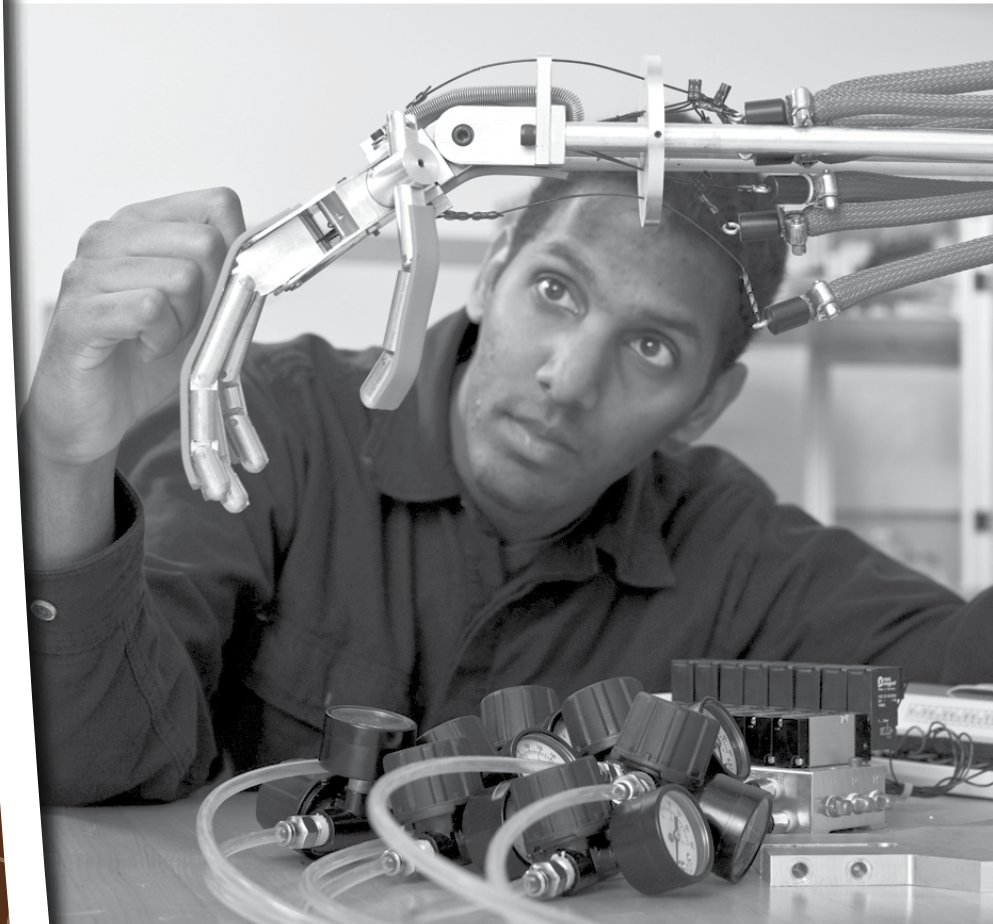


R·I·T

UNDERGRADUATE COURSE DESCRIPTIONS

2012-2013



Rochester Institute of Technology

2012–13 University Calendar

Fall Quarter (2121*)

September 3
Day, evening, and online classes begin

September 8
Saturday classes begin

September 9
Last day to add/drop classes

September 10
First day to drop classes online via SIS;
receive a “W” grade

October 26
Last day to drop classes online; receive a
“W” grade

November 9
Last day and evening classes

November 10
Last Saturday and online classes

November 12, 13, 14, 15, 16, 17†
Final exams

November 18-25
Fall/Winter break

November 22-23
Thanksgiving
(University closed)

Winter Quarter (2122*)

November 26
Day, evening, and online classes begin

December 1
Saturday classes begin

December 2
Last day to add/drop courses

December 3
First day to drop classes online via SIS;
receive a “W” grade

December 21
Last day and evening classes before break

December 22
Last Saturday and online classes before
break

December 24, 2012–January 6, 2013
Holiday break

December 24, 2012–January 1, 2013
University closed

January 2
University re-opens

January 7
Day, evening, and online classes resume

January 12
Saturday classes resume

February 1
Last day to drop classes online; receive a
“W” grade

February 15
Last day and evening classes

February 16
Last Saturday and online classes

February 18, 19, 20, 21, 22, 23†
Final exams

February 24- March 3
Winter/Spring break

Spring Quarter (2123*)

