

COURSE DESCRIPTIONS

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The four-letter prefix of the course number identifies the subject area:

ACPE	Arioch Center for Professional Education	FMGT	Facilities Management
ARCH	Architecture	GEOL	Geology
BIOL	Biology	HIST	History
BLDG	Building Construction	HUMN	Humanities
BMED	Biomedical	INDS	Industrial Design
CCEV	Civil, Construction, Environment	INTD	Interior Design
CHEM	Chemistry	LITR	Literature
CMGT	Construction Management	MANF	Manufacturing
COMM	Communication	MATH	Mathematics
COMP	Computer Science	MGMT	Management
COOP	Cooperative Education	MECH	Mechanical
DSGN	Design	PHIL	Philosophy
ECON	Economics	PHYS	Physics
ELEC	Electronics	POLS	Political Science
ELMC	Electromechanical Engineering	PSYC	Psychology
ENGL	English	*ROTC	Reserve Officer Training Corps
ENGR	Engineering	SOCL	Sociology
ENVM	Environmental	SURV	Surveying

*ROTC courses are located in Section E on pages E-8 to E-9.

The last three digits of the course number identify the course level as follows:

- 000-199 Introductory
- 200-349 Intermediate
- 350-399 Sophomore/Junior courses
- 400-549 Advanced Courses (Junior year)
- 550-699 Advanced Courses for Majors and Selected Students (Senior year)
- 800-999 Fifth-year Courses

To the right of the course are three numbers separated by hyphens. The first number denotes lecture/recitation hours per week; the second denotes laboratory hours per week; and the third denotes the number of semester credit hours. Some courses may be offered in the Arioch Center for Professional Education programs in an alternate format.

ARCHITECTURE COURSES

ARCH115 SURVEY OF ARCHITECTURE I 3-0-3

This course is a lecture-based historical survey of western and non-western architecture, covering the ideas, their social implications, and the evolution of construction technology. The survey follows the course of history through the Industrial Revolution. Corequisite: ARCH155 Design Principles I. Day Course.

ARCH155 DESIGN PRINCIPLES I 2-4-4

This course focuses on freehand drawing, utilizing drawing as a tool for the exploration of the built environment. Drawing as a method of 'seeing', the sketchbook as a recording device, and drawing as a tool in the design process are studied. Weekly exercises guide the course and weekly seminars integrate the materials covered in ARCH115 Survey of Architecture I. Corequisite: ARCH115 Survey of Architecture I. Day Course.

ARCH155 SURVEY OF ARCHITECTURE II 3-0-3

This course is a lecture-based historical survey of Western and non-Western architecture, covering the ideas, their social implications, and the evolution of construction technology. The survey follows the course of history from the Industrial Revolution to the present day. Prerequisite: ARCH115 Survey of Architecture I and ARCH155 Design Principles I. Corequisite: ARCH175 Design Principles II. Day Course.

ARCH175 DESIGN PRINCIPLES II 2-4-4

This course introduces students to computer-aided drawing, utilizing the computer as a tool in its many roles in the exploration and the production of architecture. Two-dimensional drawing, three-dimensional modeling, and animation are discussed and explored. Weekly exercises guide the course and weekly seminars integrate the materials covered in ARCH165 Survey of Architecture II. Prerequisite: ARCH115 Survey of Architecture I and ARCH155 Design Principles I. Corequisite: ARCH165 Survey of Architecture II. Day Course.

ARCH155 DIGITAL REPRESENTATION 2-0-2

This course will present advanced computer graphics programs as they pertain to architectural design and 3D visualization. Corequisite: ARCH245 Architectural Design + Technology I. Day Course.

ARCH238 MATERIALS AND METHODS I 3-0-3

A lecture-based survey on materials and methods of construction as they relate to structural design. The course provides an overview of contemporary building technology and theory. State-of-the-art technology is introduced through the use of high quality contemporary case studies. Prerequisite: ARCH165 Survey of Architecture II and ARCH175 Design Principles II. Corequisite: ARCH245 Architecture Design and Technology I. Day Course.

ing the study of absorption, and sound isolation in a variety of building types. Field trips to observe significant examples will be taken. Prerequisite: MATH245; Junior status or above in BSA. Day Course.

ARCH433 TECTONICS AND DESIGN 4-0-4

This course examines the relationship between sophisticated design thinking and advanced materials/building technologies in contemporary architecture. Prerequisite: Junior status or above in BSA. Day Course.

ARCH435 DESIGN METHODS 4-0-4

Students consider the multiple aspects of the architectural design process, beginning with information modeling and information diagramming. The student then progresses to image analysis, function analysis, context analysis and diagramming. The student ends the course with concept development and design process synthesis. Prerequisite: Junior status or above in BSA. Day Course.

ARCH436 MARKETING FOR DESIGN PROFESSIONALS 4-0-4

This course introduces the process necessary to define the market for services and to further examine its segments and targets. Concurrent awareness of the tools and techniques used to move through the stages of proposal, courting, presentation and closing will enable students to actively participate in case analysis early in the course. The scope includes comparison of different design segments, their overlapping segments and the identification of opportunities for partnering. Prerequisites: Junior status or above in BSA. Day Course.

ARCH442 BOSTON ARCHITECTS:TECHNOLOGY AND DESIGN 4-0-4

Study of a variety of building technologies through weekly presentations by Boston architects of current projects that illustrate the integration and influence of technology in both the design and construction process. Prerequisite: Junior status or above in BSA. Day Course.

ARCH449 CONSTRUCTING A SACRED SPACE 4-0-4

Concepts in religious and symbolic architecture will be studied, including sacred cities, places of worship, and symbolic sites, both past and present in Eastern and Western thought and tradition. Students create design projects involving cultural and religious influences on the forms and technology of sacred spaces. Prerequisite: Junior status or above in BSA. Day Course.

ARCH453 HISTORY OF ARCHITECTURAL ORNAMENT 4-0-4

Investigation of the various systems of composing ornament that have been used since early historic times. Students analyze from both reproductions and original examples in the Museum of Fine Arts and other local collections as well as actual Boston buildings. Prerequisite: Junior status or above in BSA. Day Course.

- ARCH454 HISTORICAL PERSPECTIVES 4-0-4**
ON ARCHITECTURAL TECHNOLOGY
- Students are introduced to the social and cultural history of building technologies and their consequences in the built environment. Students are familiarized with the idea of technology and culture, and then explore materials, production methods, and building systems. Junior status or above in BSA. Day Course.
- ARCH456 D+R STUDIO III: TECTONICS 0-12-6**
- A series of design projects are explored with an emphasis on the integration of structural systems and building envelope. Prerequisite: Enrollment in BSA Design + Research concentration; Corequisite: ARCH481 Structures I. Please refer to the Design Studio Grade Requirement on page B-22 regarding the final grade for this course. Day Course.
- ARCH467 D+T STUDIO III: TECTONICS 0-12-6**
- A series of design projects are explored with an emphasis on the integration of structural systems and building envelope. Prerequisite: Enrollment in BSA Design + Technology concentration; Corequisite: ARCH481 Structures I, ARCH528 Environmental Systems. Please refer to the Design Studio Grade Requirement on page B-22 regarding the final grade for this course. Day Course.
- ARCH469 D+C STUDIO III: TECTONICS 0-12-6**
- A series of design projects are explored with an emphasis on the integration of structural systems and building envelope. Prerequisite: Enrollment in BSA Design + Culture concentration; Corequisites: ARCH481 Structures I and ARCH528 Environmental Systems. Please refer to the Design Studio Grade Requirement on page B-22 regarding the final grade for this course. Day Course.
- ARCH472 HISTORY OF BOSTON ARCHITECTURE 4-0-4**
- Study of the architectural and urban developments of the City of Boston from the seventeenth century to the present. Selected readings, lectures, and visits to historic sites are included. Prerequisite: Junior status or above in BSA. Day Course.
- ARCH474 AMERICAN CULTURAL LANDSCAPES 4-0-4**
- Students explore the idea of cultural landscapes and the theory and practice of cultural landscape studies. Prerequisite: Junior status or above in BSA. Day Course.
- ARCH479 BUILDING GREEN: SUSTAINABLE DESIGN 4-0-4**
IN DETAIL
- Through lectures, case studies and the investigation of materials and construction details, this course will focus on a tectonic understanding of sustainable design. Students will research built examples of ‘green’ architecture and study their construction through specific system and detail models. Junior status or above in BSA. Day Course.

and environmental systems in projects of different scales to investigate the integration of design. Prerequisite: Enrollment in BSA Design + Technology concentration, ARCH467 D+T Studio III: Tectonics; Corequisite: ARCH482 Site Planning and Landscape and ARCH531 Structures II. Please refer to the Design Studio Grade Requirement on page B-22 regarding the final grade for this course. Day Course.

ARCH519 D+C STUDIO IV: SITE & ENVIRONMENT 4-12-6

Architectural design issues of materials, structure and environmental systems relative to specific sites and programs are emphasized in this studio. Students design site, landscape and environmental systems in projects of different scales to investigate the integration of design. Prerequisite: Enrollment in BSA Design + Culture concentration, ARCH469 D+C Studio III: Tectonics; Corequisite: ARCH482 Site Planning and Landscape and ARCH531 Structures II. Please refer to the Design Studio Grade Requirement on page B-22 regarding the final grade for this course. Day Course.

ARCH525 ARCHITECTURAL ANALYSIS 4-0-4

Students analyze a number of significant historic and contemporary architectural works through the medium of drawing. The course exposes students to a variety of presentation drawing techniques and their appropriate use as analytical tools. The course includes field trips to a number of the studied works. Junior status or above in BSA. Day Course.

ARCH528 ENVIRONMENTAL SYSTEMS 3-0-3

This course will study mechanical, electrical, heating, ventilating and air conditioning systems, including equipment selection, energy issues, code requirements, environmental conservation and sustainable design. Corequisite: ARCH516 D+R Studio IV: Site and Environment; or ARCH467 D+T Studio III: Tectonics; or ARCH469 D+C Studio III: Tectonics. Day Course.

ARCH531 STRUCTURES II 3-0-3

Students analyze more complex systems and design beams and columns in wood, steel and concrete. Topics include analysis of continuous beams and rigid frames, loads on structural systems, grids & pattern layout and funicular structures (cables and arches). Prerequisite: ARCH481 Structures I. Day Course.

ARCH537 PROJECT PLANNING 4-0-4

This course is a hands-on study of the planning process for a complex design project. It examines the many options and decisions involved in project delivery through each phase of a project from schematic design through construction administration. Students develop comprehensive plans for projects and firms. Prerequisite: Junior status or above in BSA. Day Course.

ARCH541 HISTORY OF ARCHITECTURE IV 4-0-4

Through lectures and readings, students explore issues of contemporary architectural

and technological thought from 1965 to present. Prerequisite: Junior status or above in BSA. Day Course.

ARCH551 URBAN DESIGN AND PLANNING 3-0-3

This course presents a broad overview of cities and urban form. Physical, political, social and technological issues are considered, in both historical and contemporary examples. Prerequisite: Senior status in BSA, Design + Research or Design + Culture concentration. Day Course.

ARCH552 INNOVATIONS IN URBAN HOUSING DESIGN 4-0-4

This course is a survey and analysis of the design and new architecture of urban housing, with focus on urban communities and affordable housing. Topics include social theory, culture of communities, new architectural design precedents, and the implementation of affordable housing to urban communities. Prerequisite: Junior status or above in BSA. Day Course.

ARCH556 D+R STUDIO V: COMPREHENSIVE 0-12-6
COMMUNITY DESIGN

Students develop highly detailed design proposals, integrating structure, mechanical systems, building envelope and other major building systems with the framework of well-articulated design intentions. Housing and community design are studied through the development of mediumsized urban projects. Site design, building technology, community planning and social issues in design are addressed. Prerequisite: Senior status in BSA Design + Research concentration, ARCH516 D+R Studio IV: Site & Environment. Please refer to the Design Studio Grade Requirement on page B-22 regarding the final grade for this course. Day Course.

ARCH565 AMERICAN ARCHITECTURE 4-0-4

The history of architecture in the United States from the 17th century colonial beginnings to the early 20th century. Topics include: European influence, the progression from housewright/craftsman to ‘gentleman-architect’ to professionalism; and distinctively American contributions to design and construction, from balloon framing to the skyscraper. Field trips will be taken, primarily in the Boston area, to inspect significant examples of historic buildings in New England. Prerequisite: Junior status or above in BSA. Day Course.

ARCH566 LATIN AMERICAN ARCHITECTURE 4-0-4
AND LANDSCAPE

Advanced architecture students are introduced to the diversity and richness of Latin American social and natural landscape and the avant-garde architecture produced in the second half of the 20th century. Prerequisite: Junior status or above in BSA. Day Course.

ARCH567 D+T STUDIO V: COMPREHENSIVE 0-12-6
COMMUNITY DESIGN

Students develop highly detailed design proposals, integrating structure, mechanical systems, building envelope and other major building systems with the framework of well-articulated design intentions. Prerequisite: Senior status in BSA Design + Technology concentration, ARCH517 D+T Studio IV: Site & Environment. Please refer to the Design Studio Grade Requirement on page B-22 regarding the final grade for this course. Day Course.

ARCH569 D+C STUDIO V: COMPREHENSIVE 0-12-6
COMMUNITY DESIGN

Students develop highly detailed design proposals, integrating structure, mechanical systems, building envelope and other major building systems with the framework of well-articulated design intentions. Prerequisite: Senior status in BSA Design + Culture concentration, ARCH519 D+C Studio IV: Site & Environment. Please refer to the Design Studio Grade Requirement on page B-22 regarding the final grade for this course. Day Course.

ARCH590 SPECIAL TOPICS IN ARCHITECTURE 4-0-4

This course investigates a topic of special interest to faculty and students that is outside regular course offerings. Prerequisite: Consent of instructor. Day Course.

Recent Special Topics (ARCH590) course offerings include:

ADVANCED DIGITAL REPRESENTATION

This course encourages students to explore both new and conventional forms of graphic representation in architecture. Focusing on innovative presentation techniques, students will diagram, map, record and render using video, audio, and computer-generated models and images. Prerequisite: Junior status or above in BSA. Day Course.

ARCHITECTURAL PERCEPTION AND COMMUNICATION

This elective course is a drawing-based course that will examine architecture in detail through freehand drawing. Pencil, pen and limited color drawing media will be explored. Prerequisite: Junior status or above in BSA. Day Course.

ARCHITECTURE RENDERING: COLOR TECHNIQUES

This introductory course in architectural rendering exploring various color media including watercolor, marker and color pencil provides the student with a better understanding of the use of color as it pertains to architectural presentation techniques. Prerequisite: Junior status or above in BSA. Day Course.

**BOOKS ABOUT BUILDING: HISTORY OF
ARCHITECTURE LITERATURE**

Students will investigate the surviving writings on the theory and practice of

architecture, beginning with the earliest examples (the De Architecture of Vitruvius and the comments of ancient writers on the subject). The Medieval phase and the Renaissance will be examined along with writings from Manetti's life of Brunelleschi through the published (and often illustrated) treatises of Alberti, Selio, Palladio, and Vignola. Prerequisite: Junior status or above in BSA. Day Course.

BOSTON, THE CITY AND THE SEA

Using site visits, photography, documentation, and graphic analysis, this course will focus on the interwoven relationship of water, land, architecture, and urban design in Boston's present and recent history. Students will experience the city through on-site explorations in the formation of the city, evolving building forms and urban spaces, and the cultural significance of the architecture. Prerequisite: Junior status or above in BSA. Day Course.

COMPUTER-BASED DESIGN, ANALYSIS AND DRAWINGS

This course examines the ability of today's designers to prepare preliminary sketches, present schematic solutions, prepare preliminary design, perform structural analysis and design, prepare drawings and presentations using only computer software packages. Students proceed from schematic design, through analysis and then to construction drawings using different computer software packages without using any paper tools. Prerequisite: Junior status or above in BSA. Day Course.

CONCEPTUALIZATION THROUGH PAINTING

Using the medium of painting, students will analyze and diagram precedent studies, and discover the role of abstraction in art and architecture. They will then use abstraction through the painting medium for conceptualization. Prerequisite: Junior status or above in BSA. Day Course.

CONTEMPORARY LANDSCAPE THEORY

This course provides an overview of Western landscape architecture theory starting with its roots in 18th Century Europe and continuing to the present day. Prerequisite: Junior status or above in BSA. Day Course.

DESIGN ANALYSIS

Through readings, analysis and diagramming, students discover the role of abstraction in architecture. By analyzing and diagramming precedent studies, students will see principles in architecture that go across history and style. These ideas will be presented through various media (two dimensional, three dimensional, and time-based). Prerequisite: Junior status or above in BSA. Day Course.

EMERGENCY STRUCTURES

This course investigates nomadic design, postwar architecture, emergency and homeless shelters, and transitional dwellings. Through case studies, research and a final design problem, the course focuses on developing innovative strategies and techniques in the production of emergency shelters. Prerequisite: Junior status or above in BSA. Day Course.

FOUND DESIGN REFERENCE

The consideration of design references found in the study of the un-built environment, observed in work of notable artists, authors, and philosophers. Students progress from the abstraction and intensification of found form to the projection of architectural form. Prerequisite: Junior status or above in BSA. Day Course.

GENERATIVE FORCES IN DIGITAL ARCHITECTURE

This course is directed towards advanced CAD users with a working knowledge of FormZ. Beginning with simple explorations into existing topographical conditions, students will explore the possibilities of using the software to generate new and emergent forms. These forms will then be organized into verifiable structures that can be expressed as a new architectural typologies. Prerequisite: Junior status or above in BSA. Day Course.

ITALY

Students explore historic Italian cities and their relationship to urban design and the architectural design of selected buildings, in order to understand their design and the culture that influenced their evolution, form and architectural expression. Prerequisite: Junior status or above in BSA. Day Course.

NON-ORTHOGONAL ARCHITECTURE

This course is an exploration into the architectural spatial potential of non-orthogonal structure as found in nature and a translation of that spatial structure to buildable architectural form. Prerequisite: Junior status or above in BSA. Day Course.

PRECEDENT AND INVENTION

As a practice, the work of an architect is founded on the previous work of others. This course explores how precedent and invention are inherent to architectural production. Prerequisite: Junior status or above in BSA. Day Course.

SCANDINAVIA

Students examine a broad range of architecture, landscape and urban design topics through daily site explorations of selected buildings and urban fabric. Scandinavia's rich architectural history is experienced firsthand, through on-site observation and documentation. Special emphasis is placed on the

evolution of Nordic building traditions, materials and technology.
Prerequisite: Junior status or above in BSA. Day Course.

SECOND MODERNITY

This course will explore early and recent modern architecture to test a thesis that we are entering a new era characterizable as a second modern movement.
Prerequisite: Junior status or above in BSA. Day Course.

SWITZERLAND

Students will explore a range of selected buildings throughout Switzerland to understand the architectural systems utilized there. The architecture and systems will be analyzed through on-site observation and documentation.
Prerequisite: Junior status or above in BSA. Day Course.

VERNACULAR ARCHITECTURE

Students explore the roots of human habitation, which were developed pragmatically through the influences of climate, site, available materials, known technologies and local culture, but without the benefit of architects. This wide variety of shelter spans the globe and serves to demonstrate the importance of these basic factors to good architectural design. Prerequisite: Junior status or above in BSA. Day Course.

ARCH604 D+T HISTORY OF ARCHITECTURE II 3-0-3

This course introduces students to the social and cultural history of building technologies and their consequences in the built environment. Students gain a historical understanding of the importance of architectural technology and an awareness of how this technology is socially and culturally grounded. Prerequisite: Senior status in BSA Design + Technology concentration. Day Course.

ARCH606 D+C HISTORY OF ARCHITECTURE II 3-0-3

This course familiarizes students with the idea of cultural landscape - the physical spaces created by and used by humans and the way that humans think about those spaces. Students are exposed to the theory and practice of cultural landscape studies through lectures, readings and critical discussion. Prerequisite: Senior status in BSA Design + Culture concentration. Day Course.

ARCH605 ALVAR AALTO SEMINAR AND WORKSHOP 4-0-4

This course surveys the breadth of Alvar Aalto's oeuvre, examines his influences, and investigates his design processes. Weekly lectures, seminars and workshops engage the student in an active study of this important master of 20th Century architecture. Prerequisite: Junior status or above in BSA. Day Course.

ARCH615 LOUIS I. KAHN: ARCHITECTURE AND TECHNOLOGY 4-0-4

This course investigates the relationship between significant architectural ideas and the

development - sometimes invention - of cutting-edge technology in the work of Louis I. Kahn. Prerequisite: Junior status or above in BSA. Day Course.

ARCH617 PERFORMATIVE DESIGN 3-0-3

This course explores both the philosophic and tectonic aspects of performative building design, such as sustainability and building envelope design. Topics are investigated through lectures, class discussions, and research projects as well as local building tours and contact with professionals currently working in the field. Prerequisite: Senior status in BSA Design + Technology concentration. Day Course.

ARCH622 TRANSFORMATIONS IN 4-0-4
CONTEMPORARY ARCHITECTURE

This seminar studies the work of architects from the last decade to illustrate a range of approaches to conceiving and making buildings. Themes focus on the transformation of architectural practice in the face of contemporary global cultures. Prerequisite: Junior status or above in BSA. Day Course.

ARCH625 PROFESSIONAL PRACTICE I: 4-0-4
CONTRACT DOCUMENTS

Students gain a detailed understanding of building construction through the development of a set of construction documents (computer-generated drawings and project specifications) for a moderate-sized project. Prerequisite: Senior status in BSA. Day Course.

ARCH627 FUNDAMENTALS OF DESIGN FINANCE 4-0-4

An overview of financial tools and the management of money as it applies to the design professions. Topics include fundamentals of cash management, leveraging options, investments, design fee management, project development financing and current economic trends. Prerequisite: Junior status or above in BSA. Day Course.

ARCH656 D+R STUDIO VI: COMMUNITY 0-12-6
COMPREHENSIVE DESIGN

Housing and community design are studied through the development of medium-sized urban projects. Site design, building technology, community planning and social issues in design are addressed. Students develop highly detailed design proposals, integrating structure, mechanical systems, building envelope and other major building systems with the framework of well-articulated design intentions. Prerequisite: ARCH556 D+R Studio V: Community Design and senior status in BSA Design + Research concentration. Please refer to the Design Studio Grade Requirement on page B-22 regarding the final grade for this course. Day Course.

ARCH667 D+T STUDIO VI: COMMUNITY 0-12-6
COMPREHENSIVE DESIGN

Housing and community design are studied through the development of medium-sized

ARCH919 D+C STUDIO VII: SPECIAL TOPICS 0-12-6
This studio addresses topics relevant to the Fifth Year concentration in Design + Culture. Students integrate the major architectural issues emphasized in the previous studios in a single design project. Prerequisite: 5th year status in Design and Culture concentration, ARCH669 D+C Studio VI: Comprehensive Design; Corequisite: ARCH929 D+C Theory and Methods, ARCH939 D+C Thesis Preparation. Please refer to the Design Studio Grade Requirement on page B-22 regarding the final grade for this course. Day Course.

ARCH926 D+R THEORY AND METHODS 4-0-4
Students are introduced to a range of issues in the analysis of architecture. This course examines theoretical underpinnings and methodology pertinent to the Design + Research concentration. Prerequisite: 5th year status in Design + Research concentration; Corequisite: ARCH916 D+R Studio VII: Special Topics, and ARCH936 D+R Thesis Preparation. Day Course.

ARCH927 D+T THEORY AND METHODS 4-0-4
Students are introduced to a range of issues in the analysis of architecture. This course examines theoretical underpinnings and methodology pertinent to the Design + Technology concentration. Prerequisite: 5th year status in Design + Technology concentration. Corequisite: ARCH917 D+T Studio VII: Special Topics, and ARCH937 D+T Thesis Preparation. Day Course.

ARCH929 D+C THEORY AND METHODS 4-0-4
Students are introduced to a range of issues in the analysis of architecture. This course examines theoretical underpinnings and methodology pertinent to the Design + Culture concentration. Prerequisite: 5th year status in Design + Culture concentration; Corequisite: ARCH919 D+C Studio VII: Special Topics, and ARCH939 D+C Thesis Preparation. Day Course.

ARCH936 D+R THESIS PREPARATION 4-0-4
Students propose individual design projects and conduct relevant research including history/theory/precedents, site analysis, program and pre-design planning, in preparation for ARCH956 D+R Studio VIII: Thesis. Prerequisite: 5th year status in Design + Research concentration; Corequisite: ARCH916 D+R Studio VII: Special Topics, and ARCH926 D+R Theory and Methods. Day Course.

ARCH937 D+T THESIS PREPARATION 4-0-4
Students propose individual design projects and conduct relevant research including history/theory/precedents, site analysis, program and pre-design planning, in preparation for ARCH967 D+T Studio VIII: Thesis. Prerequisite: 5th year status in Design + Technology concentration; Corequisite: ARCH917 D+T Studio VII: Special Topics, and ARCH927 D+T Theory and Methods. Day Course.

ARCH939 D+C THESIS PREPARATION 4-0-4
Students propose individual design projects and conduct relevant research including history/theory/precedents, site analysis, program and pre-design planning, in preparation for ARCH969 D+C Studio VIII: Thesis. Prerequisite: 5th year status in Design + Culture concentration; Corequisite: ARCH919 D+C Studio VII: Special Topics, and ARCH929 D+C Theory and Methods. Day Course.

ARCH956 D+R STUDIO VIII: THESIS 0-12-6
Students pursue individual design projects, as developed during the fall semester in ARCH936 D+R Thesis Preparation. Analysis, programming, concept, design development, tectonic studies, history / theory / precedent and architectural methodology are synthesized in a final project design. Prerequisite: 5th year status in Design + Research; ARCH916 D+R Studio VII: Special Topics, ARCH926 D+R Theory and Methods, and ARCH936 D+R Thesis Preparation; Corequisite: ARCH976 D+R Advanced Topics. Please refer to the Design Studio Grade Requirement on page B-22 regarding the final grade for this course. Day Course.

ARCH967 D+T STUDIO VIII: THESIS 0-12-6
Students pursue individual design projects, as developed during the fall semester in ARCH937 D+T Thesis Preparation. Analysis, programming, concept, design development, tectonic studies, history/theory/precedent and architectural methodology are synthesized in a final project design. Prerequisite: 5th year status in Design + Technology; ARCH917 D+T Studio VII: Special Topics, ARCH927 D+T Theory and Methods, and ARCH937 D+T Thesis Preparation; Corequisite: ARCH977 D+T Advanced Topics. Please refer to the Design Studio Grade Requirement on page B-22 regarding the final grade for this course. Day Course.

ARCH969 D+C STUDIO VIII:THESIS 0-12-6
Students pursue individual design projects, as developed during the fall semester in ARCH939 D+C Thesis Preparation. Analysis, programming, concept, design development, tectonic studies, history/theory/precedent and architectural methodology are synthesized in a final project design. Prerequisite: 5th year status in Design + Culture; ARCH919 D+C Studio VII: Special Topics, ARCH929 D+C Theory and Methods, and ARCH939 D+C Thesis Preparation; Corequisite: ARCH979 D+C Advanced Topics. Please refer to the Design Studio Grade Requirement on page B-22 regarding the final grade for this course. Day Course.

