor permission. May be repeated for credit with a different topic. Offered annually.

HI 315. Modern China. 3 Credits.
A standard reading and lecture course, Modern China introduces students to the major processes shaping twentieth century Chinese history. The course emphasizes regional knowledge, historical research and analytical skills building. Major topics will include in all cases an overview of Chinese history since 1700 (late imperial and twentieth century "modern" China) with emphasis on political, social history and environmental developments. Other sub-topics in the course include, but are limited to, nation building/nationalism, gender issues, and border/Central Asia relations. Prerequisite: C or better in one 200 level history course or instructor permission. Offered annually.

HI 317. Modern Japan. 3 Credits.
A standard reading and lecture course, Modern Japan introduces students to the major processes shaping twentieth century Japanese history. The course emphasizes regional knowledge, historical research and analytical skills building. Major topics will include in all cases an overview of Japanese history since 1868 (Tokugawa dissolution through the late twentieth century) with emphasis on political and economic history. Other sub-topics in the course include, but are not limited to, Japan-in-the-world (international relations), gender issues, ethnic relations and the environment. Prerequisite: C or better in one 200 level history course or instructor permission. Offered on occasion.

HI 319. Colloquium in Chinese History. 3 Credits.
This is a thematic, reading and writing intensive course, emphasizing historical research and analytical skills. Possible topics include, but are not limited to, the development of ethnicity and ethnic visions of regional history in China, China's military history, frontier/border history, Ancient China and Greece, etc. Prerequisite: C or better in one 200 level history course or instructor permission. May be repeated for credit with a different topic. Offered alternate years.
HI 321. Reformation Europe. 3 Credits.
The years immediately following the 1517 publication of Martin Luther's Ninety-Five Theses saw a sudden and unprecedented upheaval in European society. This course will examine the social, political, and spiritual context of late medieval Europe, then consider the implications of the Reformation for politics, gender and the modern world. Original sources in translation will form the basis for discussion, supplemented by lecture and secondary materials. Prerequisite: C or better in one 200 level history course or instructor permission. Offered alternate years.

HI 322. Colloquium in Early Modern European History. 3 Credits.
A reading and writing intensive course covering a specialized topic within the history of Early Modern Europe. Topics could include the Thirty Years War, Crime and Deviance, the Enlightenment, the French Revolution, or Persecution and Tolerance. Designed for history majors in their junior or senior years. Prerequisite: C or better in one 200 level history course or instructor permission. May be repeated for credit with a different topic.

HI 326. Nazi Germany and the Holocaust. 3 Credits.
This course examines the political, military, cultural and social history of Germany during the period of Nazi rule, 1933-1945. Special attention is given to the sources of support for Nazism, the structure of the National Socialist state, the role of Adolf Hitler, and the Holocaust. Offered alternate years.

HI 329. Modern Russian History, 1917 to the Present. 3 Credits.
This course examines the political, military, and social history of Russia and the Soviet Union from the birth of the Soviet state through the present day. The foundations of the Soviet state - ideological, industrial, and social - proved too shaky to support the needs and expectations of a modern society. From Nicholas II to Lenin, Stalin to Yeltsin, this course examines the unique and dynamic leadership of Russia, as well as the lives of ordinary people in this fascinating culture. Offered alternate years.

HI 331. The Colonial Period of American History. 3 Credits.
A study of the settlement and development of the British colonies from their origins to 1763. Offered alternate years.

HI 332. The American Revolution. 3 Credits.
A study of the separation of the 13 British colonies from the mother country and establishment of the United States as an independent nation in the period 1763-1789. Offered alternate years.

HI 333. Colloquium in Early American History. 3 Credits.
An intensive reading, research and writing course focusing on selected topics relating to early American history. The chronological range of possible topics extends from the Age of Discovery in the sixteenth century through the American Revolution and the ratification of the U.S. Constitution in 1789. Prerequisite: C or better in one 200 level history course or instructor permission. May be repeated for credit with a different topic.

HI 334. The Citizen-Soldier in American History. 3 Credits.
An examination of the evolution of American military policy from the colonial era through the Vietnamese War, giving special attention to the perennial conflict between the advocates of a professional army and the proponents of a civilian soliderly. Offered alternate years.

HI 335. Colloquium in 10th Century United States History. 3 Credits.
A reading and writing intensive course, emphasizing historical research and analytical skills. Possible topics include, but are not limited to, the rise of political parties in the United States, the Gilded Age, etc. Prerequisite: C or better in one 200 level history course or instructor permission. May be repeated for credit with a different topic.

HI 338. U.S. Diplomatic History, 1776-1914. 3 Credits.
A study of the foreign relations and foreign policies of the United States from the American Revolution up to the First World War. Topics include territorial expansion, the War of 1812, the Mexican-American War, the expansion of American trade, and the Spanish-American War. Offered alternate years.

HI 339. U.S. Diplomatic History, 1914-present. 3 Credits.
A study of the foreign relations and foreign policy of the United States from the First World War to the present. Topics include the two World Wars, the Cold War, the Korean War, the Vietnam War, and post-cold war policy. Offered alternate years.

HI 340. Colloquium in Twentieth Century United States History. 3 Credits.
A reading and writing intensive course, emphasizing historical research and analytical skills. Possible topics include, but are not limited to, World War I, the Great Depression, the 1960's, and the Rise of the Modern Conservative Movement. Prerequisite: C or better in one 200 level history course or instructor permission. May be repeated for credit with a different topic.

HI 341. U.S. Civil War Era, 1848-1877. 3 Credits.
This course examines the causes of the American Civil War, the course of the conflict, and the subsequent period of reconstruction through 1877. Offered alternate years. 3 lecture hours.

HI 345. Colloquium in the History of the Middle East & Northeast Africa. 3 Credits.
This colloquium topic deals with the history of the Ottoman Empire, one of the most significant and longest lasting empires in world history. It rose from the remnants of the Byzantine Empire to be the most powerful “state” in the world during the 15th and 16th Centuries. Even in its decline, the Ottoman Empire played a key role in European and global politics. Its disintegration during the late 19th and early 20th Centuries would have a lasting impact on subsequent events throughout Middle East and Eastern Europe. Special emphasis will be placed upon the evolution of its political, military, and economic institutions, as well as its successful integration of numerous and disparate ethnic and religious groups. 3 lecture hours.
HI 355. Colloquium in Modern Military History. 3 Credits.
A reading and writing intensive course, emphasizing historical research and analytical skills. Possible topics include, but are not limited to, the First World War, the Second World War, the military history of Russia, etc. Prerequisite: C or better in one 200 level history course or instructor permission. May be repeated for credit with a different topic.

HI 360. Topics in U.S. History. 3 Credits.
Topics vary. Prerequisite: C or better in one 200 level history course or instructor permission.

HI 361. Topics in Modern European History. 3 Credits.
Topics vary. Prerequisite: C or better in one 200 level history course or instructor permission.

HI 362. Topics in Pre Modern History. 3 Credits.
Topics vary. Prerequisite: C or better in one 200 level history course or instructor permission.

HI 363. Topics in Non-Western History. 3 Credits.
Topics vary. Prerequisite: C or better in one 200 level history course or instructor permission.

HI 371. Nation-Building. 3 Credits.
This course provides an exposure to the challenges of crating or re-creating nations after a period of crisis and upheaval. Whether following wars, grants of independence from foreign rule, or human rights atrocities, countries must undertake political, economic, and social reforms to construct stable, popularly accepted, and economically viable polities. How have nations tried to accomplish this complex task in the past hundred years? Historical case studies may be drawn from Africa, the Caribbean, Europe, and Asia. Prerequisite: C or better in one 200 level history course or instructor permission. Offered alternate years.

HI 372. Military History of the United States I, 1775-1902. 3 Credits.
This course will trace the evolution of American military power from the early days of frontier and revolutionary conflict to an era of American imperial ambition at the end of the nineteenth century. Particular attention will be given to strategic challenges of protecting/expanding the American state, the tactical innovations and failures of nineteenth century warfare, and the formulation of the civil-military relationship in American politics and society. Prerequisite: C or better in one 200 level history course or instructor permission.

HI 373. Military History of the United States II, 1902-Present. 3 Credits.
This course will explore the evolution of the American military from its days as a small frontier force at the turn of the twentieth century to its present status as a multi-tasking, global power. Specifically, this course will examine the struggle of American political and military leaders to work together in developing strategies and tactics capable of tackling the complex challenges of modern warfare. Prerequisite: C or better in one 200 level history course or instructor permission.

HI 400. Independent Study. 3 Credits.
An opportunity for qualified upperclass students to engage in an intensive reading or research program in fields of interest not satisfactorily covered by regular course offerings. Periodic conferences will be required. Prerequisites: written consent of the instructor to a specific project presented by the applicant. Offered as occasion demands.

HI 405. History Internship. 3-12 Credit.
Supervised experience at a museum, archives, historical society, or restoration project involving research or field work. Direct participation in such activities as the editing of manuscripts, the interpretation of artifacts, or the preservation of historic structures. Prerequisite: permission of department chair. Normally open only to seniors. Offered as occasion demands.

HI 430. Capstone Seminar in United States History. 3 Credits.
A semester course for advanced students, primarily for senior History or Studies in War & Peace majors. Topics vary from semester to semester. Prerequisite: Completion of one history colloquium with a grade of C or higher and permission of the instructor.

HI 431. Capstone Seminar in Modern European History. 3 Credits.
A semester course for advanced students, primarily for senior History or Studies in War & Peace majors. Topics vary from semester to semester. Prerequisite: Completion of one history colloquium with a grade of C or higher and permission of the instructor.

HI 432. Capstone Seminar in Pre-Modern History. 3 Credits.
A semester course for advanced students, primarily for senior History or Studies in War & Peace majors. Topics vary from semester to semester. Prerequisite: Completion of one history colloquium with a grade of C or higher and permission of the instructor.

HI 433. Seminar in Non-Western History. 3 Credits.

HI 490. Honors in History I. 3,6 Credits.
First semester of a two semester sequence honors thesis project. The first semester is devoted primarily to research. Not repeatable for credit. Does not fulfill distribution requirement for major.
HI 491. Honors in History II. 3,6 Credits.
Second semester of a two semester sequence. The second semester is devoted to writing and defending the honors thesis. Not repeatable for credit. Does not fulfill distribution requirement for major. Prerequisite: A grade of "B" or higher in HI 490 and permission of the program director and department chair. 3 lecture hours.

Honors Program (HN)

Courses

HN 101. Introductory Honors Seminar. 3 Credits.
A reading and writing intensive course, emphasizing development of creative, analytical, problem-solving and communication skills while challenging students to approach the topics discussed from an interdisciplinary perspective. Offered every semester. Prerequisites: enrollment in Honors Program or permission of the Director of the Honors Program. Repeatable when topic is different. 3 lecture hours.

HN 301. Honors Seminar. 3 Credits.

Information Systems (IS)

Courses

IS 100. Foundations of CSIA. 3 Credits.
This survey of computing and information assurance fundamentals is required for computer science and information assurance majors. The course focuses on learning to use key concepts and terminology in information technology, computer science, networking, and information security. Discussions regarding computing ethics, safety, and professionalism are included throughout. No prerequisites. Permission is required for non-computer science and non-information assurance majors to enroll in this course. (3 credits).

IS 120. Business Applications & Problem Solving Techniques. 3 Credits.
An introductory course in management information processing. The course explores the most important aspects of information systems with specific emphasis on business applications, practical usage, and current information. The student will obtain skills in word processing, spreadsheet analysis, presentation tools and website design using professional software packages. Structured problem-solving techniques will be emphasized throughout the course. Practical implementation projects and case studies will be used to reinforce topics such as computer, academic, and professional ethics for an information-based society.

IS 121. Introduction to Computer Programming. 3 Credits.
An introduction to computer programming in a high-level language. This course combines the mechanics of learning a first computer language with the fundamental stylistic elements of general problem solving. Emphasis on the creation of basic gram structures, modular design, and logical flow of control is reinforced by writing programs both in and out of the classroom. Prerequisite: IS 120 or permission of instructor.

IS 130. Introduction to Computing. 3 Credits.
A breadth-first introduction to the discipline of computing. This course provides a broad survey of the sub-disciplines within computer science and information systems culminating in the exploration to programming fundamentals. Topics include: hardware survey, software survey, software engineering strategies, algorithmic design, ethics in computing, societal impact of computing, history and theory of computing, and an introduction to information systems and their application, and introductory programming. Throughout the course, responsible computer, academic, and professional ethics in an information-based society will be stressed.

IS 131. Computer Programming. 3 Credits.
Application of fundamental programming concepts using a high level language. The course will emphasize object-oriented design and implementation techniques. Good software engineering practice will be introduced by means of programming projects that illustrate the importance of software quality attributes. Prerequisite: IS 130.

IS 221. G.U.I. Programming. 3 Credits.
A study of the design and implementation of the graphical user interface. The course will present fundamentals of usability and human factors in GUI design. One or more of the following will be studied and implemented in a student project: Visual Basic programming, Web programming, GUI code generators. Prerequisite: IS 131.

IS 228. Introduction to Data Structures. 3 Credits.
An introduction to the basic concepts of data and the techniques used to operate on the data. Topics will include the file handling, searching, sorting, multi linked structures, trees, and graph presentations. Prerequisite: IS 131.
IS 240. Database Management. 3 Credits.
A study of the concepts and structures necessary to design and implement a database management system. Various data models will be examined and related to specific examples of database management systems. Techniques of system design, system implementation, data integrity, and file security will be examined. Prerequisite: IS 228.

IS 260. Data Communications and Network. 3 Credits.
IS 300. Management Information Systems. 3 Credits.
This course will provide an overview of information systems, their role in organizations, and the relationship of information systems to the objectives and structure of an organization. Management of software projects, decision making with regard to systems development, and organizational roles with regard to information systems will also be discussed. 3 lecture hours.

IS 301. Software Engineering I. 3 Credits.
An in-depth initiation to the system development life cycle, the techniques of information analysis, and the logical specification of the system. Documentation and communication aids are introduced as well as interpersonal approaches and techniques used in analysis. Prerequisite: IS 240.

IS 302. Software Engineering II. 3 Credits.
Utilizing techniques, the student will progress through the phases of specification, design, implementation, and testing of information systems. Object-oriented design techniques are used to design new logical and new physical systems for business related problems. Both technological and managerial aspects of system design and implementation are considered. Students will learn the importance of and design of security systems such as firewalls and passwords. Prerequisite: IS 301.

IS 311. Network Forensics. 3 Credits.
IS 330. Ethics in Computing & Technology. 3 Credits.
The course is designed to expose students to some of the ethical dilemmas posed to our culture as a result of the current technological trends. Students will study various ethical standards and creeds offered through a variety of organizations (e.g., ACM) Students will learn to evaluate case studies from an ethical perspective. Students will be expected to conduct literature surveys, produce bibliographies, write literature reviews, and present oral summaries of research as well as offer critical evaluation of writings related to ethics and technology. This course fulfills General Education Requirement #6: The ability to think critically and make ethical decisions. Prerequisite: one semester of college mathematics.

IS 340. Information Systems Security Assurance I. 3 Credits.
This course provides an overview of design considerations involved with the security of site design. The course will also provide and understanding of the Levels of Trust and system accreditation/certificate processes. Life cycle management of software, hardware, and physical plant, from planning through destruction will be examined and reinforced using case studies. Additionally understanding of the variety of security systems involving computers and networks and an ability to evaluate vulnerabilities will be discussed. Prerequisite: IS 228 or permission of instructor.

IS 342. Management of Information Assurance. 3 Credits.
This course continues the study of information assurance begun in IS 340. The focus is on management of the information assurance process. Topics include human factors in reducing security breaches, security incident detection and response, remediation, management's role in information assurance, and other considerations in framing and implementing information assurance policies. The final section reviews current topics of particular interest and activity in the field of information assurance. Prerequisite: IS 228 or MG 351.

IS 353. Business Programming Languages. 3 Credits.
A study of programming languages commonly used in business applications. A working knowledge and appreciation of the power of several business languages are obtained through programming assignments based on business-related subjects such as payroll, mailing lists, and sorting. Prerequisite: IS 228.

IS 370. Intro to Information Warfare. 3 Credits.
This course introduces students to the overall concept of Information Warfare (IW) and Information Operations (IO), particularly with regard to the US Federal government and the Department of Defense. Introduction to IW / IO surveys the development of Information Warfare (IW) and Information Operations (IO) as these elements of power have become more important for the United States Department of Defense (DoD) and Federal Government as a whole. The course assumes only a rudimentary familiarity with the basic concepts and terminology of modern Internet usage and computing and is not a technology-focused course. Prerequisites: None. Open to third and fourth year students or by permission of instructor. 3 lecture hours.

IS 380. Offensive Information Operations. 3 Credits.
This course introduces students to the overall concept of Offensive Information Operations (O-IO), which are conducted across the range of military operations at every level of war to achieve mission objectives. Combatant commanders must carefully consider the potential of IO to deter, forestall, or resolve crises. The course assumes only a rudimentary familiarity with the basic concepts and terminology of modern Internet usage and computing and is not a technology-focused course. Prerequisites: IS 370 Introduction to IW/IO. Open to third and fourth year students or by permission of the instructor. 3 lecture hours.

IS 399. Test course. 3 Credits.
IS 406. Special Topics in Computer Science. 3 Credits.
A study of topics chosen from areas of current interest that are not offered as part of the permanent curriculum. This course may be taken for credit more than once. Prerequisite: IS 228 or permission of instructor.