January 24-March 12, 2013
Spring registration

March 4
Day, evening, and online classes begin

March 9
Saturday classes begin

March 10
Last day to add/drop courses

March 11
First day to drop classes online via SIS;
receive a “W” grade

April 26
Last day to drop classes online; receive a
“W” grade

May 10
Last day and evening classes

May 11
Last Saturday and online classes

May 13, 14, 15, 16, 17†
Final exams

May 17
Academic Convocation and
Commencement Ceremonies

May 18
Commencement Ceremonies

May 19 - May 27
Spring/Summer break

May 27
Memorial Day
(University closed)

Summer Quarter (2124‡)

May 28
Day, evening, and online classes begin

June 1
Saturday classes begin

June 3
Last day to add/drop summer courses

June 4
First day to withdraw online via SIS;
receive a “W” grade

July 4
Independence Day
(University closed)

July 22
Last day to withdraw online; receive a
“W” grade

August 3
Last Saturday and online classes

August 5
Last day and evening classes

August 6, 7, 8, 9, 10†
Final exams

* *New PeopleSoft SIS Term Codes*

† *Day students can access their individual exam schedules online through SIS. Students attending evening, Saturday and on-line courses should check with their instructors regarding their final exam schedules.*

‡ *Check infocenter.rit.edu for summer short session (1-5 week) course dates.*

Course Number Index

RIT course numbering: Throughout this bulletin and in registration materials that are published quarterly, courses are generally referred to by their seven-digit registration number. The first two digits refer to the college offering the course. The third and fourth digits identify the discipline within the college. The final three digits are unique to each course and identify whether the course is noncredit (less than 099); lower division (100–399); upper division (400–699); or graduate level (700 and above).

The contents of this publication reflect courses for the 2012-13 academic year. Beginning in the fall of 2013, RIT will convert from three 10-week quarters to two 16-week semesters. Students should consult their academic adviser with questions regarding the semester system and course planning and selection.

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Course Descriptions

Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's schedule of courses, published by the Office of the Registrar. Prerequisites and/or corequisites are noted in parentheses at the end of the course description.

College of Applied Science and Technology

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0606-099 Co-op Preparation Course

This course is intended for third-year students. It introduces the concept of cooperative education and the services of the office of cooperative education and placement, and provides the student with basic job search skills; research and identification of potential employers; resume writing and correspondence; interviewing techniques. Ethics of the job search and expectations of employers will also be covered. This course is required for students in MMET programs before registering for co-op and using the services of the office of cooperative education and career services. **Class 1, Credit 0**

Packaging Science

0607-201 Principles of Packaging

An overview of packaging that includes the historical development of packaging; the functions of packaging; and the materials, processes and technology employed to protect goods during handling, shipment, and storage. A brief review of container types, package design and development, and research and testing are presented, along with information about economic importance, social implications and packaging as a profession. **Class 3, Credit 3**

0607-301 Engineering Design Graphics

A basic course in engineering drawing. Topics include, but are not limited to, lettering, line quality, use of instruments, free-hand sketching, orthographic projections, pictorials, sections, auxiliary views and dimensioning. Students learn how drawing is accomplished using a computer-aided drafting (CAD) application package. Drawing assignments required, concentrating on packaging applications. **Class 3, Lab 2, Credit 4**

0607-311 Packaging Materials I

The study of packaging materials from extraction through conversion and production, physical and chemical properties and uses. Emphasis is on metals and plastics used in packaging and on adhesives and other component materials. Recognized standard testing procedures are presented and students gain practical experience in the operation of various testing instruments, interpretation of results, and evaluation of properties and performance characteristics. (0607-201) **Class 3, Lab 2, Credit 4**