ARCH976 D+R ADVANCED TOPICS 4-0-4
This course addresses topics relevant to the Design + Research concentration. Readings, discussion and analytical projects address contemporary issues in the field. Prerequisite: 5th year status in Design + Research, ARCH916 D+R Studio VII: Special Topics, ARCH926 D+R Theory and Methods, and ARCH936 D+R Thesis Preparation; Corequisite: ARCH956 D+R Studio VIII: Thesis. Day Course.

ARCH977 D+T ADVANCED TOPICS 4-0-4

This course addresses topics relevant to the Design + Technology concentration. Readings, discussion and analytical projects address contemporary issues in the field. Prerequisite: 5th year status in Design + Technology, ARCH917 D+T Studio VII: Special Topics, ARCH927 D+T Theory and Methods, and ARCH937 D+T Thesis Preparation; Corequisite: ARCH967 D+T Studio VIII: Thesis. Day Course.

ARCH979 D+C ADVANCED TOPICS 4-0-4

This course addresses topics relevant to the Design + Culture concentration. Readings, discussion and analytical projects address contemporary issues in the field. Prerequisite: 5th year status in Design + Culture, ARCH919 D+C Studio VII: Special Topics, ARCH929 D+C Theory and Methods, and ARCH939 D+C Thesis Preparation; Corequisite: ARCH969 D+C Studio VIII: Thesis. Day Course.

ARIOCH CENTER FOR PROFESSIONAL EDUCATION

ACPE650 INDEPENDENT STUDY 2-4-4

This capstone course is for senior-level students to pursue individual or group research and/or projects that will demonstrate a comprehensive understanding and competency in their selected discipline. Prerequisites: Fifth-year ACPE status (a minimum of 104 earned credits with a 2.0 GPA) and permission of the ACPE Dean. Contact your ACPE academic advisor for a copy of the required format and conditions. ACPE Course.

BIOLOGY COURSES

BIOL 110 GENERAL BIOLOGY I 3-2-4

Introduces basic principles of biology, including cell structure and function, and metabolism; genetics; reproduction; theories of evolution; classifications of organisms; plant form and function, animal form and function; community ecology and ecosystems dynamics. Emphasis placed on scientific inquiry. Day Course.

BIOL 120 GENERAL BIOLOGY II 3-2-4

Introduction to the evolution, biology and classification of vertebrates, including fish, amphibians, reptiles, birds and mammals. A comparative approach will be used to examine the respiratory, circulatory, endocrine, skeletal, nervous reproductive and digestive systems of vertebrates. Emphasis on evolution, speciation, behavior, spatial patterns, migration. Communications, thermal adaptations, communication, coloration and behavior of vertebrates may be emphasized. Lecture and laboratory components are included. Prerequisite: BIOL 110 General Biology. Day Course.

BIOMEDICAL COURSES

BMED260 PHYSIOLOGY FOR ENGINEERS I 3-2-4

Provides the foundations of biochemistry, cell metabolism, reproduction and genetics,

microorganisms, cells as organ subsystems, cells' interaction with the environment. Will include laboratory projects and simulations. Prerequisites: MATH280 Calculus I; PHYS310 Engineering Physics I; CHEM100 Chemistry I. Day Course.

BMED460 PHYSIOLOGY FOR ENGINEERS II 3-2-4

Covers human physiology and anatomy, comparative physiology, the mechanism, types and prevention of diseases, and the environmental effects on human physiology. Will include laboratory projects and simulations. Prerequisite: BMED260 Physiology for Engineers I. Day Course.

BMED660 BIOMEDICAL SYSTEMS ENGINEERING 2-4-4

Covers biomedical modeling, design, applications: instrumentation, clinical experiments, biostatistics, ethics, biomechanics, biomaterials, bio-fluids, bioelectricity, bio-signal and image processing, physiological control systems. Will include laboratory projects and simulations. Prerequisite: Fifth-year status in BELM and BMED460 Physiology for Engineers II. Day Course.

BUILDING CONSTRUCTION COURSES

BLDG150 CONTRACTS AND CODES 2-2-4

A comprehensive study of construction contracts including conditions of agreement and modifications. Students analyze the Massachusetts State Building Code as it applies to buildings. Prerequisites: BLDG155 Construction Methods or CCEV115 Construction Graphics; or ARCH201 Contract Drawing and Methods II. ACPE Course.

BLDG155 CONSTRUCTION METHODS 3-2-4

A detailed study of current methods and equipment used in timber, masonry and steel construction. Laboratory exercises emphasize plan reading. ACPE Course.

BLDG200 CONSTRUCTION ESTIMATING 2-2-4

The fundamentals of construction estimating are covered. Quantity surveys are made for various building components and prices determined for labor and materials, using a current pricing handbook. Standard estimators' forms are prepared. Computer techniques and applications are also examined. Prerequisites: BLDG155 Construction Methods, BLDG420 Construction Operations and CCEV115 Construction Graphics. ACPE Course.

BLDG210 CONCRETE CONSTRUCTION METHODS 2-4-4

An introduction to reinforced concrete buildings with concentration on mix design and complete applications according to the ACI Standard Code, with emphasis on laboratory testing practices of fresh and hardened concrete. Prerequisites: BLDG155 Construction Methods; and ARCH145 Architectural CADD or CCEV115 Construction Graphics. ACPE Course.

BLDG420 CONSTRUCTION OPERATIONS 3-2-4

Materials handling in heavy construction. The selection and application of heavy construction equipment including equipment productivity and cost. Prerequisite: BLDG155 Construction Methods. ACPE Course.

CHEMISTRY COURSES

CHEM100 CHEMISTRY I 3-2-4

This is a course designed to relate the fundamental principles of chemistry with industrial and contemporary applications. Topics will include: the atomic model and theory, chemical bonding, balancing chemical reactions, stoichiometry, chemical equilibrium, acid and base reactions, properties of solutions, oxidation and reduction. Laboratory will correlate with lecture material. Corequisite: MATH205 College Mathematics I or MATH265 Engineering Mathematics. Day Course.

CHEM110 CHEMISTRY A 2-2-3

This course will introduce the students to basic concepts in chemistry through contemporary applications. Topics will include atomic model and periodic chart, solutions, chemical formulas, balancing chemical reactions, and acids and bases. Laboratory sessions illustrate principles. Prerequisite: MATH225 College Math A. ACPE Course.

CHEM150 CHEMISTRY II 3-2-4

This course is a continuation of CHEM100 Chemistry I. Emphasis will be placed on environmental applications. Topics include weak acid/base solutions and buffer systems; solubility and pH problems in water and wastewater analysis; chemical thermodynamics and equilibrium; chemical kinetics; rate laws and decay/degradation processes; electrochemistry; chemistry of the atmosphere; introduction to organic chemistry. Laboratory experiments will illustrate or correlate with lecture topics. Prerequisite: CHEM100 Chemistry I; Corequisite: MATH250 Precalculus. Day Course.

CHEM205 CHEMICAL HEALTH AND SAFETY 3-0-3

The course will focus on the requirements and implications of the OSHA Laboratory Standard, Hazard Communication Standard, and related topics. Prerequisite: CHEM100 Chemistry I, CHEM360 Chemistry I or equivalent. Day Course.

CHEM250 CONSUMER HEALTH AND SAFETY 4-0-4

This course is designed for students who want to learn about the health and safety of foods and beverages, household cleaners, building materials, workplace practices, and industrial processes. The impact on environmental quality is also addressed. Day Course.

CHEM360 CHEMISTRY I 3-2-4

This is a course designed to relate the fundamental principles of chemistry with practical problems encountered in industry. Emphasis will be placed on problem-

solving. Topics include: the atomic model and theory, chemical bonding, balancing chemical reactions, simple and complex stoichiometry equilibrium, acids-bases reactions, properties of solutions, combustion, oxidation and reduction, and electrochemistry. Laboratory will correlate with lecture material. Prerequisite: MATH250 Precalculus, MATH235 College Mathematics C. Day Course.

CHEM400 ENVIRONMENTAL CHEMISTRY 2-4-4

Concepts in organic chemistry, including identification of functional groups, reactivity and synthesis. Environmental pollutants are measured and analyzed using state-of-the-art laboratory techniques. Prerequisite: CHEM150 Chemistry II. Day Course.

CHEM550 ENVIRONMENTAL CHEMISTRY 2-4-4

Concepts in organic chemistry, including nomenclature, physical properties and mobility. Organic and inorganic contaminants and materials are analyzed and evaluated using state-of-the-art laboratory techniques. Prerequisite: Senior status and CHEM150 Chemistry II. Day Course.

CIVIL, CONSTRUCTION & ENVIRONMENTAL COURSES

CCEV112 LIFE IN THE CONSTRUCTION LANE 2-2-3

This course provides an overview of the civil and construction professions, plus an introduction to problem solving, professional report writing skills, and computer skills. Prerequisite: Enrollment in BCET or BCMT. Day Course.

CCEV115 CONSTRUCTION GRAPHICS 2-4-4

The development and interpretation of civil, architectural, structural, and electrical drawings; freehand sketching of construction details and sections; computer-aided construction drafting. ACPE Course.

CCEV116 CONSTRUCTION GRAPHICS 1-6-4

The development and interpretation of civil, architectural, structural, and electrical drawings; freehand sketching of construction details and sections; computer aided construction drafting. Day Course.

CCEV136 BUILDING CONSTRUCTION 3-2-4

Survey of current materials and methods used in building construction, including building foundations; timber, concrete and steel framing systems; masonry construction; interior and exterior finishes. Day Course.

CCEV140 ELECTRICAL BUILDING SYSTEMS 2-2-3

Topics include the basic design principles and code requirements of electricity, power supply, lighting and electric power distribution in buildings. Corequisite: MATH205 College Math I and CCEV116 Construction Graphics. Day Course.

CCEV160	FUNDAMENTALS OF CONSTRUCTION	2-2-3
An overview of the operations and materials presently being used in the construction industry. Emphasis is placed on understanding common practices, materials, nomenclature, and interpretation of construction documents and plans.		
		Day Course.
CCEV201	CONSTRUCTION SURVEYING	2-4-4
Instruction is given in the theory and techniques of horizontal and vertical measurements. Laboratory exercises will focus on the application of these techniques as they relate to the building industry including construction layout and grades. Prerequisite: MATH250 Pre-calculus and CCEV116 Construction Graphics.		
		Day Course.
CCEV202	SURVEYING FOR CIVIL ENGINEERING TECHNOLOGY	2-4-4
Theory and techniques for horizontal and vertical measurements with theodolites, automatic levels, and steel tapes. Projects in linear measurements, leveling, traversing, and stadia surveys. Prerequisite: MATH250 Precalculus.		
		Day Course.
CCEV206	HEAVY CONSTRUCTION	3-2-4
Study of current methods and equipment used in heavy construction projects including highways, tunnels, bridges, dams, storm drains and sanitary sewers. Prerequisite: CCEV116 Construction Graphics.		
		Day Course.
CCEV210	STRUCTURAL MECHANICS I	3-2-4
Fundamentals of static equilibrium are applied to the analysis of beams, trusses, and frames. Free bodies, shear and moment diagrams, and sectional area properties are covered. Prerequisite: MATH250 Precalculus; PHYS210 College Physics I. Corequisite: MATH280 Calculus I.		
		Day Course.
CCEV225	CODES AND SPECIFICATIONS	2-2-3
An overview of the role that codes and specifications play in the construction process with a detailed examination of selected articles from the Massachusetts State Building Code. Prerequisite: CCEV160 Fundamentals of Construction, or CCEV136 Building Construction.		
		Day Course.
CCEV230	INTRODUCTION TO DESIGN PRINCIPLES	3-2-4
The design of simple building elements including beams, columns, joists and trusses in wood, steel and reinforced concrete. ACI and AISC codes will be studied. Prerequisite: MECH190 Mechanics and Strength of Materials; CCEV136 Building Construction or equivalent.		
		Day Course.
CCEV235	MECHANICAL BUILDING SYSTEMS	2-2-3
Topics include the basic design principles and code requirements of plumbing and drainage systems; heating, ventilating and air-conditioning to control temperature, humidity and indoor air quality; heat and cooling calculations; and fire-protection		

systems. Prerequisite: CCEV116 Construction Graphics; and MATH 205 College Math I.
Day Course.

CCEV242 STATICS AND STRENGTH OF MATERIALS 3-2-4
This course covers the fundamental concepts of structural static; forces, moments, equilibrium, support conditions, and free body diagrams; and the fundamentals of strength of materials: properties, stress, strain, shear, bending, and torsion. Prerequisite: MATH250 Pre-calculus; and PHYS210 College Physics.
Day Course.

CCEV265 ESTIMATING 3-2-4
Topics include the basic manual and computer-aided skills for estimating a variety of projects and developing takeoffs for all trades. Prerequisite: CCEV116 Construction Graphics and CCEV136 Building Construction.
Day Course.

CCEV295 SPECIAL TOPICS 1-4-3
This course explores selected topics of interest to students and faculty. It may include lectures, readings, laboratory experiences, field trips, and design or research projects as appropriate. Offered only on demand. Prerequisite: Consent of the instructor. Day Course.

CCEV300 SURVEYING II 2-4-4
Instruction in traverse calculations, coordinates, area determination, horizontal and vertical curve computations, and earthwork volumes. Field projects in curve layout, slope staking, profiling, and volume measurements by cross-section and contour methods. Computers will be used to solve problems and verify hand solutions. Prerequisite: CCEV202 Surveying for Civil Engineering Technology.
Day Course.

CCEV310 STRUCTURAL MECHANICS II 2-2-3
Study of internal stresses induced by external loads on beams, trusses, and frames. Discussion includes sectional properties, stress-strain behavior, column buckling, combined stresses, and Mohr's circle. Concepts are illustrated through student participation in laboratory tests. Prerequisite: CCEV210 Structural Mechanics I.
Day Course.

CCEV350 ENVIRONMENTAL TOPICS FOR DESIGN 3-0-3
AND CONSTRUCTION INDUSTRY
This is a survey course covering most of the environmental topics of concern to Civil Engineers: energy use, groundwater and surface water, solid waste and recycling, and air, noise and radiation pollution. Prerequisite: CCEV112 Life in the Construction Lane.
Day Course.

CCEV355 BASIC BUILDING SERVICES 3-2-4
Examines the basic building services, including heating, water, plumbing, drainage, ventilation, air-conditioning, vertical transportation, acoustical control, electrical controls, and associated building code requirements.
ACPE Course.

- CCEV360 MATERIALS TESTING AND QUALITY CONTROL 2-4-4**
Aggregate, concrete, asphalt, wood and masonry are tested using ASTM procedures to establish design criteria, inspection and quality control programs. Prerequisite: CHEM100 Chemistry I. Day Course.
- CCEV365 SOILS AND FOUNDATIONS 2-2-3**
The basic principles of soil mechanics and their application to the solutions of problems in earthwork and foundation engineering. Prerequisite: MATH250 Precalculus; and PHYS210 College Physics. Day Course.
- CCEV402 WOOD AND STEEL ANALYSIS AND DESIGN 3-2-4**
This course covers the properties of wood and steel products used in construction. The basic design principles for timber and steel structures are covered including connections, beams, columns, trusses, and frames. Prerequisite: CCEV242 Statics and Strength of Materials. Day Course.
- CCEV405 DYNAMICS 3-0-3**
A study of particles and rigid bodies in rectilinear and curvilinear motion including Newton's laws of motion, work and energy, impulse and momentum. Prerequisite: CCEV210 Structural Mechanics I. Day Course.
- CCEV406 CONSTRUCTION PROJECT SCHEDULING 2-2-3**
Topic items include project network planning, scheduling and cost control models. Computer applications to PERT and CPM will be explored and used by the student. Prerequisite: CCEV265 Estimating. Day Course.
- CCEV410 CONSTRUCTION PROJECT MANAGEMENT 3-2-4**
Covers feasibility studies, site selection, planning, programming, risk allocation, client relationships, project reporting, design coordination, and contracting procedures. Prerequisite: Junior status in BCMT program. Day Course.
- CCEV417 DESIGN FOR THE ENVIRONMENT 4-0-4**
Concepts and innovative technologies associated with sustainable development and life cycle assessments. Topics include design, construction, maintenance of environmentally beneficial buildings and interiors, material selection, recycling of construction waste, energy conservation and landscaping. Day Course.
- CCEV430 ADVANCED ESTIMATING AND BID ANALYSIS 3-2-4**
Detailed cost estimates including quantity takeoffs, labor/material pricing, overhead/profit. Also, included are the preparation of preliminary budgets; factors affecting construction cost, bid strategies and computer applications are explored. Prerequisite: CCEV265 Estimating. Day Course.

- CCEV440 APPLIED FLUID MECHANICS 3-2-4**
A study of the basic characteristics of fluids. Topics include physical and gravimetric properties, hydrostatic pressure, buoyancy, fluid flow, the application of energy, momentum, and continuity equations. Prerequisites: MATH290 Calculus II. and CCEV310 Structural Mechanics II. Day Course.
- CCEV450 HYDRAULICS AND DRAINAGE 3-2-4**
Introduction to basic hydrostatics, fundamental concepts of fluid flow in pipes and open channels, methods of estimating storm runoff, size determination of culverts, storm sewers, and open channels. Prerequisites: MECH190 Mechanics and Strength of Materials or CCEV310 Structural Mechanics II; and MATH290 Calculus II. Day Course.
- CCEV455 HYDRAULIC DESIGN 3-2-4**
Principles of hydraulics applied to common civil engineering projects. Topics include laminar and turbulent flow, energy losses in pipes, piping systems, pumps and turbines, and open channel flow. Prerequisite: CCEV440 Applied Fluid Mechanics. Day Course.
- CCEV460 HIGHWAY AND PAVEMENT DESIGN 2-4-4**
Introduction to highway design principles, including environmental impact, horizontal and vertical alignment studies, interchanges, earthwork, drainage, rigid and flexible pavement design. Extensive computer applications. Prerequisites: CCEV116 Construction Graphics; CCEV360 Materials Testing and Quality Control; CCEV455 Hydraulic Design; CCEV300 Surveying II. Day Course.
- CCEV472 STRUCTURAL ANALYSIS 3-2-4**
The study of statically determinate and indeterminate structures including: stability analysis; influence lines; maximum positive moment; an Energy Method to determine deflections; Moment Distribution; an Energy Method to determine a redundant reaction or support settlement. Prerequisite: CCEV310 Structural Mechanics II. Day Course.
- CCEV473 CONCRETE ANALYSIS AND DESIGN 3-2-4**
Topics include the design principles for reinforced concrete structures covering beams, columns, slabs, footings and retaining walls. Prerequisite: CCEV242 Statics and Strength of Materials. Day Course.
- CCEV480 SOIL MECHANICS 3-2-4**
Study of the characteristics and behavior of soil as it relates to the design and construction of civil engineering projects. Topics include compaction, seepage, subsurface stress, shear strength and settlement. Lab sessions are devoted to testing soil samples for relevant properties. Prerequisite: CCEV310 Structural Mechanics II; CCEV440 Applied Fluid Mechanics. Day Course.
- CCEV490 INTRODUCTION TO STRUCTURAL DESIGN 2-4-4**
An introduction to the design of simple beams, columns and tension members, using structural steel and reinforced concrete. Ultimate strength concepts of both the ACI and

AISC codes are emphasized. Prerequisite: CCEV472 Structural Analysis. Day Course.

CCEV510 STRUCTURAL STEEL DESIGN 2-2-3

Structural steel is used in the design of tension, compression and flexural members and their connections. Design for combined stress is also introduced. The LRFD philosophy is employed throughout. Prerequisite: CCEV472 Structural Analysis. Day Course.

CCEV550 CONSTRUCTION SCHEDULING AND CONTROL 3-2-4

Introduces common scheduling tools, including critical path method and bar charts as an aid in project planning, budgeting, and cost control. Also introduces the gathering, processing, and evaluation of project information for effective project control. Prerequisite: CCEV260 Construction Estimating and Scheduling. Day Course.

CCEV555 FOUNDATION DESIGN AND CONSTRUCTION 2-4-4

This course presents the principles of shallow and deep foundation design. Conditions where shallow foundations are not appropriate are reviewed as is selection of appropriate types of deep foundations. This course is a relevant technical elective to students who desire to pursue careers in heavy construction and design. Day Course.

CCEV562 EARTHWORK DESIGN AND CONSTRUCTION 2-2-3

Design and construction of earth-related structures, such as dams, embankments, slopes, bulkheads, excavations and retaining walls. Topics include lateral earth pressures, stability, compaction, permeability, stabilization, and use of geosynthetics. Prerequisite: Junior standing; CCEV365 Soils and Foundations or CCEV480 Soil Mechanics. Day Course.

CCEV570 HIGHWAY DESIGN AND CONSTRUCTION 2-2-3

Introduces the design of highways and the associated construction methods, operations, maintenance, and rehabilitation. Prerequisite: CCEV115 Construction Graphics; CCEV300 Surveying II and CCEV360 Materials Testing and Quality Control; Corequisite: CCEV450 Hydraulics and Drainage. Day Course.

CCEV575 MUNICIPAL PLANNING 2-4-4

Study of the regulations and engineering principles involved in the planning and development of residential and commercial sites and subdivisions. Topics include zoning, subdivision regulations and design, wetland protection, urban street design, sanitary sewers, storm drains, and water mains. Prerequisite: Senior status. Day Course.

CCEV580 CONSTRUCTION PROJECT CONTROL 2-2-3

Examines the activities involved in the effective management of single and multiple construction projects including basic control theory, the preparation of control models, the collection of actual production data, and the corresponding computation of project performance. Prerequisite: CCEV406 Construction Project Scheduling and CCEV430 Advanced Estimating & Bid Analysis. Day Course.

CCEV585 REINFORCED CONCRETE DESIGN 2-2-3

Introduction to the analysis and design of reinforced concrete members including beams, columns and one-way slabs. Strength and serviceability requirements are considered. Ultimate strength design provisions of the ACI code are employed. Prerequisite: CCEV470 Structural Analysis II. Day Course.

CCEV595 CONSTRUCTION BUSINESS AND FINANCE 3-2-4

Topics include construction financing during all phases of project development involving permanent loans, construction loans, sources of mortgage funds and venture capital, and tax and interest considerations. Prerequisite: MGMT390 Financial Accounting; CCEV410 Construction Project Management; Senior Standing. Day Course.

CCEV600 ENVIRONMENTAL DESIGN AND CONSTRUCTION 2-2-3

Introduces the design principles and construction techniques associated with environmental projects including waste and wastewater treatment plants, landfills, and water supply systems. Prerequisite: Senior status. Day Course.

CCEV625 CONSTRUCTION SAFETY AND RISK MANAGEMENT 2-2-3

Topics include the knowledge and skills required to effectively manage safety compliance and risks associated with construction. This course satisfies the OSHA 30-hour training requirement for graduation. Prerequisite: CCEV136 Building Construction; and CCEV206 Heavy Construction. Day Course.

CCEV630 PROFESSIONAL PRACTICE 3-0-3

An introduction to business practice including, liability issues, safety in the workplace, ethical considerations faced by technical personnel in professional practice and issues of engineering economy in civil engineering. Prerequisite: Senior status. Day Course.

CCEV645 BCMT SENIOR PROJECT 3-2-4

Students have the opportunity to explore a subject in construction management of their own choice and to present it. A final oral presentation is required. Prerequisite: Completion of preceding 7 semesters of BCMT program-this course is taken by Seniors during their last semester. Day Course.

CCEV660 BCET SENIOR DESIGN 0-8-4

Open-ended design project in which students work in teams. Oral presentations and written reports will cover alternatives considered, design assumptions, cost, safety and feasibility. Prerequisite: Completion of preceding 7 semesters of BCET program - this course is taken by Seniors during their last semester. Day Course.

CCEV670 CONSTRUCTION LAW AND GOVERNMENT REGULATIONS 4-0-4

A study of construction contracts and the contractual relationships commonly

established between owner, designer, builder and construction manager. Prerequisite: CCEV410 Construction Project Management. Day Course.

COMMUNICATION COURSES

COMM155 ORAL COMMUNICATIONS 2-2-3

Students will learn theories/practices of public speaking in various settings. Audience analysis and speech development will be considered. Students will participate in preparing/performing of a variety of oral presentations. Day Course.

COMM270 BUSINESS COMMUNICATIONS 2-2-3

This course will involve the student in the diverse aspects of business communication theories and practices, and provide instruction in understanding basic principles and the importance of appropriate and professional business communication. Students will learn to compose various communication-related correspondence expected of business and industry. Participants may also address ethical concerns as they relate to business communication. Prerequisite: Successful completion of English sequence. Students may not take both COMM270 and COMM400. Students enrolled in majors requiring COMM400 may not take this course as a general elective. Day Course.

COMM310 PROFESSIONAL COMMUNICATION 3-0-3

This course focuses on the development of professional-level written and oral communication skills. Students will learn how to conduct a meeting, do an effective oral presentation, write technical descriptions, instructions and reports, and effectively present information to their clients. Standard business formats (memo, letter, etc.) will also be reviewed. Prerequisite: ENGL105 English Composition and ENGL116 Literature and Composition. ACE Course.

COMM330 INTRODUCTION TO MASS COMMUNICATION 3-0-3

This course serves as an overview to the mass media and the process of mass communication including its historical aspects, as well as the relevance of the mass media messages that our students will face today and tomorrow. Prerequisite: Successful completion of English sequence or MGMT111 Introduction to Management. Day Sophomore Social Science Course.

COMM400 TECHNICAL COMMUNICATIONS 2-2-3

Business correspondence is reviewed. Technical description, instructions, process analysis, short and long reports, proposals, documentation and manuals are covered. Students are exposed to the latest communications technologies. Work in oral communication presentations and team projects are required. Prerequisite: Successful completion of English Sequence. Students may not take both COMM400 and COMM270. Day Course.

COMM405 NEWSWRITING AND EDITING 4-0-4

Provide basic instruction in news gathering and writing, interviewing and organizing

and reporting news. This course will also introduce students to the historical aspect and impact of the newspaper in the United States. Students will also increase awareness of the role of the journalist in determining news qualities and elements in writing and reporting news. Prerequisite: Junior Status. Day Course.

COMM430 PUBLIC RELATIONS WRITING 3-0-3

This introductory course increases awareness of the public relations (PR) field and the journalism/news process as it relates to PR, and provides basic instruction in public relations writing and communications. Prerequisite: Successful completion of English sequence and Junior status. Day Course.

COMM440 INTRODUCTION TO DESKTOP PUBLISHING 3-2-4

This course is designed to provide students with techniques and practice with desktop publishing programs. Students will learn the basics of electronic publishing in a Macintosh environment, learn to assess their hardware and software needs and review essential desktop software. Students will work with both high-end and low-end software and will produce their own deliverables. Day Course.

COMM555 ADVANCED TECHNICAL WRITING 4-0-4

This course will provide opportunities for students to master research skills for science and technology publication. They will also learn to prepare technical manuals and specifications, journal articles, abstracts, and longer reports. The ethical and practical choices in technical editing will also be explored. Prerequisites: Junior Status; COMM200 Technical Writing or COMM400 Technical Communications. Day Course.