IS 407. Politics of Cyberspace. 3 Credits.
This course explores the interrelations of modern computing and communications technology with politics, power, news, privacy, crime, and creativity. The course assumes only a rudimentary familiarity with the basic concepts and terminology of modern Internet usage and computing and is not a technology-focused course. Open only to juniors and seniors. 3 lecture hours.

IS 410. Computing Internship. 3 Credits.
Internships within CS/CIS are designed to provide computing majors with the opportunity to apply and expand their knowledge within the computing discipline. The student must be a junior or senior at the time of enrollment and have good academic standing. The student must have the internship approved beforehand by a faculty member in CS/CIS and have the written consent of the CS/CIS Program Coordinator. In addition, a supervisor within the sponsoring organization must agree to provide a written description of the internship beforehand, and provide progress reports during and after the internship experience.

IS 411. Cyber Investigation. 3 Credits.
This course is an introduction to cyber investigation. It includes elements of cyber crime, cyber warfare and cyber terrorism. The course will examine investigative techniques for cyber investigators, case studies of representative cyber crimes and cyber warfare incidents, some cyber investigation tools and expert witnessing. The course builds up to a mock trial where students act as a cyber investigation task force on an actual case of cyber crime. This is a course that incorporates extensive reading as well as hands-on lab exercises. No prerequisites. Open to third and fourth year students or by permission of the instructor. 3 lecture hours.

IS 440. Software Engineering III. 3 Credits.
An advanced course in the field of Software Engineering. Students will refine their use of the methods and procedures of software development from conception of an idea through its implementation and beyond. A variety of software process models will be studied. The course will seek to balance theoretical foundations with practical application. A team project will be assigned to allow for the application of software engineering techniques. The course will investigate methodologies and research with the purpose of improving personal and organizational quality and productivity. Classroom 3 hours. Prerequisites: IS 302 or permission of the Instructor.

IS 455. Contemporary Issues in Computer Science. 3 Credits.
A capstone seminar which will vary every term in accordance with the current issues of the time. Students are to work with the instructor as they explore today’s issues and trends in preparation of a thesis or project. Emphasis will be placed on critical thinking, research and evaluation of current issues. A comprehensive computer exam is included in this course. Each student will be required to prepare a paper outlining ethical standards based on the student’s life experiences. Prerequisites: IS 302, or permission of the instructor.

IS 460. Data Communications and Networks. 3 Credits.
An introductory study in fundamental concepts of computer networks and data communication including a survey of major protocols, standards, and architectures. Students will implement simple data communication protocols in the laboratory. Prerequisite: IS 228.

Interdisciplinary (ID)

Courses
ID 110. Ecology and Geology of the Connecticut River Valley. 4 Credits.
This course starts with a four-day, on-campus, period. During this time there are lectures and slide presentations on water chemistry, water pollution, flora and fauna of the river and valley, and geology of the Connecticut River valley. Canoe instruction, biological and geological identification procedures, surveying methods, and water analysis techniques are also taught. A nine-day canoe trip follows during which the ecology and geology of the upper river valley are studied. The final day of the course is spent back on campus for additional testing and the preparation of final reports. This four-credit laboratory science course is intended for non-science majors and is offered during the time between graduation and the beginning of summer school.

ID 120. Partridge Seminar. 3 Credits.
An inter-disciplinary course inspired by Norwich University’s unique history, educational mission, and Guiding Values whose content depends on the individual instructor and/or discipline and a changing annual theme. The course is open to first-year students only. Students may only take this course once.

ID 199. Topics Course. 6 Credits.
ID 220. Interdisciplinary Studies. 3 Credits.
The study of a current subject of academic inquiry that falls across disciplinary boundaries. Specific topics of ID 220 are approved for instruction on a case-by-case basis by the respective division heads, following review by program, departmental and/or divisional curriculum committees, which also determine whether such courses may count as divisional electives. Each division decides whether its recommending body shall be the program, department, and/or division. The course is taught by faculty from two or more academic disciplines. Descriptive titles reflecting course content are included on student transcripts. ID 220 may not be used to satisfy the requirement of a history course for all baccalaureate degrees. General prerequisite: sophomore standing; additional prerequisites may be announced at pre-registration.

International Studies (IN)

Courses

IN 101. Introduction to International Studies. 3 Credits.
Drawing upon the major disciplines within the social sciences, this course provides a multidisciplinary understanding of the forces that shape and affect relationships among human communities. Among the topics considered are: Ethics and human rights, geography and spatial analysis, the role of culture, and the independent and combined effects of politics and economics. In addition, the course introduces students to the methods used to address the questions and problems with which the discipline is concerned.

IN 350. Topics in International Studies. 3 Credits.
Selected Topics in international studies to be used to cover subjects not included in the regular offerings. The course can be offered and taught by faculty in other disciplines upon prior approval of the history & Political Science Department Chair. The course seeks to enhance an appreciation for the multidisciplinary nature of international studies. 3 lecture hours.

IN 410. Seminar in International Studies. 3 Credits.
This capstone course is a reading and writing intensive course designed to introduce students to graduate level work in International Studies. Seminar topics will be determined by the instructor. Prerequisite: Senior standing or permission of the instructor.

IN 490. Honors in International Studies. 3 Credits.
This course is intended for senior students who have demonstrated superior research and writing skills. It requires the commitment of an entire academic year. Topic determined by the student and faculty member. Prerequisite: Senior standing and permission of the instructor.

Management (SSMG)

Courses

SSMG 311. Operations and Project Management. 3 Credits.
This course is designed to introduce a broad overview of operations and project management, while exploring a number of important concepts critical to achieving operations and project management success. Operations management is broad in scope, encompassing products and services in a multitude of forms. These products and services range from the cars we drive, the computers we use, the Internet we access, to military operations that safeguard our county. In effect, operations management, as a field, encompasses the activities and tasks that create value for the goods and services all of us use in a variety of ways. In addition, this course will explore project management from the focus on the "nuts and bolts" or fundamentals of project management and practices, and how it supports operations management strategic goals and objectives. We'll also examine some of the key elements of project management from the project management life cycle, key processes and important tools, techniques and measurements of project. Pre-requisites: None. Note: this course is under development and will be reviewed by the University Curriculum Committee.

SSMG 315. Leadership. 3 Credits.
In this course students learn key theoretical models of leadership and apply them to a range of situations in both military and non-military organizations. Students identify key functions and skills of effective leaders, explore leadership styles through study of selected leaders and evaluate the role of communication, negotiation, strategy, purpose and ethics in leadership. Prerequisite: none.

SSMG 320. Strategic Planning. 3 Credits.
This course is designed to enhance the critical and creative thinking skills needed to solve complex and ill-defined problems. The key themes are problem framing, operational art, leadership, and the outcomes for human security. Students focus on historical and contemporary examples of strategic level planning in highly complex operations and use this learning as a framework for problem solving within and across agencies. Students complete a major team project that leverages skills learned to focus on a complex problem vignette that requires creating a course of action for the leader to meet the desired end state. There are no pre-requisites.

Management and Marketing (MG)
Courses

MG 098. Junior Career Conference. 1 Credit.
This third year seminar focuses on evolving career decisions for Business & Management majors. Guest faculty are drawn from University Board of faculty members and associates with extensive real-world business acumen. Students will experience developing skills to prepare for entering the global workplace in their chosen fields and professions. 1 lecture hour.

MG 099. Senior Career Conference. 1 Credit.
This fourth year seminar focuses on evolving career decisions for Business & Management majors. Guest faculty are drawn from University Board of faculty members and associates with extensive real-world business acumen. Students will hone and finalize skills to prepare for entering the global workplace in their chosen fields and professions. 1 lecture hour.

MG 101. Introduction to Business. 3 Credits.
The purpose of this course is to introduce the student to the world of business. Students will learn about business organization and ownership and will survey union management relations, marketing, accounting, finance, international business, the legal environment, and the stock market. The course is designed to explore the relationship between social responsibility and profits in our free enterprise system. Prerequisite: permission of instructor required for upperclassmen.

MG 299. Trial 299. 4 Credits.

MG 305. Intro to Sports Management. 3 Credits.
This course will provide an overview of the sports industry from the perspective of variety of stakeholders in the industry. It covers the major business disciplines of management, marketing, finance, operations, information technology, accounting, communications, ethics and law. 3 lecture hours.

MG 309. Management of Organizations. 3 Credits.
A study of the functions of modern management: planning, organization, staffing, leading, and controlling. This study is applicable to the management of military, government, educational and non-profit, as well as business organizations. The ethical and social responsibilities of management and contemporary challenges such as the internationalization of organizations are integrated in all aspects of this course. Prerequisites: junior or senior standing or permission of instructor.

MG 310. Production/Operations Management. 3 Credits.
Principles and applied study of the operation of manufacturing and service organizations. Managerial tools and diagnostics, decision-making, and financial management are introduced. Problems of small, medium, and large-sized businesses are studied. Prerequisites: QM 213.

MG 314. Marketing Management. 3 Credits.
This course immerses the student in the strategies and processes of marketing management - market analysis, segmentation, targeting and positioning, and the implementation and evaluation of marketing plans. When the student has completed this course they will understand how a marketing plan is developed and have the skills necessary to identify, analyze and solve marketing problems. Prerequisite: EC 202 or permission of instructor. 3 lecture hours.

MG 319. International Dimensions of Business. 3 Credits.
This course is designed to familiarize the student with the basic concepts and terminology of international business, and to gain an appreciation of the differences in social, political, and economic conditions among nations and how these affect the conduct of business and trade between nations. Topics include comparative cultural, political, and economic environments, international trade theory and policy, foreign exchange and exchange rate determination, the dynamics of international business-government relationships, and corporate policy and strategy of the multinational firm. Prerequisite: EC 201 or EC 202.

MG 341. Business Law I. 3 Credits.
A study of the law and legal system as they affect business. Topics include the court system, constitutional law, torts, criminal law, contracts, property, and the Uniform Commercial Code. In discussing business law, students will learn how morality and social responsibility are integrated into our legal system. Each student will be required to prepare a paper outlining ethical standards based on the student’s life experiences. Prerequisite: junior or senior standing.

MG 346. Business Law II. 3 Credits.
A continuation of the analysis of the legal dimension of business operations that was developed in Business Law I. Special emphasis will be given to the legal environment as it relates to the accounting student’s professional certification. Topics include bankruptcy, commercial paper, secured transactions, agency, corporations, and partnerships. Prerequisite: MG 341 or permission of instructor.

MG 351. Organizational Behavior. 3 Credits.
This course considers the individual, the nature of organizations, and the issues resulting from the dynamic relationship of people in organizations. The course addresses such topics as learning, personality, motivation, organization structure, leadership, ethics, communication, and change. Prerequisite: MG 309 or permission of instructor.
MG 360. Health Economics & Policy. 3 Credits.
This course introduces students to principles of health economics and public policy in health and social welfare. Topics include support for public health, policy intervention in health determinants, the relationship between government regulation and market competition, the demand for healthcare, and the supply of services. This course will enable students to apply economic reasoning to the health-care challenges facing society. Prerequisite: One semester of college level mathematics or QM 213.

MG 408. Human Resources Management. 3 Credits.
The management of human resources is one of the most challenging and critical aspects of contemporary organizational functions. This course addresses such issues as the nature of the American labor force, equal employment opportunity, personnel planning and staffing, compensation, employee well-being and job security, and collective bargaining. In addressing these issues attention is given to the ethical, legal, and moral questions involved. Prerequisite: MG 309 or permission of instructor.

MG 409. Organizational Leadership. 3 Credits.
This course prepares students to apply leadership principles to the roles they play as managers. Students will discover more about themselves and learn more about the connection between the individual and the organization. Other topics include organizational culture, structure, group behavior, motivation, power, politics, organizational change, and workplace conflict.

MG 411. Consumer Behavior. 3 Credits.
This course is designed to help the student understand the concepts of consumer behavior that provides the basis for marketing strategies. Students will gain an understanding of how consumers make decisions regarding the purchase and use of products and services and the internal and external factors that influence this process. Prerequisite: MG 314.

MG 416. Advanced Marketing. 3 Credits.
In this course students will examine the key concepts and issues in developing a marketing strategy from the perspective of the corporate and SBU decision-maker. The course will take students through the process for formulating marketing strategies under various market conditions, for developing strategic and tactical marketing action plans, and how to evaluate and control a marketing plan and budget. Students undertaking this course will be required to use knowledge gained from previous marketing subjects in completing course assignments. Prerequisite: MG 314.

MG 426. Marketing Research. 3 Credits.
This course explores the process and tools for data collection and analysis used to solve marketing problems. In addition, the subject addresses when marketing research is appropriate and how to define the research problem, as well as the role of marketing research in marketing decision making. This course will provide students with practical experience in the use of computer based data analysis techniques and make students aware of the biases and limitations inherent in various research methodologies. Prerequisites: QM 213, MG 314.

MG 429. Seminar in Advanced Management I. 3 Credits.
A topics course addressing managerial problems in various environments. Prerequisites: MG 309, MG 310, FN 311, and MG 314.

MG 441. Integrated Marketing Communications. 3 Credits.
This course will provide students with the necessary knowledge and skills to develop appropriate communication strategies consistent with strategic marketing principles. The role of communications in the client organization’s marketing plan is emphasized. The concept of Integrated Marketing Communication (IMC) for coordinating the individual communication elements of advertising, direct marketing and public relations to achieve specific marketing objectives is stressed. Prerequisite MG 314. 3 lecture hours.

MG 441S. Integrated Marketing Communications. 3 Credits.
This course will provide students with the necessary knowledge and skills to develop appropriate communication strategies consistent with strategic marketing principles. The role of communications in the client organization’s marketing plan is emphasized. The concept of Integrated Marketing Communication (IMC) for coordinating the individual communication elements of advertising, direct marketing and public relations to achieve specific marketing objectives is stressed. Students will complete a 40 hours practicum working with the NU Athletic Program and 3 lecture hours, plus 1 cr. (40 hours) Practicum. Prerequisite MG 314. 3 lecture hours.

MG 448. Small Business Strategies. 3 Credits.
A course that integrates the functional areas of management-human resources, finance, marketing, and operations they uniquely affect the small business enterprise. Case studies and lectures develop the student’s problem solving abilities. Prerequisites: MG 309, MG 310, FN 311, and MG 314.

MG 449. Administrative Policy and Strategy. 3 Credits.
A capstone course designed to integrate the students’ undergraduate studies. Case studies, collaborative assignments, writing assignments and oral presentations provide opportunities to synthesize and apply the knowledge gained from courses in the management program. A comprehensive Division examination is included in this course. Prerequisites: MG 309, MG 310, FN 311, and MG 314.

MG 450. Internship in Management. 3 Credits.
The internship program is designed for students who want to apply their studies by working with a business, industry, or public agency. The student will be required to work closely with a faculty supervisor to develop and implement a structured experience tailored to the career goals of the student. Prerequisites: senior standing and written consent of the department chair and internship committee. Normally only available during the summer.
Mathematics (MA)

Courses

MA 005. Preparatory Mathematics. 3 Credits.
A review of high school mathematics with some geometry in preparation for freshman level mathematics. Students assigned to MA 005 must satisfactorily complete it before the end of their first year at Norwich and enrolling in any other mathematics course.

MA 101. Mathematics: A Liberal Art. 3 Credits.
An investigation of mathematical concepts and methods with emphasis given to their impact on current and ancient problems. Topics include logic, counting problems, probability, geometry and mathematics of finance. Emphasis is on techniques of problem solving. Prerequisite: Satisfactory completion of MA 005 or equivalent as determined by departmental placement testing. Not open for the first time to a student with a grade of "C" or higher in MA 107, or with credit for any mathematics course requiring MA 107 as a prerequisite. Offered fall semesters.

MA 102. Mathematics: A Liberal Art. 3 Credits.
An investigation of mathematical concepts and methods with emphasis given to their impact on current and ancient problems. Topics include mathematics of voting systems, basic graph theory including Euler circuits and the traveling salesman problem, the mathematics of population growth, statistics, and finding fair shares. Emphasis is on techniques of problem solving. Prerequisite: Satisfactory completion of MA 005 or equivalent as determined by departmental placement testing. Not open for the first time to a student with a grade of "C" or higher in MA 107, or with credit for any mathematics course requiring MA 107 as a prerequisite. Offered spring semesters.

MA 103. College Algebra I. 3 Credits.
A comprehensive study of algebraic topics, this course provides a strong foundation for subsequent mathematics-based courses. Topics include: sets, the real number systems, polynomials and factoring, linear and quadratic equations. Prerequisite: Satisfactory completion of MA 005 or equivalent as determined by departmental placement testing. Not open for the first time to students who have received degree credit in any math course except MA 101, MA 102. This course does not fulfill the General Education requirement in mathematics.

MA 107. Precalculus Mathematics. 4 Credits.
A course on topics in precalculus mathematics involving algebra and trigonometry designed to prepare students to progress into introductory calculus. It is a rapid development of elementary topics in algebra to linear, quadratic, logarithmic, and exponential functions, followed by an analytical treatment of trigonometry. Prerequisite: Grade of "C" or better in MA 103 or equivalent as determined by departmental placement testing. Not open for the first time to students with credit in any course requiring MA 107 as a prerequisite.

MA 108. Applied Calculus. 4 Credits.
A course on topics in analytical geometry progressing to differential and integral calculus. Presentation of a wide variety of practical application to technology, business, and science. Not open for the first time to a student with credit in MA 121 or any course requiring MA 108 as a prerequisite. Prerequisite: MA 107 or equivalent as determined by departmental placement testing. Not more than one of MA 108 or MA 121 may count as degree credit.