0607-312 Packaging Materials II

The study of packaging materials from extraction through conversion and production, physical and chemical properties and uses. Emphasis is on paper, paperboard, wood, glass, and propellants used in packaging applications. Recognized standard testing procedures are presented and students gain experience in the operation of various testing instruments, interpretation of results, and evaluation of properties and performance characteristics. (0607-201) **Class 3, Lab 2, Credit 4**

0607-321 Rigid Containers

A detailed study of primary packages that includes the history, manufacturing processes, characteristics, and applications for containers in direct contact with the product. Structural design, chemical compatibility, and suitability of container for intended use are analyzed for basic container types. Students practice structural design and testing of prototype containers. Primary emphasis is on rigid paperboard, glass, plastic, and metal containers. (0607-301, 311, 312, 341) **Class 3, Lab 2, Credit 4**

0607-322 Flexible Containers

Corollary course for 0607-321. Primary emphasis is on flexible paper, foil, plastic and laminated materials and on selected processing techniques. Topics to include folding cartons, heat seal technology and test methodologies, permeability theory, modeling and empirical testing. (0607-301, 311, 312, 341) **Class 3, Lab 2, Credit 4**

0607-341 Computer Applications

Application of computer techniques for packaging. Review and analysis of current computer software packages for packaging and packaging-related applications, including design, optimum sizing, prototyping, simulation, and specification preparation. (0607-301) **Class 3, Lab 2, Credit 4**

0607-401 Career Seminar

Career opportunities in packaging science methods and procedures used in obtaining co-op and entry-level positions will be reviewed. Topics will also cover career advancement within the corporate organization and job changes. (Required prior to co-op, second year.) **Class 1, Credit 1**

0607-420 Technical Communication

An introduction to the principles of effective written technical communication for the packaging professional. Topics include memos, business letters, summary activity reports, technical proposals, and research papers. Open only to packaging majors and required as part of the packaging programs writing skills certification process. A grade of C or better is required. (0502-227 and 0607-321, 322) **Class 3, Credit 3**

0607-431 Packaging Productions Systems

A study of package forming and filling, closing, product/package identification, inspection, and other machinery commonly used in packaging, plus consideration of handling and storage/retrieval systems. Students become aware of project management techniques, setting timelines, critical path, and resource evaluation. Quality issues are integrated into line and machinery designs. Students gain practice in setting up complete production lines for packaging various products. (0607-321, 322) **Class 4, Credit 4**