COMM610 PUBLIC RELATIONS WRITING 4-0-4

Students will be exposed to and examine the issues and role of the Public Relations practitioner and media messages. They will also learn public relations writing/communication style which will be utilized to prepare press releases, public service announcements and other related materials. Prerequisites: Junior Status. Day Course.

COMPUTER SCIENCE COURSES

COMP112 INTRODUCTION TO COMPUTERS AND PROGRAMMING 2-2-4

A comprehensive computer literacy course. Students will master file management, visual and non-visual operating system commands and operations, as well as basic word processing, spreadsheets, and professional presentations using Microsoft Windows NT and the Microsoft Office suite of applications. Corequisite: MATH225 College Mathematics A. ACPE Course.

COMP113 INTRODUCTION TO COMPUTERS AND PROGRAMMING 2-4-4

Introductory level programming. Also trains the student to use word processing software, spreadsheet software, database management software, presentation graphics

software, and simple operating system commands. Corequisite: MATH205 College Mathematics I. Day Course.

COMP114 STRUCTURED PROGRAMMING FOR 2-2-3
ENGINEERING AND TECHNOLOGY

Provides an introduction to structured programming. Topics include the development of decision-making program structures as applied to data acquisition and system control. Day Course.

COMP116 INTRODUCTION TO PROGRAMMING 2-2-3
IN VISUAL BASIC

An introduction to problem-solving and program design using the Visual Basic language. Day Course.

COMP120 COMPUTER SCIENCE I USING C 3-2-4

(2-2-4) This course is an introduction to problem-solving and program design using the C language. Student understanding is enhanced by solving practical engineering and technical problems. Topics include: formatted and character I/O, selection and iteration control statements, logical operations for Boolean expressions, pointers and arrays, functions and bitwise operators. Prerequisite (ACPE): MATH225 College Mathematics A. Corequisite (Day): MATH205 College Mathematics I or MATH265 Engineering Mathematics. Day and ACPE Course.

COMP128 COMPUTER SCIENCE I 3-2-4

An introductory course in computerized problem solving using a structured programming language, such as C or Java. Topics include functions, selection structure, loops, data types, and arrays. Corequisite: MATH205 College Math I or Mathematics Placement Test. Day Course.

COMP165 INTRODUCTION TO COMPUTING AND 3-2-4
PROBLEM SOLVING

Students are introduced to the fundamentals of computing and problem solving, including logic, algorithms, the system development process and number representation. They will also develop study and research skills necessary to effectively master a technical discipline. Students will be exposed to a variety of topics through a series of colloquia presented by computer science faculty. Day Course.

COMP201 COMPUTER SCIENCE II 3-2-4

A continuation of COMP128 Computer Science I. Topics include strings, structs, arrays and linked lists, as well as text and binary files, recursion and dynamic allocation. Prerequisite: COMP128 Computer Science I. Day Course.

COMP218 NETWORKS, SERVICES AND 2-2-3
THE WORLD WIDE WEB

The course is an introduction to local and wide area networks including technical

aspects of the Internet and the development of web applications.

Day Course.

COMP221 COMPUTER PROGRAMMING WITH VISUAL BASIC 2-2-4

A comprehensive and accelerated introduction to the world of computer programming using the Visual Basic programming language. Students will learn Visual Basic syntax, proper programming techniques, and user interface design as they develop graphical applications. Prerequisite: COMP112 Introduction to Computers and Programming.

ACPE Course.

COMP231 COMPUTER PROGRAMMING WITH JAVA I 2-2-4

A first course in Java that will cover major syntactical elements of the Java programming language, Java virtual machines, and the Java programming environment. Proper object-oriented programming techniques and design will be emphasized. Prerequisites: COMP112 Introduction to Computers and Programming and MATH225 College Mathematics A.

ACPE Course.

COMP232 COMPUTER PROGRAMMING WITH JAVA II 2-2-4

As the second course in Java, this course will cover in depth the construction of Java-based classes and objects used to build more sophisticated Java-based applications. Elements of the Javascript language, used within Web pages, will also be introduced. Prerequisite: COMP231 Computer Programming with Java I.

ACPE Course.

COMP278 COMPUTER ARCHITECTURE 3-2-4

This course covers binary number and codes, logic elements, combinational and sequential logic, and architectural design of a computer using these elements. Prerequisite: COMP201 Computer Science II.

Day Course.

COMP285 OBJECT ORIENTED PROGRAMMING 3-2-4

This course is an introduction to object oriented programming and design. Topics include: abstraction and encapsulation, classes and objects, overloading operators and friend functions, inheritance, templates, iostream, fstream, dynamic allocation, pointer arrays, polymorphism, stacks, linked lists, and recursion. Prerequisite: COMP201 Computer Science II.

Day Course.

COMP290 OPERATING SYSTEMS CONCEPTS 3-2-4

An introduction to the fundamental concepts in modern operating systems including process management, memory management, input and output. Prerequisite: COMP201 Computer Science II.

Day Course.

COMP305 INTRODUCTION TO MULTIMEDIA 2-2-3

Covers multimedia authoring incorporating still images, video, sound and animation, an introduction to World Wide Web and HTML programming to make a home page. Prerequisite: Familiarity with Microsoft Windows or Macintosh System OS X.

Day Course.

COMP310 OBJECT ORIENTED DATA STRUCTURES 3-2-4

This course is an introduction to object oriented data structures using inheritance and template classes. Topics include: Queues, sorted linked lists, binary search trees, B+ trees, balanced trees, timing of sort and search algorithms, hash searching and indexed files, directed graphs and Dijkstra's weighted path algorithm, acyclic graphs, topological sorting and critical path analysis. Prerequisite: COMP285 Object Oriented Programming. Day Course.

COMP315 UNIX SYSTEMS ADMINISTRATION 3-2-4

Covers basic skills needed to administer a Unix system including file organization, backup, recovery, account maintenance, network design, administration, device control, security and system monitoring. Prerequisites: COMP278 Computer Architecture; COMP290 Operating System Concepts. Day Course.

COMP325 SYSTEMS ANALYSIS AND BUSINESS APPLICATIONS 3-2-4

This course covers the principle analysis, design and implementation methodologies and tools to develop business applications using the system development life cycle (SDLC). Students will gain experience in the analysis, design and development of business applications via a series of case studies. Prerequisites: COMP128 Computer Science I; Co-requisite: COMP355 Data Base Management Systems. Day Course.

COMP330 OPERATING SYSTEMS 2-2-4

Covers the functions and organization of operating systems including: Process and CPU management, input/output systems, primary memory management, resource allocation, performance, file and data management and information protection. Assembly language programs that interact with operating systems will be demonstrated. Prerequisites: COMP221 Computer Programming with Visual Basic or COMP231 Computer Programming with Java I. ACE Course.

COMP335 INTRODUCTION TO NETWORKS 2-2-4

Students will learn about computer networking hardware, protocols, software configuration, and security issues. Special segments on TCP/IP, firewall considerations, and Internet connectivity will be presented. Prerequisites: COMP221 Computer Programming with Visual Basic or COMP231 Computer Programming with Java I. ACE Course.

COMP340 COMPUTER PROGRAMMING WITH C++ 1-2-3

Intended for Java programmers, this course provides a firm foundation in the fundamentals of the C++ programming language. Topics will include C++-specific syntax and programming practices, classes, objects, common data structures, and memory management. Prerequisite: COMP232 Computer Programming with Java II. ACE Course.

COMP345 DATA BASE MANAGEMENT SYSTEMS 2-2-4

A thorough introduction to database architecture and data access. Using Access and Oracle, students will design and implement a tuned and optimized data model, which will be navigated and manipulated using SQL. Prerequisites: COMP221 Computer Programming with Visual Basic or COMP231 Computer Programming with Java I.

ACPE Course.

COMP355 DATA BASE MANAGEMENT SYSTEMS 3-2-4

An introduction to the use of data base management systems. Covers hierarchical networks and relational systems, and techniques for designing, creating, accessing and maintaining data bases. Prerequisite: COMP128 Computer Science I; Corequisite (BCNS): COMP325 Systems Analysis and Business Applications.

Day Course.

COMP362 OPERATING SYSTEMS 3-2-4

Covers the functions and organization of operating systems including: process management, input/output systems, memory management, resource allocation, data management and information protection. Prerequisites: COMP310 Object Oriented Data Structures; and COMP278 Computer Architecture.

Day Course.

COMP375 HISTORY OF COMPUTING 4-0-4

Students gain an historical understanding of the development of computer science, computing, and video games. Emphasis is placed on concomitant social, economic, and technological trends. Prerequisite: Successful completion of English sequence.

Day Course.

COMP380 DATA STRUCTURES I 2-2-4

Design and implementation of stack, queue, list, and sort algorithms. Students will model these common data structures using object oriented design principles. Implementation using Java. Prerequisites: COMP232 Computer Programming with Java II or COMP340 Computer Programming with C++.

ACPE Course.

COMP385 DATA STRUCTURES II 2-2-4

Advanced data structure topics covering Java-based programming of graphs, trees, advanced searches and sorts, and hash tables. Prerequisite: COMP380 Data Structures I.

ACPE Course.

COMP390 INTRODUCTION TO UNIX 3-2-4

UNIX fundamentals, file and directory manipulation, text editing using the vi, using pipes, redirections and filters, writing and debugging scripts, understanding processes.

Day Course.

COMP399 WEB DEVELOPMENT I 2-2-4

A thorough introduction to basic Web programming. Topics will include HTML, Web server configuration, visualization and navigation, and VB Script or Java Script based

development. Students will have the opportunity to create their own home pages.
Prerequisite: COMP231 Computer Programming with Java I. ACPE Course.

COMP400 LOCAL AND WIDE AREA NETWORKS 3-2-4

This course covers local, metropolitan, and wide area networks, topologies and transmission media, network interface and management, performance and internet-working. Laboratory exercises emphasize the hardware and software aspects of local area networks. Prerequisite: COMP218 Networks, Services and the World Wide Web and COMP285 Object Oriented Programming. Day Course.

COMP403 DATA BASE APPLICATIONS 2-2-4

This course covers the visualization and use of a relational database structure created in class. Emphasis will be placed on building graphical applications that serve as front ends to the backend Oracle database management system. Prerequisite: COMP345 Data Base Management Systems. ACPE Course.

COMP407 COMPUTER ARCHITECTURE 3-0-3

Understanding of the functions, design considerations, and relationships between the major components of a computer. Topics will include gates, microcode, data and memory addressing, buses, and micro-level communications. Prerequisites: MATH435 Discrete Mathematics and COMP231 Computer Programming with Java I or COMP340 Computer Programming with C++. ACPE Course.

COMP409 WEB DEVELOPMENT II 2-2-4

Advanced Web development topics covering Javascript programming, database interfacing using ADO, and Active Server Pages. Students will have the opportunity to further refine their home pages using advanced Web-programming techniques. Prerequisite: COMP399 Web Development I. ACPE Course.

COMP414 ALGORITHM DESIGN AND ANALYSIS 3-2-4

Students analyze the complexity of computer algorithms in terms of time and space requirements for large input sizes. Includes searching, sorting, pattern matching, hashing and encryption. Prerequisite: COMP310 Object-Oriented Data Structures and MATH410 Discrete Mathematics. Day Course.

COMP438 ASSEMBLY LANGUAGE 3-2-4

An introduction to assembly language, including data representation, data storage, arithmetic, control flow, stacks and procedures, integer and character I/O, and encryption. Prerequisites: COMP128 Computer Science I; COMP278 Computer Architecture. Day Course.

COMP451 INTERACTIVE MEDIA DESIGN 2-2-4

Covers many aspects of WEB design including the integration of web graphics, animation, streaming video and sound. Students will create a web-based project using

elements of graphic design with a strong emphasis on user interface. Prerequisite: COMP399 Web Development I. ACPE Course.

COMP459 SYSTEMS ANALYSIS AND DESIGN 1-2-3

This course discusses the systems development life cycle and its application to business information systems. Topics covered include systems planning and preliminary investigation, analysis, design, implementation, and operation and support. Students will participate in a group project which will utilize various tools used throughout the systems development life cycle. Prerequisites: COMP231 Computer Programming with Java I and ENGL116 Literature and Composition. ACPE Course.

COMP460 INTRODUCTION TO GAME PROGRAMMING 3-2-4

This course introduces students to the tools for designing 2d and 3d games using an industry standard framework (XNA) and languages. Prerequisite: COMP310 Oriented Data Structures. Day Course.

COMP461 ADVANCED GAME PROGRAMMING 3-2-4

This course introduces students to advanced topics in game programming and physics engines. Prerequisite: COMP460 Introduction to Game Programming. Day Course.

COMP462 VIRTUAL REALITY 3-2-4

This course introduces students to the technology and techniques used in virtual environments. Prerequisite: COMP310 Oriented Data Structures. Day Course.

COMP476 INFORMATION SYSTEMS PROJECT MANAGEMENT 3-2-4

This course provides students with a detailed understanding in the implementation of the Systems Development Life Cycle (SDLC) and the methodologies to manage information systems projects. Prerequisite: COMP355 Data Base Management Systems; MGMT390 Financial Accounting; COMP325 Systems Analysis and Business Applications. Day Course.

COMP501 INTRODUCTION TO PROGRAMMING LANGUAGES 3-2-4

An introduction to Programming Language Concepts including context-free grammars, parse trees, syntax diagrams, symbol tables, data types, control structure, and language translators. Prerequisite: COMP310 Object Oriented Data Structures. Day Course.

COMP509 ARTIFICIAL INTELLIGENCE 2-2-4

The study of the ideas and techniques that enable computers to model human behavior. Topics will include neural networks, fuzzy logic, and expert system design and implementation which will be implemented via the Visual Basic, Lisp and/or Prolog programming language. Prerequisite: COMP380 Data Structures I. ACPE Course.

COMP543 INTRODUCTION TO ARTIFICIAL INTELLIGENCE 2-2-3

Covers introduction to the LISP programming language, symbolic computation, knowledge representation, search strategies, and expert systems. Prerequisite:

COMP544 INTERNET RESEARCH METHODS 2-2-4

Completion of this course will give students the tools to communicate about and on the Internet effectively; begin academic, personal or business research; make a home page, and intelligently use the web pages of others; and stay educated about the Internet itself. This class is designed to make students familiar with the basic services available on the Internet for research purposes including the World Wide Web, search engines, ftp, telnet, USENET, mailing lists, team-based meeting places, electronic file management and more. Individuals and teams in this class will study and apply Internet research methods to effectively and ethically understand this resource as a research tool. A BCIS computer science elective. Prerequisite: Junior status. ACPE Course.

COMP546 E-COMMERCE 2-2-4

Upon successful completion of this course, students will have a thorough understanding of the infrastructure and application technologies that comprise the building blocks of E-Commerce. An analysis of the technology used to support E-Commerce sites will include selecting data mining techniques, making appropriate use of encryption technologies, understanding XML, and participating in online negotiations. Specifications, technical requirements needed to implement an E-Commerce site will be examined. Virus protection, streaming multimedia, and VR technology will also be examined. Research on current developments and applied research situations will be introduced. A BCIS computer science elective. Prerequisite: Junior status. ACPE Course.

COMP553 WORLD WIDE WEB APPLICATION DEVELOPMENT 3-2-4

In-depth project-oriented work in WWW development including page organization, frames, interactive databases, graphics, security, client and server side scripting to create robust, effective web sites. Prerequisites: COMP355 Database Management Systems, COMP218 Networks, Services and the WWW. Corequisite: COMP593 Windows Programming. Day Course.

COMP563 NETWORK ADMINISTRATION 3-2-4

Prepares the student for managing a network and servers. It covers planning, installation and configuration, as well as monitoring, troubleshooting and optimizing. Prerequisites: COMP218 Networks, Services and the World Wide Web and COMP315 UNIX System Administration. Day Course.

COMP566 SOFTWARE DESIGN AND DEVELOPMENT 3-2-4

This course presents a formal approach to state-of-the-art techniques in software design and development. Students work in teams on a large software project. Prerequisites: COMP285 Object Oriented Programming; COMP355 Data Base Management Systems. Day Course.

COMP570 DATA BASE APPLICATIONS 3-2-4

This course covers the design and implementation of data bases for several data base applications using a data base management system. Prerequisite: COMP355 Data Base Management Systems and COMP325 Systems Analysis and Business Applications.

Day Course.

COMP573 INFORMATION TECHNOLOGY MANAGEMENT 2-2-3

Examines how to run an IT organization. Includes study of organizational and staffing issues, satisfying user needs, planning and budgeting, system maintenance and upgrades. Prerequisites: COMP476 Information Systems Project Management.

Co-requisite: MGMT505 Principles of Management.

Day Course.

COMP577 SOFTWARE TESTING AND QUALITY ASSURANCE 2-2-3

The construction of reliable software is examined. Topics may include software tools, testing methodologies, retrofitting, structured design, complexity, deadlock, fault tolerance and formal proofs of program correctness. Prerequisite: COMP566 Software Design and Development.

Day Course.

COMP593 WINDOWS PROGRAMMING 3-2-4

The fundamental concepts and techniques of object-oriented and event-driven Windows programming. Techniques of event-driven programming are covered to produce a graphical user interface for applications. Prerequisites: COMP285 Object Oriented Programming.

Day Course.

COMP595 SOFTWARE DESIGN 2-2-4

This course presents a formal approach to state-of-the-art techniques in software design and development and provides a means for students to apply the techniques. This course will cover several key technological areas, including software project planning, database server design and implementation, middleware interfacing, graphical user interface programming, DLL programming, backend server programming, and technical design documentation. Prerequisites: COMP232 Computer Programming with Java II, COMP385 Data Structures II, COMP409 Web Development II, and COMP345 Data Base Management Systems.

ACPE Course.

COMP601 INTRODUCTION TO BIOINFORMATICS 3-2-4

This course introduces software tools used in biology for gene sequencing, pattern matching, etc. Tools may include database, data mining, statistical analysis, algorithms and visualization. Prerequisite: COMP355 Data Base Management Systems.

Day Course.

COMP602 BIOINFORMATICS ALGORITHMS 3-2-4

Proven computer science approaches such as divide and conquer and dynamic programming are applied to algorithmic problems faced by biologists particularly in the area of genetics. Prerequisite: COMP414 Algorithm Design and Analysis.

Day Course.

- COMP645 COMPUTATIONAL LINGUISTICS 3-2-4**
 This is a course about encoding machines to understand natural languages such as Spanish, English, Urdu, etc. It maps man's understanding of language to machines.
 Prerequisite: COMP543 Introduction to Artificial Intelligence. Day Course.
- COMP650 SENIOR PROJECT IN COMPUTER SCIENCE 1-6-4**
 This course provides the opportunity for students to participate in design and implementation of solutions to large problems with small groups of people. Problems will be chosen in consultation with and after the approval of the curriculum department head.
 Prerequisite: Senior status. Day Course.
- COMP655 SENIOR PROJECT IN COMPUTER AND 1-6-4**
NETWORK INFORMATION SYSTEMS
 Students build individual projects in computer and network information systems. This is a capstone course. Students demonstrate the design, implementation and documentation of their projects. Prerequisite: Senior status. Day Course.
- COMP660 SENIOR PROJECT 2-2-4**
 Students engage in an in-depth study, under the supervision of a faculty member sponsor, of a computer science specialty topic. Prerequisites: COMP595 Software Design and this course must be taken in the final semester of the senior year of BCIS. ACPE Course.
- COMP665 ADVANCED TOPICS IN NETWORKING 3-2-4**
 This course covers computer networks including the Internet. Open systems interconnection through protocol layering is presented in detail as well as network management. Prerequisite: COMP400 Local and Wide Area Networks or COMP563 Network Administration. Day Course.
- COMP670 ADVANCED TOPICS IN DATABASE 3-2-4**
MANAGEMENT SYSTEMS
 This course covers advanced topics in database management systems such as distributed databases, data warehousing, data mining and object-oriented databases. Prerequisite: COMP355 Data Base Management Systems. Day Course.
- COMP671 THEORY OF COMPUTATION 3-2-4**
 This course introduces formal models of computation such as Turing machines, push down automata, finite automata, grammars and formal languages. Important problems in computer science are covered, including decidability and the halting problem, the P=NP question and the NP-Completeness reductions. Prerequisite: COMP414 Algorithm Design and Analysis. Day Course.
- COMP675 DISTRIBUTED INFORMATION SYSTEMS 3-2-4**
 This course covers application systems including distributed databases. Topics will

include distribution schemes, distributed transaction and query processing support, concurrency control, reliability, security and data migration. Prerequisite: COMP355 Data Base Management Systems; and COMP400 Local and Wide Area Networks or COMP563 Network Administration. Day Course.

COMP685 SEMINAR IN COMPUTER SCIENCE 3-2-4

This course examines current topics (determined by the instructor) in computer science. Students will make presentations on assigned readings and write a term paper. Prerequisite: Senior Status. Day Course.

COMP690 SEMINAR IN COMPUTER AND NETWORK INFORMATION SYSTEMS 3-0-3

This course examines current topics (determined by the instructor) in computer and network information systems. Students will make presentations and write a term paper. Prerequisite: Senior status. Day Course.

CONSTRUCTION MANAGEMENT COURSES

CMGT350 PROJECT ESTIMATING AND SCHEDULING 2-2-4

Students learn and apply the basic principles and current practices employed in estimating project costs including unit costs, overhead and profit. Scheduling tools, such as critical path method and bar charts, are examined as an aid and technique in project planning, budgeting and cost control. Prerequisites: CCEV115 Construction Graphics or ARCH201 Contracts Drawing and Methods I; and BLDG155 Construction Methods. ACPE Course.

CMGT410 CONSTRUCTION LAW AND GOVERNMENT REGULATIONS 2-2-4

An introduction to law and contracts to avoid entanglements and disputes, and to develop awareness of legal rights so that construction claims are settled by negotiation, not litigation. In addition, a study of zoning and building code requirements is made. Roles of building departments and boards of standards and appeals, procedures, enforcement, approvals and permits are discussed. Prerequisite: Third Year status. ACPE Course.

CMGT420 CONSTRUCTION PROJECT SCHEDULING 2-2-4

Topic items include project network planning, scheduling and cost control models. Computer applications to PERT and CPM will be explored and used by the student. Prerequisite: BLDG155 Construction Methods; Third Year status. ACPE Course.

CMGT440 CONSTRUCTION PROJECT CONTROL 2-2-4

The study of information management for effective project control. The course will cover gathering of job information and the processing involved in measuring, evaluating and calculating job performance, and reporting the results. Modern-day management information systems, practical accounting techniques, and computer

applications will be explored. Prerequisite: CMGT420 Construction Project Scheduling.
ACPE Course.

CMGT450 CONSTRUCTION COST ANALYSIS 2-2-4

Topics include: practical procedures for building construction estimating of most major trades; analysis of factors and methods affecting construction costs; bid strategies; preparation of preliminary budgets and complete working estimates with quantities and costs of materials, labor and overhead. Computer applications are explored. Prerequisite: MGMT390 Financial Accounting. ACPE Course.

CMGT460 FINANCING THE CONSTRUCTION PROJECT 2-2-4

An investigation of construction financing during all phases of project development. Topic items include: permanent loans, construction loans, sources of mortgage funds and venture capital, and tax and interest considerations. Emphasis is placed on the role of the banker as a vital member of the construction management team. Prerequisite: Third Year status. ACPE Course.

CMGT550 CONSTRUCTION MANAGEMENT THEORY 2-2-4

Construction project management from conception to completion is covered. The course covers feasibility studies, site selection, planning, programming, design coordination, and contracting procedures of actual construction. Emphasis is placed on contractor operations, project administration, job planning, and subcontract coordination. Prerequisite: Third Year status. ACPE Course.

CMGT655 SENIOR PROJECT IN CONSTRUCTION MANAGEMENT 1-3-4

The student will select his or her own project with the approval of the faculty for development during the semester. Students work independently on their approved projects with periodic and timely critical evaluations by the faculty member. The student's final presentation must demonstrate an advanced level of problem-solving skills, technical knowledge and professional competency expected in the field. Students will make a final presentation and defend their work with a selected jury of professionals approved by the faculty. Prerequisite: CMGT440, 450, 460, 550 and MGMT510. This course must be taken in the final semester of the senior year. ACPE Course.

COOPERATIVE EDUCATION COURSES

COOP300 COOPERATIVE EDUCATION (OPTIONAL)

Cooperative education (co-op) aims to provide practical experience while applying classroom learning at a work site; to enhance professional skills; to experience personal growth. This course may not be used in lieu of COOP400 or COOP600 as a graduation requirement. This course is only offered during the summer term. Prerequisite: Successful completion of freshman and sophomore program requirements; 2.0 or higher Cumulative GPA.

COOP400 COOPERATIVE EDUCATION I

Cooperative education (co-op) aims to provide practical experience while applying classroom learning at a work site; to enhance professional skills; to experience personal growth. Co-op is a full-time work experience. Enrollment in this course maintains full-time student status. Prerequisite: Junior status; 2.0 or higher Cumulative GPA.

COOP500 COOPERATIVE EDUCATION (ADDITIONAL)

Cooperative education (co-op) aims to provide practical experience while applying classroom learning at a work site; to enhance professional skills; to experience personal growth. Co-op is a full-time work experience. Enrollment in this course maintains full-time student status. Prerequisite: Satisfactory completion of COOP400 and COOP600; permission of the Director of Career Services; 2.0 or higher Cumulative GPA.

COOP600 COOPERATIVE EDUCATION II

Cooperative education (co-op) aims to provide practical experience while applying classroom learning at a work site; to enhance professional skills; to experience personal growth. Co-op is a full-time work experience. Enrollment in this course maintains full-time student status. Prerequisite: COOP400; Senior status; 2.0 or higher Cumulative GPA.

DESIGN COURSES**DSGN105 DRAWING I 0-6-3**

A basic drawing course that is designed to enhance perceptual skills and to develop freehand drawing abilities by recording form and space. Day Course.

DSGN130 DESIGN I 1-6-4

Students are introduced to elements and principles of design. Application of these principles and various forms of organization are explored through two- and three-dimensional design exercises. Day Course.

DSGN135 INTRODUCTION TO COMPUTER GRAPHICS 1-2-2

This course introduces students to the use of computer technology in the process of design. Students will learn about basic visual communication skills using a variety of industry standard graphic programs. Concepts of design process from Design I (DSGN130) and Drawing I (DSGN105) will be reinforced. Day Course.

DSGN165 DESIGN II 1-6-4

This course develops a sensitivity and understanding of three-dimensional space and form by applying the design elements and principles introduced in DSGN130 Design I. Prerequisite: DSGN130 Design I. Day Course.

DSGN305 RAPID PROTOTYPING 2-4-4

Utilizing modeling software and various rapid prototyping (RP) systems, students will

create a number of parts, including working mechanisms, and short run tooling. Students will also investigate the advantages and disadvantages of current RP technologies. Day Course.