MA 121. Calculus I. 4 Credits.
An introduction to plane analytic geometry and to differential and integral calculus. Prerequisite: grade of "C" or better in MA 107 or equivalent as determined by departmental placement testing. Not more than one of MA 108 or MA 121 may count as degree credit.

MA 122. Calculus II. 4 Credits.
A continuation of MA121. Transcendental functions, methods of integration, vectors, polar coordinates, indeterminate forms, L'Hopital's Rule, improper integrals, infinite sequences and series. Prerequisite: MA121 or "C" or better in MA108 and permission of the department.

MA 212. Finite Mathematics. 3 Credits.
This course includes linear algebra with applications to systems of equations, linear programming, math of finance, sets, combinatorial analysis, and probability theory. Prerequisite: MA 107 or equivalent as determined by departmental placement testing. Offered spring semesters.

MA 220. Geometry in Action. 3 Credits.

MA 223. Calculus III. 4 Credits.
A course that continues MA 122. Topics include multiple integration, solid analytic geometry, partial differentiation, two- and three-dimensional vector analysis. Prerequisite: MA 122. Offered fall semesters.

MA 224. Differential Equations. 4 Credits.
Ordinary differential equations are developed as models of physical phenomena. Differential equations are investigated by finding exact solutions and using computer software to determine the solution to linear and non-linear problems. Solution techniques include operator methods, Laplace transforms, and numerical methods. Prerequisite: MA 122. Offered spring semesters.
MA 232. Elementary Statistics. 3 Credits.
A course that covers the study of frequency distributions, averages and standard deviations, normal curve, probability, decision-making, sampling techniques, testing hypotheses, chi-square, students-t and F-distributions, correlation and linear regression. This course is valuable for those who plan to enter teaching. Prerequisite: A college level mathematics course or equivalent as determined by departmental placement testing. Not open to students with credit in MA 311.

MA 235. Clinical Mathematical Methods. 3 Credits.
A course investigating mathematical concepts and methods used in the health care settings. This course will cover the essential math for medication calculations, the continued development of statistical techniques utilized in scientific research, and the mathematics of population dynamics and epidemiological studies. Case studies will be used where appropriate. Emphasis will be on critical thinking and logic of math in a health care environment and in health care research and administration. This is a mathematics course for Nursing Majors. Prerequisites: MA 232. Offered Fall semesters. 3 lecture hours and 1 laboratory hour. 3 credits.

MA 240. Introduction to Number Theory and Cryptology. 3 Credits.
An introduction to fundamental topics in number theory, including the real number system, prime numbers, modular arithmetic, the Euclidean Algorithm, Fermat’s Theorem, Euler’s Theorem, Euler’s Phi Function. Topics will be applied to Caesar and affine ciphers and the Chinese Remainder Theorem. Prerequisite: MA 107 and knowledge of a programming language or permission of the instructor. Offered fall semesters.

MA 241. Mathematical Computation and Modeling. 3 Credits.
A course designed to introduce effective problem solving strategies and modeling techniques to find solutions to complex and often ill-defined problems. Introductory material chosen from common experiences encompassing many academic disciplines. Emphasis is placed on the development of mathematical models and computation on a variety of computing platforms and programming environments. Prerequisite: MA 108, MA 121 or permission of instructor. Offered spring semesters.

MA 250. Communication in Mathematics. 1 Credit.
This course illustrates the organization of the mathematical literature, the efficient search of the literature and a formal introduction to writing mathematics. Prerequisite: Sophomore Mathematics Major or permission of the instructor.

MA 303. Advanced Calculus I. 3 Credits.
A course that provides an extension of concepts of basic calculus to functions of several variables to include limits, continuity, differentiation, and Riemann integration. Treatment of selected topics not included in the basic calculus series as a foundation for more advanced courses in analysis and applied mathematics is also included. Prerequisite: MA 223 and either MA 306 or permission of the instructor. Offered Fall semesters of even numbered years. 3 lecture hours.

MA 304. Advanced Calculus II. 3 Credits.
A course that continues with the content of MA 303, including limits, continuity, differentiation, and Riemann integration. Treatment of selected topics not included in the basic calculus series as a foundation for more advanced courses in analysis and applied mathematics is also included. Prerequisite: MA 303. Offered Spring semesters of odd numbered years.

MA 306. Discrete Mathematics. 3 Credits.
A course in logic, sets, techniques of proof, relations and functions, directed and undirected graphs, algebraic systems, Boolean algebra, and emphasis on applications in various areas of computer science. Prerequisite: MA 108 or MA 121 and knowledge of computer programming. Offered fall semesters.

MA 308. Modern Geometry. 3 Credits.
A course in modern geometries that includes foundations of Euclidean geometry and the development of non-Euclidean geometries. Recommended for prospective teachers. Prerequisite: MA 108 or MA 121. Offered Spring 2010 and every third year. 3 lecture hours.

MA 309. Algebraic Structures. 3 Credits.
A course on groups, rings, fields, morphisms, vector spaces; special topics selected from group theory, algebraic number theory, field theory, Galois theory. Prerequisite: MA 306 or permission of the instructor. Offered Fall semesters of odd numbered years. 3 lecture hours.

MA 310. Linear Algebra. 3 Credits.
A theoretical course on such topics as matrices, determinants, linear equations, vector spaces, bases and dimensions, linear transformations, eigenvalues, and eigenvectors. Prerequisite: MA 223 or permission of the instructor. Offered spring semesters.

MA 311. Statistical Methodology. 3 Credits.
A course designed to provide a firm foundation for the employment of statistical methodology in engineering and the sciences. Examples drawn from the technical fields will be used throughout. The course will cover probability, continuous and discrete statistical distributions, estimation, tests of hypotheses, and sample regression. As time permits, other topics may be examined based on the interests of the students. Prerequisite: MA 223. Offered fall semesters. 3 lecture hours.

MA 312. Statistical Methodology II. 3 Credits.
A continuation of MA 311. Continued development of statistical techniques utilized in scientific and engineering research. Topics to be covered include regression, multiple regression, analysis of variance, experimental design, statistical quality control, time series/forecasting, and reliability analysis. Prerequisite: MA 311. Offered Spring semester of even numbered years. 3 lecture hours.
MA 318. Cryptology. 3 Credits.
A course that covers fundamental mathematical concepts from modern algebra, number theory, and other areas of mathematics. Provides a foundation for the understanding of classical encryption systems and modern encryption methods. Emphasis on the mathematical underpinnings germane to cryptotoloy. Prepares students for advanced study of modern cryptography. Experience implementing encryption, decryption and cryptanalytic methods on a variety of systems. Prerequisite: MA 240 and knowledge of a programming language or permission of instructor. Offered spring semesters. 3 lecture hours.

MA 321. Financial Mathematics. 3 Credits.
A course designed to extend the student's understanding of the fundamental concepts of financial mathematics, and application of these concepts in calculating present and accumulated values for various streams of cash flows as a basis for future use in reserving, valuation, pricing, asset/liability management, investment income, capital budgeting and valuing contingent cash flows. The student will also be given an introduction to financial instruments, including derivatives, and the concept of no–arbitrage as it relates to financial mathematics. Offered Spring semesters of odd years. Prerequisites: MA 121 or MA 108, and MA 212. 3 lecture hours.

MA 360. Teaching Mathematics at the Elementary - Middle School Level. 3 Credits.
A course in the content, methods, and materials for the teaching of elementary and middle school mathematics. Prerequisites: MA 107. 3 lecture hours.

MA 370. Introduction to Operations Research. 3 Credits.
A course that concentrates on the fundamental concepts and techniques necessary to enable an individual to obtain “optimal” solutions to problems in business, economics, engineering, and the physical and behavioral sciences. Topics include linear programming, network analysis, dynamic programming. Prerequisites: MA 212 or MA 223. Offered Spring semesters of odd numbered years. 3 lecture hours.

MA 380. Theory of Computation. 3 Credits.
This course introduces the theory of computability, including important results from the study of automata and formal languages. Includes introductory material about the theory of directed graphs and trees. A discussion of automata and their relationship to regular, context free and context-sensitive languages. General theories of computability, including Turing machines, and recursive functions. Further topics include decidability, undecidability and computational complexity. Prerequisite: MA 306. Offered Spring semesters of even numbered years. 3 lecture hours.

MA 390. Numerical Linear Algebra and Analysis. 3 Credits.
Numerical techniques for solving problems in linear algebra and analysis. Topics to be studied include integration, interpolation, function approximation, solutions of systems of equations, locating Eigen values. Attention will be paid to the theoretical aspects of the techniques, with particular emphasis on estimation of errors and on convergence properties of iterative techniques. Prerequisites: MA 241, MA 224. Offered Spring 2009 and every third year. 3 lecture hours.

MA 399. Mathematical Problem Solving. 3 Credits.

MA 405. Complex Analysis. 3 Credits.
A course in complex numbers, analytic functions, differentiation, and integration of complex functions, Taylor and Laurent series, evaluation of improper real integrals. Prerequisites: MA 223 and either MA 306 or permission of the instructor. Offered Spring 2011 and every third year. 3 lecture hours.

MA 407. Vector Analysis. 3 Credits.
A course that analyzes scalar and vector fields. Topics included are Newtonian kinematics and Kepler's Law of Planetary Motion, gradient, divergence, curl, theorems of Green, Stokes, Gauss, curvilinear coordinates. Prerequisite: MA 223. Offered Fall 2009 and every third year. 3 lecture hours.

MA 411. Senior Seminars. 3 Credits.
Advanced study designed to develop student competence in working independently and to afford students an opportunity to pursue topics not otherwise offered by the department. Prerequisite: senior standing in mathematics or permission of the instructor. This is the capstone course for the Mathematics Major. 3 lecture hours.

MA 412. Senior Seminars. 3 Credits.
Advanced study designed to enhance student competence in working independently and to afford students an opportunity to pursue topics not otherwise offered by the department. Topics may extend research performed in MA 411 or be a topic independent of MA 411. Prerequisite: MA 411. 3 lecture hours.

MA 421. Number Theory. 3 Credits.
A course in the properties of integers, prime numbers, congruencies, Diophantine equations, quadratic reciprocity. Prerequisite: MA306 or permission of the instructor. Offered Spring 2011 and every third year. 3 lecture hours.

Mechanical Engineering (ME)
Courses

ME 211. Mechanical Engineer Tools I. 2 Credits.
An extension of EG 109 with a more in-depth treatment of 3-D solid model generation including extrusion, revolving, sweeping and lofting. Further development and modification of 3-D solid drawings. Laboratory: 3 hours. Prerequisite: EG 109.

ME 307. Thermodynamics II. 3 Credits.
Applications of thermodynamics to power and refrigeration cycles, combustion mechanisms, mixture and flow processes. Development of thermodynamic relationships and equations of state. Classroom 3 hours. Prerequisite: EG 206.

ME 311. Mechanical Engineering Tools II. 2 Credits.
An extension of ME 211 with additional application of computer based design and analysis methods. An emphasis will be placed on design for manufacturing and other tools appropriate to the mechanical engineering profession. Laboratory: 3 hours. Prerequisite: ME 211.

ME 356. Manufacturing Processes. 4 Credits.
A study of the principles of manufacturing processes. Metal removal, casting, joining and deformation processes are covered as well as introductions to numerically controlled machinery, computer-aided manufacturing, rapid prototyping, robotics, computer integrated manufacturing and modern manufacturing systems. Classroom 3 hours, laboratory 3 hours. Prerequisite: ME 311, EG 203.

ME 358. Metallurgy & Manufacturing. 4 Credits.
A study of the principles of physical metallurgy and manufacturing processes. The structure of metals, strengthening mechanisms, metal removal, deformation processes and welding are covered as well as introductions to numerically controlled machinery, computer-aided manufacturing, and robotics. Classroom 3 hours, laboratory 3 hours. Prerequisite: EG 203.

ME 363. Kinematic and Kinetic Synthesis. 3 Credits.
A study of the principles of motion and the forces necessary to cause, and be created by motion. Applications to the design of typical machine elements such as gears, linkages and cams. Classroom 3 hours. Prerequisites: EG 202, MA 223.

ME 368. Design of Machine Elements. 3 Credits.
A study of the application of the theories of mechanics and stress analysis to the design of fundamental machine parts. Some of the topics covered are shafts, springs, screws, belts, gears, rivets, bearings and lubrication. Classroom 3 hours. Prerequisites: EG 301.

ME 370. Mechanical Systems Design. 3 Credits.
An introduction to the methodology of design including problem definition, generation and evaluation of alternatives, and design completion. Emphasis is placed on creativity, feasibility, and the effect of economic and societal factors on alternative selection. Goals are achieved through the use of case studies and small projects. Classroom 3 hours. Prerequisite: junior standing.

ME 381. Mechanical Engineering Laboratory I. 2 Credits.
A study of the fundamentals of mechanical and electronic instruments and their use in measurement systems to obtain data on temperature, pressure, displacement, acceleration, and other physical variables. Introduction to experimental methods and procedures, reduction of data to significant form, and the organization of experimental results in written reports. Lecture 1 hour, laboratory 3 hours. Prerequisite: EE 204.

ME 382. Mechanical Engineering Laboratory II. 1 Credit.
Application of instrumentation to observations of gas and liquid behavior, thermo-dynamic and mechanical aspects of machines and devices. Dynamic and transient considerations in instruments, physical systems, and experimental data. Laboratory 3 hours. Prerequisite: ME 381.

ME 435. Vibrations and Controls. 3 Credits.

ME 465. Heat Transfer. 3 Credits.
A study of the fundamentals of heat transfer by conduction, radiation, and convection. Steady and unsteady state conduction. Study will include boundary layer theory, internal and external convective flows, two-phase flow, and heat exchange design theory. Classroom 3 hours. Prerequisites: EG 206, EG 303, MA 224.

ME 466. Gas Dynamics. 3 Credits.
A course that continues EG 303 as applied to compressible fluids. One and two dimensional flow and oblique shocks. Classroom 3 hours. Prerequisites: EG 303, EG 206. Offered as occasion demands.

ME 467. Mechanical Engineering Design I. 3 Credits.
A capstone design project is taken up to the point of prototype construction, testing and hardware specification. The specific skills and knowledge needed by practicing engineers in the product realization process are emphasized and developed. Classroom 3 hours. Prerequisite: senior standing, ME 370.
ME 468. Mechanical Engineering Design II. 3 Credits.
Design completion of the capstone project initiated in ME 467 including hardware specification, instrumentation, laboratory testing, data reduction, and evaluation. Written design report required with oral presentation and defense. Prerequisite: ME 467.

ME 474. Internal Combustion Engines. 3 Credits.
A course that correlates previous work in thermodynamics, heat transfer and design in the study of internal combustion engines. Classroom 3 hours. Prerequisites: ME 465, ME 307. Offered as occasion demands.

ME 487. Mechanical Engineering Laboratory III. 2 Credits.
A continuation of the Mechanical Engineering laboratory sequence with experiments stressing the performance characteristics of heat power equipment and the application of theory learned in thermodynamics and fluid flow. Classroom 1 hour, laboratory 2 hours. Prerequisite: EG 303. Corequisite: ME 307.

ME 490. Advanced Topics. 3,4 Credits.
A course that provides specific work in an area of the instructor's special competence and indicated student interest. An extension of basic principles to applied areas such as HVAC, heat transfer, thermodynamics, stress analysis, environmental control, turbo-machinery, propulsion systems and aerodynamics. Classroom or seminar, 1-3 hours. Prerequisite: senior standing. Offered as occasion demands.

Military Science (MS)

Courses

MS 111. Military Science I. 1 Credit.
Leader Development and Individual Soldier Skills I-An introduction to Army Customs, Courtesies, and Traditions. The curriculum includes an introduction to leadership development, the values and ethics of the Army, physical wellness and fitness, and stress management. Laboratory work concentrates on basic land navigation skills, field craft skills, and basic rifle marksmanship. 1 lecture hours and 2 other hours. Course Attributes: Not eligible for use as part of the six ROTC credits allowed for degree electives.

MS 112. Military Science I. 1 Credit.
Leader Development and Individual Soldier Skills II. The curriculum focuses on the leader development by emphasizing the Be, Know and Do characteristics vital for success as an Army officer. In addition, the importance of physical fitness and wellness continues to be stressed. Students are introduced to tactics within a team and squad structure, decision-making process and the structure and organization of the Army. Laboratory work includes advanced land navigation skills, basic rifle marksmanship, and troop leading procedures.

MS 211. Military Science II. 2 Credits.
A Study of the Principles of Small Unit Tactics-Leadership Laboratory-This course is designed to teach individual soldier skills required for survival in modern combat and the leadership roles required for the infantry team and squad leader in developing technically and tactically proficient soldiers. Cadets will receive hands-on training in intelligence gathering, radio communication, individual and crew served weapons. Cadets will be introduced to collective tasks such as tactical movements and formations needed to conduct squad offensive, defensive, and patrolling missions.

MS 212. Military Science II. 2 Credits.
A study of the Principles of Leadership and Small Unit Tactics II- Examines the leader's role in directing and coordinating the efforts of subordinates. Decision making skills, problem solving skills and troop leading procedures continue to be honed through leadership roles. Laboratory work focuses small unit tactics, advanced land navigation, physical fitness, and troop leading procedures.