- 0607-432 Packaging for Distribution**
An exploration of different shipping, storage, and use environments common to various products and packages. Structural design of shipping containers for product physical protection and methods for testing and predicting package performance are studied. (0607-321, 322) **Class 2, Lab 4, Credit 4**
- 0607-433 Packaging for Marketing**
A study of the interrelationship between packaging and marketing, detailing how the retail consumer package can be used as a marketing tool. The course concentrates on a systematic approach to developing an optimum package for a given product to meet the demands of the retail market. Advertising, marketing demographics, and the impact of color upon packaging are considered. Students gain practice in the development of a complete package system. (0607-431, 432 and 0105-363 or equivalent) **Class 4, Credit 4**
- 0607-462 Packaging Regulations**
A detailed study of federal, state, and local regulations that affect packaging. History of the development of packaging law; detailed study of recent packaging regulations, including the Fair Packaging and Labeling Act and the Poison Prevention Packaging Act; consideration of Food and Drug Administration regulation of packaging, including requirements for tamper-evident packaging; hazardous materials packaging regulations administered by the Department of Transportation; freight classifications, freight claims; weights and measures law; consumer product safety law; environmental law; and patent, trademark, and copyright law as they apply to packaging. (0607-431, 432) **Class 4, Credit 4**
- 0607-485 Principles of Shock and Vibration**
A study of the factors involved in analyzing potential damage to packaged items resulting from impact or vibration forces. Students are expected to master basic mathematical and physical concepts and to use various pieces of testing equipment. (0607-432) **Class 2, Lab 4, Credit 4**
- 0607-499 Packaging Co-op**
One quarter of appropriate work experience in the packaging industry. Two quarters of co-op experience are required. (0607-321, 322) **Credit 0**
- 0607-502 Packaging Materials**
This course is the first in a three-course bridge program. It is intended to introduce non-packaging students to the manufacture, physical and chemical properties of basic packaging materials and the evaluation of materials. Materials to be covered will include fiber, glass, polymers, aluminum, and steel. (This course is part of the packaging minor and cannot be taken by packaging majors.) **Class 4, Credit 4**
- 0607-503 Packaging Container Systems**
This course is the second in a three-course bridge program. It is intended to introduce non-packaging students to the study of primary packages which come in direct contact with products. History, manufacturing processes, characteristics, and application as well as evaluation of containers will be reviewed. (This course is part of the packaging minor and cannot be taken by packaging majors.) **Class 4, Credit 4**
- 0607-504 Concepts to Consumers**
This course is the third in a three-course bridge program. It is intended to introduce non-packaging students to the role packaging plays from product and package conception and development, through development, marketing, manufacturing and distribution to the final consumer and ultimate disposal. (This course is part of the packaging minor and cannot be taken by packaging majors.) **Class 4, Credit 4**
- 0607-524 Packaging Management**
A study of packaging organization in the contemporary corporation and project management techniques available to the packaging manager. Organization theory is discussed and compared with typical industry practice. Other topics include PERT, value analysis and the impact of regulatory agencies upon packaging from a management standpoint. (0607-321, 322, or 504) **Class 4, Credit 4**
- 0607-524 Packaging Economics**
A study of firm behavior with concentration on production costs and revenues. Market structures are analyzed in order to develop an understanding of how packaging fits into the general economy. Students are instructed in the use of basic economic reference materials for research purposes. A paper is required. (0607-321, 322, or 504) **Class 4, Credit 4**
- 0607-530 Packaging and the Environment**
Consideration of packaging in a social context. Factors that enhance secondary use, recycling, recovery of resources and proper disposal are discussed. Package design in relation to solid waste disposal and materials and energy shortages are considered. Other topics of current social interest are discussed. Primarily a discussion class for senior students. Open to nonmajors. (0607-321, 322, or 504) **Class 4, Credit 4**
- 0607-531 Packaging Process Control**
An advanced course designed to give packaging students instruction in design, process, and quality control techniques for packaging applications. Topics include the concepts of zero defects, computer applications for control charts, and acceptance sampling. (0607-321, 322, and 1016-319 or equivalent) **Class 4, Credit 4**
- 0607-536 Medical Products Packaging**
A study of unique requirements for pharmaceuticals and packaging materials and containers for sterilized devices. Current sterilization techniques, impacts on material properties, and distribution requirements are considered for this specialized product group. FDA regulations for product development and manufacturing GMPs are addressed. (0607-321, 322, or 504) **Class 4, Credit 4**
- 0607-555 Export Packaging**
This course consists of the study of particular forms and requirements for packaging for the export environment. Preservation techniques, international logistics, bulk intermediate containers, packing requirements, the export handling, transport and storage environment and related topics. (0607-321, 322, or 504) **Class 4, Credit 4**
- 0607-568 Food Preservation and Packaging**
A study of food products, common methods of processing and preservation, impact on quality and nutritional value of the product, and the relationships with common packaging methods and distribution practices. (0607-321, 322, or 504) **Class 4, Credit 4**
- 0607-575 Technical Skills for Professional Sales**
Introduction to a systematic problem-solving methodology in the sales profession. The core of the course explains the systematic 13 steps that lead to professional sales success. The rationale for each step is thoroughly explained, as are the procedures for implementing it. This course is required for all entering TM and D students. (0607-321, 322) **Class 4, Credit 4**
- 0607-577 Packaging Internship**
This course number is used by students in the packaging science program for earning internship credits. The number of credits and the nature of on-location experience is determined by the student's adviser, subject to approval of the department. **Credit variable 1-8**
- 0607-590 Senior Thesis**
An in-depth study of a selected phase of packaging that enables the student to make use of the knowledge and skills acquired during the course of the program. **Credit 4**
- 0607-596 Honors Packaging Science Independent Study**
A supervised investigation within an advanced packaging science area of student interest. The student must be a registered CAST/RIT honors program student. Consent of the instructor and the department approval are required. **Variable Credit 1-4**
- 0607-598 Independent Study**
Undergraduate research, in consultation with the instructor, on any packaging-related topic. Approvals are necessary from the department chair. (Undergraduate Research and Independent Study (0607-598 and 599) combined total credit allowed is limited to a maximum of 8 credits.) **Credit variable 1-8**
- 0607-599 Independent Study**
Independent study, in consultation with the instructor, on any packaging-related topic. Approvals are necessary from the department chair. (Undergraduate Research and Independent Study (0607-598 and 599) combined total credit allowed is limited to a maximum of 8 credits.) **Credit variable 1-8**