DSGN405 STUDIO PHOTOGRAPHY 4-0-4

Students develop a basic understanding of black and white and color photography while developing their own design sense. The dynamics of light in the photographic medium will be explored with pin hole, SLR, large format cameras and computer photographic/graphic programs. Students will use photography to develop a portfolio of their own design work. A 35-mm SLR camera is required. Day Course.

DSGN410 PRESENTATION TECHNIQUES 4-0-4

An advanced visual presentation course, students will work with various media and techniques such as traditional watercolor, colored pencils, and markers. Using current and previous design projects, students will learn to visualize their ideas and use renderings as a tool for visual communication. Samples of professional work will be presented in class. Prior knowledge of perspective theory is necessary. Day Course.

DSGN500 GRAPHIC DESIGN 3-2-4

A studio course in graphic design, including: organizing information, page layouts; the use of grid systems, typography, photography, computers, mechanicals and reproduction techniques. Students will be involved with the design of: booklets, letterheads, posters, trademarks, signage and graphics for packaging. Projects are developed and art work is prepared for production. Day Course.

DSGN590 SPECIAL TOPICS IN DESIGN 4-0-4

This course investigates a topic of special interest to faculty and students that is outside regular course offerings. Prerequisite: Permission of Department Head. Day Course.

ECONOMICS COURSES

ECON110 ECONOMICS 3-0-3

This course is designed to enable the student to understand the functioning of the competitive market. The analysis of the production of goods and services and the method of allocation and distribution is emphasized. Prerequisite (Day): Successful completion of English Sequence. Prerequisite (ACPE): ENGL105 English Composition. Day Sophomore Social Science and ACPE Course.

ECON115 MACROECONOMICS 3-2-4

An introduction to the functioning of market economics. National income determination, and the role of labor and capital in the determination of economic aggregates. Public and economic policy associated with unemployment and inflation, and fiscal and monetary policy. Prerequisite: MATH205 College Mathematics I. Day Course.

are analyzed using Ohm's and Kirchhoff's Laws and computer-aided circuit analysis using SPICE is included. Corequisite: MATH205 College Mathematics I or MATH230 College Mathematics B. Day and ACPE Course.

ELEC130 ELECTRICITY AND ELECTRONICS 3-2-4

Basic principles of electric circuit analysis are discussed. Voltage, current, and power relationships in AC and DC circuits are emphasized. Principles and applications of diodes, transistors, and control devices are discussed. Basic digital circuitry is also included. Laboratory work augments the theory. Prerequisite: MATH235 College Mathematics C or MATH250 Precalculus. Day and ACPE Course.

ELEC132 CIRCUITS AND CONTROLLERS 3-2-4

Provides understanding of electrical circuits, circuit controllers and the electronic control systems applicable to environmental engineering projects. Provides background in fundamentals of electrical engineering. Prerequisite: MATH265 Engineering Mathematics. Day Course.

ELEC156 DIGITAL IMAGE PROCESSING I 2-2-3

This course introduces the student to digital image processing. Topics considered are image capture, computer processing of digital images, and display. Applications include image enhancement, noise filtering, special effects, edge detection algorithms, compression methods like JPEG, and image analysis. Laboratory and class work demonstrate some of the underlying mathematical principles including transform techniques like FFT, DCT, Haar and wavelets. Prerequisite: MATH245 College Mathematics II. Day Course.

ELEC163 ELECTRONIC DESIGN I 1-4-3

This course introduces the student to the fundamental principles involved in the electronic design process. Topics include problem identification and definition, mechanisms of technological problem-solving, design alternatives, and project planning and implementation. The influence of cost, material resources, performance criteria and relevant safety issues will be discussed. All students will be expected to complete an electronic design project. Prerequisite: MATH205 College Mathematics I. Day Course.

ELEC180 LINEAR INTEGRATED CIRCUITS 3-2-4

The emphasis of this course is on basic linear operational amplifier circuits such as comparators, amplifiers, waveshaping circuits and active filters. Also considered are linear integrated circuit modules such as voltage references and instrumentation amplifiers. These circuits are tested and analyzed in the laboratory. Prerequisite: ELEC200 Fundamentals of Electronic Devices. ACPE Course.

ELEC190 CIRCUIT ANALYSIS 3-2-4

The concepts of current, voltage, power, and resistance are studied. Topics also include DC and AC sources, capacitance, inductance and magnetism. Resistive circuits are

analyzed using Ohm's and Kirchhoff's Laws and computer-aided circuit analysis using SPICE is included. The concepts of impedance and admittance in sinusoidal circuits are examined and transformer theory is also studied. Laboratory work is designed to correlate with theory. Prerequisite: MATH230 College Mathematics B. ACPE Course.

ELEC195 CIRCUIT THEORY II 3-2-4

The concepts of impedance and admittance in sinusoidal circuits are examined. Circuits are solved using superposition, Thevenin, Norton, nodal, and mesh analysis. Resonant circuits and transformer theory are also studied. Laboratory work and computer-aided analysis techniques are designed to correlate with theory. Prerequisite: ELEC105 Circuit Theory I. Corequisite (Day): MATH245 College Mathematics II.

Day and ACPE Course.

ELEC200 FUNDAMENTALS OF ELECTRONIC DEVICES 3-2-4

This course introduces the field of discrete electronic devices and its application. It also covers a broad spectrum of devices that are currently being used in the electronics industry. Prerequisites: ELEC195 Circuit Theory II; MATH235 College Mathematics C.

ACPE Course.

ELEC206 SEMICONDUCTOR DEVICES 3-2-4

A variety of semiconductor devices are introduced. Emphasis is placed on diodes, BJT, oscillators and FET. A variety of applications including triacs, SCRs, optoisolators and other devices are also included. Prerequisite: ELEC195 Circuit Theory II. Corequisite: MATH280 Calculus I.

Day Course.

ELEC231 NETWORK THEORY I 3-2-4

The fundamental concepts of current, voltage, and power are studied along with the properties of passive circuit elements as well as network theorems. Transient analysis R-L, R-C, and R-L-C circuits and initial conditions are studied. Laboratory experiments parallel classroom theory and include circuit simulation. Prerequisite: MATH280 Calculus I; Corequisite: MATH290 Calculus II.

Day Course.

ELEC234 INTRODUCTION TO FIBER OPTICS 2-2-3

This course covers the types of optical fibers used in communication and the characteristics and properties of these fibers. Criteria for optical signal confinement and propagation in an optical waveguide are also covered. Laboratory exercises will demonstrate the principles. Prerequisite: MATH235 College Mathematics C or MATH250 Precalculus; and PHYS220 College Physics II (or equivalent).

Day Course.

ELEC235 LOGIC CIRCUITS 3-2-4

This course introduces binary and hexadecimal numbers, Boolean algebra, truth tables, Karnaugh maps, and combination logic using basic gates. Flip-flops, counters, registers, ALUs, encoders, and decoders are also presented. Circuit simulation software

is used in both classroom and laboratory work. Prerequisite: ELEC105 Circuit Theory I. ACPE Course.

ELEC236 LOGIC CIRCUITS 3-2-4

This course introduces the Boolean algebra, combination logic circuits, counters, registers, ALUs, encoders, decoders and multiplexer. Circuit simulation software is used in laboratory work. Prerequisite: ELEC105 Circuit Theory I. Day Course.

**ELEC237 ELECTRONIC DEVICES AND 3-2-4
INTEGRATED SYSTEMS**

This course introduces the student to the field of analog electronics and centers around the study of linear integrated circuits and systems. Topics include sensors for measurement, signal conditioning circuit design to interface sensors to the analog-to-digital input of a microcontroller, and electronic devices to allow the microcontroller to act as an embedded computer for process control applications. Semiconductor diodes, transistors (BJT and MOSFET), triacs and other devices are studied to support these applications. Classroom theory is enhanced by laboratory exercises. Prerequisite: ELEC190 Circuit Analysis. ACPE Course.

ELEC240 INTRODUCTION TO MICROPROCESSORS 3-2-4

This course introduces microprocessors and microcomputer systems. Related hardware and software issues will be covered. It will also cover memory systems, input/output devices and interfacing mechanisms. Prerequisite: ELEC235 Logic Circuits. ACPE Course.

ELEC244 DIGITAL SYSTEMS 3-2-4

This course covers both the hardware and the software of a microprocessor-based system. The first part of this course introduces different number systems, Boolean algebra, truth table, simplification methods of Boolean expression, combination and sequential circuits. The second part of the course introduces microprocessor and microcontroller, memories, input/output interfacing, and assembly language programming. Prerequisite: COMP120 Computer Science I Using C. Day Course.

ELEC252 INTRODUCTION TO FIBER OPTICS 3-2-4

This course covers the types of optical fibers used in communication and the characteristics and property of these fibers. Criteria for optical signal confinement and propagation in an optical waveguide and optical communication devices such as directional couplers and wavelength division multiplexers are also covered. Laboratory exercises will demonstrate the principles and enhance the learning. Prerequisite: MATH235 College Mathematics C; ELEC200 Fundamentals of Electronic Devices. ACPE Course.

ELEC253 ELECTRONIC PROJECT 2-2-4

This capstone project course provides an opportunity for students to apply the various electronic design skills acquired from previous curriculum courses. Students will be

encouraged to become involved in an interdisciplinary team to develop an innovative technological system. Prerequisite: Third-year status and approval of advisor. ACPE Course.

ELEC257 MICROCOMPUTER CONTROL SYSTEMS 3-2-4

This course introduces microcontroller hardware and software and includes the work covered in ELEC237 Electronic Devices and Integrated Systems. The student studies system architecture including the CPU, timer, serial and parallel I/O ports, RAM and ROM. The software portion of the course covers assembly language instructions and addressing modes. Practical engineering problems requiring an embedded controller solution are presented, and solved with a combination of sensors, electronic devices and software design. Classroom material will be enhanced by laboratory exercises. Prerequisite: ELEC237 Electronic Devices and Integrated Systems. ACPE Course.

ELEC261 TELECOMMUNICATIONS 3-2-4

In this course, the student studies how information is transferred either between peripheral equipment and computer or between computers. Both serial and parallel techniques are studied, as well as modems, modulation, electrical interfaces, codes, half and full duplex operations and troubleshooting techniques. Laboratory exercises illustrate the principles learned in the classroom. Prerequisite: ELEC345 Microcontrollers and Embedded Computer Systems. Day Course.

ELEC262 MICROWAVE COMMUNICATIONS 3-2-4

The principles of amplitude, frequency, phase, and various types of pulse modulation are studied. Frequency division multiplexing, bandwidth, microwave transmitters and receivers, transmission lines, and antennas are discussed. Applications include long-haul and short-haul communication links. Laboratory work involves modulation and transmission practices Prerequisites: ELEC200 Fundamentals of Electronic Devices; ELEC195 Circuit Theory II. ACPE Course.

ELEC281 NETWORK THEORY II 2-2-3

In this continuation of Network Theory I, the concept of complex impedance and admittance is presented and circuits are solved using network theorems. Magnetic circuits and transformer concepts are presented as well as three-phase balanced circuits. Prerequisite: ELEC231 Network Theory I; MATH290 Calculus II. Day Course.

ELEC296 DIGITAL APPLICATIONS 3-2-4

This course covers the analysis and modeling of high-speed digital systems. It examines the use of programmable CMOS integrated circuits. The student will learn to implement both combination and sequential logic circuits in addition finite state machines. Prerequisite: ELEC236 Logic Circuits; ELEC195 Circuit Theory II; and MATH290 Calculus II. Day Course.

ELEC306 INTEGRATED CIRCUITS WITH APPLICATIONS 3-2-4

Integrated circuit applications of operational amplifiers and linear integrated circuits are

introduced. Topics include the use of linear and non-linear IC's in open and closed loop (feedback) configurations. Prerequisite: ELEC206 Semiconductor Devices. Corequisite: MATH290 Calculus II. Day Course.

ELEC310 DIGITAL COMMUNICATION 3-2-4

This course studies sampling, bandwidth, analog to digital and digital to analog converters, pulse code modulation and its codes, digital multiplexing, digital carrier systems, and frequency shift keying. Laboratory work parallels the classroom instruction. Prerequisite: ELEC235 Logic Circuits. ACPE Course.

ELEC345 MICROCONTROLLERS & EMBEDDED 3-2-4
COMPUTER SYSTEMS

This course will introduce the students to microcontroller principles, both hardware and software. Students will write assembly language programs using programming techniques and use sensor signal conditioning for interfacing and software design. Prerequisite: ELEC296 Digital Applications and ELEC306 Integrated Circuits with Applications. Day Course.

ELEC401 AUTOMATIC ELECTRONIC TEST AND 1-4-3
MEASUREMENT

Programs for automatic test and measurement of electronic circuits are developed using modern object-oriented software. Interactive graphical user interfaces are designed. Prerequisite: ELEC206 Semiconductor Devices. Day Course.

ELEC415 OBJECT ORIENTED PROGRAMMING 3-2-4
FOR ELECTRONICS

This course is an introduction to object oriented programming topics useful for electronics. Topics include I/O file streams and data files, introduction to classes, class functions and conversions. Prerequisite: COMP120 Computer Science I Using C. Day Course.

ELEC426 DATA COMMUNICATIONS 3-2-4

This course introduces the concepts of digital transmission, metallic cable and fiber transmission media, transmission lines, public telephone network and data communications. Prerequisite: ELEC236 Logic Circuits. Day Course.

ELEC430 POWER SYSTEMS ANALYSIS 3-0-3

This course provides a thorough study of the power system data necessary, and the methods commonly used in analysis of power systems. The types of studies covered may include: short circuit, symmetrical components and load flow, motor starting, cable ampacity, transient stability, harmonic analysis, switching transient, reliability, protective relay coordination, power system modeling, transmission line parameters and representation, and economic load dispatch. Prerequisite: ELEC195 Circuit Theory II or ELEC281 Network Theory II. Day Course.

ELEC443 ANALOG CIRCUIT DESIGN 3-2-4

This course covers the concepts of design, analysis, simulation, implementation and evaluation of analog electronic circuits and systems. Topics include semiconductor physics, BJT, MOS, and FET devices and linear integrated circuits. Prerequisite: Junior status, MATH290 Calculus II; ELEC281 Network Theory II. Day Course.

ELEC462 EMBEDDED MICROCONTROLLER 2-2-3
SYSTEM DESIGN

This course is a continuation of Introduction to Microprocessors and includes the work studied in Linear Integrated Circuits. Students use sensors for measurements, signal conditioning for input interfacing, semiconductor devices for output control and the software design necessary to implement practical engineering designs using embedded microcontroller IC systems. Prerequisites: ELEC180 Linear Integrated Circuits; ELEC240 Introduction to Microprocessors. ACPE Course.

ELEC467 ELECTRIC MACHINES AND TRANSFORMERS 3-2-4

This course concentrates on single-phase and three-phase systems, magnetic systems, transformers, electromechanical conversion principles, three-phase and single-phase induction motors, synchronous motors and generators, DC generators and motors, and stepper motors as applied to electric power and control systems. Laboratory work parallels classroom theory. Prerequisite: ELEC195 Circuit Theory II. Day Course.

ELEC471 EMBEDDED COMPUTER SYSTEMS 2-2-3

Students will design embedded data acquisition systems to monitor and record data from a variety of electromechanical systems. This course includes the study and use of sensors for measurement of physical parameters, signal conditioning for input interfacing, semiconductor devices for output control. Both hardware and software designs are implemented to solve a variety of engineering applications. Prerequisites: COMP120 Computer Science I Using C; ELEC443 Analog Circuit Design; ELEC244 Digital Systems. ACPE Course.

ELEC480 PRINCIPLES OF VLSI DESIGN 2-2-3

Principles of analog and digital CMOS VLSI logic circuits using schematics, symbolic, and physical layout representations are presented in context with their mathematical design parameters. Prerequisite: ELEC667 Advanced Programmable Logic. Day Course.

ELEC485 ADVANCES OF NANOTECHNOLOGY 2-2-3

The fabrication of nanostructured materials, nanoscale films, compositions, devices, their unique properties and recent advances and issues in molecular nanotechnology are studied. Prerequisite: Junior status. Day Course.

ELEC486 COMPUTER SYSTEMS ARCHITECTURE 3-2-4

This course examines the operation of a computer system including microprocessor, I/O, mass storage, monitors, and memory. Introduces machine language and compilers

as applied to current and state-of-the-art systems. Interfacing with stepper motors and sensors are also introduced. Prerequisite: Junior status; ELEC296 Digital Applications.
Day Course.

ELEC490 INTRODUCTION TO FIBER OPTICS 2-2-3

This course introduces the concepts of optical fiber communications and some other applications of fiber optics. Analysis of optical transmitters and receivers is also covered. Prerequisite: ELEC206 Semiconductor Devices and ELEC355 Integrated Circuits with Applications.
Day Course.

ELEC496 ADVANCED SENSORS AND INTERFACING 3-2-4
SYSTEMS

Topics include linear and nonlinear sensors, high-performance instrumentation amplifiers for signal conditioning, temperature sensors, analog computational units with application of linear regression techniques, and design of multiplier circuits. Modern sensors and interfacing with microcontrollers are introduced. Prerequisite: ELEC306 Integrated Circuits with Applications.
Day Course.

ELEC505 LINEAR NETWORK ANALYSIS 3-2-4

This course introduces first and second order differential equations, initial condition problems, Laplace Transforms with partial fraction expansion, pole/zero analysis, and Fourier Transforms. Associated laboratory experiments parallel the theory and help demonstrate the practical usefulness of the topics as they apply to electronic and computer engineering technology problems. Prerequisite: Junior status; MATH510 Calculus III.
Day Course.

ELEC510 DISCRETE SIGNALS AND SYSTEMS 3-2-4

Discrete signals and systems are identified and studied. The use of difference equations, convolution techniques, and z-transforms are included. The need for anti-aliasing filters, sample-and-hold circuitry as well as limitations of ADCs are emphasized. Laboratory exercises address practical solutions to problems. Prerequisite: Junior status; Corequisite: ELEC505 Linear Network Analysis.
Day Course.

ELEC516 COMPUTER COMMUNICATION AND NETWORKS 3-2-4

This course covers local (LAN), metropolitan (MAN) and wide area (WAN) networks, topologies and transmission media, network interface and management, congestion/flow/error control, routing and addressing. Laboratory exercises include simulation and installation of small network. Prerequisite: ELEC426 Data Communications.
Day Course.

ELEC565 NETWORK ANALYSIS 4-0-4

In this course, circuit equations are developed using a matrix format. Solutions obtained by computer techniques are included. The characteristics of controlled sources and Thevenin's and Norton's Theorems are studied. The response of RLC circuits to

impulse, step and ramp time functions are explored. The Laplace transform and its use in the determination of circuit behavior is introduced. Network functions are characterized and studied using pole-zero and frequency response diagrams. Prerequisite: ELEC580 Signals and Systems; and MATH495 Applied Calculus and Differential Equations. ACPE Course.

ELEC573 WAVES AND TRANSMISSION 2-2-3

The important static and time-varying characteristics of electric and magnetic fields are explored. The wave equation is developed. The propagation behavior of electromagnetic waves is investigated, and study is extended to transmission lines. Methods and devices used in the generation, detection and amplification of high frequency electrical signals are studied. Laboratory applications cover antennas, filters, circulators, couplers and matching techniques. Prerequisite: MATH495 Applied Calculus and Differential Equations; Junior status. ACPE Course.

ELEC575 DIGITAL SIGNAL PROCESSING 3-2-4

This course presents the basic digital signal processing (DSP) principles used in the design and analysis of sampled signals. Topics include but are not limited to design of finite impulse response (FIR) filters and infinite impulse response (IIR) filters. The Fast Fourier Transform (FFT) is studied in order to compute the Discrete Fourier Transform (DFT). Laboratory experiments emphasize hardware and software solutions to practical problems. Prerequisites: ELEC505 Linear Network Analysis; ELEC510 Discrete Signals and Systems; ELEC345 Microcontrollers and Embedded Computer Systems. Day Course.

ELEC577 DIGITAL SIGNAL PROCESSING SYSTEMS 2-2-3

This course presents the basic digital signal processing (DSP) principles used in the design and analysis of sampled signals. Topics include but are not limited to design of finite impulse response (FIR) filters and infinite impulse response (IIR) filters. The Fast Fourier Transform (FFT) is studied in order to compute the Discrete Fourier Transform (DFT). Laboratory experiments emphasize hardware and software solutions to practical problems. Prerequisite: ELEC580 Signals and Systems; ELEC240 Introduction to Microprocessors. ACPE Course.

ELEC580 SIGNALS AND SYSTEMS 4-0-4

The response of linear, time-invariant systems to exponential and sinusoidal signals for both continuous and discrete time-systems is studied. The transfer function of a system is introduced. This is followed by a study of Fourier Series, Fourier transforms, and Laplace and Z-transforms. The filter characteristics of a system, distortionless transmission and natural frequencies are introduced. The correspondence between time domain and frequency domain representation of a signal is stressed. Prerequisite: MATH495 Applied Calculus and Differential Equations; Junior status. ACPE Course.

- ELEC584 ENGINEERING SIGNALS AND SYSTEMS 3-2-4**
 Continuous and discrete-time signals and systems will be studied. Time domain analysis of linear systems will include convolution (discrete and continuous), time-invariance, causality, and stability of systems. Time domain analysis of signals using the Fourier series and Fourier integral will be covered as well as frequency domain analysis of signals using the Fourier transform. Laplace transform analysis of linear systems including pole-zero plots and z-transform analysis of discrete systems will be studied. Laboratory exercises will use computer software to strengthen important course concepts. Prerequisite: ELEC281 Network Theory II; MATH620 Applied Differential Equations I. Day Course.
- ELEC585 ELECTROMAGNETICS 3-2-4**
 Static electric and magnetic fields are studied in this course. Maxwell's equations are presented and time-varying fields are introduced. Laboratory applications include transmission of electromagnetic waves in air and on transmission lines. Prerequisite: Junior status; MATH510 Calculus III. Day Course.
- ELEC595 DIGITAL CONTROL SYSTEMS 3-2-4**
 This course will use velocity and position feedback to control servos. PID and other types of systems will be analyzed through software packages employing BODE, Nyquist and Root locus techniques. Prerequisite: ELEC505 Linear Network Analysis. Corequisite: ELEC596 Introduction to Digital Signal Processing. Day Course.
- ELEC596 INTRODUCTION TO DIGITAL SIGNAL PROCESSING 3-2-4**
 This course introduces sampling, aliasing, ADCs and z-transforms. DSP applications including digital filtering (both FIR and IIR) are analyzed and designed. Fast Fourier Transform (FFT) is studied in order to compute the Discrete Fourier Transform (DFT). Laboratory experiments emphasize hardware and software solutions to practical problems. Prerequisites: ELEC505 Linear Network Analysis; ELEC345 Microcontrollers and Embedded Computer Systems. Day Course.
- ELEC601 SENIOR DESIGN PROJECT 2-2-4**
 This subject is for senior students who wish to pursue individual or group studies in either laboratory or project-oriented course work. The student will work in his or her curriculum area and may become involved in an interdisciplinary approach to technological problems. The work will be performed under the direction of one or more faculty advisors. Course requirements include oral and written progress reports throughout the semester plus a final technical report documenting the work for the semester. Prerequisite: Senior status; and approval of Advisor. ACPE Course.
- ELEC605 SENIOR DESIGN PROJECT I 1-4-3**
 The first of a two course sequence, this course concentrates on the selection of an appropriate engineering project for design, the development of time and financial budgets, and milestone graphs. The majority of work is spent in the laboratory research-

ing, designing, prototyping, debugging, and acquiring data on the students' individual designs. Engineering notebook is required. Prerequisites: Senior Status; ELEC496 Advanced Sensors and Interfacing Systems; ELEC345 Microcontrollers and Embedded Computer Systems. Day Course.

ELEC610 ELECTRONIC COMMUNICATION SYSTEMS 2-2-4

This course studies communication systems including time and frequency multiplexing. Theory and circuits for signal sampling, amplitude modulation, frequency modulation, phase modulation and various kinds of pulse modulations are treated. Recent developments and practices in digital communication systems are presented. Laboratory exercises parallel the theory portion of this course. Prerequisite: ELEC580 Signals and Systems. ACPE Course.

ELEC620 FEEDBACK CONTROL SYSTEMS 2-2-4

Analysis and design of linear control systems and feedback are studied. Nyquist's and Routh's stability criteria, Bode plots, transient behavior, static error coefficients and the steady-state behavior of various system types are presented. The rootlocus method and block diagram representation and simplification are also included. The theory is augmented with laboratory work. Prerequisite: ELEC565 Network Analysis. ACPE Course.

ELEC625 FEEDBACK CONTROL SYSTEMS 3-2-4

Analysis and design of linear control systems will be accomplished using Root locus, Bode and Nyquist techniques. The laboratory experiments will include servo trainers and employing 4 software packages. Digital systems will be introduced as well as state variables. PID controllers will be covered. Prerequisites: ELEC510 Discrete Signals and Systems; ELEC505 Linear Network Analysis. Day Course.

ELEC645 INTRODUCTION TO NANOTECHNOLOGY 2-2-3

The ongoing impact of nanotechnology on the current state of science and engineering will be explored here. Various deposition techniques and applications are also studied. Day Course.

ELEC667 ADVANCED PROGRAMMABLE LOGIC 2-2-3

The objective of this course is to build a RISC processor core. The emphasis will be on implementing MSI circuits using VHDL language. Students utilize top-down methodology to design complex logic circuits using programmable logic abstractions. They synthesize hierarchical architecture structures in building a processor core. Prerequisite: ELEC296 Digital Applications. Day Course.

ELEC675 DIGITAL COMMUNICATION SYSTEMS 3-2-4

This course studies sampling, coding, decoding, pulse code modulation, digital multiplexing, digital carrier systems, frequency shift keying, data compression as well as bandwidth considerations. Laboratory work parallels classroom theory. Prerequisite:

ELEC510 Discrete Signals and Systems or ELEC596 Introduction to Digital Signal Processing. Day Course.

ELEC685 SENIOR DESIGN PROJECT 1-6-4

This course is for BCOT senior students to pursue project-oriented work. Students may work in their curriculum or become involved in an interdisciplinary problem. Course requirements include oral and written progress reports throughout the semester plus a final technical report documenting the semester's work. Prerequisite: COMM400 Technical Communications; Senior status. Day Course.

ELEC695 SENIOR DESIGN PROJECT II 1-4-3

The second of a two course sequence, Senior Design Project II focuses on implementing the design developed in Senior Design Project I. Emphasis is placed on both oral and written presentation skills as well as packaging and fabrication of an "engineering prototype". Prerequisites: COMM400 Technical Communications; ELEC605 Senior Design Project I. Day Course.

ELEC820 FEEDBACK AND CONTROL 3-2-4

The definition of an analog feedback control system will be the introduction of the course. The course proceeds with the time-domain and frequency-domain analysis of closed loop feedback control systems. The relationship between the time-domain and frequency-domain is discussed. The stability methods are explained. The course provides an introduction to the state-space method and an introduction to discrete control systems. Prerequisites: ELEC586 Motors and Controls; MATH 620 Applied Differential Equations I. Day Course.