MS 311. Military Science III. 3 Credits.
Advanced Tactics-Leadership Laboratory-An in-depth study of the light infantry squad and platoon operations in the offense and defense. Cadets will continue to develop their oral and written communication skills through preparation of warning, fragmentary, and operation orders; and their leadership and management skills through decision making and analytical skills utilizing combat estimates, battle analysis, and intelligence gathering. Prerequisite: Successful completion of MS 212 or approval by the Professor of Military Science. Course Attributes: May be used as part of the six ROTC credits allowed for degree electives.

MS 312. Military Science III. 3 Credits.
Advanced Leadership-Leadership Laboratory-A comprehensive study and application of light infantry and ranger patrolling operations. Cadets will learn leadership techniques by gaining a comprehensive understanding of the mission and organization of combat and reconnaissance patrols and the methods utilized by effective combat leaders. The course will explore historical examples to illustrate the critical importance of dynamic leadership. Prerequisite: Successful completion of MS 311 or approval by the Professor of Military Science. Course Attributes: May be used as part of the six ROTC credits allowed for degree electives.
MS 411. Military Science IV. 3 Credits.
This course begins the transition from Cadet to US Army 2nd Lieutenant. This is the first of two senior capstone courses in Military Science. MS411 training will include Army Operations, training management, communications and leadership skills. Additionally, cadets will participate in selected studies of Military History to include a staff ride to a Revolutionary War battlefield. This training will enable you to attain knowledge and proficiency in several critical areas needed to operate effectively and efficiently as an Army Officer. These areas include: The Army’s training management system, coordinating activities with staffs, and counseling skills. These skills will assist you in leading Junior Army ROTC cadets through out the school year. Instruction will include lecture/seminar, case studies, practical exercises and military laboratories to include field-training exercises. One third of your grade will include a measurement of your ability to develop subordinate leaders and personnel. Various members of the Army Department Cadre will serve as Assistant Instructors. With the Addition of MS402 in the Spring, you will leave for your Branch specific Basic Course as Commissioned Army Officers possessing high moral character, instilled with Army Values, physically fit, knowledgeable in basic soldier skills and a rich understanding of leadership and management.

MS 412. Military Science IV. 3 Credits.
Army Leadership and Professional Development-Leadership Laboratory: The second of two senior capstone courses. Students will study the origins, development, and implementation of US National Security Policy as it applies to the application of land power. Focus will be on understanding and conducting Peace Keeping Operations, the parameters in which the US will participate, and the role of the military in PKOs. Once understanding the larger picture, the students must understand how to prepare and train their particular organization to ensure their objectives support the national will. Course includes case studies of recent Peace Keeping Operations and how tactical decisions can effect strategic outcomes. Current events are constantly examined. Students will develop their individual leadership skills and knowledge through class seminars, leadership laboratories, and a field training exercises. Students will learn how to assess the level of training in their organizations, develop a training plan to correct deficiencies and re-enforce strengths, and how to evaluate training results. The second half of the semester students will further develop an understanding of leadership in organizations, team building, counseling subordinates and the various support systems available to leaders. Students will develop oral and written communications skills by preparing written assignments in the military writing style and giving oral presentations.

MS 499. Topics in Military Science. 3 Credits.

Music (MU)

Courses

MU 101. Music Appreciation. 3 Credits.
A survey course of western music from the medieval through the contemporary periods.

MU 200. Applied Music. 1 Credit.
A course that provides studio instruction in keyboard instruments, orchestra and band instruments, and voice under the guidance of a performing artist. Offered at various levels of advancement appropriate to the individual student. Objectives include analysis and mastery of technical problems and the study of literature characteristic of the instrument or voice. This course is repeatable for credit. Prerequisites: permission of instructor and audition, if required. Three accumulated hours will comprise one three-degree-credit course upon petition by the student.

MU 210. Campus Choraleers. 1 Credit.
A select group of 40 mixed voices organized for the study and performance of advanced choral works of all periods. Repeatable for credit to three accumulated hours. Repeatable without credit indefinitely. Three accumulated hours will comprise one three-degree-credit course upon petition by the student. Prerequisite: Audition.

MU 230. Instrumental Ensemble. 1 Credit.
A course that provides study, analysis, and performance of music for small instrumental groups of verse combinations. An objective is to become acquainted with a wide variety of music and styles pertaining to the student’s instrument and to other instruments as well. (This requires several sections to accommodate combinations. Sections are scheduled by the instructor with the students). Three accumulated hours will comprise one, three credit free elective course.

MU 260. Regimental Band. 1 Credit.
A course that provides study and performance of marching band literature and technique, as well as rehearsal and presentation of small ensemble pep band music. Membership is open, through audition, to members of the Corps of Cadets. This course is repeatable for credit. Three accumulated hours will comprise one three credit free elective course.

MU 271. History of Jazz. 3 Credits.
History of Jazz is a historically based music course to expose the student to American jazz. Jazz occupies a unique place in American cultural history. Although it has been influenced by the music of many countries, it remains a purely American phenomenon. The course will include the study of historical readings, listening to the many styles and artists of American jazz, and attendance at live performances. Upon completion of the course, the student should have a general knowledge of the various styles, artists, and social history of the period from 1890 to 2006.

MU 299. Music Topics. 1-3 Credit.
MU 300. The Vermont Philharmonic Orchestra. 1 Credit.
A major project in community arts development through study and performance. The Vermont Philharmonic orchestra presents, throughout the state, a series of symphonic concerts each season. Membership is open to qualified players of orchestral instruments by audition. This course is repeatable for credit. Three accumulated hours will comprise one. three credit free elective course.

Naval Science (NS)

Courses

NS 121. Introduction to Naval Science. 2 Credits.
Introduction to Naval Science - Required for all freshman midshipmen. Provides a comprehensive overview of the Navy and Marine Corps organization, military courtesies and traditions.

NS 122. Sea Power and Maritime Affairs. 3 Credits.
Sea Power and Maritime Affairs - Required for all freshman midshipmen. Provides a comprehensive overview of the Navy’s heriage, mission and role in the development of the United States.

NS 221. Leadership and Management. 3 Credits.
Leadership and Management - Required for all sophomore midshipmen. Provides an introduction to the principles of both leadership and management for future leaders.

NS 222. Navigation. 3 Credits.
Navigation - Required for all sophomore Navy Midshipmen. Provides an introduction to the principles of navigation and basic seamanship.

NS 242. Marine Corps Weapons Systems. 2 Credits.
Required for all sophomore Marine midshipmen. Provides a comprehensive overview of weapons in the Marine Corps inventory. 2 lecture hours and 2 lab hours. Course Attributes: Not eligible for use as part of the six ROTC credits allowed for degree electives.

NS 321. Naval Ship Systems I. 3 Credits.
Required for all junior Navy midshipmen (except Nurses). Provides an introduction to basic naval engineering concepts and naval propulsion systems. 3 lecture hours and 3 lab hours. Course Attributes: May be used as part of the six ROTC credits allowed for degree electives.

NS 322. Naval Ship Systems II. 3 Credits.
Required for all junior Navy midshipmen (except Nurses). Provides an introduction to basic naval weapons engineering concepts and weapons systems. 3 lecture hours and 2 lab hours. Course Attributes: May be used as part of the six ROTC credits allowed for degree electives.

NS 331. Evolution of Warfare. 2 Credits.
Required for all junior Marine midshipmen and MECEPs. Provides an overview of the development of warfare through the ages using the joint principles of warfare. 2 lecture hours and 2 lab hours. Course Attributes: May be used as part of the six ROTC credits allowed for degree electives.

NS 342. Small Unit Leadership Skills. 2 Credits.
Required of all junior Marine midshipmen and freshman MECEPs. Provides candidates with all basic skills, knowledge and physical preparation for attending OCS during summer cruise. 2 lecture hours and 2 lab hours. Course Attributes: May be used as part of the six ROTC credits allowed for degree electives.

NS 421. Naval Operations and Seamanship. 3 Credits.
Required for all senior Navy midshipmen (except Nurses). Provides an introduction to advanced navigation and seamanship, shipboard operations and naval warfare doctrine. 3 lecture hours and 2 lab hours. Course Attributes: May be used as part of the six ROTC credits allowed for degree electives.

NS 422. Leadership and Ethics. 3 Credits.
Required for all commissioning seniors. Provides all prospective commissionees with advanced leadership, ethics, service etiquette, and junior training. 3 lecture hours and 2 lab hours. Course Attributes: May be used as part of six ROTC credits allowed for degree electives.

NS 431. Amphibious Warfare. 2 Credits.
Required for all senior Marine midshipmen and MECEPs. Provides an overview of the history of amphibious warfare, with a focus on Marine Corps operations. 2 lecture hours and 2 lab hours. Course Attributes: May be used as part of the six ROTC credits allowed for degree electives.

Nursing (NR)
Courses

NR 103. Introduction to Professional Nursing. 3 Credits.
This course provides a forum in which to explore the present and emerging role of the professional nurse. The student is introduced to the Norwich University BSN Program and the major strands (Nursing Process, Communication, Teaching/Learning, Leadership, Research, Personal and Professional Growth, Life Span Development and Caring) that will be built upon during subsequent courses. Socialization into professional nursing is examined. Students are introduced to nursing informatics with an emphasis on acquisition and ethical use of knowledge through the use of the Internet. Open to Nursing Majors only, or by permission of the instructors. Classroom 3 hours.

NR 104. Focus on Nursing. 3 Credits.

NR 105. Promoting Healthy Individuals. 3 Credits.

NR 204. Nursing Informatics. 1 Credit.
This course is designed to provide students with an initial experience in accessing information from a variety of sources. Further, through active learning, this course guides students through utilization of a number of commonly used information technologies. Basic information and computer competencies will be learned and assessed. Classroom 3 hours. Concurrent: NR 104, NR 105.

NR 206. Health Assessment. 3 Credits.
This course focuses on the development of beginning skills in assessment of the healthy adult. A family and community assessment is also developed. Interviewing, obtaining a health history, and the components of a physical assessment are presented. Students learn to integrate interview data with physical findings to formulate nursing diagnoses that will guide the nursing process. Practice will be provided in a laboratory setting and selected clinical settings. Students continue to gain proficiency in interviewing and data collection. Patient’s rights and issues of privacy are continued to be reinforced throughout the course. Classroom 3 hours. Prerequisites: NR 103, NR 207. Co-requisites: NR 208, BI 216 or permission of the instructor.

NR 207. Fundamentals of Nursing I. 6 Credits.
This course provides the foundation for Professional Nursing Practice. Emphasis is placed on wellness, physiological, psychological, social, cultural and spiritual factors which contribute to the well-being of the individual and family. The concepts of Nursing Process, Gordon’s Functional Health Patterns and clinical decision making are explored. Communication is emphasized as an essential aspect of the professional role and is applied through interviews and data collection. Related theory from behavioral and physical sciences is incorporated. Prerequisites: BI 101, CH 112, & NR 103. Co-requisites: NR 305, MA 232, BI 215. Classroom 3 hours, clinical 8 hours.

NR 208. Medical/Surgical Nursing I. 7 Credits.
This course builds on the theoretical concepts and nursing practice skills learned in NR 207. Students continue to build critical thinking skills to effectively assess client needs and implement the nursing process to plan and provide basic nursing care. This course examines common alterations in health patterns and variety of health care problems and serves as the theoretical foundation for the future study of complex Medical/Surgical nursing problems. The theoretical concepts of stress and adaptation, inflammation, pain, fluid and electrolyte, acid base balance as well as alterations in nutrition and elimination are studied while related nursing interventions are integrated. Classroom 4 hours, clinical 9 hours. Prerequisites: NR 207, MA 232, NR 305. Co-requisites: NR 403, BI 216, NR 211.

NR 211. Nursing Pharmacology. 3 Credits.
A study of the therapeutic use of chemicals and their interactions in the human body to produce biologic effect. Students will identify pharmacotherapeutic interventions for clients of all age groups utilizing a nursing process approach. Clinical decision making in pharmacotherapeutics will be explored through the use of critical thinking exercises. Classroom 3 hours. Prerequisites: CH 112. Co-requisites: NR 207, BI 215 or permission of the instructor.

NR 215. Client, Psy/Mental Health Prob. 3 Credits.
In this course students are introduced to current theory and research about contemporary practices in mental health nursing. Students develop their use of self as a therapeutic tool and focus on a holistic approach to assessment and care of persons with psychological issues and selected psychiatric disorders and conditions. Students will provide care to patients with mental health and social health problems and their families as part of the interdisciplinary health care team. Prerequisites PY211, PY220, NR204, NR206. Co-requisite N215L. Classroom 3 hours.

NR 215L. Client, Psy/Mental Health Prob. 2 Credits.

NR 219. Simulations Clinical Practice. 2 Credits.

NR 225. Evidenced - Based Practice. 3 Credits.

NR 303. Nursing in Today’s World. 3 Credits.
This course provides a forum in which to explore the present and emerging role of the professional nurse. The RN/BSN student is introduced to the Norwich University BSN Program, and the major strands (Nursing Process, Communication, Teaching/Learning, Leadership, Research, Personal and Professional Growth, Lifespan Development and Caring) that will be built on during subsequent courses. Socialization into professional nursing is examined. Students are introduced to nursing informatics with an emphasis on acquisition and ethical use of knowledge through the use of the Internet. Classroom 3 hours. Open to nursing majors only.
NR 312. Medical-Surgical Nursing II. 9 Credits.
NR312 emphasizes the role of the nurse in the care of adults with acute and chronic Medical/Surgical problems in the acute care setting. Students refine their assessment, critical thinking and clinical decision making skills. Students apply previously learned knowledge in the use of the nursing process, and teaching/learning principles to provide care to two clients, planning care to promote or restore health. Students carry out learned complex nursing skills in providing planned care. Classroom 5 hours, clinical 12 hours for 14 weeks. Prerequisites: NR208, NR211, NR305, NR403, BI215, BI216. Co-requisites: BI360.

NR 313. Mental Health Nursing. 4 Credits.
NR313 provides an overview of current mental health issues. Current theories and nursing care of clients with mood/affect, neurotic and/or psychotic disorders will be explored. Selected clinical experiences will enhance the theory. Confidentiality is emphasized to ensure a patient’s complete privacy. Classroom 2 hours, clinical 65 hours. Clinical hours are done in a five-week rotation. Prerequisites: NR211, NR312, PY 211, PY220, and SO201. Co-requisites BI220 and NR315.

NR 314. Tech Innovations Clinical Nsr. 1 Credit.

NR 315. Maternal-Child Health Nursing. 7 Credits.
NR315 builds on fundamentals of nursing and medical-surgical nursing to explore the fields of maternity and pediatric nursing. NR315 theory will emphasize nursing process, teaching/learning, and health promotion in these special populations. Students will care for clients in a variety of settings across the wellness-illness continuum. This course has two separately graded components (one for each content area), both of which must be passed. It also has two clinical components. Students will continually apply proper ethical/legal considerations into clinical practice. Classroom 4 hours, clinical 130 (65 pediatric and 65 obstetrics) hours. Prerequisites: NR312, PY220, NR211, NR305. Co-requisite NR313 and BI220.

NR 316. Care of the Adult 1. 3 Credits.
In this course students integrate the physiological, psychological, spiritual, developmental and socio-cultural dimensions of adults as they study nursing care during wellness and illness. Focus is on the musculoskeletal, endocrine, immune, integumentary, gastrointestinal and genitourinary systems. Students learn the professional nursing role in planning care of the adult client. 3 Lecture hours per week. Prerequisites: NR 219 Co-Require NR 316L.

NR 316L. Care of the Adult 1. 3 Credits.

NR 321. Nursing Leadership. 3 Credits.
In this course students focus on theoretical foundations and conceptual principles of nursing leadership and the skills necessary to practice leadership competently in healthcare environments. The course is designed to enhance leadership self-awareness and to encourage students to fashion personal perspectives on how to lead professionally. Analyzing trends and issues in the current healthcare system has implications for exercising leadership and will help students determine the way they can make a difference. 3 lecture hour Prerequisites: NR 314, NR 316, or permission of the instructor.

NR 331. Care of Women-Childbearing Fmly. 3 Credits.
In this course students are introduced to current evidence based knowledge, theory and skills of the practice of maternal/newborn and women’s health nursing building on knowledge from preceding courses in the social and physical sciences, and nursing courses, to help the student further develop the professional role behavior. Covered topics may include health promotion, disease prevention, genetics, social justice, issues of access and gender in healthcare. The continuity of care delivery from practitioner’s office to hospital to home is stressed enabling the emerging clinician to see the interdisciplinary team at work in the care of women and childbearing families. Prerequisites: NR 314 and NR 316 Co-requisites: NR 331L.

NR 331L. Care of Wmn-Childbrng Fam Prac. 1 Credit.
In the clinical practicum of Nursing Care of Women and Childbearing Families students apply current knowledge, research and skills in contemporary practice of maternal/newborn and women’s health nursing to the care of selected clients. Client selection will be based on availability and will include newborns, postpartal mothers, antepartal mothers and families, and intrapartal mothers and families. The emphasis will be on safe, evidence based care for this vulnerable patient population. Clinical hours 45. Prerequisites: NR 314 and NR 331 Co-requisite: NR 331.

NR 341. Care of Children&Child Rearing. 3 Credits.
In this course students focus on the nursing care of children, adolescents and families dealing with health and developmental challenges of childhood and explore health promotion needs of childrearing families. This course employs a developmental perspective through which major causes of morbidity and mortality are examined while it challenges students to develop critical and creative reasoning skills and utilize empathetically appropriate communication skills as the basis for care. 3 lecture hours per week. Prerequisites NR 316, NR 316L Co-Requisite NR 341L.