Civil Engineering Technology

0608-198 Introduction to CETEMS, Freshman
This course introduces students to the CETEMS program in order to ease the college transition. Information is provided on cooperative education electives, liberal arts core and concentration courses, and pre-registration procedures. Discussion of topics may include professional credentials. **Class 1, Credit 1**

0608-199 Introduction to CET, Transfer
This course introduces students to the CETEMS program in order to ease the transition from their previous colleges. Information is provided on cooperative education, technical electives, liberal arts core and concentration courses, and pre-registration procedures. Discussion of topics may include PE registration and NICET certification. **Class 1, Credit 1**

0608-211 Engineering Graphics with CAD
An introduction to engineering graphics as a means of communication in the technical fields. The course is laboratory oriented and provides the student with basic skills to create and edit professional 2D and 3D drawings with this comprehensive first course in the use of AutoCAD software for Mechanical, Architectural and Civil drawings. The course assumes no prior knowledge of engineering drawing or AutoCAD. **Class 2, Lab 4, Credit 4**

0608-220 Civil Engineering Graphics
The objective of this course is to develop an understanding of plans and drawings in civil engineering projects as well as in related disciplines: architecture, mechanical and electrical engineering, and landscape architecture. This understanding is implemented by requiring certain drafting exercises relating to these drawings, incorporating pertinent lectures, making field visits to civil engineering works in order to make the connection between plans and actual structures, and requiring exercises in the use and interpretation of plans. Civil engineering works include site development, structures, hydraulic structures, water and wastewater transport and treatment facilities, and transportation facilities. Students develop an understanding of the technical and legal purpose of plans and how to assemble them. **Class 2, Lab 4, Credit 4**

0608-225 Problem Solving and Communications with Computers
This course provides students with a solid foundation in the use of basic computer software programs that have common applications in future courses and in the workplace. The programs include word processing, spreadsheets, and public presentation software. The class structure includes instruction of new skills and practicing these procedures with laboratory problems. **Class 1, Credit 2, Lab 2**

0608-303 Land Development Computer Applications
Civil Engineers will learn to use AutoDesk Land Desk Development (including Civil Design and Survey Modules) software to create a Mortgage Survey Map from field notes, to create a Topographic Base Map from field notes, and to design a Site Plan that will include a building layout, roadway alignment, profiles, cross sections, grading, storm sewers, earthwork, and pond design. (0608-211, 0608-220) **Credit 2**

0608-304 Structural Loads and Systems
An introduction to structural loading and load combinations. Calculation of structural loads on buildings in accordance with the New York State 2002 Code (NYS 2002), the International Building Code (IBC) 2000 Code, and the ASCE 7-02 Code. Structural loads to be studied include dead loads, live loads, snow loads, wind loads and seismic or earthquake loads. Selection of structural systems for resisting lateral loads in building structures. (0610-302, 0610-303) **Credit 2**

0608-305 Structural Computer Applications
Introduction to commercially available structural analysis and design software that is widely used in structural engineering practice. The software is used in the analysis of 2D and 3D trusses and frames, beams, slabs, and walls. (0610-302, 0610-303, 0608-380) **Credit 2**

0608-320 Surveying I
An introduction to surveying. Topics include note keeping, leveling, vertical and horizontal measurement, traverses, and topographic mapping. Students apply lecture lessons to assignments in the field using modern surveying equipment. (1016-204; corequisite: lab section) **Class 3, Credit 4, Lab 2**