ELECTROMECHANICAL ENGINEERING COURSES

ELMC110 ENGINEERING GRAPHICS 2-4-4

Basic concepts of CAD, design, and sketching are explored. Drafting exercises include orthographic projection, 2- and 3-dimensional elements, multiviews, dimensioning, sections, tolerance, and assemblies. CAD is used in drafting exercises for electrical and mechanical design. Corequisite: MATH205 College Mathematics I, MATH265 Engineering Mathematics or MATH225 College Mathematics A. ACPE Course.

ELMC290 ELECTROMECHANICAL DESIGN PROJECT 3-2-4

This capstone project course provides an opportunity for students to apply the various electromechanical design skills acquired from previous curriculum courses. Students will be encouraged to become involved in an interdisciplinary team to develop an innovative technological device or system. Prerequisite: ELMC110 Engineering Graphics and ELEC257 Microcomputer Control Systems. ACPE Course.

ELMC410 ENGINEERING ETHICS AND LIABILITY 3-0-3

This course will utilize case studies and group projects to make the student aware of the important ethical and liability issues in engineering and their consequences in practice.

Prerequisite: Junior status. Day Course.

ELMC461 ELECTROMECHANICAL DESIGN 1-4-3

Students work in teams to design and construct an interdisciplinary project. Teams, with clearly defined individual responsibilities, are required. During the course of the semester, each team undertakes the necessary activities to bring about a successful design project that is well understood, documented, and presented in both oral and written form. Emphasis is placed on research, innovation, project management, decision-making, prototyping, design for manufacturing, design for testability, environmental and ethical issues in design, depth and breadth of analysis, quality of hardware, documentation, and communications. Prerequisites: Junior status; ENGR160 Introduction to Engineering Design I; MECH302 Mechanics of Materials; ELEC244 Digital Systems; ELEC443 Analog Circuit Design. Day Course.

**ELMC805 ADVANCED MATHEMATICAL MODELING 3-0-3
FOR ENGINEERS**

Problems in heat transfer, fluid mechanics, vibration systems, and wave propagation will be modeled using partial differential equations. Solution techniques will involve the study of orthogonal expansions in Fourier series, Sturm-Liouville theory, and the method of separation of variables. Additional problems in heat conduction will be presented and solved using Bessel functions and cylindrical coordinates. Computer software for both modeling and problem solving will be employed. Prerequisite: MATH620 Applied Differential Equations. Day Course.

ELMC815 ELECTROMECHANICAL SYSTEMS I 3-2-4

This course analyzes the dynamic behavior of mechanical, fluid and thermal systems using modeling and simulation techniques. Steady state and transient conditions will be examined in both free and forced modes. Various simulation software packages are used in the laboratory to analyze electromechanical systems. Prerequisites: MECH572 Engineering Dynamics, ELEC820 Feedback Control, MATH890 Linear Algebra and Matrix Theory. Day Course.

ELMC829 ELECTROMAGNETIC FIELD THEORY 3-0-3

This course introduces static electric and magnetic fields. Time-varying fields are studied using Maxwell's equations. Application of energy transfer in space and in communication transmission lines are analyzed. Prerequisite: MATH510 Calculus III. Day Course.

ELMC831 SENIOR DESIGN I 1-6-4

This course is only for electromechanical students with senior status and the required prerequisite courses. Students will work in the electrical and mechanical fields alone and in small project groups to study, analyze, design, and sometimes build and test

concepts in a field of their choosing. The study will be performed under the direction of one or more faculty advisors. Projects from industry will be encouraged to increase the interaction and cooperation with local engineering firms. Course requirements include regular oral and written progress reports throughout the semester. The final technical report will detail the plans and schedule for the following Senior Design II course. Prerequisites: MECH620 Engineering Thermal Design; ELEC820 Feedback and Control; MECH600 Advanced Mechanics of Materials. Day Course.

ELMC833 OPTICAL FIBER COMMUNICATIONS 2-2-3

This course will cover electromagnetic waves (Maxwell equations, reflection, refraction, diffraction, Poynting vector, polarization, photons); fundamentals of fiber optics; applications in telecommunications. Laboratory demonstrations and experiments will illustrate concepts covered in the lectures. Prerequisites: MATH620 Applied Differential Equations I; PHYS320 Engineering Physics I. Day Course.

ELMC840 FINITE ELEMENT ANALYSIS 3-2-4

This course will cover advanced problems of stress, strain, heat transfer, and fluid flow using 2D and 3D software. Students will cover topics that will prepare them for their Senior Design Projects. Prerequisites: MECH600 Advanced Mechanics of Materials; MECH505 Engineering Thermodynamics; MECH565 Engineering Fluids. Day Course.

ELMC870 ELECTROMECHANICAL SYSTEMS II 3-2-4

This course is a continuation of Electromechanical Systems I. Analysis of multi-degree of freedom systems will be studied. Dynamic responses of first and second order systems to harmonic excitation are analyzed. State space analysis will be used to solve sets of n th-order coupled differential equations. Sensors to detect displacement, velocity, and acceleration as well as digital signal processing techniques to acquire data, provide filtering, and perform system analysis will be employed. The laboratory projects will reinforce the theory and demonstrate the rigor of the analytical techniques. Laboratory exercises will stress the comparison of theoretical and simulated results. Prerequisite: ELMC815 Electromechanical Systems I. Day Course.

ELMC881 SENIOR DESIGN II 1-6-4

This course is a continuation of Senior Design I. The students continue with their design and analysis with emphasis on improvements and applications. Other faculty and local engineers will review the student work and make recommendations. Prerequisites: MATH505 Probability and Statistics for Engineers; ELMC831 Senior Design I; ELMC815 Electromechanical Systems I. Day Course.

ENGINEERING COURSES

ENGR100 INTRODUCTION TO ENGINEERING 2-4-4

This course develops the skills needed during the student's study of engineering. Topics include task/time management, effective use of notes, engineering research, oral and

written communications, problem-solving techniques, ethics and professional responsibility and Institute resources. In the laboratory, students work in teams to complete a variety of engineering tasks. Day Course.

ENGR160 INTRODUCTION TO ENGINEERING DESIGN 2-4-4

This course is the first in a sequence of design courses introducing students to the fundamentals of engineering design and professional practice. Design problems are selected from various engineering disciplines. Students learn about the design cycle and the necessary steps to complete a successful project as a member of a team. Topics include problem identification, brainstorming, project planning, and design alternatives. Cost, safety and environmental issues are considered as well as ethical and professional responsibilities. Students present formal oral presentations and written reports of their designs. Prerequisite: MATH265 Engineering Mathematics; ENGL100 English 100.

Day Course.

ENGLISH COURSES

ENGL013 COLLEGE WRITING: INTERNATIONAL 3-2-4

This course takes students from paragraph writing and revising through an introduction to rhetorical models. The focus is on sentence writing, including topic sentences, grammar review, idiomatic expression, and usage. Prerequisite: English Placement Test.

Day Course.

ENGL017 COMPOSITION AND LITERATURE: INTERNATIONAL 2-2-3

This course is a continuation of ENGL013 College Writing: International. Examples of English prose, poetry and drama will be used as the basis of continuing development of English comprehension skills. Extra writing assignments will be required. Prerequisite: ENGL013.

Day Course.

ENGL020 ENGLISH LANGUAGE SKILLS 3-2-4

A course in basic English language skills and writing practice in which less than adequately prepared students may upgrade their readiness for college-level study through improved reading, writing, speaking and listening. Prerequisite: 4 units of high school English, or a TOEFL of 525.

Day Course.

ENGL025 ENGLISH LANGUAGE AND COMPOSITION SKILLS 2-2-3

This course is designed for those students who need practice in basic English language and composition skills. This course will help students prepare for college-level composition through reading, writing, and speaking assignments. Students who successfully complete ENGL025 may proceed to ENGL105 English Composition. Prerequisite: English Placement Test.

ACPE Course.

ENGL100 ENGLISH I (COMPOSITION) 4-0-4

Through a study of the major problems which students encounter in writing - unity, coherence, effective development - the groundwork will be laid for the principal aim of

the course: to write well-organized paragraphs and compositions. To serve as models of effective writing, various essays will be read for form and content. Weekly research and/or writing assignments will be expected in this course. Prerequisite: English Placement Test. Day Course.

ENGL105 ENGLISH COMPOSITION 3-0-3

A short review of English basics is provided. Emphasis is on writing coherent paragraphs and short essays, basic rhetorical strategies and techniques of rewriting and editing. Prerequisite: 4 units of high school English. ACPE Course.

ENGL115 ENGLISH II (LITERATURE AND COMPOSITION) 3-0-3

While emphasizing the development of effective writing skills through frequent practice, this course introduces the student to the study of literature and literary themes in representative fictional, dramatic and poetic forms. A term paper will be required. Weekly research and/or writing assignments will be expected in this course. Prerequisite: ENGL100 English I (Composition) or equivalent. Day Course.

ENGL116 LITERATURE AND COMPOSITION 3-0-3

This course introduces students to the study of literature and literary themes in the genres of short story, poetry, drama and novel. While the emphasis is on critical reading and thinking, the course also encourages the continued development of effective writing skills through frequent writing assignments. Prerequisite: ENGL105 English Composition. ACPE Course.

ENGL125 ENGLISH I HONORS 4-0-4

This course is the first part of a sequence for students who would benefit from an enriched program. The subject of this year-long course is the identity of Western man. The first semester explores representative writers in the areas of religion and philosophy from the Greeks to the scientific revolution. Prerequisite: Recommendation of the Department. Day Course.

ENGL135 ENGLISH II HONORS 3-0-3

The second course of the advanced sequence continues to trace the evolution of Western man's consciousness as he reflects and defines himself through his literature. The period from the Enlightenment to the present will be examined. Critical discussion and the writing of substantive essays highlight the course. Prerequisite: ENGL125 English I Honors or recommendation of the Department. Day Course.

ENGL350 WRITING COMPETENCY ASSESSMENT 0

At the end of the sophomore year spring semester, Day students must take and successfully complete the Writing Competency Assessment to receive a baccalaureate degree. Refer to page D-27 of this catalogue. Prerequisite: ENGL115 or ENGL135; or ENGL017 and ENGL100. Day Course.

ENVIRONMENTAL COURSES

ENVM105 ENVIRONMENTAL HEALTH AND SAFETY 2-2-3

An introduction to the effect of hazardous substances on human health, including identification of risks, hazard communication, respiratory protection, material storage, noise, radiation, and mitigation. The basic elements of applicable federal and state health and safety regulations are examined with emphasis on the requirements of OSHA's 40-hour Health and Safety Training program for hazardous waste site operations. Prerequisite: Junior status or above in BES program. Day Course.

ENVM200 ENVIRONMENTAL FORUM (COFE200) 2-0-2

This course provides a forum for different disciplines and interests to assess and evaluate current environmental topics. This course includes a service-learning component and encourages student and faculty interaction with local, regional, and national environmental advocates. In the process, students will develop applied research skills as well as oral and written skills. In addition to addressing environmental issues from a scientific basis, socioeconomic and political aspects of environmental issues are also incorporated. Day Course.

ENVM215 ENVIRONMENTAL ECOLOGY 2-2-3

An introduction to environmental systems, including air, water and land, and their inter-relationships with human activity. Prerequisite: GEOL400 Site Characterization. Day Course.

ENVM220 ENVIRONMENTAL MICROBIOLOGY 3-2-4

An introduction to the fundamentals of microbiology, with elements of public health, microbiology, process microbiology, treatment of wastewaters, the roles of microbiology on chemical cycles, and the ecological elements of energy nutrient relations, species diversity and food webs. Prerequisite: CHEM100 Chemistry I; Enrollment in BES program. Day Course.

ENVM350 WATER AND WASTEWATER TREATMENT 2-2-3

Introduces the operation of drinking water treatment plants and the physical, biological, and chemical processes utilized to treat municipal wastewater. Prerequisite: CHEM100 Chemistry I. Day Course.

ENVM430 FUNDAMENTALS OF CHEMICAL PROCESSES 3-0-3

Provides the techniques to design and characterize chemical balances based on an understanding of material balances, energy balances, and other fundamental system analysis methods. Prerequisite: CHEM150 Chemistry II and MATH510 Calculus III. Day Course.

ENVM440 ENVIRONMENTAL IMPACT AND PROTECTION 2-4-4

Introduces the relationship of the environment and human activity to public health and

welfare, and its control from governmental, regulatory and legal perspectives.
Prerequisite: Junior status or above in BES program. Day Course.

ENVM490 ENVIRONMENTAL RISK ASSESSMENT 3-2-4

Introduces the various modeling techniques appropriate to environmental problems for estimating, predicting, and evaluating the effects of projects, processes and systems upon the environment and humans. Prerequisite: Junior status or above in BES program. Day Course.

ENVM500 WASTE AND WASTEWATER TREATMENT SYSTEM DESIGN 3-2-4

Instruction in the theory and design of water and wastewater treatment systems including physical, biological and chemical processes. Prerequisite: CHEM150 Chemistry II; Enrollment in BES program. Day Course.

ENVM520 SUSTAINABILITY OF THE BUILT ENVIRONMENT 3-2-4

This course introduces the student to the theory and practice of sustainability for the built environment with an emphasis on life-cycle design, materials selection and resources conservation. Prerequisite: Junior status or above in BES program. Day Course.

ENVM570 INTRODUCTION TO AIR, NOISE AND RADIATION POLLUTION 3-2-4

Examines the basic concepts of air, noise and radiation pollution, typical sources and potential remedial actions. Prerequisite: PHYS310 Engineering Physics I; Enrollment in BES program. Day Course.

ENVM580 ENERGY RESOURCES AND CONSERVATION 3-2-4

This course introduces the student to the generation, transmission, use and conservation of energy at local, regional and global scales. Prerequisite: Junior status or above in BES program. Day Course.

ENVM660 SENIOR DESIGN IN ENVIRONMENTAL SCIENCE 1-6-4

Students work in small groups to perform a significant design or research project, utilizing skills and knowledge they have acquired in the Environmental Science (BES) program. Prerequisite: Senior status in BES program. Day Course.

FACILITIES PLANNING & MANAGEMENT COURSES

FMGT405 FACILITIES MANAGEMENT I 3-2-4

This course examines the scope of the professional facilities manager's position within various practice situations. The FM's role in relation to an organization's strategic plan is stressed. Prerequisite: Junior status. Day Course.

FMGT410 FACILITY SPACE UTILIZATION & MANAGEMENT 3-2-4

This course focuses on space utilization and management by studying comprehensive facilities projects. Lectures and lab assignments will emphasize issues and guidelines that are often employed to manage space requirements over time. Prerequisite: Junior status. Day Course.

FMGT415 PROJECT MANAGEMENT FOR FACILITY MANAGERS 4-0-4

Students study methods, concepts and procedures of FM project management. Topics include team development, scheduling, budgeting/estimating, contract administration, purchasing, relocations and move management. Prerequisite: Junior status. Corequisite: FMGT405 Facilities Management I. Day Course.

FMGT420 FACILITY DEVELOPMENT AND PLANNING SEMINAR 3-2-4

Informal talks by practicing developers, architects, contractors, lawyers, engineers and financiers on topics relating to facility management. Students have the opportunity to explore a topic of their own choice in facility management and to present it at the seminar. The student's final oral presentation is made with visual exhibits, and a typewritten bound report is submitted for final examination. Prerequisite: FMGT405 Facilities Management I. Day Course.

FMGT450 FACILITY ASSESSMENT AND FORECASTING 3-2-4

This course emphasizes the strategic role required of the facilities manager in providing information for corporate managers and executives for facility forecasting. Topics include corporate real estate, attorney and developer interface, operating budgets and capital expenditures, and build performance assessment. Prerequisite: FMGT500 Computer Applications for Facility Managers. Day Course.

**FMGT500 COMPUTER APPLICATIONS FOR FACILITY 2-4-4
MANAGERS**

Students study the capabilities of CAFM systems designed to enhance facilities management. Students are introduced to CAFM programs and appropriate CAD software that interfaces with CAFM format. Prerequisite: INTD285 Technical Drawing II and FMGT405 Facilities Management I. Day Course.

**FMGT550 ENERGY MANAGEMENT AND BUILDING 3-2-4
OPERATIONS**

Students examine how facilities, building operations, and maintenance organizations are managed. Topics covered include sources, forms, and methods used to manage energy consumption in buildings. Prerequisite: FMGT405 Facilities Management I. Day Course.

FMGT590 DIRECTED STUDIES RESEARCH 2-0-2

This course is in preparation for FMGT620 by having students investigate an approved

study topic and plan a project for completion in Directed Studies. Prerequisite: FMGT410, FMGT420, and FMGT500. Day Course.

FMGT610 PRINCIPLES OF REAL ESTATE FOR FACILITY MANAGERS 4-0-4

Students study real estate concepts pertinent to facility management. Topics will include real estate financial management, site selection, RE master planning, leasing, purchase vs. lease, property management and highest and best use analysis. Prerequisite: FMGT450 Facility Assessment and Forecasting. Day Course.

FMGT620 FACILITIES DIRECTED STUDIES 2-4-4

Students will select their own project with the approval of the faculty for development through the semester. Students are encouraged to select an area of investigation that is a specialization within FM that most interests them. Project will be supported by written original investigation and submitted periodically during development for review by the faculty. Prerequisite: all FMGT courses, except FMGT610, must be successfully completed prior to this course. Day Course.

GEOLOGY COURSES

GEOL360 PHYSICAL GEOLOGY 3-2-4

A study of the principles of physical geology important to many engineering activities. Included are seismic exploration methods; mineralogy; igneous and metamorphic processes; structure and stability of crustal features; ground and running water; weathering and erosion; and coastal processes. Prerequisite: MATH205 College Mathematics I. Day Course.

GEOL370 ENGINEERING GEOLOGY 4-0-4

Internal structure of the earth, composition, strength and mechanical properties of rocks, surface features, rivers, movement of groundwater, slope stability, dams erosion and land subsistence, gravity and seismic site surveying, plate tectonics and associated earthquakes and hazards are studied. Prerequisite: MATH245 College Mathematics II and PHYS210 College Physics I. Day Course.

GEOL400 SITE CHARACTERIZATION 2-4-4

An introduction to the techniques and equipment utilized to characterize the physical, chemical, and biological characteristics of a site and their interpretation as related to environmental issues or projects. Prerequisite: Completion of Sophomore Social Sciences requirement. Day Course.

HISTORY COURSES

HIST125 WORLD CIVILIZATION I 3-0-3

An introduction to concepts of culture and history. A variety of cultures are examined.

Institutions and ideas are studied from ancient times to 1600. Prerequisite (Day): Successful completion of an English sequence; Prerequisite (ACPE): ENGL105 English Composition. Day Sophomore Social Science and ACPE Course.

HIST126 WORLD CIVILIZATION II 3-0-3

An introduction to the concepts of culture and history. A variety of cultures are examined. Institutions and ideas are studied from around 1500 to the present day. Prerequisite (Day): Successful completion of an English sequence; Prerequisite (ACPE): ENGL105 English Composition. Day Sophomore Social Science and ACPE Course.

HIST130 U.S. HISTORY I: TO 1877 3-0-3

United States history from the colonial period through Reconstruction. Emphasis on the interpretation of American institutions and ideas. Prerequisite (Day): Successful completion of an English sequence; Prerequisite (ACPE): ENGL105 English Composition. Day Sophomore Social Science and ACPE Course.

HIST140 U.S. HISTORY II: FROM 1877 TO THE PRESENT 3-0-3

United States history from Reconstruction to the present. Emphasis on the interpretation of American institutions and ideas. Prerequisite (Day): Successful completion of an English sequence; Prerequisite (ACPE): ENGL105 English Composition. Day Sophomore Social Science and ACPE Course.

HIST361 ANCIENT WORLD HISTORY 3-0-3

This course deals with the variety of social, cultural and political institutions in the context of world history. Emphasis is on major ideas and changes from the Neolithic period to the seventeenth century. A research project is required. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. This course replaces HIST360; repeating this course will not satisfy any degree requirements. ACPE Course.

HIST363 MODERN WORLD HISTORY 3-0-3

This course deals with the revolutions: technological, political, cultural, intellectual and social that have shaped the modern world. A research project is required. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. This course replaces HIST362; repeating this course will not satisfy any degree requirements. ACPE Course.

HIST364 HISTORY OF AMERICAN TECHNOLOGY 3-0-3

This is a study of the relationship between technology and society in America from colonial times to the present. Emphasis is given to the history of invention and innovation and their consequences. A research project is required. Prerequisite: ENGL105 and ENGL116 or ENGL100 and ENGL115, or equivalent. ACPE Course.

HIST365 ART IN HISTORY I 3-0-3

Part One of a course which studies the development of artistic expressions in painting, sculpture, and architecture from prehistoric cave painting to the end of the Middle Ages.

The relationship between art and culture will be studied, with particular attention to cultural, philosophical, religious, and political influences. Prerequisite (Day): Successful completion of an English sequence; Prerequisite (ACPE): ENGL105 and COMM200 or ENGL105 and ENGL116. Day Course.

HIST370 TECHNOLOGY AND SOCIETY 3-0-3

This is a one-semester survey on the relationship of technology and society from ancient times to the present. Various topics are covered. Special emphasis is given to the relationship of science, engineering and technology. The cultural impact of technology is central to the course. An oral research project is required. Prerequisites: ENGL105 and ENGL116 or ENGL100 and ENGL115 or equivalent. ACPE Course.

HIST376 U.S. HISTORY TO RECONSTRUCTION 3-0-3

This course deals with American culture and institutions. Emphasis is placed on issues of national policy and the history of significant ideas in the development of the United States. A research project is required. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. This course replaces HIST375; repeating this course will not satisfy any degree requirements. ACPE Course.

HIST377 U.S. HISTORY FROM RECONSTRUCTION 3-0-3

This course deals with American culture and institutions. Emphasis is placed on issues of national policy and the technological, political, intellectual and social changes that have created a modern nation. A research project is required. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACPE Course.

HIST380 HISTORY OF LANDSCAPE DESIGN 3-0-3

This course will introduce the student to the major themes in the history of landscape design as expressed in various cultures and in so many places and times. The course will examine the designed and cultivated landscape as both a cultural icon and a social place. We will look at the people, ideas, and influences that have contributed to this enduring activity. The course will take a chronological approach and begin with the Egyptian gardens and culminate in the mid-twentieth century. Several of the more prominent elements of landscape design will be studied, including gardens, estates, villas, parks, commons and greenspaces. Prerequisite: ENGL105 or ENGL100 ACPE Course.

HIST385 ART IN HISTORY II 4-0-4

Part Two of the sequence will cover the development of artistic expressions in painting, sculpture, and architecture from the proto-Renaissance to the Impressionists, with the same consideration to the relationship between art and culture in Part One. Prerequisite: Completion of Sophomore Social Sciences requirement. Day upper level HUMN/LITR elective

HIST400 FACING HISTORY AND OURSELVES 4-0-4

Through the study of historical events, this course will examine the concepts of power, obedience, loyalty and justice in society; explore the roles and responsibilities of

individuals and groups; and confront moral issues and dilemmas that defy superficial analysis and simple solutions. Prerequisite: Completion of Sophomore Social Sciences requirement. Day upper level SOCL SCI or HUMN/LITR elective

HIST405 HOLOCAUST AND HUMAN BEHAVIOR 3-0-3

By studying the historical development and lessons of the Holocaust and other examples of genocide in the 20th century, the course will examine racism, prejudice, and anti-semitism as well as concepts of power, obedience, loyalty, and justice. By making the link between history and the moral choices confronted in our own lives, the course will make the essential connection between history and our own society. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACEPE Course.

HIST415 THE CIVIL WAR 4-0-4

The course deals with the central American event of the nineteenth century. The years before the war, the war itself, Reconstruction, and the meaning of the war today are among the topics studied. Prerequisite: Completion of Sophomore Social Sciences requirement. Day upper level SOCL SCI or HUMN/LITR elective

HIST417 THE WARS OF THE UNITED STATES 4-0-4

This course will analyze the major military conflicts of the United States from the Revolutionary War to the Gulf War. Students will examine the causes of these conflicts, the manner in which the wars were conducted, and their outcome and economic, social and international effect. Prerequisite: Completion of Sophomore Social Sciences requirement. Day upper level SOCL SCI or HUMN/LITR elective

HIST420 HISTORY OF TECHNOLOGY 4-0-4

An examination of the history of technology and its relationship to social and historical change. A special emphasis will be placed upon the transitions from one technological age to another. Prerequisite: Completion of Sophomore Social Sciences requirement. Day upper level SOCL SCI or HUMN/LITR elective

HIST425 THE HISTORY OF WORLD WAR II 4-0-4

Students will be exposed to the events that precipitated the conflict and to the major battles and personalities of the war. The political results of the war and the start of the Cold War will also be examined. Prerequisite: Successful completion of the English sequence. Day upper level SOCL SCI or HUMN/LITR elective

HIST435 HISTORY OF PHOTOGRAPHY 4-0-4

This course surveys the history and development of photography worldwide from the 1830s to the present, examining new technologies and styles such as documentary, portrait, and landscape photography. Prerequisites: Successful completion of the English sequence and Completion of Sophomore Social Sciences requirement.

Day upper level HUMN/LITR elective

HIST440 U.S. FOREIGN POLICY: THE VIETNAM ERA 4-0-4

This course deals with one of the most controversial conflicts in American history. Students will become familiar with post-World War II foreign policy, the phases of involvement in Indochina, the Vietnamese view and the domestic impact of the war. Prerequisite: Completion of Sophomore Social Sciences requirement.

Day upper level SOCL SCI or HUMN/LITR elective

HUMANITIES COURSES

HUMN105 INTRODUCTION TO ART AND ARCHITECTURE 3-0-3

Art and architecture reflect culture and technology, and represent significant career possibilities. Through readings, guest lectures, and field trips, students will explore outstanding examples in Boston, make critical reports, and develop skills for success in Architectural Technology at Wentworth. ACPE Course.

HUMN150 ART AND THEORY 4-0-4

This course is an interdisciplinary examination of selected theories driving artistic production at key historical moments and how these theories are expressed in completed works of art. Corequisite: ARCH245 Architectural Design and Technology I. Day Course.

HUMN395 THE ART OF THE NATURAL GARDEN 3-0-3

A garden is a mix of culture and cultivation, a place of pleasure and reflection, society and solitude. This course will examine the elements and components of the natural garden in all its expressions as both fine art and a refining involvement with the natural environment. Historical references and contemporary practice will be used to give an integrated view of context and theory. Prerequisites: ENGL105 and ENGL116 or ENGL100 and ENGL115 or equivalent. ACPE Course.

HUMN402 SHAKESPEARE ON FILM 4-0-4

This course will examine several of Shakespeare's plays as literature and then how these plays have been brought to film, both in their historic and artistic contexts. In the course of this examination, the nature of film, the nature of artistic interpretation, the significance of audience response and the significance of authorial intent will be considered. Prerequisite: Completion of Sophomore Social Sciences requirement.

Day upper level HUMN/LITR elective

HUMN403 HISTORY OF AMERICAN FOLK MUSIC 4-0-4

This course covers the history of American folk music from the work songs and spirituals of the 17th and 18th centuries to the folk revival of the 1960s. Numerous musical genres and traditions will be covered including gospel, minstrelsy, blues, ragtime, country, and bluegrass within various social, cultural, and political contexts. Matters of race, class, and gender will be given particular emphasis. Prerequisite: Completion of the Sophomore Social Sciences requirement. Day upper level HUMN/LITR elective.