NR 341L. Care of Children&Child Rearing. 2 Credits.
In this course students apply knowledge of the causes of childhood and adolescent illness in context with the relevant developmental challenges specific to the patient. Health promotion needs of the child and family in illness are stressed. Critical thinking and empathetically appropriate communication serve as the context for care. Clinical hours - 80. Prerequisites: NR 316, NR 316L Co-Requisite NR 341.

NR 351. Family Centered Nursing. 1 Credit.
In this course students acquire an understanding of family centered care from a variety of cross disciplinary theoretical perspectives. Students will apply critical thinking in the analysis of family care across clinical settings and contexts. Traditional and contemporary family definitions will be examined along with the changes in structure, role, and function as families begin, age and face end of life issues. An introduction to the medical home will be incorporated, indentifying the roles of the health care team, the family and the client. 1 lecture hour Prerequisites: NR 316, NR 400.

NR 399. Pathopharmacology for Nursing. 1-4 Credit.
NR 400. Independent Study. 3 Credits.
A course in which there is an opportunity to select and read in a specific area of interest that is not available through regular course offerings. Prerequisites: three baccalaureate nursing courses and permission of the instructor. Students will continually apply proper legal/ethical considerations into clinical practice.

NR 403. Nursing Research. 3 Credits.
This course introduces students to the principles and methods of research and emphasizes the application of research in nursing as a product and process. It prepares students to critically read research articles and relate the value of that research to nursing practice and client outcomes; to develop a research problem and literature review; to participate with a research team; and to utilize nursing research in their practice. Confidentiality is emphasized to promote and ensure complete patient privacy. Classroom 3 hours. Prerequisites: NR103, MA232. Co-requisites: NR208 or permission of the instructor.

NR 404. Nursing Leadership. 3 Credits.
This course examines the leadership process in nursing. The student studies the effects of leadership theory in the management of people and tasks within the health care environment, such as teaching assistive personnel the requirements of ensuring security of patient’s medical information and professional ethics. Emphasis is placed on a humanistic model for teaching and learning that stresses interpersonal communication as an essential component of nursing and leadership. Classroom 3 hours. Prerequisites: NR103 or NR303, NR315 or permission of the instructor.

NR 405. The Nurse’s Role in Health Promotion and Health Protection. 8 Credits.
The role of the baccalaureate nurse in the health promotion and protection of individuals, families, and populations is emphasized. The student is introduced to the components of community health nursing. The focus of the clinical components is the nursing care of families and populations. Students will continually apply proper ethical/legal considerations and the insurance of patient privacy. Classroom 4 hours, clinical 12 hours for 14 weeks. Prerequisites: NR312, NR315.

NR 416. Care of the Adult II. 4 Credits.
In this course students are required to integrate the physiological, psychological, spiritual, developmental and socio-cultural dimensions of adults as they study nursing care during wellness and illness. Focus is on the neurological system, cardiovascular system, respiratory system, hematology and oncology. Students learn the professional nursing role in planning care of the adult client. 4 lecture hours per week. Prerequisites: NR 331, NR331L, NR 341 and NR341L Co-Requisite NR 416L.

NR 416L. Care of Adult II. 4 Credits.
In this course students apply knowledge of the physiological, psychological, spiritual, developmental and socio-cultural dimensions of adults as they study nursing care during wellness and illness. Students learn the professional nursing role in planning care of the adult client through clinical experiences at external agencies. Acquisition of communication and psychomotor skills is critical to providing nursing care. 12 clinical hours a week/Simulation 1 hour 40 minutes every other week. Prerequisites: NR 331, NR 331L, NR 341 and NR 341L Co-Requisite: NR 416.

NR 420. Care at End of Life. 2 Credits.
In this course students will study current theory and research about contemporary practices caring for clients and their families at the end of life. It teaches students effective interaction skills with clients, families and health care providers. Throughout the course, students develop their use of self as a therapeutic tool and focus on a holistic approach to assessment and care of persons with a variety of life-limiting illnesses/diseases. Interventions will be discussed regarding the physical care as well as psychological, social, cultural and spiritual care of clients and their families as they face life’s final journey. Classroom: 2 hours. Prerequisites: NR 331 NR 331L, NR 341, and NR 341.

NR 421. Coordinator of Care. 3 Credits.
NR 421 - Coordinator of Care 3 credits In this course students integrate the physiological, psychological, spiritual, developmental and socio-cultural dimensions of adults as they study nursing in the context of uncertain and complex clinical environments. Students will use previous medical surgical nursing knowledge and builds skill sets as they prepare to enter the nursing professions as a new graduate nurse. Students will work one on one with an agency preceptor in a specialty of interest. 3 lecture hours per week Prerequisites: NR 416 and NR416L Co-Requisite NR 421L.

NR 421L. Coordinator of Care Practicum. 4 Credits.
NR 421L - Coordinator of Care Practicum 4 credits In this final undergraduate clinical practicum, students demonstrate achievement of knowledge and skills in nursing practice as they enter into professional practice. Clinical experiences include seven weeks of practice under the guidance of an agency preceptor. Students integrate knowledge and skills from the humanities and basic, behavioral, social leadership and nursing sciences in developing the professional role in selected adult and pediatric health environments. Learning experiences allow students to gain confidence; practice critical thinking, leadership and ethical decision making in clinical situations. 168 hours clinical, 30 Simulation hours Prerequisites: NR 416 Co-Requisite NR 421.

NR 431. Promoting Health in Communities. 3 Credits.
NR 431 - Promoting Health in Communities 3 credits In this course students learn current theory and research about contemporary practices in community/public health nursing. In population-focused nursing, the group, aggregate, community, or population is the unit of care. Epidemiologic studies have shown that lifestyle, environmental and genetic factors are major determinants of population health. Students will work collaboratively with community agencies to address population-focused health issues. Classroom 3 hours Prerequisites: NR 416 and NR416L Co-requisite: NR 431L 319.
NR 431L. Promoting Health in Communities: Clinical Practicum. 2 Credits.
NR 431L - Promoting Health in Communities: Clinical Practicum 2 credits. In this course, students will apply concepts of community/public health in providing population-focused care to groups, aggregates, and communities. Clinical experiences are coordinated in a variety of settings and require students to engage with individual agencies and in collaboration with community partners in addressing community/public health issues. Students are encouraged to clarify their own beliefs and values in order to provide nonjudgmental nursing care. Clinical hours: 80. Prerequisites: NR 416, NR 416L Co-requisite: NR 431.

NR 441. Nursing Capstone. 4 Credits.
NR 441 - Nursing Capstone 4 credits. In this course the student begins to transition to the role of graduate nurse and explores issues relevant to contemporary nursing practice including the ethics and regulation of practice. Local, state, national and international policies and initiatives and their influence on health of populations are examined. Students create and implement an approved capstone leadership project which is undertaken with guidance of faculty and clinical partners and reflects integration of all elements of the BSN curriculum. Classroom 2 hours; seminar leadership project 2 hours. Prerequisites: NR 416 and NR 416L.

Philosophy (PH)

Courses

PH 210. Foundations of Western Thought I: The Ancient World. 3 Credits.
The first in a four-semester sequence which enables students to enter the "great conversation" of western civilization, debating ultimate or philosophical questions about science, religion, self-awareness, ethics and politics. This course examines themes in the thought of Plato, Aristotle and the Stoic, Epicurean and neo Platonist philosophers of the ancient world. Offered fall semester of even-numbered years.

PH 230. Logic. 3 Credits.
A study of the principles of valid reasoning and argument: how to analyze arguments, detect fallacies, apply logical rules, prove and refute conclusions from given premises. Both syllogistic methods of argument and modern systems of symbolic inference are studied.

PH 303. Survey of Ethics. 3 Credits.
An introduction to critical thinking about the fundamental principles on which moral judgments and ethical conduct are based. This course will survey the major historical and contemporary positions.

PH 305. Foundations of Western Thought II: The Middle Ages. 3 Credits.
This course considers the synthesis of Christianity with classical pagan philosophy achieved by St. Augustine and St. Thomas Aquinas (1225-1274). What became of the ancients' ideal of human knowledge (of the universe, the soul, the divine, and the political community) in an age during which philosophy became the "handmaid of theology"? What were the underpinnings of the "natural law" conception of moral and political philosophy? How did this medieval synthesis break down on the scientific side with Galileo's challenge to Aristotelian physics and astronomy, and on the moral and political side with Machiavelli's portrayal of a Renaissance prince? Offered spring semester of odd-numbered years.

PH 306. Foundations of Western Thought III: 17th & 18th Centuries. 3 Credits.
This course follows the development of the European philosophical tradition through the age of religious upheaval, secular enlightenment, scientific and democratic revolutions. Included is a discussion of Post-Aristotelian physical science -- especially the concepts of space, time, motion and causation -- from Galileo through Descartes to Newton and a consideration of the foundation of modern moral and political philosophy by Hobbes and its continuation through Locke, Hume, Rousseau and Kant. Includes Kant's Copernican Revolution in moral philosophy and philosophical theology. The Enlightenment ideal. Offered fall semester of odd-numbered years.

PH 307. Foundations of Western Thought IV: 19th and 20th Centuries. 3 Credits.
This course follows themes discussed in Foundations of Western Thought I, II and III into the contemporary period. Works by Hegel, Kierkegaard, Marx, Mill, Nietzsche, Jaspers, Heidegger, Sartre, Russell, Weil and Arendt. Offered spring semester of even numbered years.

PH 322. Business Ethics. 3 Credits.
This course considers a range of ethical issues arising in the business world which are of common public concern. It is intended to provide a working knowledge of the concepts, theories and types of argument characteristic of ethics in general and an appreciation of how they relate to a market environment. The rights and responsibilities of businesses, managers and employees to each other, to stockholders and to society at large are examined in such contexts as marketing, accounting and auditing, job security, pensions and health care, working conditions, affirmative action, product liability and safety, executive compensation and governance, globalization and the natural environment.
PH 323. Environmental Ethics. 3 Credits.
An introduction to ethical issues concerning the human and non-human environment. The course provides a working knowledge of the concepts, theories, and types of argument characteristic of ethics in general. It analyzes and debates a selection of such topics as: ethical implications of continued economic and population growth; designing the infrastructure and architecture of human communities for optimal integration into the natural environment; sustainable agriculture and wilderness management; biodiversity and endangered species; pollution, waste disposal and climate change. Mainstream philosophical approaches will be compared with radical perspectives such as deep ecology and eco-feminism; and responses to ecological hazards ranging from free market strategies, through government regulation, local economic and ecological initiatives, to civil disobedience and eco-sabotage, may be examined.

PH 324. Criminal Justice Ethics. 3 Credits.
This course provides a short introduction to general ethics (about 1/3 of the semester) with applications to practices and problems in the criminal justice field. Its focus is less on specific rules of ethical conduct for criminal justice professionals than on their interface with issues of common public concern. We will debate the legitimate functions and limitations of the criminal law, as well as a selection of moral problems in policing, judicial processing and corrections. In addition, a number of recent high-profile Supreme and Appeals Court cases in the areas of civil rights and civil liberties will be analyzed. The emphasis will be on developing discussion skills and familiarity with essential patterns of legal and moral reasoning.

PH 340. Philosophy of Non-Violence. 3 Credits.
A study of permissible uses of force by individuals and nations. Topics include the theory of the just war, pacifism and non-resistance, conscientious objection, civil disobedience, and the moral problem of nuclear armaments.

PH 350. Medical Ethics. 3 Credits.
This course examines general ethics and professional ethics; patient rights and professional responsibilities; terminating and prolonging life; allocating scarce medical resources; human experimentation and informed consent; genetic intervention; and other issues.

PH 360. Philosophy of Science. 3 Credits.
A course examining the basic principles of scientific reasoning, questions concerning scientific progress and scientific revolutions and ethical issues in the technological application of scientific discoveries. Case studies are drawn both from the history of science and from contemporary controversies. Prerequisites: sophomore standing or above and one course in laboratory science.

PH 400. Reading and Research. 3 Credits.
An inquiry into the pertinent literature and source materials of a specific area concerned with a special project to be agreed upon by instructor and student. Prerequisite: consent of instructor involved.

Physical Education (PE)

Courses

PE 107. Foundations of Physical Education. 3 Credits.
A course designed to provide students with an introduction to the professional aspects of the physical education profession. Includes historical and philosophical implications with emphasis on modern trends in program design. Acquaints students with professional organizations and reviews career possibilities in the field.

PE 161. Physical Fitness & Wellness Assessment. 3 Credits.
Introduces the student to the theory and practice of teaching physical fitness activities. A personalized assessment is conducted of health-related fitness and wellness components. Based on the evaluation results and individual interests, an exercise program is designed by each participant, which she/he is expected to revise and update during her/his professional preparation at Norwich University. Individualized exercise program prescriptions may include aerobics, cycling, jogging, lap swimming, walking, yoga, or weight training. Professional ethics, client privacy, and liability issues are stressed throughout the program.

PE 199. Phys Ed Topics; 4 Credits.

PE 260. Personal and Community Health. 3 Credits.
A course that emphasizes principles, problems, and procedures concerned with the improvement of individual and community health. Consideration is given to the nature of communicable diseases and the preventative measures used in schools and community. Health information protection and client privacy are stressed as an integral part of the community health care provider’s professional ethics.

PE 261. Foundations in Health Education. 4 Credits.
This course will teach historical development, professional standards, philosophy and program planning, including current best practices in the development, implementation and evaluation of health education programs. It will focus on developing personal and social health skills, including decision making, interpersonal communication, goal setting and self management skills. In addition, this course will integrate teaching students media literacy, personal advocacy, and how to access valid health information, products and services and how to teach this to prospective students. Lecture 3 hours: Field Experience 2 hours. Prerequisite: PE260. Offered even-numbered fall semesters.
PE 265. Lifelong Motor Development. 3 Credits.
This course studies the sequential, continuous age-related process whereby movement behavior changes. The class will cover information processing theories, theories of motor learning, effects of practice regimens and feedback and biological changes experienced over a lifetime, which affect motor skill acquisition. Understanding lifespan motor development is important for educators at all levels, special education teachers, physical educators, coaches, and adult fitness leaders.

PE 304. Motor Development Activities I. 4 Credits.
This course teaches students to apply principles of best practice to the development and delivery of appropriate instructional programs in individual and dual activities currently being taught in the public schools (e.g. dance, gymnastics, racket activities, orienteering). Consideration is given to the development of personal performance and skill acquisition in order to more effectively lead practical lessons in school. Students must demonstrate an understanding of, and competence in motor skill acquisition and physical education pedagogy in the context of public school instructional programs.

PE 305. Motor Development Activities II. 4 Credits.
This course teaches students to apply principles of best practice to the development and delivery of appropriate instructional programs in team sport and group activities currently being taught in the public schools (e.g. cooperative/challenge activities, basketball, volleyball, softball, soccer, lacrosse and floor hockey). Consideration is given to the development of personal performance and skill acquisition in order to more effectively lead practical lessons in school. Students must demonstrate an understanding of, and competence in motor skill acquisition and physical education pedagogy in the context of public school instructional programs.

PE 306. Outdoor Physical Education I. 3 Credits.
This course provides students with a comprehensive background in warm weather Outdoor Physical Education. Skills in trip planning, risk management, equipment selection concerning use and care, and group leadership techniques will be covered. This class will prepare students to recognize the assumption of risk, attractive nuisances, negligence, and the standard of care when facilitating an Outdoor Physical Education program. Students will study and practice principles and protocols for administering safe, high-quality outdoor education experiences in activities such as, canoeing, mountain biking, hiking & backpacking, and adventure. Also covered will be topics in animal and wilderness conservation, nutrition, compass use and navigation, and environmental ethics. 3 classroom/field experience hours. Prerequisites: PE 107, PE 161, or permission of instructor. Offered fall semester.

PE 307. Outdoor Physical Education II. 3 Credits.
This course provides students with a comprehensive background in cold weather Outdoor Physical Education. Students will be actively engaged in winter activities. This class will prepare students to conduct classes in outdoor education during the winter in activities such as, snowshoeing, cross-country skiing, and ice skating. Also presented will be, but not limited to, topics in animal and wilderness conservation, nutrition, mountain and cold weather illness and injuries, and snow science, such as avalanche assessment and ice assessment. An emphasis will be placed on preparing individuals to be active in cold weather under winter conditions. 3 classroom/field experience hours. Prerequisites: PE 107, PE 161, or permission by instructor. Offered spring semester.

PE 333. Management Sports Facilities. 3 Credits.

PE 341. Instructional Strategies for Physical Education in Elementary School. 4 Credits.
A course that provides classroom and laboratory experience designed to acquaint the student with basic materials, methods, and principles necessary to meet the educational needs of the elementary school child. Emphasis on curriculum development with consideration given to concepts of movement education and perceptual motor development. Application of movement theory to specific sports skills and activities. Health information protection and student privacy issues are included throughout the course of instruction. Classroom 2 hours, laboratory 3 hours on site at Barre Town Middle, Elementary School.

PE 342. Instructional Strategies for Physical Education in Middle-Secondary School. 4 Credits.
A course that places emphasis on ethics, principles, procedures, and techniques related to teaching health and physical education in the elementary and secondary schools. Methods of organization, types of programs, and content and materials of health and physical education courses. Laboratory experience provided in traditional and new media, self and peer evaluation, and micro teaching. Health information protection and student privacy issues are reinforced throughout this course. Classroom 2 hours, laboratory 3 hours on site at U-32 Jr. - Sr. High School.