0608-330 Materials of Construction
A study of Portland cement concrete and asphalt cement concrete. Aggregates, Portland cement, and asphalt cement (each an ingredient in the concretes) are studied extensively. Mass-volume relationships are explored. Laboratory work focuses on testing aggregates, designing Portland cement concrete mixes, and testing Portland cement concrete cylinders using ASTM standards. Students also test mortar (ASTM standard) and asphalt concrete (NYS DOT standards) in the laboratory. (Corequisite: lab section) **Class 3, Credit 4, Lab 2**

0608-340 Surveying II
An introduction to the fundamentals of route surveying and earthwork. Topics include simple horizontal curves, reverse curves, compound curves, transitional spiral curves, and vertical curves. Techniques for estimating earthwork volume quantities are covered, along with development of drawing profiles and cross sections. Mass-haul diagrams are explored. Laboratory exercises include designing and laying out various types of curves in the field. (0608-320/Surveying I; corequisite: lab section) **Class 3, Credit 4, Lab 2**

0608-360 Elements of Soil Mechanics
An introduction to soil mechanics and its application to problems encountered in civil engineering. Major topics include soil classification, strength and compressibility analysis, effect of water on soil characteristics, and modern and traditional soil improvement techniques. Laboratory tests commonly used to evaluate engineering properties of soils are performed. (0610-302, 0610-303) **Class 3, Credit 4, Lab 2**

0608-380 Elementary Structures
Applications of the principles of statics and strength of materials to the design and analysis of basic structural elements such as beams, T beams, columns, slabs, and footings. The available time is split evenly between structural steel (allowable stress design using AISC guidelines) and reinforced concrete (strength design using ACI code). Design and analysis of steel connections are covered. (0610-302, 0610-303) **Class 4, Credit 4**

0608-404 Applied Mechanics of Materials
Basic strength of materials and statics are reviewed. Advanced topics are covered to include stress and strain, Mohr's circle concept, transversely loaded members, statically indeterminate problems, Euler's equations and column design principles. (0610-302, 0610-303) **Class 3, Recitation 2, Credit 4**

0608-420 Hydraulics
A study of principal physical and mechanical properties of liquids, hydrostatic pressure and forces; pressure-measuring devices; buoyancy and flotation; principles of kinematics and dynamics; Bernoulli Law; concept of momentum. Flow of liquids in closed conduits, and introductory principles of piping systems design; pumps and pump selection; flow of water in open channels and introduction to their design. (Physics, 0610-302, 0610-303; corequisite 0608-421 lab) **Class 3, Credit 3**

0608-421 Hydraulics Laboratory
An experimental study of principal physical properties of liquids and major laws of fluid mechanics. Operating various laboratory equipment and devices along with concurrently taking 0608-420, Hydraulics, for principal theoretical studies of physical and mechanical properties of liquids, hydrostatics, fluid kinematics and dynamics corequisite 0608-420 Hydraulics. **Class 3, Credit 1**

0608-422 Elements of Building Construction
Elements and details of building construction, both residential and commercial, are explored. The course does not focus on design, but rather on specific building components, and on how these components work together to create a functional building. Some of the topics include: foundations, wood light frame, heavy timber frame, steel, concrete, masonry, glass, roofing, curtain wall systems, and interior finishes. The role of building codes in design and construction is introduced. **Class 4, Credit 4**

0608-432 Water and Wastewater Transport Systems
A brief overview of surface and groundwater sources. Hydraulic design of sewers, storm drains, and potable water systems, including piping and pumping systems, storage, and ancillary facilities. (0608-420) **Class 1, Recitation 1, Credit 2**

0608-438 Principles of Water and Wastewater Treatment
An introduction to water and wastewater treatment, interpretation of analyzed physical, chemical and biological water quality parameters associated with the design and operation of treatment processes. Fundamental principles and applications of physical, chemical and biological processes employed in water and waste-water treatment and the analysis of waste assimilative capacity of streams are introduced. (1011-272, 276, 0608-420, 0608-432; corequisite: recitation section) **Class 3, Credit 4, Lab 2**