HUMN407 SPECIAL TOPICS IN HUMANITIES 4-0-4

Independent studies in humanities to be arranged with the program advisor. Requires approval of the department head. Prerequisite: Completion of Sophomore Social Sciences requirement. Day Course.

Recent Special Topics (HUMN407) course offerings include:

IRISH CULTURAL STUDIES

Irish History, Irish Art and Irish Literature will be examined. An optional trip to attend classes and lectures at the Institute of Tralee, Ireland is available as part of this course. A term paper is required for students who do not take the optional trip. Prerequisite: Successful completion of English sequence.

Day upper level SOCL SCI or HUMN/LITR elective

HUMN420 HUMANITIES AND THE ARTS 4-0-4

An introductory course which will explore a variety of art forms, including film, drama, music, painting, sculpture and architecture. Literary works which have inspired or influenced other cultural forms will also be studied. A special effort will be made to utilize the cultural resources available in the Boston area. Prerequisite: Completion of Sophomore Social Sciences requirement. Day upper level HUMN/LITR elective

HUMN425 TECHNICAL THEATRE 4-0-4

The course explores the relationship between the written text and design. Design, decoration, light, sound, and color are elements that affect performance. Several plays and their technical challenges are studied. Prerequisites: Completion of Sophomore Social Sciences requirement. Day Course.

HUMN430 HISTORY OF MOTION PICTURES 4-0-4

An introduction to the monuments of film art and a survey of the development of motion pictures from their beginning to the present time. The emphasis will be upon films as art forms and upon the contributions of individual directors. Prerequisite: Completion of Sophomore Social Sciences requirement. Day upper level HUMN/LITR elective

HUMN435 AMERICAN CINEMA - AMERICAN CULTURE 3-0-3

This course deals with the historical development of American film and the film industry. Particular attention is given to the relationship between films and American culture. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACEP Course.

**HUMN437 AMERICAN CINEMA AS REFLECTION OF
AMERICAN CULTURE 4-0-4**

This course will examine selected critical American films as reflections of and products of American culture. The impact of certain particularly American themes on these films will be explored, both in an historical and artistic context. Prerequisite: Completion of Sophomore Social Sciences requirement. Day upper level HUMN/LITR elective

HUMN445 MODERN AGE IN ART AND LITERATURE 4-0-4

A study of the issues of modern society as seen in art and literature. Time frame 1870 to the present. Prerequisite: Completion of Sophomore Social Sciences requirement.

Day upper level HUMN/LITR elective

HUMN455 HUMANITIES THROUGH THE ARTS 3-0-3

This course investigates ways in which the arts (painting, music, dance, theatre, sculpture, film and literature) explore the humanities and reveal the human condition.

Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACPE Course.

HUMN461 ANTHROPOLOGY OF ART 4-0-4

Using anthropological methods, the course examines the definition of art by studying the role of the artist and the artistic process in various cultures and subcultures.

Prerequisite: Completion of Sophomore Social Sciences requirement.

Day upper level HUMN/LITR elective

HUMN465 THE AMERICAN DREAM 4-0-4

An examination of that which is unique in the American experience as expressed in literature. This course will provide the student with a profile of the American character as portrayed in the national literature. The focus will be upon political, religious and economic roots which illuminate the past and make the present more comprehensible.

Prerequisite: Completion of Sophomore Social Sciences requirement.

Day upper level HUMN/LITR elective

HUMN475 AMERICAN ART 4-0-4

This course is a survey of American art from the pre-colonial period to the present. American art production will be evaluated for both its aesthetic value and as an historical document. Prerequisite: Successful completion of English sequence and Completion of Sophomore Social Sciences requirement.

Day upper level HUMN/LITR elective

HUMN485 UNDERSTANDING GLOBALIZATION THROUGH ART 4-0-4

An examination of the impact of globalization on a broad range of art communities in an effort to understand how expanded international connections have yielded re-definitions of cultural and national identity. Prerequisite: Successful completion of English sequence and Completion of Sophomore Social Sciences requirement.

Day upper level HUMN/LITR elective

INDUSTRIAL DESIGN COURSES

INDS150 DESIGN HISTORY I 4-0-4

Beginning with the Industrial Revolution, the student is made aware of the social, economic, technological and artistic forces, as well as unique individuals that shaped the evolution of modern design.

Day Course.

INDS205	DESIGN HISTORY II	4-0-4
<p>This course introduces students to the social, political, technological and artistic forces, as well as the unique individuals that shaped the twentieth century in design. Prerequisite: INDS150 Design History I. Day Course.</p>		
INDS215	CAD I	2-2-3
<p>This is an introductory course in the use of traditional and computer-aided drafting techniques utilized in the Industrial Design profession. The basic principles of orthographic sketching and drawing are covered. Day Course.</p>		
INDS222	VISUALIZATION I: PERSPECTIVE DRAWING	2-4-4
<p>This course introduces students to perspective concept drawing and sketching used by industrial designers. One and two-point perspective, line value, lighting, surface value, shade, shadow and techniques are covered. Prerequisite: DSGN105 Drawing I. Day Course.</p>		
INDS265	MODELING TECHNIQUES I	2-4-4
<p>This course develops students' model-making skills in the use of various papers, wood, foam plastics, and fabrication technologies to assemble study models for studio courses. Corequisite: INDS275 Industrial Design I: Studio. Day Course.</p>		
INDS275	INDUSTRIAL DESIGN I: STUDIO	1-6-4
<p>This studio focuses on design methodology and problem solving techniques to develop and enhance creativity. Small scale design problems in packaging, table and desk top products are used. Please refer to the Design Studio Grade Requirement on page B-37 regarding the final grade for this course. Prerequisite: DSGN165 Design II and INDS222 Visualization I. Day Course.</p>		
INDS280	VISUALIZATION II: IDEATION	0-6-3
<p>This course introduces students to advanced freehand drawing and format conventions used by industrial designers to communicate design concepts visually. Professional presentation skills are stressed. Prerequisite: INDS222 Visualization I. Day Course.</p>		
INDS300	INDUSTRIAL DESIGN II: STUDIO	1-6-4
<p>This studio focuses on the comprehensive integration of small-scale design problems with issues of appearance, function, materials, and manufacturing processes. Please refer to the Design Studio Grade Requirement on page B38-39 regarding the final grade for this course. Prerequisite: INDS275 Industrial Design I: Studio. Day Course.</p>		
INDS310	VISUALIZATION III: RENDERING TECHNIQUES	2-2-3
<p>This course advances the student's understanding of representing objects in freehand depictions, and begins to integrate the computer as a tool for refining and altering those depictions. Prerequisite: INDS280 Visualization II: Ideation. Day Course.</p>		

IINDS515 CAD III (3-D MODELING) 2-2-3

This course focuses on 3-D modeling using the computer. Concepts in rapid prototyping will also be introduced. Prerequisite: INDS415 CAD II. Day Course.

INDS565 DESIGN PERSPECTIVES: TOPICS IN HISTORY 4-0-4

Students take an in-depth look at selected movements, individuals, companies and/or product lines that are significant in the history of industrial design. Prerequisite: Junior status. Day Course.

INDS575 INDUSTRIAL DESIGN V: STUDIO 0-8-4

This studio focuses on social scale design problems such as biomedical, exhibit, and environmental projects. Student solutions that explore primary research are emphasized. Please refer to the Design Studio Grade Requirement on page B38-39 regarding the final grade for this course. Prerequisite: INDS500 Industrial Design IV: Studio. Day Course.

INDS580 DIRECTED STUDIES: RESEARCH 2-0-2

Students propose an area of study to faculty. Faculty define projects within area of proposed study for students to choose and develop a research document. This document becomes the basis for their Directed Studies design project. Day Course.

INDS600 PROFESSIONAL PRACTICE 4-0-4

The course examines business and legal aspects of Industrial Design practice by focusing on financial and project management, marketing, and personnel issues. Professional standards and ethics in design are discussed. Day Course.

INDS625 DIRECTED STUDIES 0-8-4

Students develop and complete their design projects based on their previous semester's research document. Individual student professional development is emphasized. Please refer to the Design Studio Grade Requirement on page B38-39 regarding the final grade for this course. Prerequisites: INDS575 Industrial Design V: Studio; INDS580 Directed Studies Research. Day Course.

INDS635 SENIOR SEMINAR 2-0-2

This seminar investigates the future of design and its impact on the planet, the responsibilities of the designer to society and the profession, and the expectations of graduates upon entering the field of design. Day Course.

INTERIOR DESIGN COURSES

INTD155 TECHNICAL DRAWING I 1-6-4

The basic principles and methods for drawing three-dimensional space are explored using a variety of media. Orthographic, paraline, and perspective drawings are introduced as critical tools for understanding and representing interior design. Day Course.

to the Design Studio Grade Requirement on page B38-39 regarding the final grade for this course. Prerequisite: INTD211 Interior Studio I. Day Course.

INTD325 TECHNICAL STUDIES III 3-2-4

This course provides students with an introduction to the following building systems that support interior environments: lighting; power, data, communication; HVAC (heating, ventilation and air conditioning); security; and acoustics. Prerequisite: INTD225 Technical Studies I. Day Course.

INTD401 INTERIOR STUDIO III 0-12-6

Demonstrating their proficiency with the design process, students develop comprehensive solutions for a private residential interior by synthesizing their expanding theoretical, artistic, technical and practical knowledge. Please refer to the Design Studio Grade Requirement on page B38-39 regarding the final grade for this course. Prerequisite: INTD301 Interior Studio II. Day Course.

INTD430 INTERIOR ARCHITECTURAL LIGHTING 3-2-4

This course is an in-depth study of interior illumination from aesthetic, technical, and functional points of view. Conceptual design and documentation, lamps, luminaries, color rendition, lighting calculations, and daylighting will be presented through lectures, projects, and site observation. Prerequisite: INTD325 Technical Studies III. Day Course.

INTD450 FURNITURE DESIGN AND CONSTRUCTION 2-4-4

The course explores both design issues and construction techniques used in furniture. Both free-standing and built-in furniture projects are studied for residential and contract use. Emphasis is placed on the various stages in furniture production - from the concept state, the detailing and shop drawing, to the prototype model stage. Prerequisite: Junior status. Day Course.

INTD455 MATERIALS AND FURNITURE SPECIFICATIONS 2-0-2

This course presents industry standard formats for selection and specification of construction materials. Selection criteria and specification formats for furniture are introduced. Prerequisite: INTD275 Technical Studies II. Corequisite: INTD500 Construction Documents. Day Course.

INTD460 TEXTILES 3-2-4

A study of fabrics and their use in interior spaces that examines construction, coloring and printing techniques, finishes and properties of natural and manmade fibers. The quality, price, performance and maintenance of fabrics are discussed in relationship to their practical application and the governing safety regulations. Day Course.

INTD485 BEHAVIORAL ASPECTS OF DESIGN 3-0-3

Through lectures and discussions, students examine psychological and social research that assesses the dynamic relationship between human behavior and the physical

environment with an emphasis on interior spaces. Special populations may be discussed - the elderly, children, and the physically challenged. Prerequisite: Junior status. Day Course.

INTD500 CONSTRUCTION DOCUMENTS 2-4-4

Students learn the graphic conventions and appropriate formats to translate design documents into construction documents employing CAD (computer-aided design). Prerequisites: INTD275 and INTD285. Corequisite: INTD455. Day Course.

INTD501 INTERIOR STUDIO IV 0-12-6

Projects of intermediate programmatic complexity are studied in context with commercial building types - typically office space. Project resolution requires solutions that simultaneously resolve theoretical, artistic, technical, and practical issues. Please refer to the Design Studio Grade Requirement on page B38-39 regarding the final grade for this course. Prerequisite: INTD401 Interior Studio III. Day Course.

INTD515 BUILDING REGULATORY REQUIREMENTS 2-0-2

The focus of this course is a comprehensive study of regulatory issues that affect the design of interior spaces. Day Course.

INTD570 PROGRAMMING FOR INTERIOR DESIGN 2-0-2

The focus of this course is a comprehensive study of “programming”, the systematic collection and documentation of project parameters including both quantitative and qualitative data. Students will also begin preparation for INTD621 Directed Studies Studio. Day Course.

INTD601 INTERIOR STUDIO V 0-12-6

Projects of advanced programmatic complexity are studied in context with institutional building types. Project resolution requires competent and creative solutions that explore and simultaneously resolve theoretical, artistic, technical, and practical issues concerning the integration of selected building systems. Please refer to the Design Studio Grade Requirement on page B38-39 regarding the final grade for this course. Prerequisite: INTD501 Interior Studio IV. Day Course.

INTD610 PROFESSIONAL PRACTICE 4-0-4

The course examines business and legal aspects of interior design practice by focusing on financial and project management, marketing, and personnel issues. Ethics and career path issues in design are discussed. Day Course.

INTD621 DIRECTED STUDIES STUDIO 0-12-6

Following faculty approval of a “project brief” highlighting a building type, building program, and personal learning objectives, students are permitted to pursue the design of individually created projects. Please refer to the Design Studio Grade Requirement on page B38-39 regarding the final grade for this course. Prerequisite: INTD601 Interior Studio V. Day Course.

LITERATURE COURSES

LITR320 AMERICAN SHORT FICTION 3-0-3

A study of the American short story. Content is variable. Literature is studied as a reflection of craft, culture and ideas. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACPE Course.

LITR330 INTRODUCTION TO POETRY 3-0-3

This course will look at poetry as literature of communications and technique, and investigate several forms of poetry, their history and application. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACPE Course.

LITR410 AMERICAN LITERARY CLASSICS 4-0-4

This course will provide an opportunity for students to explore the works of selected American writers whose vision and artistry have given distinction to American literature. Certain 19th and 20th century authors will be selected by the instructor. Prerequisite: Completion of Sophomore Social Sciences requirement.

Day upper level HUMN/LITR elective

LITR415 SOCIAL THEMES IN LITERATURE 3-0-3

This course will focus on literary works of the 20th century which explore the social and philosophical changes that grew out of such seminal social events as the Industrial Revolution, the global wars, or the various modern protest movements. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACPE Course.

LITR420 POST-COLONIAL LITERATURE 4-0-4

An introduction to 20th-century authors who come from countries that were once European colonies and who in their writing address colonialism and its consequences. Through the study of this literature students will gain an understanding of colonialism's impact on the history, society, culture, and identity of the colonized, and achieve insight into the post-colonial response to stereotypes of the colonized. Prerequisite: Completion of the Sophomore Social Sciences requirement. Day upper level HUMN/LITR elective

LITR425 TWENTIETH CENTURY LITERATURE 4-0-4

Through the study of authors such as Remarque, Dostoevsky, Kafka, Sartre and Hemingway, this course will assess the problems of alienation, isolation and individual responsibility as they are confronted by modern man in the twentieth century. Prerequisite: Completion of the Sophomore Social Sciences requirement Day upper level HUMN/LITR elective

LITR435 LITERATURE OF THE TWENTIETH CENTURY 3-0-3

An exploration of modern and contemporary fiction, in which students will investigate how 20th century authors treat such themes as personal and social conflict, isolation,

globalization, hope and despair. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACPE Course.

LITR440 CONTEMPORARY LITERATURE 4-0-4

Readings in poetry, fiction and drama of the Post-World War II period. This course examines American literature and cultural history from 1945 to the present. The work of major writers will be studied to gain insights into the life of our times. Prerequisite: Completion of Sophomore Social Sciences requirement.

Day upper level HUMN/LITR elective

LITR445 LITERATURE AND THE MODERN AGE 4-0-4

This course will explore the modern age primarily through literature and, on occasion, representations of the plastic arts. Critical thinking will be employed to facilitate this investigation. Direct connections will be made between the literary works studied and the human situation in the modern era. Time frame is 1840 to the present. Prerequisite: Successful completion of English sequence and HUMN150 Art and Theory; Corequisite: ARCH345 Architectural Design and Technology II. Day Course.

LITR460 SCIENCE FICTION AND FANTASY 4-0-4

Readings in science fiction and fantasy including myth and legend and classic literature in the 19th and 20th centuries. The social implications of technology in the 20th century science fiction literature will be explored. Prerequisite: Completion of Sophomore Social Sciences requirement. Day upper level HUMN/LITR elective

LITR462 FANTASY AND SCIENCE FICTION 3-0-3

This course will examine imaginative literature such as mythology, fantasy, and science fiction, as both a reflection of the world in which it was created and as a reflection on the future of humankind. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACPE Course.

LITR465 SHORT FICTION 4-0-4

This course studies the form of the short story in the literature of Great Britain, the United States and other nations. Content is variable. Stories are studied as a reflection of craft, culture and ideas. Prerequisite: Completion of Sophomore Social Sciences requirement. Day upper level HUMN/LITR Elective

LITR468 SHORT STORY 3-0-3

This course studies the form of the short story in the literature of Great Britain, the United States and other nations. Content is variable. Stories are studied as a reflection of craft, culture and ideas. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACPE Course.

LITR470 LITERATURE OF SOCIAL COMMENTARY 4-0-4

This course will be concerned with literary works of 19th and 20th century writers who

have explored the social and philosophical changes which grew out of the Industrial Revolution, the American Labor Movement, and modern protest movements.
Prerequisite: Completion of Sophomore Social Sciences requirement.

Day upper level HUMN/LITR elective

LITR480 MODERN NOVEL 4-0-4

Students taking this course will study a variety of short novels by contemporary authors. Students will investigate how modern writers treat such themes as personal and social conflict, and visions of change and hope, as suggested by these authors.
Pre-requisite: Completion of Sophomore Social Sciences requirement.

Day upper level HUMN/LITR elective

MANAGEMENT COURSES

MGMT111 INTRODUCTION TO MANAGEMENT 1-0-1

This informational seminar focuses on student discovery as related to the management discipline, careers, models and theories, and management research techniques. This seminar also introduces students to the three concentrations within the management program: Technology Management, Communication, and Project Leadership.
Prerequisite: Enrollment in BSM. Day Course.

MGMT115 INTRODUCTION TO PROJECT MANAGEMENT 2-2-4

This course surveys major areas of project management: design processes, scheduling, financing, production, marketing, and distribution. Organizational structures will also be discussed. Prerequisite: MATH235 College Mathematics C. ACPE Course.

MGMT145 INTRODUCTION TO COMPUTERS AND BUSINESS APPLICATIONS 3-2-4

This course covers the implementation of computer programs for several business areas including marketing and accounting. Students are introduced to intermediate to advanced level word processing, spreadsheets, database, presentation, HTML and a spectrum of “out-of-the-box” business applications. Business applications, project management, techniques, design and development are reviewed. Corequisite: Enrollment in BSM program. Day Course.

MGMT195 MANAGEMENT INFORMATION SYSTEMS 2-2-3

This course introduces the student to various concepts and considerations involved in the education, design, implementation and operation of Management Information Systems. This is an integrative course that brings together information, computers, and the systems approach. Prerequisite: COMP113 Introduction to Computers and Programming or MGMT145 Introduction to Computers and Business Applications. Day Course.

MGMT250 RESEARCH METHODS IN BUSINESS 3-2-4

This course provides prospective managers with an understanding of the skills necessary to make effective use of formal quantitative and qualitative research and analytical processes. Prerequisite: MATH250 Precalculus. Day Course.

MGMT280 CONTEMPORARY MANUFACTURING 3-2-4

A survey of modern manufacturing practices with emphasis placed on the concepts of lean manufacturing. Topics in job design include: capacity planning, ergonomics and environmentally-friendly manufacturing. Prerequisite: MATH245 College Mathematics II and MGMT250 Research Methods in Business. Day Course.

MGMT300 INVESTMENT PRINCIPLES 4-0-4

This course presents a broad overview of the concept, practices and procedures of investment management. Reviews various types of investments, including the role of security markets and security analysis. Day Course.

MGMT320 INTRODUCTION TO TECHNOLOGY MANAGEMENT 2-2-3

Introduction to technology management concepts and principles, serving as a foundation for further study. Course focuses on the scope of technology management: leadership, innovation, ethics, knowledge management, strategic planning, research, process management and more. Prerequisite: Successful completion of MGMT111 Introduction to Management. Day Course.

MGMT325 INTRODUCTION TO PROJECT PLANNING AND LEADERSHIP 3-0-3

This survey course introduces students to the many issues involved in creating and leading a project team. Topics will include, but will not be limited to, the importance of teamwork, barriers to teamwork, leadership skills and group process. Prerequisite: Successful completion of MGMT111 Introduction to Management. Day Course.

MGMT390 FINANCIAL ACCOUNTING 2-2-3

An introduction to the basics of the accounting process. The course covers the basic techniques of analyzing financial transactions, trial balances, and preparation of financial statements. Day and ACPE Course.

MGMT403 INDEPENDENT STUDIES IN MANAGEMENT 3-0-3

Independent studies in management to be arranged with a subject area faculty member and approved by the Humanities, Social Sciences, and Management Department Head. Prerequisite: Junior status. Day Course.

MGMT406 SPECIAL TOPICS IN MANAGEMENT 4-0-4

Independent studies in management to be arranged with the program advisor. Requires approval of the department head. Prerequisite: Junior Status. Day Course.

MGMT410 THE MANAGEMENT OF CONTEMPORARY ORGANIZATIONS 4-0-4

This course examines the human aspects of management and is concerned with the ways in which the interactions of members of the management hierarchy contribute to the achievement of organizational goals. The course utilizes both case studies and textual material allowing students to apply management approaches to a variety of management situations and environments. Prerequisite: Junior status. Day Course.

MGMT415 LEADERSHIP AND MANAGEMENT 3-2-4

The course presents a range of contemporary theories in management. The role of the leader and how to create leadership are stressed. Prerequisite: Fourth-year status. ACPE Course.

MGMT418 MANAGEMENT LAW 2-2-4

To familiarize students with legal aspects of business and management, with special emphasis on torts, contracts, choice of business entity and creditor and consumer issues that students may encounter in their careers. Prerequisite: Fourth-year status. ACPE Course.

MGMT425 EFFECTIVE TEAM BUILDING 3-0-3

Many projects in business, industry and government are group efforts. The course covers the study of group dynamics that encourage both invention and achievement. Prerequisite: Fourth-year status. ACPE Course.

MGMT435 MANAGERIAL ACCOUNTING 3-2-4

The course deals with cost accounting information and its use in managerial decision-making. Budgets, cost behavior, and determination, profit and expense planning, production and materials planning are among topics considered. Prerequisite: Junior status; MGMT390 Financial Accounting. Day Course.

MGMT440 PROJECT PLANNING AND CONTROL 3-2-4

A study of design and production projects in their entirety. Costs, resource allocation, planning techniques and programs, management styles, and leadership methods are among the topics considered. Prerequisite: (Day) Junior status; (ACPE): Fourth-year status. Day and ACPE Course.

MGMT445 SMALL BUSINESS MANAGEMENT 4-0-4

A course for students who may someday go into business for themselves and for those who are already in business for themselves. This course covers the entire spectrum of entrepreneurship. Graphics and case studies are used throughout the course. Prerequisite: Junior status; MGMT390 Financial Accounting. Day Course.

MGMT450 FINANCIAL MANAGEMENT 4-0-4

This course is an introduction to basic financial management. Topics include financial analysis and planning, working capital management, the time value of money, valuation,

cost of capital, capital budgeting, dividend policy, different types of securities, short-term and long-term financial decision, and an introduction to international finance and international trade organizations. Prerequisite: MGMT390 Financial Accounting.

Day and ACPE Course.

MGMT460 LABOR RELATIONS 4-0-4

Current labor law arbitration processes, labor agreements, and the negotiation process are interrelated in actual case studies. Grievance proceedings, wage negotiation, and contract negotiation are treated specifically. Prerequisite: Fourth year status. ACPE Course.

MGMT462 BUSINESS LAW 3-2-4

This course is designed to give students a basic understanding of the principles of the American legal system. It covers the foundation of the system and treats topics important to business and industry such as: business organizations, contract laws, torts, and commercial transactions. Prerequisite: Junior status. Day Course.

MGMT466 HUMAN RESOURCE AND LABOR MANAGEMENT 2-2-3

This course surveys what managers need to know about human resource management. The course covers staff planning, recruitment/selection, compensation/benefits, performance management and labor relations. Prerequisite: Junior status; and MGMT410 Management of Contemporary Organizations. Day Course.

MGMT473 PRINCIPLES OF MARKETING MANAGEMENT 3-2-4

Designed to give the student a broad appreciation of the fundamentals of marketing analysis. Discussions of actual case studies are used to study advertising, personal selling, channels of distribution, marketing research, pricing, new product policy, and the marketing mix. Prerequisite: Junior status. Day Course.

MGMT480 POLICY AND PLANNING 3-2-4

An analysis of management from a long-term perspective. The course focuses on the changing nature of internal and external environments and the continuous process of management decision-making in facing the future. Prerequisite: MGMT450 Financial Management. ACPE Course.

MGMT490 LABOR RELATIONS 3-0-3

Current labor law arbitration processes, labor agreements, and the negotiation process are interrelated in actual case studies. Grievance proceedings, wage negotiation, and contract negotiating are treated specifically. Prerequisite: Senior status. Day Course.

MGMT500 MANAGEMENT INFORMATION SYSTEMS 3-2-4

This course introduces the student to various concepts and considerations involved in the education, design, implementation and operation of management information systems. This is an integrative course that brings together information, computers and the

system approach. Prerequisite (Day): COMP113 and COMP482; Prerequisite (ACPE): Junior status and COMP112 or equivalent. ACPE Course.

MGMT505 PRINCIPLES OF MANAGEMENT 3-2-4

This survey course includes the basic management concepts and disciplines of planning, organizing, directing, controlling, and supervising along with new and rapidly developing areas of management. The skills needed to manage effectively under constantly changing conditions are identified. Active involvement through lectures, discussion, case studies, role playing, and group exercises will be required of each student. Note: Students enrolled in BSM are not eligible to take this course. Day Course.

MGMT510 ENGINEERING ECONOMY 3-0-3

The study of the effect of the time value of money and tax consequence on the analysis of engineering problems. Areas such as equipment and project costs and investment transactions are included. Prerequisite: MATH205 College Math I or MATH230 College Mathematics B or MATH265 Engineering Mathematics. Day and ACPE Course.

MGMT515 OPERATIONS MANAGEMENT 3-2-4

A study of planning and control methods for industrial and production processes. Typical topics included: scheduling, updating, time-cost analysis, cost control, resource allocation, and the role of personnel in projects. Prerequisite: Junior status; and MGMT280 Contemporary Manufacturing. Day Course.

MGMT520 POWER AND LEADERSHIP IN ORGANIZATIONS 4-0-4

This course will provide an overview of approaches to leadership. The relationship between the factors of organization, power, and leadership are considered through provocative analysis. This course will include a combination of lecture, discussion, readings in leadership theory, media, role-play, and selfreflection. Prerequisite: Junior status. Day Course.