PE 355. Coaching:Leadership in Sports. 3 Credits.
A course covering the philosophy, principles, and techniques of coaching individual and team sports. Emphasis on the organization and administration of interscholastic athletics in relation to the achievement of education objectives. Opportunity for youth sport certification.

PE 356. Kinesiology. 4 Credits.
A review of the structure and function of the skeletal and muscular systems with special emphasis on an analysis of human motion as related to human performance. Classroom 3 hours, laboratory 2 hours. Prerequisite: BI215, 216 or permission of the instructor.

PE 371. Physiology of Exercise. 4 Credits.
A review of physiological principles of muscular activity with emphasis on the integration of body systems in the performance of exercise and various athletic activities. Classroom 3 hours, laboratory 2 hours. Prerequisite: BI215, 216 or permission of the instructor.
PE 373. Activities and Programs for the Disabled and Aging. 3 Credits.
A study of activities and programs focused on meeting the needs of special population groups and the aging. Consideration given to teaching methodology and program planning for individuals and groups. Health information protection and client privacy is stressed as it relates to professional ethics and liability.

PE 399. Topics:. 3 Credits.

PE 406. Readings in Physical Education. 3 Credits.
This course examines the current literature on issues facing future professional educators of an ethical, legal or pedagogical nature. Students are expected to think, read, write and speak critically about these professional issues in the physical education discipline. The submission of a professional portfolio is required. Seminar 3 hours.

PE 426. Internship. 6,12 Credits.
A course designed to provide the Physical Education students with an intern-type experience in a professional setting appropriate to their career goals. Prerequisite: satisfactory completion of all courses in the major through the sixth semester. Cross listed as PE/SM. A student may not receive credit for both.

PE 432. Organization and Administration in Physical Education. 3 Credits.
A course that emphasizes the study of administrative principles, functional organization, and supervision in relation to the total physical education program in grades K-12 and to managing sports facilities and sports programs. Major topics include personnel, curriculum, legal liability, intramurals, evaluation, budgeting and risk management.

PE 441. Advanced Exercise Physiology and Prescription. 4 Credits.
This course prepares and qualifies students to work as personal trainers and fitness specialists in corporate fitness and health club facilities. The course bridges the gap between exercise physiology and the practical application skills of personal training. Advanced exercise physiology knowledge is presented to assure new knowledge and exercise techniques are acquired. Students will learn how to design and implement exercise prescriptions for multiple populations and as well as successful goal attainment. Students will be prepared to sit for certification examinations. Three lecture hours per week and two hour laboratory component. Prerequisites: PE 365, 371, or permission of instructor. Offered Fall semesters.

PE 450. Exercise Testing and Electrocardiography. 4 Credits.
This course focuses on the theory and methods of administering exercise stress tests using different modes of exercise and consideration of different populations. Further analysis of information gained from exercise testing, studying deviations from normal, and applications of exercise test information in adult fitness and cardiac rehabilitation programs will be highlighted. Emphasis will be placed on the recognition and interpretation of normal and abnormal resting and exercise ECG monitoring. Three lecture hours per week and two hour laboratory component. Prerequisites: BI 215, 216 and PE 371 or permission of instructor. Offered fall semester.

PE 499. TEST COURSE. 12 Credits.

Physics (PS)

Courses

PS 100. Elementary Physics. 4 Credits.
A study of topics from kinematics, dynamics, fluids, energy, acoustics, electricity, optics, and modern physics chosen for applicability to physical education and health. Classroom 3 hours, Laboratory 2 hours. Prerequisite: MA103 or equivalent.

PS 107. Introductory Solar System Astronomy. 4 Credits.
A descriptive study of the solar system, including the sun, planets, asteroids, comets and interplanetary space. The role of observation in the evolution of astronomy is emphasized. Lecture 3 hours, laboratory 2 hours. Does not count as a lab science if taken for 3 credits.

PS 108. Stellar and Galactic Astronomy. 4 Credits.
A descriptive introduction to the universe, including stars, galaxies, and recent deep space discoveries. Discussions survey the techniques used by astronomers to interpret the wide variety of observed phenomena in the cosmos. Lecture 3 hours, laboratory 2 hours. Does not count as a lab science if taken for 3 credits.

PS 110. Physics of Continuous Media. 3 Credits.

PS 201. General Physics I. 4 Credits.
An algebra-based study of mechanics, sound and heat, with correlated laboratory experiments. Classroom 3 hours, laboratory 2 hours. Prerequisite: MA107 or the equivalent.

PS 202. General Physics II. 4 Credits.
An algebra-based study of magnetism, electricity, light, and atomic physics, with correlated laboratory experiments. Classroom 3 hours, laboratory 2 hours. Prerequisite: PS201.
**PS 205. Basic Instrumentation in the Natural Sciences. 4 Credits.**
An introductory course in electricity and electronics including A.C. and D.C. bridge circuits, diodes and transistors, linear and digital integrated circuits. Emphasis is placed on the use of these devices in typical research equipment such as spectrophotometers, radiation counters, turbidity and conductivity meters, electronic thermometers, etc. Lecture 3 hours, laboratory 3 hours. Prerequisites PS201, PS202.

**PS 207. Meteorology and Climatology. 3,4 Credits.**
A first study of atmospheric processes, elementary forecasting, and the major climatic classes. Particular emphasis is placed on the effects of these phenomena on human activities. Laboratory practice includes elementary forecasting techniques, observations, calculations, and theoretical analysis of weather and climate patterns. Classroom 3 hours, Laboratory 2 hours. Prerequisite: PS201 or PS202 or permission of the instructor. Does not count as a lab science if taken for 3 credits.

**PS 211. University Physics I. 4 Credits.**
A calculus-based study of vectors; Newton's laws; uniform, accelerated, rotational and harmonic motion; conservation laws; fluid mechanics; elasticity. Classroom 3 hours, laboratory 2 hours. Required in chemistry, mathematics and engineering curricula. Prerequisite: MA121.

**PS 212. University Physics II. 4 Credits.**
A calculus-based study of topics in electricity, magnetism, waves and optics. Classroom 3 hours, laboratory 2 hours. Prerequisite: PS122, Co-requisite: MA122.

**PS 232. University Physics III. 3 Credits.**
A study of topics from quantum phenomena, spectroscopy, relativity, nuclear and solid state physics. Classroom 3 hours. Prerequisite: PS202 or PS212, MA223 or permission of the instructor.

**PS 331. Mechanics. 4 Credits.**
Newtonian Mechanics applied to a particle including rectilinear and general motion, linear oscillations, non-inertial reference frames, gravitation, and central forces. Non-linear oscillators and chaos. Classroom: 3 hours; laboratory: 3 hours. Prerequisites: PS202 or PS212; MA224 offered odd numbered fall semesters.

**PS 332. Mechanics II. 4 Credits.**
Newtonian Mechanics applied to a system of particles including planar and general motion of rigid bodies, and oscillating systems. Lagrangian and Hamiltonian dynamical formulations. Introduction to relativistic dynamics. Classroom: 3 hours; laboratory: 3 hours. Prerequisite: PS331. Offered even numbered spring semesters.

**PS 354. Thermodynamics. 4 Credits.**
A study of first and second laws of thermodynamics with applications; thermodynamic potentials and applications to systems in equilibrium; introduction to statistical mechanics including Boltzmann statistics, quantum statistics, and statistical interpretation of entropy. Classroom 3 hours, laboratory 3 hours. Prerequisites: PS202 or PS212; MA224.

**PS 363. Optics. 4 Credits.**
A study of the nature and propagation of light; reflection and refraction, thick lenses, lens aberrations, and optical instruments. Interference, dispersion, diffraction, polarization, and color phenomena. Classroom 3 hours, laboratory 3 hours. Prerequisites: PS202 or PS212; MA224.

**PS 421. Advanced Laboratory I. 1-4 Credit.**
A laboratory investigation in a specific area of experimental physics designed in consultation with physics faculty. Prerequisite: Permission of the instructor. Offered fall semesters only.

**PS 422. Advanced Laboratory II. 1-4 Credit.**
A laboratory investigation in a specific area of experimental physics designed in consultation with physics faculty. Prerequisite: Permission of the instructor. Offered spring semesters only.

**PS 423. Electricity and Magnetism I. 4 Credits.**
A study of electrical circuits, electrostatic fields, application of Gauss' Law and Laplace's equation; dielectric theory; magnetic fields, induced electric fields and currents; theory of magnetic materials; Maxwell's equations and electromagnetic waves. Classroom 3 hours, laboratory 3 hours. Prerequisites: MA224 and PS205 or permission of instructor. Offered even numbered fall semesters.

**PS 424. Electricity and Magnetism II. 4 Credits.**
A continuation of PS423, studying electrical circuits, electrostatic fields, application of Gauss' Law and Laplace's equation; dielectric theory; magnetic fields, induced electric fields and currents; theory of magnetic materials; Maxwell's equations and electromagnetic waves. Classroom 3 hours, laboratory 3 hours. Prerequisites: PS423. Offered odd numbered spring semesters.

**PS 441. Modern Physics I. 4 Credits.**
An introduction to special relativity, quantum mechanics, structure and spectra of atoms and molecules, nuclear models, and nuclear interactions. Classroom 3 hours, laboratory 3 hours. Prerequisites: PS212 and MA224 or permission of instructor. Offered odd numbered fall semesters.

**PS 442. Modern Physics II. 4 Credits.**
A continuation of PS441, introducing special relativity, quantum mechanics, structure and spectra of atoms and molecules, nuclear models, and nuclear interactions. Classroom 3 hours, laboratory 3 hours. Prerequisite: PS441. Offered even numbered spring semesters.
PS 451. Seminar I. 1 Credit.
A study of special topics of current interest. This capstone course integrates reading, writing, speaking and critical thinking skills. Classroom 1 hour. Prerequisite: permission of the instructor. Offered fall semesters only.

PS 452. Seminar II. 1 Credit.
A continuation of PS451, investigating special topics of current interest. This capstone course integrates reading, writing, speaking, and critical thinking skills. Classroom 1 hour. Prerequisite: permission of the instructor. Offered spring semesters only.

PS 461. Senior Project I. 1 Credit.
A project-oriented capstone experience that integrates reading, writing, speaking and critical thinking. The senior student chooses a project with faculty advice and takes charge of its execution to a satisfying conclusion. The course requires oral and written presentations of the project results. Prerequisites: senior class standing and permission of the instructor. Offered fall semesters only.

PS 462. Senior Project II. 1 Credit.
A project-oriented capstone experience that integrates reading, writing, speaking and critical thinking. The senior student chooses a project with faculty advice and takes charge of its execution to a satisfying conclusion. The course requires an oral and written presentation of the completed project. Prerequisites: senior class standing and permission of the instructor. Offered spring semesters only.

Political Science (PO)

Courses

PO 105. American Politics. 3 Credits.
A study of the theoretical, institutional, and behavioral elements of the U.S. political system. Offered both semesters. Open freshman only, except by permission of department chair or unless a major requirement for another program or major.

PO 106. Introduction to Public Policy and Administration. 3 Credits.
An introductory examination of theoretical and practical approaches to policymaking and administration, the essential steps in the process, and the roles of key actors at all levels. This course prepares students for more in-depth study of all other facets of the political realm. 3 lecture hours. Open freshman only, except by permission of department chair or unless a major requirement for another program or major.

PO 202. Introduction to Comparative Politics. 3 Credits.
An introductory course that acquaints students with the comparative study of politics. The course will compare executive and legislative relationships, electoral systems, ideologies, and political parties. Various countries from around the world will be used to illustrate the application and consequences of different institutions and ideas. Not open to freshman without instructor's permission.

PO 215. International Relations. 3 Credits.
An inquiry in assumptions, theories, and dogmas of the modern state system. Examination and evaluation of such topics as realist theory; conflict resolution; game theory; decision-making theory; and ecopolitics. Not open to freshman without instructor's permission.

PO 220. Research Methods. 3 Credits.
An introduction to the methods of political analysis, standard nomenclature, and basic research methods relied upon in the study of politics. Emphasis is placed on quantitative methods and ethical issues in conducting research. Not open to freshman without instructor's permission.

PO 300. Special Topics in Politics. 3 Credits.
Select topics offered on occasion. Open to upperclassmen, otherwise by permission of the instructor.

PO 301. Special Topics in International Relations. 3 Credits.
Select topics in the area of international relations offered on occasion. Topics courses may be repeated for credit as long as a different topic is offered. 3 lecture hours. Open to upperclassmen, otherwise by permission of the instructor.

PO 303. Political Philosophy. 3 Credits.
After introducing the political philosophies of Socrates, Plato and Aristotle, this course explores the ideas of major Western thinkers from the Renaissance through the Industrial Revolution. The course does not only examine each philosopher's understandings of power, justice, equality and freedom, but also contemporary applications and implications of these ideas. Open to upperclassmen, otherwise by permission of the instructor.

PO 305. Geopolitics. 3 Credits.
Geopolitics will give students an increased appreciation of the influence of geography on political decision-making. This course will help students "visualize" world politics and understand how geography affects both national and transnational political behaviors. Students will learn to think and write critically about such issues and forces as globalization, development, and conflict. Students will develop an understanding of how interests and perceptions are shaped by geography. Offered alternate years. Open to upperclassmen, otherwise by permission of the instructor.
PO 310. European Politics. 3 Credits.
A study of the political systems, cultures, and issues of selected countries from western, northern, and southern Europe as well as Russia and the European Union. This course will also consider the relationship between domestic and foreign policies and the relationship between the United States and Europe. Offered alternate years. Open to upperclassmen, otherwise by permission of the instructor.

PO 312. The Presidency. 3 Credits.
A study of the presidential office and its relationship with the major American political institutions. Offered alternate years. Open to upperclassmen, otherwise by permission of the instructor.

PO 313. Political Parties and Interest Groups. 3 Credits.
A study of political parties and interest groups as they influence the decision-making process, the formulation of government policy, and the selection of officials. Open to upperclassmen, otherwise by permission of the instructor.

PO 314. The Legislative Process. 3 Credits.
A study of the national and state legislatures in the United States, through a combination of lectures, readings, contact with legislators, and actual investigations on the state legislative scene itself. Offered alternate years. Open to upperclassmen, otherwise by permission of the instructor.

PO 315. Public Opinion and Political Behavior. 3 Credits.
A study of the development of political attitudes and the formation of public opinion; the influence of public opinion on governmental policy through its relationship to political participation, representation, and leadership. Offered alternate years. Open to upperclassmen, otherwise by permission of the instructor.

PO 320. Topics in Area Studies. 3 Credits.
Selected topics in area studies will be offered on occasion. This course will be used to cover subjects not included in the regular offerings in comparative politics. Topics may include the politics of a particular country or region such as Latin America, Africa, Eastern Europe, or the Middle East. A topics course may also be offered on a particular issue area such as foreign and defense policy, healthcare policy, welfare policy, or environmental policy. Open to upperclassmen, otherwise by permission of the instructor.

PO 321. U.S. Constitutional Law. 3 Credits.
Introduction to the evolution and structure of the American constitutional system, focusing on the federal relationship, the separation of powers, and judicial review, relying primarily upon the case method of analysis. Open to upperclassmen, otherwise by permission of the instructor.

PO 324. Civil Liberties. 3 Credits.
An examination of the relationship of individuals to government, relying primarily upon the case method of study, with specific consideration of problems of equal protection, due process, privacy, and freedoms of speech and religion. Open to upperclassmen, otherwise by permission of the instructor.

PO 330. American Citizenship. 3 Credits.
Using the Declaration of Independence, the Constitution and the Bill of Rights as a foundation, this course examines what it means to be a citizen of the United States. The course addresses such questions as: What are citizens entitled to and what do they owe the state and each other? Is there an obligation to obey political authority? Is there ever an obligation to disobey authority? An important consideration is the role of the military in American political life and in particular, the relationship between the military ethic and republican values. Offered alternate years.

PO 331. State and Local Politics. 3 Credits.
The primary objective of this course is to gain an understanding of the role of the state and local political institutions within the context of American federalism. Emphasis is placed on procedural and policy differences as well as political issues in state, regional, and local governments. 3 lecture hours. Open to upperclassmen, otherwise by permission of the instructor.

PO 333. American Foreign Policy. 3 Credits.
Through studies of the three "levels of analysis"—personal political psychology, bureaucratic politics, and international relations—this course examines the processes of American foreign policy formulation and execution; it explores the objectives, methods, and consequences of major U.S. foreign and military policies. If practicable, students will take part in role-playing simulations. Open to upperclassmen, otherwise by permission of the instructor.

PO 340. Revolution and Forces of Change. 3 Credits.
A critical analysis of several revolutions that will examine causes, outcomes, and accepted explanations in an attempt to discern generalities applicable to all revolutions. Offered alternate years. Open to upperclassmen, otherwise by permission of the instructor.

PO 348. Asian Politics. 3 Credits.
A study of the political systems, cultures, and issues of the People’s Republic of China, Taiwan, Japan, North and South Korea, Vietnam, Indonesia, Pakistan, and India. This course will pay particular attention to the relationship between the West and Asia, the processes of "modernization," and the role of Asia in contemporary international relations. Offered alternate years. Open to upperclassmen, otherwise by permission of the instructor.

PO 400. Independent Study. 3 Credits.
An opportunity for qualified upperclass students to engage in an intensive reading or research program in fields of interest not satisfactorily covered by regular course offerings. Periodic conferences will be required. Prerequisite: written consent of the instructor to a specific project presented by the applicant. Offered as occasion demands. Open to upperclassmen, otherwise by permission of the instructor.
PO 403. Internship. 3-15 Credit.
Direct participation in the practical workings of state, municipal, and Federal government. Ordinarily open only to seniors. Offered on availability to internships. Credits to be determined by instructor. Prerequisite: permission of the instructor. Not open to freshmen. Open to upperclassmen, otherwise by permission of the instructor.

PO 405. International Organizations. 3 Credits.
This course focuses on the increasingly influential and varied roles international organizations play in the world today from peace and security to international development, human rights, and environmental protection. It traces the evolution of the thinking behind, and efforts to establish international organizations, and analyzes not only their promise and challenges, but also their successes and failures to date. Although particular attention is paid to the United Nations and its many affiliated bodies, regional organizations (e.g. European Union, Organization of American States, African Union, NATO), international non-governmental organizations (NGOs), and multi-national corporations are also assessed. Offered alternate years. Open to upperclassmen, otherwise by permission of the instructor.

PO 410. Capstone Seminar in Political Science. 3 Credits.
A research and writing course designed to introduce students to graduate standards of original research and critical writing in political science. Open to upperclassmen, otherwise by permission of the instructor.

PO 412. War and Peace. 3 Credits.
An inquiry into the ostensible causes of war-- biological, economic, psychological, strategic, and theological; and an examination of the purported causes of war -- personal probity, military counterpoise, political utopia, and world government. Preparation of a substantial paper is required. Open to upperclassmen, otherwise by permission of the instructor.

PO 415. International Law. 3 Credits.
This course examines the development of international law, and assesses its effectiveness in governing the relations among nation-states. The course examines early as well as more recent efforts to build a body of such law. It compares international law with domestic law, and explores the principal sources of international law. The course uses cases to analyze the development of international law in areas such as extraterritorial jurisdiction, the range of sovereignty, diplomatic relations, the treaty system, arbitration and adjudication, the use of force, human rights, the environment, and economic relations. Offered alternate years. Open to upperclassmen, otherwise by permission of the instructor.

PO 490. Honors in Political Science. 3 Credits.
A substantial, sequential, research and writing project. See description of department honors program. Offered as occasion demands. Students must take this course for two successive semesters. Open to upperclassmen, otherwise by permission of the instructor.

PO 491. Honors in Political Science. 3 Credits.
The second semester of honors in political science. Devoted to writing and defending the honors thesis. 3 lecture hours. Open to upperclassmen, otherwise by permission of the instructor.

Psychology (PY)

Courses

PY 210. Psychology of Leadership. 3 Credits.
This course is designed to introduce students to the theoretical aspects of leadership, and to help them understand how theory applies to real situations. Topics include leadership models, leader behavior, leadership skills, followership, teams and motivation. Students will be expected to analyze cases, current situations and their own leader style. Prerequisite: PY211, Introduction to Psychology.

PY 211. Introduction to Psychology. 3 Credits.
An introduction to psychology as the science of behavior. Topics to be discussed will include learning, motivation, emotions, perception, personality, tests and measurements, and additional selected topics.

PY 212. Abnormal Psychology. 3 Credits.
A course on the origin and development of psychopathology with emphasis on the biological, social, and psychological determinants. Prerequisite: PY211 or permission of the instructor.

PY 220. Developmental Psychology. 3 Credits.
A lifespan study of normal development with emphasis on physical, intellectual, social, and emotional growth. Prerequisite: PY211 or permission of the instructor. This course is taken concurrently with ED102 by Teacher Education/Licensure Students.

PY 230. Biopsychology. 3 Credits.
This course is a survey of the neurophysiological bases of human behavior. Topics include basic brain anatomy and physiology, neurotransmitters and drugs, sensation and perception, learning and memory, sleep, and neurological disorders.
PY 232. Engineering Psychology. 3 Credits.
The objective of this course is to expose students to the theoretical foundations of research in human factors. Students will be introduced to basic concepts in psychology such as perception, attention, decision making, and motor control. Knowledge of these concepts is critical for the intelligent design of human-technological systems.

PY 234. Forensic Psychology. 3 Credits.
A survey of psychological research and theory dealing with criminal behavior and the legal system. Topics include prediction of violent behavior, sexual assault, victimization, juvenile delinquency, scientific jury selection, criminal investigation and profiling, eyewitness testimony, assessment of mental competency, lie detection, DNA testing, and forensic science.

PY 236. Cross-Cultural Psychology. 3 Credits.
This course will expose students to the influence of culture on human behavior, and will illustrate differences and commonalities in behavior (verbal and non-verbal), attitudes, and values across a range of cultures around the world. Issues concerning cultural contact and inter-cultural relations will be considered to enhance a student’s ability to deal with and understand variations in human behavior across cultures and ethnic groups. Methodological issues of particular importance to cross-cultural research will be discussed.

PY 238. Political Psychology. 3 Credits.
This course will examine key research in political psychology which includes the interactions of political and psychological processes and their impact on behavior in personal, local and global communities.

PY 240. Introduction to Social Psychology. 3 Credits.
A general survey of theories, methods and research on individual behavior in a social context. Among topics to be considered are: aggression, interpersonal attraction, a filiation, person perception, attitudes, group processes, and social influence. Prerequisite: PY211.

PY 241. Introduction to Personality Theory. 3 Credits.
An overview of selected influential statements regarding the structure, dynamics, and development of the human personality. Included are the theories of the Freidmans (Freud, Jung, Adler), the Environmentalists (Dollard and Miller, Skinner), and the Existentialists and Humanists (Rogers, Maslow, Frankl). Comparisons among theorists are organized around philosophical and historical themes. Prerequisite: PY211.

PY 263. Perception. 3 Credits.
Coverage of the major themes and research in perception. Topics include perception of color, form, motion, depth, illusions, perceptual learning, development, and the physiology of perception. Prerequisite: PY211 or permission of the instructor.

PY 299. Leadership at Norwich Univ.. 3 Credits.

PY 313. Experimental Psychology I. 3 Credits.
A course on the principles and skills required to plan, execute, and interpret psychological research. Topics include the nature of science, the value of empirical evidence, psychology viewed as a science, the logic of experiments, and the ethics of using human subjects. Students are taught to develop a testable idea, to write and read research reports, and to design, conduct, and analyze univariate and correlational studies. Prerequisite: PY211 or permission of the instructor.

PY 314. Experimental Psychology II. 3 Credits.
This course will teach students how to design, conduct, and report psychological experiments. The purpose of the course is to link the academic subject matter of psychology to the conduct of research in the laboratory and the field. Topics include the nature of science, formulation of hypotheses, measurement and reliability, research methods (including experimental, correlational, and observational techniques), research design, and ethics of using human subjects. Issues of experimental control, its relation to confounding and research design, and internal and external validity will be included. The course will also focus on the teaching of library research and scientific writing skills. Students will design, implement, analyze, and report results of several research projects. Prerequisite: PY313, or MA232, or permission of instructor.

PY 315. Exceptional Child I. 3 Credits.
An introduction to the developmental, emotional, behavioral, and learning characteristics of the special child. Topic areas include learning disabilities, retardation, emotional disorders, physical handicaps. Also included are federal and state laws, regulations, curricular adaptations and integration strategies. Required and only for elementary and secondary Teacher/Education Licensure Candidates. Prerequisite: PY211 or permission of the instructor.

PY 321. Organizational Psychology. 3 Credits.
An analysis of organizational behavior including motivation, climate, leadership, and the use of such techniques as behavior modification in changing human behavior. Theoretical consideration will be followed by application experiences through role playing and case analysis. Prerequisite: PY211 or permission of the instructor.

PY 324. Adolescent Psychology. 3,4 Credits.
This course examines the physical, emotional, social, cognitive aspects of adolescence from a developmental perspective. Identity, autonomy, sexuality, achievement, and intimacy are examined within the context of the school, the peer group, and the family. Students will have the opportunity to work with adolescents in schools, recreational centers, counseling centers, or through youth service agencies. Required for secondary teacher licensure candidates (Formerly ED324, Educational Psychology). Prerequisite: PY211 or permission of the instructor.
PY 344. Cognition. 4 Credits.
Overview of research and theory on human cognitive processes emphasizing the acquisition, storage, representation, retrieval and use of knowledge. Topics include memory, concept formation, language and thought, problem solving and creativity, and cognitive development. Laboratory will include hands-on experiments in cognitive research paradigms.

PY 350. Environmental Psychology. 3 Credits.
A study of the relationship between people and the environment, the use of space as a means of regulating social interaction, and human responses to environmental stressors such as overcrowding, toxic agents, noise, air, and water pollution. Also a brief look at ecological psychology in which setting-specific rather than person-specific determinants of a person’s reaction to the environment are analyzed. Prerequisites: minimum junior standing, PY211, and permission of the instructor.

PY 352. Learning and Memory. 4 Credits.
This course provides an overview of historical and current research findings in the area of learning and memory. The subject will be approached from various theoretical approaches, including behaviorist, cognitive, and neurobiological paradigms. Laboratory will include hands-on experiments using research paradigms from the field of learning and memory.

PY 355. Psychology and the Law. 3 Credits.
A course that examines the research of psychology as it relates to the judicial process; the nature, source, and development of antisocial behavior; and forensic psychology relative to the development of law and policy at the national and international levels. Prerequisites: PY211, junior standing and permission of the instructor.

PY 360. History and Systems of Psychology. 3 Credits.
An overview of significant movements, theories and individuals in the development of contemporary psychology. The course is organized around significant themes and includes discussion of the philosophy of scientific growth, structuralism, functionalism, behaviorism, Gestalt psychology and psychoanalysis. Included will be examples, cases, and discussions of the APA ethics code that governs the performance of professionals in the field of psychology. This course satisfies the university’s General Education Ethics requirement. Prerequisite PY 211 and permission of the instructor. 3 lecture hours.

PY 398. Thesis Preparation. 3 Credits.
The students will prepare a senior thesis prospectus in accordance with the ethical standards of the Human Subjects Committee. This course precedes PY498. Prerequisites: junior standing, permission of the instructor, PY211, PY313, PY314.

PY 401. Senior Seminar. 3 Credits.
This course is the capstone experience marking the end of a student’s undergraduate studies. Students both majoring and minoring in psychology will be provided the experience of synthesizing their learning across their courses in the context of a liberal arts education. Prerequisite: senior status or permission of the instructor, PY211, PY313, PY314.

PY 402. Conference. 0 Credits.
Each Psychology major, must during his/her tenure at Norwich attend at least one professional Psychology meeting.

PY 403. Presentation. 0 Credits.
In order to complete the process of psychological inquiry and communication, each psychology major must present his/her senior research at an appropriate professional forum, spring semester, senior year.

PY 451. Theory and Practice of Psychoanalysis. 3 Credits.
A seminar course which deals with particular theories or areas of psychology not elsewhere covered in depth or within present course offerings. Prerequisite: PY211 and permission of the instructor.

PY 452. Thematic Seminar. 3 Credits.
A seminar course which deals with particular theories or areas of psychology not elsewhere covered in depth or within present course offerings. Prerequisite: PY211 and permission of the instructor.

PY 453. Internship. 3-9 Credit.
Assignments will include work and observation in local, state, and federal institutions or agencies concerned with the education, health, or the protection of society. Written and oral reports. Prerequisites: PY211 and permission of the instructor.

PY 471. Directed Readings. 3 Credits.
A course in which there is an opportunity to select and read in a specific area of interest that is not available through regular course offerings. Prerequisites: three psychology courses and permission of the instructor.

PY 498. Senior Thesis. 3 Credits.
A research course designed to enable a student to experience all phases of the experiment from literature research, experimental design, data collection and analysis, and written and oral reports. The student will learn all of the procedures, considerations, and standards necessary to ensure the ethical treatment of human participants. Prerequisites: PY211, PY313, PY314, PY398, senior standing and permission of the instructor.
Quantitative Methods (QM)

Courses

QM 213. Business and Economic Statistics I. 3 Credits.
A course emphasizing the development and presentation of statistical data for business and economic decision-making. Topics will include survey methods, statistical description measures, sampling distributions, statistical inference procedures, simple regression and time series analysis, and construction and use of index numbers. Prerequisite or corequisite: MA212.

QM 317. Business and Economic Statistics II. 3 Credits.
A course in which the statistical concepts developed in QM213 are continued. New topics developed are multiple correlation and regression theory and analysis, the assumptions of regression analysis and econometric problems, and an introduction to simultaneous models and advanced topics. Prerequisite: QM213. Offered in the fall-even years.

QM 370. Quantitative Methods for Marketing & Finance. 3 Credits.
A course in which the statistical concepts developed in QM 213 are continued. The focus of the course will be the application of statistical techniques to real world issues in Finance and Marketing. Emphasis will be placed on problem solving, class participation, computer applications and completion of a term paper. Prerequisite QM213. 3 lecture hours.

Sociology (SO)

Courses

SO 201. Introduction to Sociology. 3 Credits.
An analysis of the order and change in social life, both at the micro (interactional) and macro (societal) levels. An examination of fundamental concepts and research methods applied to understanding culture and socialization; social groups and organizations; social stratification; and social change.

SO 202. Problems of Modern Society. 3 Credits.
This course examines the problems of American social institutions such as the family, the economy, and education, using basic sociological principles and paradigms. The course also covers problems of inequality, deviance, and problems of change and modernization.

SO 209. Methods of Social Science Research. 4 Credits.
An examination of the methodological foundations of the social sciences; the logic and technique of empirical inquiry; the nature of social facts, the operationalization of concepts, and the construction of hypotheses; research designs including surveys, interviews, experiments, observation, and evaluation; the organization and analysis of data; graph and table construction and interpretation; the common problems of empirical social research; and research ethics. Emphasis given to criminal justice applications. The lab part of the course instructs students how to use and apply SPSS and other relevant software. Cross-listed with CJ209. Offered fall semester. Classroom and Laboratory 4 hours.

SO 212. Cultural Anthropology. 3 Credits.
Principles and methods in the comparative study of cultures. An examination of the concepts and theories in terms of which cultural anthropology is pursued. Offered in fall semesters.

SO 214. Racial and Cultural Minorities. 3 Credits.
A study of relations between racial and ethnic groups in modern America. Attention is also given to selected subordinate groups in the U.S. and other countries.

SO 216. Soc of Health, Wellness & Med. 3 Credits.
Introduction to the sociology of health, wellness and medicine. Examines the cultural and institutional aspects of health, wellness, and healthcare systems through basic sociological principles, paradigms and methods. Explores inequality in health outcomes, access to resources, and within the medical field. Includes an international comparative approach. Offered annually in the fall semester. Open only to Nursing majors in their third semester of the degree program, students with a Sociology minor, or by permission of the Instructor and the Department Chairperson (3 credits).

SO 300. Topics in Criminal Sociology. 3 Credits.
Selected topics offered on occasion.

SO 316. Aging in Society. 3 Credits.
Introduction to the sociological study of aging in society. This course examines the cultural, relational and institutional interpretations of aging through the life course using basic sociological principles, paradigms and methods. Students will explore inequality as it relates to aging and diverse populations in terms of health outcomes, in access to resources, and within the medical field. Offered annually in the fall semester. Prerequisites: SO216 or S0201, or by permission of the instructor. 3 lecture hours.
SO 320. Drugs and Society. 3 Credits.
This course focuses on the interrelationships between drugs and the social order. Issues considered include: the nature and effects of legal and illegal drugs; the determinants of drug effects, especially the social determinants; the history of drug prohibition; drug addiction and drug treatment; and drug policy. Cross-listed with CJ320. Offered every other year.

SO 330. Military Sociology. 3 Credits.
This course provides a sociological perspective of the military as both an institution as an occupation. It examines the social structure and functions of the military and the social factors that influence behavior in and of the military. In terms of function, it examines the changing purposes of the military in view of changing national and international conditions; and in terms of structure, it examines the norms, values, traditions, organizations, and culture of the military. It is designed to provide greater insight into the routine life within the military and into contemporary issues confronting the military. Course taught in spring every other year.

SO 400. Independent Study. 3 Credits.
An opportunity for qualified upper class students to engage in an intensive research program in fields of interest not satisfactorily covered by regular course offerings. Periodic conferences will be required. Prerequisite: written consent of the instructor to a specific project presented by the applicant. Open only to students with a cumulative quality point average of 2.5. Offered on occasion. Prerequisite: Sociology minor and SO201. 3 lecture hours.

SO 402. Law and Society. 3 Credits.
An analysis of various theoretical perspectives on the nature, courses, organization and operation of law and legal systems. Emphasis will be placed on law creation, conflict resolution, the legal profession, and the role of law in social change. Cross listed with CJ402. Offered every other year.

Spanish (SP)

Courses

SP 111. Beginning Spanish I. 6 Credits.
An intensive course providing an introduction to the Spanish language, in which speaking proficiency, aural comprehension, vocabulary acquisition, reading, and writing are brought to a level enabling students to use the language actively in everyday situations. Classroom: 6 hours, laboratory: 2 hours. Not open to students who have successfully completed SP205 or higher.

SP 112. Beginning Spanish II. 6 Credits.
A continuation of SP111, in which language skills are brought to a level enabling students to participate more fully in general conversation, to read more sophisticated passages, and to write with a firmer command of syntactical structures. Classroom: 6 hours, laboratory: 2 hours. Prerequisite: SP111 or equivalent, NU placement. Not open to students who have successfully completed SP205 or higher.