MGMT525 GROUP PROCESSES AND TEAM BUILDING 3-0-3

This second course in the Project Leadership concentration provides experiences in applying the theories of group behavior and team building to the analysis of organizational behavior. Readings, activities and case studies are utilized. Prerequisite: Junior status; and MGMT325 Introduction to Project Planning and Leadership. Day Course.

MGMT530 TECHNOLOGY ASSESSMENT AND ACQUISITION 2-2-3

This course provides a practical approach to technology assessment and acquisition through case studies, research, guest speakers and published books. The strategic tasks related to technology assessment/acquisition are covered. Students will learn about technology evaluation and selection methodologies. Prerequisite: Junior status; and MGMT320 Introduction to Technology Management. Day Course.

MGMT560 MARKETING MANAGEMENT 4-0-4

Designed to give the student a broad appreciation of the fundamentals of marketing analysis. Discussions of actual case studies are used to study advertising, personal selling, channels of distribution, marketing research, pricing, new product policy, and the marketing mix. Prerequisite: Fourth-year status. ACPE Course.

MGMT570 STRATEGIC MANAGEMENT 3-2-4

This course presents and explains concepts and theories useful in understanding the strategic process. It provides students with the opportunity to apply concepts, skills, and techniques to real-world corporate problems. Prerequisite: MGMT111 Introduction to Management, MGMT450 Financial Management, MGMT473 Principles of Marketing Management, and MGMT466 Human Resource and Labor Management. Day Course.

MGMT580 BUSINESS NEGOTIATIONS 2-2-4

The course is a study of human behavior in the business world that offers a practical, professional approach toward agreement attainment. Strategic planning, consensus building, influence, time management, perceived value, customer focus, and satisfaction of organizational and individual goals are among the topics considered. Prerequisite (ACPE): Fourth-year status. ACPE Course.

MGMT585 THE GLOBAL ECONOMY 3-2-4

This course will examine the global economic shifts which have precipitated regional and global economic integration and interdependence among the world's economies. Topics include the role of international organizations, global corporations, and international flows of finance, information, technology and trade in shaping the scope, depth, and pace of economic growth and development in the international community. Prerequisites: ECON110 Economics, ECON115 Macroeconomics or ECON215 Microeconomics; and Junior status. Day Course.

MGMT590 PROFESSIONAL PRACTICE 2-2-4

An examination of current professional practice through the case study method. Case studies and lecturers will be selected to reflect a student's discipline area. Prerequisite: Third year status. ACPE Course.

MGMT605 MANAGEMENT POLICY 2-2-3

The course exposes the student to long-range and strategic decision-making in the life-span of private and public enterprises. Emphasis is placed on the analysis of organizations and their external environment. Case studies are utilized. Prerequisite: Third year status. ACPE Course.

**MGMT615 MANAGEMENT ELECTRONIC CAREER
PORTFOLIO (ECP) 0**

From the first year through the senior year, BSM students are required to compile an

electronic career portfolio of their work in consultation with their academic advisor and concentration track advisor. The ECP should be a representative sampling of the student's best work for each semester and conform to the Management Electronic Career Portfolio Requirement Guidelines that are available in the Humanities, Social Sciences and Management Department office. In the spring semester of the senior year, seniors are required to register for their graded portfolio assessment. Prerequisite: Graduating Senior status in BSM. Day Course.

MGMT620 TECHNOLOGY TRANSFER 3-2-4

This course provides a practical approach for understanding technology transfer through case studies, research, guest speakers and published books. The course is presented from a multi-dimensional perspective acknowledging that a shift takes place within an organization upon the adoption of new technology. Prerequisite: Junior status; and MGMT530 Technology Assessment and Acquisition. Day Course.

MGMT625 BUSINESS NEGOTIATION PRINCIPLES 2-2-3

This course is a study of human behavior in the business world that offers a practical, professional approach toward agreement attainment. Strategic planning, consensus building, influence, time management, perceived value, customer focus, and satisfaction of organizational and individual goals are among the topics considered. Prerequisite: Junior status in BSM or BFPM. Day Course.

MGMT630 ADVANCED TOPICS IN TECHNOLOGY 3-2-4
MANAGEMENT

This course examines current trends in Technology Management including ECommerce. It equips the student with a practical and conceptual understanding of what is needed to develop and maintain competitive advantage in the new economy. Students will learn about the e-business technologies, develop an ebusiness model, and determine the infrastructure needed to support an ebusiness. Prerequisite: Junior status; and MGMT620 Technology Transfer. Day Course.

MGMT650 SENIOR PROJECT 2-4-4

A capstone course. Students undertake a significant project with faculty guidance. A project presentation is required. Prerequisite: MGMT590 Professional Practice or MGMT570 Strategic Management. Day and ACPE Course.

MANUFACTURING COURSES

MANF155 MANUFACTURING PROCESSES 3-2-4

This survey course introduces the student to the operation of the engine lathe, drill press, surface grinders, and milling machines. Fabrication techniques, machining times, set-up times, material feed rates, and cutting speeds are analyzed throughout the course. ACPE Course.

MANF195 MANUFACTURING PROCESSES I 1-6-4

This course is designed to provide a basic understanding of present-day manufacturing processes. Through lectures, demonstrations, and practical applications, the student will be introduced to various manufacturing processes. Topics will include machine tools, welding, casting, sheet metal, and an introduction to numerical control programming.

Day Course.

MANF260 QUALITY CONTROL 2-2-3

This course examines quality and reliability development, process planning, evaluation and control, supplier quality assurance measurement equipment and field quality evaluation. Much of this course is devoted to statistical control concept and quality circles which are further investigated in the laboratory. Prerequisite: MATH250 Precalculus; and MGMT250 Research Methods in Business.

Day Course.

MANF305 COMPUTER AIDED MANUFACTURING 1-4-3

A hands-on computer-aided manufacturing course. Students will utilize the latest PC-based industrial “CAM” software to produce Computer Numerical Control machine tool programs. The students will perform several milling and turning projects. Prerequisite: MANF195 Manufacturing Processes and ELMC110 Engineering Graphics.

Day Course.

MANF306 COMPUTER NUMERICAL CONTROL PROGRAMMING 1-4-3

This is a survey course of computer-aided industrial programming. Students are introduced to the history and fundamental concepts of Manual Numerical Control (NC) programming. Students will use a PC graphics-based “CAM” software package to produce Computer Numerical Control (CNC) programs. Several industrial machining lab projects will also be assigned. Prerequisites: MATH205; and DSGN135 or COMP113; and INTD155 or ELMC110.

Day Course.

MANF405 MANUFACTURING PLANNING AND CONTROL 2-4-4

Topics in production planning, including time-series analysis, inventory systems, project planning, scheduling, and operations sequencing, will be examined. Process planning, methods, and work measurement will also be covered. Students will participate in a competitive computer simulation, using the manufacturing control elements presented in the course. Prerequisite: Junior status.

Day Course.

MANF500 APPLIED ROBOTICS 2-2-3

Components and systems that make up a flexible manufacturing cell, including robotics and automated systems, will be presented. The course places heavy emphasis on process control, including sensor and programmable logic applications. Students will demonstrate proficiency in all aspects of production control through presentations and laboratory projects. Prerequisite: MANF305 Computer Aided Manufacturing.

Day Course.

MANF530 QUALITY ASSURANCE 3-2-4
This course examines quality and reliability development, process planning, evaluation, and control, supplier quality assurance, measurement equipment, and field quality evaluation. Much of this course is devoted to Statistical Process Control and Total Quality Management. Prerequisite: Junior Status; MATH505 Probability and Statistics for Engineers. Day Course.

MANF600 FLEXIBLE MANUFACTURING SYSTEMS 3-2-4
Components and systems that make up a FMS will be studied, including automated guided vehicles, automatic storage and retrieval systems, material handling equipment, automated quality control, and tool management equipment. Using the principles of design for manufacture and group technology, students will complete a project utilizing an existing flexible manufacturing cell. Prerequisite: MANF500 Applied Robotics. Day Course.

MATHEMATICS COURSES

MATH120 BASIC ALGEBRA 4-0-4
Algebraic operations and equations, exponents and radicals, polynomials and factoring, and introduction to the geometry of angles and triangles. Prerequisite: Placement by the ACPE Admissions Office. ACPE Course.

MATH130 STATISTICS AND APPLICATIONS 3-2-4
This course is designed to introduce students to statistical concepts relating to engineering design, inspection, and quality assurance. Topics covered include probability, normality, sampling, regression, correlation, and confidence intervals in reliability. Sampling plans, including MIL-STD-105 and MIL-ST-D-4, will be examined. Day Course.

MATH205 COLLEGE MATHEMATICS I 3-2-4
Algebra and trigonometry, including algebraic fractions, systems of linear equations, quadratic equations, literal equations, word problems and their solutions, right triangles, and vectors. Applications will be stressed. Prerequisite: High School Algebra II. Day Course.

MATH211 PLANE AND SOLID GEOMETRY 4-0-4
A survey of elementary Euclidean geometry including lines and angles, measurement and units, properties of triangles, parallelograms, trapezoids, regular polygons, circles, conic sections, spheres, cylinders, pyramids, polyhedra, areas and volumes. Day Course.

MATH225 COLLEGE MATHEMATICS A 3-0-3
Topics in college algebra including exponents, radicals, complex numbers, polynomials, factoring, algebraic fractions, equation solving techniques, an introduction to functions and their graphs, and linear functions. ACPE Course.

MATH230 COLLEGE MATHEMATICS B 3-0-3

Topics in college algebra including functions and their graphs, composite and inverse functions, applied functions and variation, quadratic functions, exponential functions, logarithmic functions, systems of equations and applications. Prerequisite: MATH225 College Math A. ACPE Course.

MATH235 COLLEGE MATHEMATICS C 3-0-3

Topics in college algebra and trigonometry including the trigonometric functions, inverse trigonometric functions, trigonometric identities, trigonometric equations, and applications. Prerequisite: MATH230 College Math B. ACPE Course.

MATH250 PRECALCULUS 3-2-4

Topics include: polynomial and rational functions, exponential and logarithmic functions, trigonometric functions, parametric equations, analytic trigonometry, multivariable systems, and applications and modeling. Prerequisite: MATH205 College Math I. Day Course.

MATH265 ENGINEERING MATHEMATICS 3-2-4

Applied engineering applications of logarithms and exponentials, complex numbers, two and three dimensional vectors, matrix algebra and transformations, and basic statistics. Data collection, modeling and analysis of models using contemporary technological methods. Prerequisite: High school Trigonometry or Advanced Mathematics; Mathematics Placement Test. Day Course.

MATH280 CALCULUS I 4-0-4

Introduction to limits, definition of the derivative, differentiation of algebraic functions, rules of differentiation, implicit differentiation, application of the derivative, and integration of algebraic functions by substitution. Fundamental theorem of calculus, area, plus other applications of integration. Prerequisite: MATH235 College Mathematics C, MATH250 Precalculus or MATH265 Engineering Mathematics. Day and ACPE Course.

MATH290 CALCULUS II 4-0-4

Differentiation of transcendental functions, and integration involving transcendental functions, techniques of integration and integration by using tables. Prerequisite: MATH280 Calculus I. Day and ACPE Course.

MATH370 MATHEMATICS: HISTORY AND APPLICATIONS 3-0-3

This course will present important mathematical ideas that arose during a vast sweep of time. Ideas will be discussed in terms of intellect, impact on society, and their ultimate application to future engineering and science. Prerequisite: MATH250 Precalculus. Day Course.

MATH410 DISCRETE MATHEMATICS 4-0-4

Topics of this course to be chosen from: elementary logic, sets, permutations and

combinations, induction, relations, digraphs, functions, trees, Warshall's Algorithm, and Boolean algebra. Prerequisite: MATH250 Precalculus or MATH235 College Math C.
Day Course.

MATH425 QUANTITATIVE METHODS 3-0-3

Set theory and logic, basic matrix notation and manipulation, linear programming, and simplex method are studied. An introduction to probability and statistics is provided. Applications of these concepts are then applied to management problems with a survey of inventory problems, forecasting, and decision-making. Prerequisites: MATH235 College Math C.
ACPE Course.

MATH430 FINITE MATHEMATICS 4-0-4

Set theory and logic, matrix notation and manipulation, linear programming and simplex method are studied. An introduction to probability and statistics is provided. Problem-solving by computer. Prerequisite: MATH250 Precalculus.
Day Course.

MATH435 DISCRETE MATHEMATICS 3-0-3

Topics of this course to be chosen from: elementary logic, sets, permutations and combinations, induction, relations, digraphs, functions, trees, Warshall's Algorithm, and Boolean algebra. Prerequisites: MATH235 College Mathematics C.
ACPE Course.

MATH450 MATHEMATICAL MODELING AND NUMERICAL ANALYSIS 3-2-4

This course is an introduction to computational techniques used in science and industry. Topics include: root-finding, interpolation, linear systems, numerical integration, solution of initial value problems. Prerequisite: MATH290 Calculus II or equivalent; Junior status.
Day Course.

MATH460 OPERATIONS RESEARCH 3-2-4

An introduction to Operations Research including linear programming, scheduling, queuing and network theory. Other areas of interest are transportation and assignment methods, allocation problems and simulation (if time permits). Prerequisite: MATH430 Finite Mathematics.
Day Course.

MATH495 APPLIED CALCULUS AND DIFFERENTIAL EQUATIONS 4-0-4

Topics are chosen from multivariable calculus and ordinary differential equations of first and second order. Applications to physical systems will be emphasized. Prerequisite: MATH290 Calculus II.
Day and ACPE Course.

MATH505 PROBABILITY AND STATISTICS FOR ENGINEERS 3-2-4

Topics studied are basic probability and a variety of probability distributions used in engineering modeling and reliability (expected life of products); linear regression and correlation; and hypothesis testing. Prerequisite: MATH290 Calculus II.
Day Course.

MATH510 CALCULUS III 4-0-4

L'Hopital Rule, improper integrals, vectors, three-dimensional analytic geometry, partial differentiation, multiple integrals. Prerequisite: MATH290 Calculus II.

Day and ACPE Course.

MATH620 APPLIED DIFFERENTIAL EQUATIONS I 4-0-4

Introduction to the solution of differential equations. First order: separable, linear with applications. Second order: linear, constant coefficients, homogeneous and nonhomogeneous. Methods: undetermined coefficients, and Laplace transform. Other selected topics and applications are studied. Prerequisite: MATH510 Calculus III.

Day and ACPE Course.

MATH640 APPLIED DIFFERENTIAL EQUATIONS II 4-0-4

Solutions of linear systems of ordinary differential equations with applications. Numerical methods for solving differential equations are developed and implemented on a computer. Solutions of separable partial differential equations with boundary-value problems applications, power series solutions of ordinary differential equations. Prerequisites: MATH620 Applied Differential Equations I; an introduction to computer programming course.

Day Course.

MATH890 LINEAR ALGEBRA AND MATRIX THEORY 4-0-4

Topics include the basic operations of n-tuples and matrices, geometric vectors, equations of lines and planes, systems of linear equations, row reduction of matrices, linear independence, determinants, and an introduction to basis, dimension, eigenvalues, eigenvectors, and vector spaces. Prerequisite: MATH510 Calculus III.

Day Course.

MECHANICAL COURSES

MECH103 INTRODUCTION TO ENGINEERING AND TECHNOLOGY 2-2-3

This course provides an overview of the fundamental skills and knowledge utilized in the study of mechanical engineering technology. Topics covered include: Institute resources, successful collegiate-level study skills, oral and written communication, design and research methodologies, as well as ethics and professional organizations. Student teams will perform introductory laboratory exercises to gain hands-on experience in the field of engineering technology. Prerequisite: Freshman status in BMET.

Day Course.

MECH124 MECHANICAL GRAPHICS I 2-4-4

Basic concepts of CAD, design and sketching, as they apply to mechanical design and engineering, are explored. CAD (drafting) exercises include orthographic projection, 2- and 3-dimensional elements, multi-views, dimensioning, sections, tolerance and assemblies. Sketching is used to visualize designs and studies for mechanical design and engineering. Sketching and CAD drafting follow common paths as this course explores

engineering graphics topics. Corequisite: MATH205 College Mathematics I or MATH225 College Math A. Day Course.

MECH163 MECHANICAL DESIGN I 1-4-3

This course introduces the student to the fundamental principles involved in the mechanical design process. Topics include problem identification and definition, mechanisms of technological problem-solving, design alternatives, and project planning and implementation. The influence of cost, material resources, performance criteria and relevant safety issues will be discussed. All students will be expected to complete an electronic design project. Prerequisite: MATH205 College Mathematics I; Corequisite: MECH124 Mechanical Graphics. Day Course.

MECH180 STRENGTH OF MATERIALS 3-2-4

Topics include: concepts of static equilibrium; shear and bending moment diagrams; area properties; tensile, compressing shear, bending stress and strains. Individual laboratory reports are required from each student. Prerequisites: PHYS210 College Physics I; and MECH343 Statics. Corequisite: MATH290 Calculus II. Day Course.

MECH190 MECHANICS AND STRENGTH OF MATERIALS 3-2-4

This course presents the principles of static equilibrium and focuses on material properties such as tensile, shear, bending, and torsional stresses as applied to beams, shafts, and trusses. Laboratory tests are conducted to emphasize concepts of elasticity, deflections, and ultimate stresses. Prerequisites: MATH205 College Math I or MATH225 College Math A; PHYS205 Physics A or PHYS 210 College Physics I. ACPE Course.

MECH240 THERMODYNAMICS 3-2-4

The First and Second Laws of Thermodynamics serve as the basis for investigating problems involving liquids, gases and vapors as applied to the generation of power. Emphasis is placed on an understanding of the thermodynamic properties as they relate to processes. Topics include analysis of the Carnot, Otto, Diesel, and Rankine cycles. Prerequisite: MATH280 Calculus I. ACPE Course.

MECH242 THERMODYNAMICS 3-2-4

The First and Second Laws of Thermodynamics are investigated with open and closed systems, and thermodynamic properties of liquids and vapors are analyzed for various non-flow and steady flow processes. Concepts of thermal power, efficiency, entropy, and Carnot Cycle are introduced, and laboratory experiments are conducted to introduce measurement techniques. Prerequisites: MATH225 College Mathematics A; and PHYS205 Physics A. ACPE Course.

MECH251 ENGINEERING STATICS 3-2-4

The vector approach of the equilibrium of particle and rigid bodies is presented. Trusses, frames, shear and bending moment diagrams, centroids and moments of inertia

are studied. Prerequisites: MATH290 Calculus II; PHYS310 Engineering Physics I.
Day Course.

MECH255 THERMODYNAMICS 3-2-4

The First Law of Thermodynamics serves as the basis for investigating problems as applied to open and closed systems. Emphasis is placed on evaluating the change in properties of gases and vapors undergoing various nonflow and flow processes. The Carnot Cycle is used to develop the Second Law and Entropy concept. Prerequisite: MATH205 College Mathematics I.
Day Course.

MECH270 FLUID MECHANICS 3-2-4

This course is a general study of both incompressible and compressible flow using the continuity, general energy and momentum equations. Topics covered are properties of fluids, the Bernoulli equation, orifice and venturi flow, turbulent and laminar flow through pipes and over flat plates, compressible flow through nozzles, and drag and lift. Prerequisite: MECH255 Thermodynamics I and MATH280 Calculus I.
Day Course.

MECH290 THERMODYNAMICS II 3-2-4

The fundamental laws governing energy conversion are used to analyze both nonflow and steady-flow processes as applied to heat exchangers and power generating equipment. The theory of mixtures and their application to the chemistry of combustion for fossil, liquid and gaseous fuels is thoroughly discussed. Prerequisite: MECH255 Thermodynamics I.
Day Course.

MECH302 MECHANICS OF MATERIALS 3-2-4

The concepts of stress and strain and their relation are introduced. Axially loaded members, temperature effect, torsion, bending, combined loading and stress transformations are studied. Stability and buckling of columns are discussed. Laboratory experiences reinforce classroom theory. Prerequisite: MECH251 Engineering Statics.
Day Course.

MECH315 KINEMATICS 3-2-4

This course covers graphic and analytical kinematics with regard to the study of various mechanisms that produce motion or change of motion, analysis and synthesis of mechanisms (cams, gears, gear trains, etc.). Included in the course is a study of friction and mass moment of inertia. Prerequisites (DAY): MECH124 Mechanical Graphics and MECH343 Statics. Prerequisites (ACPE): MATH235 College Mathematics C; ELMC110 Engineering Graphics; and MECH190 Mechanics and Strength of Materials.
Day and ACPE Course.

MECH320 MACHINE DESIGN 3-2-4

This course covers the function and selection of machine components. Topics include belt drives, chain drives, bearings, welded structures, and shafting. Stress analysis and

fatigue of machine elements are also emphasized. Prerequisites: MECH315 Kinematics; MECH180 or MECH190 Strength of Materials; and MATH280 Calculus I.

ACPE Course.

MECH341 MECHANICAL PROJECT 2-2-4

In this course students will complete designs initiated in MECH320 Machine Design. Detail and assembly drawings will be developed, from which parts will be machined and fabricated. Projects will be assembled and tested to demonstrate technical sophistication. Oral and written reports on the individual projects will be required. Prerequisite: MECH320 Machine Design. ACPE Course.

MECH343 STATICS 3-2-4

Through this course, the concept of equilibrium of forces as applied to particles as well as rigid bodies is studied. Vector analysis along with mathematical solutions will be developed and utilized. Prerequisite: MATH250 Precalculus and PHYS210 College Physics. Day Course.

MECH365 SOPHOMORE MECHANICAL ASSESSMENT TEST 0

Students must complete a comprehensive test for assessment of their capabilities in Mechanical Engineering Technology. Prerequisite: Sophomore standing in BMET. Day Course.

MECH375 MACHINE DESIGN I 2-2-3

Machine elements are analyzed using the techniques of stress analysis. Topics include two and three dimensional stress analysis, transformation of strain to stress, and the evaluation of principal stresses and maximum shear stress. Problems involving combined loading are considered. The laboratory and home assignments include problems and projects related to the topics. Prerequisite: MECH180 Strength of Materials; MATH280 Calculus I. Day Course.

MECH380 INTRODUCTION TO HVAC SYSTEMS 2-2-3

The primary principles of heating, ventilating, and air conditioning that deal with human comfort in buildings, control of temperature, humidity, air purity and air movement will be covered. Building heat losses and load calculations will be discussed along with different heating systems and subsystems such as hot air, hydronic, vapor compression, absorption and cogeneration. Building environmental control software will be explored in the laboratory. Prerequisite: MECH255 Thermodynamics; Corequisite: MECH270 Fluid Mechanics. Day Course.

MECH395 MECHANICAL CAD APPLICATIONS I 2-4-4

This 3-D CAD course provides insight into the mechanical design process. Interface tolerance analysis to ensure manufacturability of designs is explored. Prerequisite: MECH124 Mechanical Graphics. Day Course.

MECH403 ENGINEERING DYNAMICS 2-2-3

Kinematics and kinetics of particles and rigid bodies will be covered using vectors, rectilinear, and curvilinear motion. The principles of conservation of energy, linear and angular momentum, work, impulse, and impact are explored. Dynamic simulation software will be used to present various engineering design and problem-solving applications. Prerequisite: MATH 510 Calculus III. ACPE Course.

MECH410 HYDRAULICS AND PNEUMATICS 3-2-4

This course offers basic instruction in fluid power systems using both oil and air. Topics covered include: pumps, actuators, valves, reservoirs, plumbing, circuit design and troubleshooting. Engineering calculations will include horsepower, flow rate, force and pressure, velocities, torque, pipe sizings, and head and friction losses. The laboratory will provide the student with hands-on experience to understand fluid power components and how they function internally in order to design and troubleshoot fluid power systems. Prerequisite: Junior status. Day Course.

MECH450 ADVANCED THERMODYNAMICS 2-2-4

The theory of mixtures serves as a basis for the development of the psychrometric chart and processes involving mixtures of gases and vapors. Chemical reactions in relationship to the combustion process are analyzed. Power producing cycles are analyzed thermodynamically and the theory of air breathing engines is investigated. Prerequisite: Fourth-year Status; MECH240 Thermodynamics; and MATH290 Calculus II. ACPE Course.

MECH460 HEAT TRANSFER 4-0-4

This subject includes a study of the fundamental laws governing the transfer of heat by conduction, convection and radiation, in both steady and unsteady state. It will also cover extended surfaces and heat exchangers. Analytical, numerical and graphical solutions will be presented. Prerequisite: MECH255 Thermodynamics, or equivalent, and MECH270 Fluid Mechanics. Corequisite: MATH620 Applied Differential Equations I or equivalent. Day Course.

MECH468 MACHINE DESIGN II 2-2-3

An introduction to methods of statistics is presented for the dimensioning and evaluation of tolerance and clearances. Failure theories, deformation criteria and fatigue are considered. Deflection and stiffness are investigated concentrating on the methods of superposition and integration. Prerequisite: MECH375 Machine Design I. Day Course.

MECH475 ADVANCED CAD APPLICATIONS 2-4-4

This course is designed to allow the student to become familiar with and use CAD systems to their full advantage. It will allow for the development and use of advanced and custom features of AutoCAD. Topics included will be AutoLISP programming, customization of menus, and attribute definitions and their use. The use of data base

management and control will also be covered. Prerequisite: MECH143 Computer-Aided Design or equivalent. ACPE Course.

MECH480 ENGINEERING CAD 2-2-4

This course intends to draw upon the student's knowledge of engineering graphics to employ industry-standard computer-aided design software such as AutoCAD to generate various engineering drawings. Customization of menus, data base management and control, and 3-D solid modeling techniques will be explored. Rotation, scaling, translation and part specification methods will also be investigated. Prerequisite: ELMC110 Engineering Graphics. ACPE Course.

MECH485 AUTOMATIC CONTROL SYSTEMS 3-0-3

This course introduces classical control theory. The Laplace transform will be used in analyzing and designing mechanical, electromechanical and thermodynamic systems. Transient and steady state response and system stability will be investigated with the aid of root locus diagrams and Bode plots. Prerequisite: MATH620 Applied Differential Equations I. Day Course.

MECH496 MATERIALS SCIENCE 3-2-4

This is an introductory course into the structure and properties of materials. Subjects include the processing of materials, crystal structure, miller indices, composition, alloying, electrical properties, phase diagram, corrosion, diffusion, heat treating, inspection and testing of materials utilized in the electromechanical field. The laboratory activities will reinforce the classroom theory. Prerequisite: Junior status; MECH302 Mechanics of Materials. Day Course.

MECH500 DESIGN OF EXPERIMENTS 2-2-4

This course covers the complete planning of an engineering experiment, from formulating the objectives, searching the literature, and preparing the procedure, through instrument selection, data acquisition and recording, to the analytical methods, error assessment, and presentation of results. Model scaling, environmental control, and cost, schedule and workforce requirements are considered. Prerequisites: MECH190 Mechanics and Strength of Materials; MECH240 Thermodynamics and MECH480 Engineering CAD. Corequisite: MECH568 Engineering Fluid Mechanics. ACPE Course.