SP 150. Topics Course. 3 Credits.
Specialized topics offered relating to culture, literature, business practices, language or linguistics. Topic will be indicated in the schedule of classes. May be repeated for credit, as topics vary. May be taught in Spanish or English; see schedule of classes. (When taught in English, this course may not count towards fulfilling the foreign language requirement.) Classroom: 3 hours.

SP 205. Intermediate Spanish I. 3 Credits.
A course that provides aural-oral practice in Spanish, in which students are enabled to enter into full discussion of topics that include abstract themes; review and expanded use of syntactical structures; intensive and extensive reading; and composition. Classroom 3 hours, laboratory 1 hour. Prerequisite: SP112, NU placement, a score of 500 on the CEEB Spanish Reading Test, or permission of instructor.

SP 206. Intermediate Spanish II. 3 Credits.
A course that provides aural-oral practice in Spanish, in which students are enabled to enter into full discussion of topics that include abstract themes; review and expanded use of syntactical structures; intensive and extensive reading; and composition. Classroom 3 hours, laboratory 1 hour. Prerequisite: SP205 or the equivalent, NU placement, a score of 500 on the CEEB Spanish Reading Test, or permission of the instructor.

SP 250. Topics Course. 3 Credits.
Specialized topics offered relating to culture, literature, business practices, language, or linguistics. Topic will be indicated in the schedule of classes. May be repeated for credit, as topics vary. The number ascribed to the course will reflect the level of the material under study as well as the level of proficiency expected of the student. May be taught in Spanish or English; see schedule of classes. Classroom 3 hours. (When taught in English, this course may not count towards fulfilling the foreign language requirement.)

SP 301. Advanced Spanish I. 3 Credits.
Oral and written practice of the language through class discussions of selected Hispanic authors. Selective review of grammar, especially of the more difficult and subtle aspects, designed to facilitate an idiomatic and fluent use of the language. Classroom 3 hours. Prerequisite: SP206 or permission of instructor.
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SP 302. Advanced Spanish II. 3 Credits.
Oral and written practice of the language through class discussions of selected Hispanic authors. Selective review of grammar, especially of the more difficult and subtle aspects, designed to facilitate an idiomatic and fluent use of the language. Classroom: 3 hours. Prerequisite: SP206 or permission of instructor.

SP 321. Introduction to the Literature of Spain I. 3 Credits.
A survey of peninsular Spanish literature from prehistoric Spain to the Modern Age. Lectures, readings, discussion, and written reports in Spanish. Prerequisite: SP206 or a 300-level course (may be taken concurrently), NU placement, or permission of the instructor.

SP 322. Introduction to the Literature of Spain II. 3 Credits.
A survey of peninsular Spanish literature from the Modern Age up through the 20th Century. Lectures, readings, discussion, and written reports in Spanish. Prerequisite: SP206 or a 300-level course (may be taken concurrently), NU placement, or permission of the instructor.

SP 327. Hispano-American Literature I. 3 Credits.
A survey of Hispano-American literature from the pre-Columbian period up through the 19th Century. Lectures, readings, discussion, and written reports in Spanish. Prerequisite: SP206 or a 300-level course (may be taken concurrently), NU placement, or permission of the instructor.

SP 328. Hispano-American Literature II. 3 Credits.
A survey of Hispano-American literature from the end of the 19th Century up through the 20th Century. Lectures, readings, discussion, and written reports in Spanish. Prerequisite: SP206 or a 300-level course (may be taken concurrently), NU placement, or permission of the instructor.

SP 331. Advanced Spanish Composition and Conversation I. 3 Credits.
A study of Spanish stylistics, translation into Spanish from modern English texts, oral reports, and discussion in Spanish. Prerequisite: SP206 or a 300-level course (may be taken concurrently), NU placement, or permission of the instructor.

SP 332. Advanced Spanish Composition and Conversation II. 3 Credits.
A study of Spanish stylistics, translation into Spanish from modern English texts, oral reports, and discussion in Spanish. Prerequisite: SP206 or a 300-level course (may be taken concurrently), NU placement, or permission of the instructor.

SP 350. Topics Course. 3 Credits.
Specialized topics offered relating to culture, literature, business practices, language, or linguistics. Topic will be indicated in the schedule of classes. May be repeated for credit, as topics vary. May be taught in Spanish or English; see schedule of classes. Classroom: 3 hours. (When taught in English, this course may not count towards fulfilling the foreign language requirement.)

SP 415. Seminar: Topics in Spanish or Latin-American Literature and Culture. 3 Credits.
A study of a particular author, theme, genre, or literary movement including cultural themes. Topic varies each year these courses are offered. Prerequisite: SP300-level course.

SP 421. Reading and Research in Spanish or Latin-American Literature and Culture. 3 Credits.
A report on an approved project of original research in Spanish or Latin-American literature or civilization under the direction of a department member. Limited to students who have demonstrated aptitude for independent work. May be scheduled either or both semesters. Prerequisite: SP300-level course and permission of the department chair and course instructor.

Sports Medicine (SM)

Courses

SM 128. Clinical Anatomy I. 3 Credits.
This course is part one of a two part series of anatomy courses in a modular format aligned with clinical practice. It provides an introduction to human anatomy with a basic survey of the body and pathological processes. Students will learn basic concepts related to anatomy, pathology and medical assessment of the head, eyes, ears, nose, throat, neck, back, and upper extremities. Classroom 2 hours, laboratory 2 hours. Offered fall semesters.

SM 129. Clinical Anatomy II. 3 Credits.
This course is part two of a two part series of anatomy courses in a modular format aligned with clinical practice. It provides an introduction to human anatomy with a basic survey of the body and pathological processes. Students will learn basic concepts related to anatomy, pathology and medical assessment of the thorax, abdomen, pelvis, cranial nerves, and lower extremities. Classroom 2 hours, laboratory 2 hours. Offered spring semesters.

SM 136. Emergency Care, Injury/Illness. 3 Credits.
SM 138. Introduction to Sports Medicine. 3 Credits.
This course provides students with an introduction to the principles of pharmacology, medical terminology, and documentation used in the care of physically active individuals.

SM 139. Health Science Research Methods. 2 Credits.
SM 199. New Course. 3 Credits.
SM 200. Clinical Education in Athletic Training I. 1 Credit.
This course provides students the opportunity to integrate clinical proficiencies introduced in prerequisite courses during a supervised practicum in an athletic training setting. Clinical rotation(s) (3 hours/week) and clinical proficiency evaluations. Prerequisites: SM 136, 138, and 220.

SM 201. Clinical Education in Athletic Training II. 2 Credits.
This course provides students the opportunity to integrate clinical proficiencies introduced in prerequisite courses during a supervised practicum in an athletic training setting. Clinical rotation(s) (6 hours/week) and clinical proficiency evaluations. Prerequisites: SM 212 and 231, MA 235.

SM 210. Assessment of Injury and Illness. 4 Credits.
Building on the assessment principles acquired in SM138 and 220; this course focuses on the techniques necessary to evaluate body systems for injury/illness. Classroom 3 hours, laboratory 3 hours. Prerequisites: SM220. Co-Requisite: BI216.

SM 212. Health Promotion. 3 Credits.
This course provides students with the knowledge and skills essential for understanding the etiology and prevention of common injuries and illness. Special emphasis is placed on acute and chronic conditions of the musculoskeletal system and chronic conditions of the cardiovascular, endocrine and respiratory systems. Classroom 3 hours. Offered fall semesters.

SM 220. Care and Prevention of Athletic Injuries. 4 Credits.
Course provides students with the knowledge and skills essential for the proper prevention, evaluation, and treatment of common athletic injuries. Risk management and professional ethics are stressed. Classroom 3 hours, laboratory 3 hours. Prerequisite: SM138.

SM 226. Clinical Education in Sports Medicine. 2 Credits.
Emphasis will be placed on the application of knowledge and skills introduced in SM135, 138, 210 and BI215. This course provides students the opportunity to develop clinical proficiencies introduced in preceding courses. Supervised practicum in athletic train setting. Class meets for 2 hours/week utilizing lecture, demonstrations and hands-on instructional techniques, plus Clinical Rotation (average 4 hours/week). Prerequisites: SM135 and 138.

SM 227. Clinical Anatomy&Biomechanics. 3 Credits.
This course is designed to explore clinical anatomy and biomechanical principles, exposing students to the structural interrelationships that serve to form the basis for normal function and as a means to understanding structural and functional pathology. Classroom 3 hours. Co-requisite: SM 220.

SM 228. Clinical Physiology I. 4 Credits.
This course is part one of a series of two physiology courses in a modular format aligned with clinical practice. It provides an introduction to human physiology with a basic survey of the physiologic and pathological processes. Students will learn concepts related to cellular, neuromuscular, renal, and cardiovascular physiology. Classroom 3 hours, laboratory 3 hours. Offered fall semesters.

SM 229. Clinical Physiology II. 4 Credits.
This course is part two of a series of two physiology courses in a modular format aligned with clinical practice. It provides an introduction to human physiology with a basic survey of the physiologic pathological processes. Students will learn concepts related to respiratory, gastrointestinal, endocrine, and reproductive physiology and temperature regulation. Classroom 3 hours, laboratory 3 hours. Prerequisite: SM 228. Offered spring semesters.

SM 230. Fundamentals of Evidence-Based Practice. 2 Credits.
This course prepares students to make independent judgments about the validity of clinical research and implement evidence-based clinical practice in their careers. Focus is on concepts of evidence-based practice with emphasis on forming answerable clinical questions, effective literature search strategies, and structured evaluation of the strength and relevance of clinical evidence. Classroom 2 hours. Offered spring semesters.

SM 231. Management of Spine and Pelvic Conditions. 3 Credits.
This course will focus on a critical analysis of injuries and conditions that may affect the spine and pelvis in physically active individuals. The application of joint and musculoskeletal anatomy will be utilized to assess the various joints and body regions of the spine and pelvis to determine the appropriate management of these conditions. Classroom 2 hours, Laboratory 2 hours. Offered fall semesters.

SM 232. Lower Extremity Injuries. 3 Credits.
This course will focus on a critical analysis of injuries and conditions that may affect the lower extremity in physically active individuals. The application of joint and musculoskeletal anatomy will be utilized to assess the various joints and body regions of the lower extremity to determine the appropriate management of these conditions. Classroom 2 hours, Laboratory 2 hours. Offered spring semesters.

SM 233. Upper Extremity Injuries. 3 Credits.
This course will focus on a critical analysis of injuries and conditions that may affect the upper extremity in physically active individuals. The application of joint and musculoskeletal anatomy will be utilized to assess the various joints and body regions of the upper extremity to determine the appropriate management of these conditions. Classroom 2 hours, Laboratory 2 hours. Offered fall semesters.

SM 299. Topics. 1-3 Credit.

SM 300. Clinical Education in Athletic Training III. 4 Credits.
This course provides students the opportunity to integrate clinical proficiencies introduced in prerequisite courses during a supervised practicum in an athletic training setting. Clinical rotation(s) including non-traditional seasons (12 hours/week) and clinical proficiency evaluations. Prerequisites: SM 228, 229, and 232.
SM 301. Clinical Education in Athletic Training IV. 4 Credits.
This course provides students the opportunity to integrate clinical proficiencies introduced in prerequisite courses during a supervised practicum in an athletic training setting. Clinical rotation(s) (12 hours/week) and clinical proficiency evaluations. Prerequisites: SM 233 and 420.

SM 400. Clinical Education in Athletic Training V. 4 Credits.
This course provides students the opportunity to integrate clinical proficiencies introduced in prerequisite courses during a supervised practicum in an athletic training setting. Clinical rotation(s) including non-traditional seasons (12 hours/week) and clinical proficiency evaluations. Prerequisites: SM 212, 420, 422; BI 253 and PE 371.

SM 401. Clinical Education in Athletic Training VI. 4 Credits.
This course provides students the opportunity to integrate clinical proficiencies introduced in prerequisite courses during a supervised practicum in an athletic training setting. Clinical rotation(s) (12 hours/week) and clinical proficiency evaluations. Prerequisites: SM 400 and 439.

SM 420. Therapeutic Modalities. 4 Credits.
Investigation of the physiological response of selected human body tissues to trauma and inactivity as well as the implications of said responses for the selection, use, and application of therapeutic modalities. Classroom 3 hours, laboratory 3 hours. Prerequisites: SM220.

SM 422. Therapeutic Exercise. 4 Credits.
Investigation of principles, objectives, indications, contraindications and progression of various modes of conditioning and reconditioning exercises. Methods for evaluation, progress assessment and development of criteria for return to activity. Classroom 3 hours, laboratory 3 hours. Prerequisite: SM420.

SM 426. Internship. 12 Credits.
A course designed to provide the Sports Medicine students with an intern-type experience in a professional setting appropriate to their career goals. Prerequisite: satisfactory completion of all courses in the major through the sixth semester. Cross listed as PE/SM. A student may not receive credit for both.

SM 439. Leadership & Management in Sports Medicine. 3 Credits.

SM 440. Evidence-Based Sports Med. 3 Credits.
Part of a two-semester capstone experience in sports medicine/athletic training. This course focuses on the development and utilization of evidence-based practice research as it is applied to sports medicine. Prerequisites: SM439 and MA232.

SM 450. Capstone Experience I. 1 Credit.
This course will focus on the development of two evidence-based practice projects that have direct application to clinical practice. Classroom 1 hour. Offered fall semesters.

SM 451. Capstone Experience II. 1 Credit.
This course will focus the presentation and evaluation of two evidence-based practice projects from SM 450. Classroom 1 hour. Offered spring semesters.

SM 460. Emerging Practice Skills. 3 Credits.
This course will focus on emerging topics in sports medicine practice. Included in the course will be advanced airway management, advanced wound closure techniques, IV therapy, advanced cardiac examination and advanced immobilization techniques. Classroom 2 hour, Laboratory 2 hours. Offered spring semesters.

Studio Arts (SA)

Courses
SA 103. Introduction to Drawing. 3 Credits.
An introduction to drawing, emphasizing articulation of space and pictorial syntax while developing abilities of perception and ways of seeing. Class work is primarily based on observational study. Assigned projects address fundamental and conceptual problems through historical and contemporary artistic practice. Three-hour studio, one-hour lecture per week.

SA 104. Introduction to Visual Design. 3 Credits.
An introduction to the language of visual expression, using studio projects to explore the basic principles of visual art and design as a fundamental component of visual communication. Students acquire a working knowledge of visual syntax applicable to the study of art history, popular culture, and the art of composition. Three-hour studio, one-hour lecture per week.

SA 105. Introduction to Painting. 3 Credits.
An introduction to the issues of contemporary painting, stressing a beginning command of the conventions of pictorial space, narrative, and the language of color. Students explore painting as a means of communicating ideas through visual symbols and metaphors. Class assignments and individual projects explore technical, conceptual, and historical issues central to the language of painting. Three-hour studio, one-hour lecture per week.
SA 106. Introduction to Printmaking. 3 Credits.
An introduction to a diverse range of printmaking media: linocut, woodcut, and screen-printing process. Both color and black-and-white printing methods are explored. Class assignments and individual projects explore technical, conceptual, and historical issues central to the language of printmaking and its connections to contemporary culture. Three-hour studio, one-hour lecture per week.

SA 107. Introduction to Photography. 3 Credits.
An introduction to photographic principles as a means of visual communication and its relationship to history and contemporary issues. The class examines the invention and history of photography. A single-lens reflex manual 35mm film camera is required. Three-hour studio, one-hour lecture per week.

SA 200. Intermediate Studio. 3 Credits.
This course level is for students pursuing further study in one of the following areas: drawing, design, painting, photography, and printmaking. The focus is on developing more complex levels of thought more thorough incorporation of theory and individual initiative in project content and completion. Only one area of study will be pursued each semester. Can be repeated for credit. Six hours of studio per week. Prerequisite: SA100-level studio in area of study or permission of the instructor.

SA 205. Water Media. 3 Credits.
This course examines water media, stressing an advanced command of the conventions of pictorial space, narrative, and the language of color and design. Class assignments and individual projects explore technical, conceptual, contemporary, and historical issues central to water media. Attention is given to each student’s unique and expressive handling of the media. Six hours of studio per week. Prerequisite: SA103 or instructor’s permission.

SA 210. The Portrait. 3 Credits.
This course explores the perceptual and conceptual means to construct the human face as a way to explore, understand, and portray the human condition. The structure of the head is examined as anatomy and as form. Historical examples are presented and examined as well as contemporary theory of the portrait and self-portrait. Six hours of studio per week. Prerequisite: SA103, or instructor’s permission.

SA 265. Life Drawing. 3 Credits.
The course focuses on study and exploration of the human figure using a range of approaches, with emphasis on observation, anatomy, spatial structure, and the use of life drawing as a means to analyze and explore the nature of the human condition. Historical examples ranging from cave painting to contemporary art are presented, researched, and discussed. Six hours of studio per week. Prerequisite: SA103, or instructor’s permission.

SA 299. Life Drawing. 3 Credits.

SA 299L. Inter Studio: Sketching. 0 Credits.

SA 300. Advanced Studio. 3 Credits.
This course is for students who have completed SA100 and SA200 level courses in their area of study and have a demonstrated ability to be self-directed and self motivated in their purposes and goals. Prior to registration, the student must have an approved outline for their individual course of study. Can be repeated for credit. Six hours of studio per week. Prior to registration, the student must submit in writing, and the instructor must accept, a proposed course of study.