MECH505 ENGINEERING THERMODYNAMICS 3-2-4

Thermodynamics properties, work and heat interaction are defined. The First and Second laws of thermodynamics are introduced. Conservation of mass and energy and the entropy and the exergy balance relations are applied in analyzing thermodynamic systems. Alternative energy sources and fuel cells are discussed. Psychrometric applications in the air conditioning processes are covered. Laboratory experiences reinforce the classroom theory. Prerequisites: Junior status; MATH290 Calculus II; PHYS320 Engineering Physics II. Day Course.

- MECH530 MATERIAL SCIENCE 2-2-3**
 This course considers how structure, mechanical working and heat treatment of materials affect their mechanical and environmental behavior. Microstructural analysis will be used to correlate structural and physical properties. Ferrous and nonferrous metals and plastics are covered. Theory is correlated by pertinent laboratory experimentation for which oral and written technical reports are required. Reinforced materials such as fiberglass are also studied. Prerequisite: CHEM360 Chemistry I. Day Course.
- MECH532 MATERIAL SCIENCE 2-2-4**
 This course investigates the structure and properties of ferrous and nonferrous metals, ceramics, composites and plastics. Various testing procedures for materials will be explored in the laboratory to correlate structural and physical properties with mechanical behavior. Additional topics include microstructural analysis, heat treatment, materials processing and engineering design applications. Prerequisite: CHEM110 Chemistry A. ACPE Course.
- MECH535 DYNAMICS 3-2-4**
 The kinematics and kinetics of particles and rigid bodies are analyzed using vectors, rectilinear and curvilinear motion, work, energy, impulse, and momentum. Prerequisite: Junior status; MECH343 Statics and MATH510 Calculus III. Day Course.
- MECH540 ENERGY ANALYSIS AND COGENERATION FOR BUILDING FACILITIES 2-2-3**
 This course covers fundamentals of HVAC. Design and hourly analysis of heating and cooling load will be performed using an energy simulation package. Waste heat recovery and cogeneration devices will be explored. Day Course.
- MECH562 FLUID MECHANICS II 3-0-3**
 This course covers isentropic flow through nozzles with normal shock. Compressible flow, with friction, through pipes will be investigated. Additional topics include incompressible flow through pump and turbine rotors, pump scaling, and selection. Prerequisite: MECH270 Fluid Mechanics. Day Course.
- MECH565 ENGINEERING FLUIDS 3-2-4**
 Mechanics of fluids with emphasis on control volume analysis are studied. The continuity, energy and momentum principles are applied to real fluids. Additional emphasis is on electromechanical systems and laboratory exercises. Prerequisite: Junior status; MATH510 Calculus III; MECH505 Engineering Thermodynamics. Day Course.
- MECH568 ENGINEERING FLUID MECHANICS 2-2-3**
 This course involves incompressible flow systems which include tube flow, pipe flow and open channel flow. The principles of conservation of mass, energy and momentum are presented through applications of the Bernoulli equation and laboratory exercises.

The principles of compressible and high speed flow are surveyed. Prerequisites: MATH510 Calculus III and MECH240 Thermodynamics. ACPE Course.

MECH572 ENGINEERING DYNAMICS 3-2-4

This course covers the kinematics and kinetics of particles and rigid bodies. Kinetic problems are analyzed by utilizing the second law of Newton, work and energy and impulse momentum methods. Dynamics simulation software is used to reinforce the theory. Prerequisite: MECH251 Engineering Statics; MATH620 Applied Differential Equations. Day Course.

MECH578 SPECIAL TOPICS IN ENGINEERING TECHNOLOGY 1-4-3

This course is an elective for students who wish to pursue project-oriented course work. Students are encouraged to become involved in an interdisciplinary team to develop an innovative technological system. Prerequisite: MECH180 Strength of Materials and MECH270 Fluid Mechanics. Day Course.

MECH591 INSTRUMENTATION AND MEASUREMENTS 2-2-3

This course covers fundamental concepts of modern instrumentation, methods to collect, understand and interpret data, and techniques to obtain measurements of physical properties and quantities related to the field of mechanical engineering technology. Prerequisites: MECH180 Strength of Materials; MECH255 Thermodynamics; MECH270 Fluid Mechanics; and ELEC130 Electricity and Electronics. Day Course.

MECH594 ENGINEERING HEAT TRANSFER 2-2-4

The student is introduced to the various modes of heat transfer: conduction, convection, and radiation. Application of these methods to steady and unsteady flow is considered. Fins, various other forms of extended surfaces, heat sources and sinks are thoroughly investigated with particular attention to electronic/ electrical systems. Heat exchangers are also studied. Prerequisites: MATH620 Applied Differential Equations I; MECH450 Advanced Thermodynamics; and MECH568 Engineering Fluid Mechanics. ACPE Course.

MECH595 ENGINEERING HEAT TRANSFER 3-2-4

Conduction, convection, and thermal radiation heat transfer mechanism are described. Steady-state and transient conduction problems are discussed. Convective heat transfer mechanisms and various correlations to evaluate the heat transfer coefficient are discussed. Heat exchanger analysis and thermal radiation heat transfer between surfaces are presented. Laboratory experiences enforce the classroom theory. Prerequisites: MATH620 Applied Differential Equations I; MECH505 Engineering Thermodynamics; MECH565 Engineering Fluids. Day Course.

MECH600 ADVANCED MECHANICS OF MATERIALS 3-2-4

Stress analysis, the development of strain, stress concentrations, failure theories and fatigue are studied. Shafts, gears, and other elements are also considered. Laboratory

problems and appropriate projects are assigned. Prerequisites: MATH510 Calculus III; MATH505 Probability and Statistics for Engineers; COMP120 Computer Science I Using C; MECH302 Mechanics of Materials. Day Course.

MECH605 MECHANICAL CAD APPLICATIONS II 2-4-4

This 3-D CAD course focuses upon establishing design intent for mechanical systems. Various engineering design tools will be utilized including FEA. Prerequisite: Senior status; MECH395 Mechanical CAD Applications I. Day Course.

MECH620 ENGINEERING THERMAL DESIGN 1-4-3

Fundamentals of thermodynamics are used to model power generation, refrigeration, and cogeneration systems. Numerical methods in heat transfer and fluid mechanics are studied. The heat transfer theories are integrated with thermodynamics and fluid mechanics in the design of thermal systems, including heat exchangers. The course includes laboratory experiences and an open-ended design project. Students are expected to use computational methods throughout the course. Prerequisites: MECH505 Engineering Thermodynamics; MECH565 Engineering Fluids; MECH595 Engineering Heat Transfer. Day Course.

MECH655 SENIOR DESIGN PROJECT 2-2-4

This capstone project course requires students, either individually or in a team, to design and develop an innovative prototype device or system which reflects the students' breadth of knowledge in the mechanical engineering related disciplines. Project topics must be pre-approved by the supervisory faculty, and oral presentations will be conducted to demonstrate effective technical and professional communication skills. Prerequisite: MECH500 Design of Experiments. ACPE Course.

MECH690 MECHANICAL DESIGN PROJECT 1-6-4

This capstone project course is for senior-level mechanical engineering technology students who will formulate a topic and develop a project for an innovative technological device or system. Students are encouraged to take an interdisciplinary approach to their design project, and the work will be performed under the direction of one or more faculty advisors. Course requirements include oral and written progress reports throughout the semester plus a final comprehensive technical report. Prerequisite: Senior status; MECH591 Instrumentation and Measurements. Day Course.

PHILOSOPHY COURSES

PHIL300 PHILOSOPHY OF HUMAN NATURE 3-0-3

This course will explore the ever-present phenomenon of human aggression and how various philosophers have attempted to define its nature. The class will focus on a reflection of the current state of the world (war and violence in the Middle East) as a paradigmatic topic of discussion on human nature. Many authors and texts will be used to study, first, the world-views of philosophy and religion; and second, to provide

students with the hopeful prospect of cultivating love as an enduring answer to man's rapacious form of aggression. Prerequisite: ENGL105 and ENGL116 or ENGL105 and COMM200. ACPE Course.

PHIL330 PROBLEM OF EVIL 3-0-3

This course will explore ways of sharpening the ability to think critically by reflecting on the problem of evil. Students will examine arguments from various disciplines (philosophy, logic, theology, psychology and literature) that will allow them to understand and appreciate the importance of thinking critically about the mysteries of evil. Readings will include arguments by Camus, Weisel, Plantinga, Hicks, and Donaldson. Prerequisite ENGL105 and COMM200 or ENGL105 and ENGL116. ACPE Course.

PHIL410 PHILOSOPHY AND RELIGION 4-0-4

An introductory course in the concepts and processes of philosophical and religious thought and experience. In this course students will be able to examine the classical and contemporary traditions and issues in philosophy and religion, the nature of existential reality, and the process of ethical decision-making. Prerequisite: Completion of Sophomore Social Sciences requirement. Day upper level HUMN/LITR elective

PHIL425 CRITICAL THINKING 4-0-4

This course will explore the method of Critical Thinking as a tool for minimizing error in our beliefs and attitudes and as a tool for increasing the probability of success in our innovative efforts. This course also explores how to remove bias from our observation, interpretation and inference. Prerequisites: ENGL100 and ENGL115 or equivalent; Completion of Sophomore Social Sciences requirement.

Day upper level HUMN/LITR course

PHIL450 ETHICS 4-0-4

The study of the rules and standards of right conduct in regard to the self, industry, and society. Historical perspectives and contemporary case studies are utilized. Prerequisite (Day): Completion of Sophomore Social Sciences requirement. Prerequisite (ACPE): ENGL105 and COMM200 or ENGL105 and ENGL116. Day upper level HUMN/LITR elective and ACPE Course.

PHIL460 VIRTUAL ETHICS 4-0-4

In attempts to explore the impact of information technology on the individual and on society, this course will address questions regarding freedom, privacy and control in an information age. Topics including development and research of computer programs and hardware, networked environments and virtual realities, and artificial intelligence will shed light on the new ethical questions that challenge our evolving symbiotic relationship with technology. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACPE Course.

PHIL470 FUNDAMENTAL CONCEPTS OF PHILOSOPHY 4-0-4

This course will examine the various methods and concepts the philosophers have developed since the early Greek Thinkers who attempted to define the enterprise of philosophy. Prerequisite: ENGL105 and ENGL116 or ENGL105 and COMM200 ACPE Course.

PHIL475 CRITICAL AND CREATIVE THINKING 2-2-4

This course will explore the method of Critical Thinking as a tool for minimizing error in our beliefs and attitudes and Creative Thinking as a tool for increasing the probability of success in our innovative efforts. This course also explores how to remove bias from our observation, interpretation and inference. Prerequisites: ENGL105 and ENGL116 or ENGL100 and ENGL115 or equivalent. ACPE Course.

PHYSICS COURSES

PHYS205 PHYSICS A 2-2-3

General introduction to mechanics, including Newton's Laws, equilibrium, work, energy and momentum. The laboratory work will support the concepts studied in class. Prerequisite: MATH225 College Mathematics A. ACPE Course.

PHYS210 COLLEGE PHYSICS I 3-2-4

General introduction to mechanics. Topics include kinematics, vectors, Newton's Laws, equilibrium, work and energy, momentum, circular motion. Prerequisite: MATH205 College Mathematics I. Day Course.

PHYS211 CONCEPTUAL PHYSICS 3-2-4

A survey of physics and its applications to modern life. Mechanics, sound, heat, electricity, light, structure of matter are examined. Understanding of concepts, rather than detailed calculations, is emphasized through lecture and laboratory. Day Course.

PHYS215 PHYSICS B 2-2-3

General introduction to mechanical and thermal properties of matter, sound, light, and electricity. The laboratory work will support the concepts studied in class. Prerequisites: PHYS205 Physics A. ACPE Course.

PHYS220 COLLEGE PHYSICS II 3-2-4

Physical properties of solids and fluids, heat, sound, light, electric and magnetic forces. Prerequisites: MATH250 Precalculus and PHYS210 College Physics I. Day Course.

PHYS310 ENGINEERING PHYSICS I 3-2-4

A calculus-based course emphasizing the principles and applications of mechanics. Topics include: Newton's Laws, equilibrium; work, energy, power; momentum, circular motion. Prerequisite: MATH265 Engineering Mathematics or MATH235 College Mathematics C. Corequisite: MATH280 Calculus I. Day and ACPE Course.

PHYS320 ENGINEERING PHYSICS II 3-2-4

Topics include: physical properties of solids and fluids, atomic structure, heat, sound, wave motion, electricity and magnetism. Prerequisites: PHYS310 Engineering Physics I; and MATH280 Calculus I. Corequisite: MATH290 Calculus II Day Course.

PHYS355 SOUND AND MUSIC, LIGHT AND COLOR 4-0-4

Properties and principles describing light and sound are studied. Explanations of natural observations of light and sound are given and technical applications are made to such fields as architectural design, sound transmission and communication systems, optical phenomena and musical reproduction. Laboratory demonstrations are used in class to provide further explanation of topics. Prerequisite: MATH205 College Math I. Day Course.

PHYS356 ENERGY AND THE ENVIRONMENT 4-0-4

This course is intended to convey the nature of energy and its effects on technology and environment to the student. A basic explanation of fundamental concepts as well as the origin, forms, uses and distribution of energy will be discussed. Energy sources, such as fossil fuels, wind, hydroelectric, nuclear, solar, and tidal, will be discussed in terms of their supply, cost and effects on the environment. During the course practical problems will be solved and demonstration experiments presented. Prerequisite: PHYS210 College Physics I. Day Course.

**PHYS365 EXPERIMENTAL TECHNIQUE
IN THE INDUSTRIAL R & D LAB 2-4-4**

This course gives the student skills and practice in designing and performing experiments, analyzing results according to mathematical models, and presenting experimental conclusions in written form as appropriate to an industrial R&D laboratory. Prerequisite: PHYS210 College Physics I, PHYS310 Engineering Physics I or PHYS205 Physics A; Sophomore status. Day Course.

PHYS380 METEOROLOGY 3-2-4

Basic weather science is introduced. Topics will include solar radiation, heat balance, water vapor, winds, vertical circulation, air masses and storms. Prerequisite: MATH280 Calculus I. Day Course.

PHYS406 SPECIAL TOPICS - PHYSICS 3-2-4

This course investigates a topic of special interest to faculty and students that is outside regular course offerings. Prerequisite: Consent of department head and instructor. Day Course.

PHYS411 MODERN PHYSICS 3-2-4

(2-2-4) Fundamental ideas of quantum physics applied to the atom, the nucleus, and electromagnetic radiation. Energy levels, emission and absorption of photons, nuclear energy, radioactivity, relativity and solid state may be discussed. Prerequisite:

MATH280 Calculus I; PHYS220 College Physics II or PHYS215 Physics B.

Day and ACPE Course.

PHYS525 ASTRONOMY 4-0-4

Topics selected from the following: planets and satellites; origin of the solar system; structure and evolution of the sun and stars; white dwarfs, neutron stars and black holes; and the expanding universe. Prerequisite: MATH280 Calculus I; PHYS210 College Physics I. Day Course.

PHYS650 DIRECTED STUDIES 3-2-4

This course provides the opportunity for students to participate in one or more projects involving an investigation into a current topic in engineering technology. Problems will be chosen in consultation with and after the approval of the curriculum department head. Prerequisite: Senior Status. Day Course.

POLITICAL SCIENCE COURSES

POLS120 POLITICAL SCIENCE 3-0-3

Study of the use of power in society. The course introduces the student to the nature of political systems at the local, state, national, and international levels. Prerequisite (Day): Successful completion of English Sequence; Prerequisite (ACPE): ENGL105 English Composition. Day Sophomore Social Science and ACPE Course.

POLS150 INTRODUCTION TO AMERICAN GOVERNMENT 3-0-3

This course is an introduction to the structures and functions of American government. Emphasis is given to the rights and duties of citizens. Written research projects are required. Prerequisite: Successful completion of an English sequence. Day Sophomore Social Science elective

POLS350 AMERICAN GOVERNMENT 3-0-3

This course covers the concept of citizenship in the community and the nation. Basic political concepts, governing philosophies, and contemporary governmental structures as they pertain to public policy development are studied. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACPE Course.

POLS405 CURRENT POLITICAL ISSUES 3-0-3

Students will examine and analyze a selected series of problems facing the United States. Analysis of news media treatment will be essential. Material varies each semester. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACPE Course.

POLS415 AMERICAN POWER AND POLITICS: 20TH CENTURY 3-0-3

Analysis of the growth and development of American military, political, and economic

power with particular emphasis on the second half of the twentieth century. The course will examine how such critical events as the Vietnam war, the end of the Cold War, and the emergence of the global economy have impacted the redefinition of the role of the United States in the post-modern era. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACPE Course.

POLS420 MODERN GOVERNMENT AND POLITICS 4-0-4

An introductory course in contemporary government and politics with special emphasis upon the United States. Major governmental institutions at all levels, national, state and local, will be explored by the student with special emphasis on problems and issues of concern to the engineering technologist. Other governmental systems outside of the United States will also be discussed. Prerequisite: Completion of Sophomore Social Sciences requirement. Day upper level SOCL SCI elective.

POLS445 THE CULTURE AND POLITICS OF ASIA 3-0-3

This course will explore the social, political and economic systems of three nations in Asia: China, Japan, and Vietnam. The emphasis will be on the everyday lives of the peoples in these nations. In an increasingly interconnected world, it is hoped that through this course the student will gain a greater understanding of at least a part of Asia's cultures and traditions. In addition to classroom work, use will be made of the cultural resources available in Boston. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACPE Course.

POLS450 INTERNATIONAL POLITICS 4-0-4

A course designed to analyze how nation states interact in the contemporary world. Basic concepts such as sovereignty, national interest and diplomacy will be studied and assessed in relation to the conduct of foreign policy. Case studies will be used to examine and understand the process of modern decision-making and the intelligence and diplomacy upon which it is based. A basic knowledge of modern history or government is recommended. Prerequisite: Completion of Sophomore Social Sciences requirement. Day upper level SOCL SCI elective

POLS455 INTERNATIONAL RELATIONS 3-0-3

This course will examine the relations among states, and the international organizations associated with the maintenance of the world order. Major topics to be covered will include, nuclear proliferation, disarmament, international peacekeeping, government and non-government international actors, and human rights. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACPE Course.

POLS475 THIRD WORLD STUDIES 4-0-4

A course by which a student may enlarge his or her knowledge and understanding about the history and traditions of sub-Asia, Africa and Latin America. The purpose of this course is to prepare students for employment in multi-national corporations with overseas divisions and for technical assistance projects in emerging nations. Prerequisite: Completion of

Sophomore Social Sciences requirement.

Day upper level SOCL SCI elective.

POLS485 POLITICS AND CHANGE IN DEVELOPING COUNTRIES 3-0-3

Analysis of the interaction between politics and society in less-developed countries in Asia, Africa, Latin America and the Caribbean. Case studies will be done on selected countries to examine the social and economic changes accompanying their transition to democracy, and free market economies. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACPE Course.

POLS490 THE POLITICAL ECONOMY OF POST-WAR AMERICA, 1945-1980'S 4-0-4

This course will examine the socioeconomic and political changes consequent upon America's victorious emergence from WW II; the dynamics of superpower status; the Korean and Vietnam Wars, and the domestic and international issues of the era, which have influenced change in America. Prerequisite: Completion of Sophomore Social Sciences requirement; a political science or world civilization course.

Day upper level SOCL SCI elective.

PSYCHOLOGY COURSES

PSYC110 PSYCHOLOGY 3-0-3

The study of the mind, focusing on both the individual and group. Topics such as consciousness, perception, learning, growth, personality, and motivation are covered. Prerequisite (Day): Successful completion of English sequence; Prerequisite (ACPE): ENGL105 English Composition. Day Sophomore Social Science and ACPE Course.

PSYC350 INTRODUCTION TO SOCIAL PSYCHOLOGY 3-0-3

Social psychology investigates how the thoughts, feelings, and actions of individuals are influenced by the presence of others. Topics will include person-to-person perception, decision-making, attitudes, prejudice, and group behavior. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACPE Course.

PSYC375 PSYCHOLOGY OF ADULTHOOD 3-0-3

This course presents an overview of the theoretical and practical aspects of adult psychological development and aging. Topics covered are: relationships, careers, midlife, retirement and death. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACPE Course.

PSYC400 SOCIAL PSYCHOLOGY 4-0-4

This course goes beyond an introductory course in psychology or sociology to examine the nature of social interaction in depth. The biological and cultural roots of interaction; the structure and dynamics of groups and organizations; social exchange and competence; social space and distance; evaluation of self and others; verbal and non-

verbal communication; and similar topics are considered. Prerequisite: Completion of Sophomore Social Sciences requirement. Day upper level SOCL SCI elective

PSYC405 STUDIES IN ABNORMAL PSYCHOLOGY 3-0-3

The systematic study of behavioral disorders including the various psychoses, psycho neuroses, mental deficiencies, and other abnormal conditions. Emphasis is on the use of theories and data to understand the description, etiology, progress, treatment, and prevention of abnormal behavior. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACPE Course.

PSYC410 ABNORMAL PSYCHOLOGY 4-0-4

The systematic study of a variety of psychological disorders and troublesome problems of behavior. Attention will be given to the recognition of various symptoms and behaviors, several treatment methods, and preventive mental health measures for affected person and families. Prerequisite: Completion of Sophomore Social Sciences requirement. Day upper level SOCL SCI elective.

PSYC425 INDUSTRIAL-ORGANIZATIONAL PSYCHOLOGY 4-0-4

By establishing the link between theory and application, this course enables the student to study the psychological principles that emerge in technology and business environments. Topics covered include leadership, communication, organizational culture, motivation, attitude, and stress. Prerequisite: Completion of Sophomore Social Sciences requirement. Day upper level SOCL SCI course.

SOCIOLOGY COURSES

SOCL105 SOCIOLOGY 3-0-3

This course is an introduction to sociology, the systematic study of human groups and social relations. We will analyze the basic structure of society and the issues confronting contemporary life in America. Special emphasis will be placed upon the problems and concerns that bring about change in modern society. Prerequisite (Day): Successful completion of English sequence; Prerequisite (ACPE): ENGL105 English Composition. Day Sophomore Social Science and ACPE Course.

SOCL406 SPECIAL TOPICS: SOCIOLOGY 4-0-4

This course investigates a topic of interest to faculty and students that is outside regular course offerings. Requires approval of Department Head. Prerequisite: Completion of Sophomore Social Sciences requirement; and successful completion of English sequence. Day Course.

Recent Special Topics (SOCL406) course offerings include:

ART AND TECHNOLOGY

Technology and artistic production have always been bound together. In this

course, the areas where art and technology intersect, abrade and overlap will be examined. Students will respond verbally and in writing to a variety of artworks, readings and short fiction. Prerequisite: Completion of Sophomore Social Sciences requirement; Successful completion of English sequence.

Day upper level SOCL SCI elective

SOCL410 SOCIAL MOVEMENTS 4-0-4

This course will focus on group behavior which occurs outside established institutions. It considers behavior which occurs in spontaneous and structured situations. The main theme of the course is to study social movements aimed at transforming society. Prerequisite: Completion of Sophomore Social Sciences requirement.

Day upper level SOCL SCI elective

**SOCL425 CONTEMPORARY SOCIAL CHANGE:
AMERICAN CIVIL RIGHTS MOVEMENT 3-0-3**

This course will examine crucial portions of American social, political, and economic history that look back to slavery, segregation, Jim Crow, and the struggle for racial equality as exemplified in the civil rights movement of the 50s and 60s. The course shall focus on citizen participation and the leadership that attempted to bring justice and create change in modern American society. For this study, the course shall explore other groups who also strove to transform society. Prerequisite: ENGL105 and COMM200 or ENGL105 and ENGL116. ACPE Course.

SURVEYING COURSES

SURV100 CONSTRUCTION SURVEYING 2-4-4

Instruction is given in the theory and techniques of horizontal and vertical measurements using the tape, transit, and level. Laboratory exercises will focus on the application of these techniques as they relate to the building industry, including construction layout and grades. Prerequisite: MATH225 College Mathematics A. ACPE Course.

SURV150 OVERVIEW OF SURVEYING TECHNOLOGY 3-0-3

This course will introduce the student to the various methods and applications of land surveying to the real estate, construction, and land development industries. Students will also be introduced to the various technologies employed by Professional Land Surveyors in accomplishing their work including differential leveling, electronic distance measurement (EDM), electronic data collection, computer-aided design (CAD), the global positioning system (GPS) and geographical and land information systems (GIS/LIS). Prerequisite: ENGL105 or ENGL100. ACPE Course.

SURV160 SURVEYING MEASUREMENT I 2-4-4

This course will introduce the student to the fundamental theories and techniques for horizontal and vertical measurements with theodolites, automatic levels and steel tapes. Labs include projects in linear measurements, leveling, traversing and stadia surveys.

Prerequisite: MATH235 College Math C.

ACPE Course.

SURV250 LEGAL ASPECTS OF LAND SURVEYING I 3-0-3

This course includes an introduction to the realm of real estate law that is essential to the practice of land surveying and the basics of land surveying research. Real estate law and conveyancing terminology, evidence gathering, and research theory will be taught. Key principles of boundary law will be explored such as the relative weight of evidence, sequential and simultaneous conveyances, easements and rights of way, and the public land survey system. Prerequisite: ENGL105 or ENGL100; and SURV160 Surveying Measurement I. ACPE Course.

SURV340 SURVEYING MEASUREMENT II 2-4-4

This course includes traverse calculation, and error analysis, applications of coordinate geometry, horizontal and vertical curve calculations, introduction to geodetic survey principles, basic map projection calculations, and introduction to, and use of, data collection equipment and software. Labs include layout of horizontal and vertical curves, field techniques for boundary layout, data collection and site detail mapping. The final project in this course will involve the detailed surveying and mapping of a section of the campus suitable for use in engineering design, construction or conveyancing. Prerequisite: SURV160 Surveying Measurement I. ACPE Course.

SURV380 MASSACHUSETTS REGULATIONS AFFECTING 3-0-3
THE SURVEYING PROFESSION

This course will involve the study of those regulations directly affecting the practice of Land Surveying in the Commonwealth of Massachusetts such as the Registration Law, (MGL Chap. 112, Secs. 81D-81T), the Regulations of the Board of Registration of Professional Engineers and of Land Surveyors (250 CMR), the Subdivision Control Law (MGL Chap. 41), the Zoning Act, (MGL Chap 40A) and the Massachusetts Land Court Manual of Instructions. Students will be introduced to other bodies of regulations often encountered in the practice of Land Surveying such as municipal subdivision regulations, The Wetlands Protection Act, The Massachusetts Environmental Protection Act (MEPA). Prerequisite: ENGL105 or ENGL100. ACPE Course.

SURV390 LEGAL ASPECTS OF LAND SURVEYING II 3-0-3

Building on the principles taught in Legal Aspects of Land Surveying I, special boundary topics such as water boundaries, unwritten transfers, and writing legal descriptions will be covered along with the roles of statute and case law in the boundary decision process. Students will complete a final project that will involve the application of legal principles to an actual surveying problem requiring them to make boundary decisions involving conflicting evidence. Prerequisite: SURV250 Legal Aspects of Land Surveying I and SURV340 Surveying Measurement II. ACPE Course.

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