0608-444 Mechanical Equipment for Building
A presentation of mechanical and electrical equipment used in both residential and commercial building construction. The course investigates HVAC, plumbing, and electrical systems/equipment with an emphasis on function rather than design. Heat loss, psychometrics, duct sizing, and refrigeration systems are among the topics covered. **Class 2, Credit 2**

0608-460 Construction Equipment
The fundamentals of equipment characteristics, uses, and earthwork productivity are explored. The course investigates excavators, loaders, scrapers, off-highway trucks, bulldozers, and other earth-moving machines, as well as cranes. Students gain practice in machine selection and equipment fleet assembly using productivity, operating costs, and owning costs as criteria. **Credit 2**

0608-470 Timber and Design Construction
Discussion of the properties of structural lumber including grades, sizes and design properties. Design of beams, columns, trusses, plywood diaphragms, shear walls, and glued-laminated timber. The provisions of various building codes are investigated, and the specification of the American Forest and Paper Association is followed. A comprehensive group design project is assigned and some computer work using a spreadsheet program is involved. (0608-404) **Class 4, Credit 4**

0608-480 Groundwater Hydraulics
Groundwater movement and engineering applications. Topics include construction dewatering, groundwater remediation, flow-net analysis, flow analysis to wells and trenches, design of groundwater collection systems, pump selection, and groundwater's interaction with engineered structures. Application of groundwater software. (0608-420) **Class 4, Credit 4**

0608-482 Stormwater Management
Presents the concept of the hydrologic cycle and the evaluation of its components. Course concentration on the analysis of stream and surface water hydrology, management of stormwater runoff, practical engineering procedures, and hydrologic software. (0608-420) **Class 4, Credit 4**

0608-485 Hydraulic Structures
Analysis and design of engineered systems in lakes and streams. Topics may include drainage channels, erosion protection, bridge piers and scour, dam spillways and ancillary structures, docks, breakwaters, harbor structures, and roadway systems. Many of these hydraulic systems will be evaluated using USCOE and USDOT design manuals. Approximately one half of the course work involves the application of various software in analysis and design. (0608-420, 0608-432) **Class 3, Recitation 2, Credit 4**

0608-490 Structural Analysis
An introduction to loads, and the analysis of statically determinate and indeterminate structures by classical and modern techniques. The types of structures covered include beams, trusses, and frames that are loaded in the plane of the structure. Topics include introduction to cables and arches, influence lines and the effect of moving loads, determination of the degree of indeterminacy, approximate methods (including the Portal Method), moment distribution, and an introduction to matrix methods. Some computer work using a popular structural analysis software is involved. (0608-404,0608-305) **Class 4, Credit 4**

0608-496 Reinforced Concrete Design
Design of members and frames of reinforced concrete. Topics include principles of structural design; loads; properties of concrete and reinforcement; design of slabs, beams, columns, and footings. Emphasis is on the use of the ACI code, and a comprehensive group design project is assigned. Some computer work is involved. (0608-303, 305, 404, 490) **Class 4, Credit 4**

0608-497 Structural Steel Design
Design of members and frames of structural steel and their connections. Topics include principles of structural design, loads, types of steels, tension members, columns, noncomposite and composite beams, beam-columns, column base plates, and simple bolted and welded connections. The use of the AISC LRFD specification is emphasized and a comprehensive group design project is assigned. Some computer work is involved. (0608-304, 305, 404, 490) **Class 4, Credit 4**

0608-499 Civil Tech Co-op
One quarter of appropriate work experience in industry. (0606-099) **Credit 0**

0608-500 Labor Relations
An introduction to the fundamentals of labor laws as well as the understanding that good workplace relations depend upon interpersonal skills on a one-on-one basis. Topical legislative and regulatory subjects include the Fair Labor Standards Act, National Labor Relations Act, Davis-Bacon Act, Americans with Disabilities Act, Civil Rights Act and other requirements of the workplace. In addition, time is devoted to an understanding of conflict resolution, sexual harassment, age-in-hiring, family leave, and other managerial requirements and considerations that make the workplace effective and productive. Course content applies to conduct in engineering offices, construction firms, and public works agencies and authorities. Several speakers from open shop and union backgrounds share their views and experiences with the class. The assumption is that graduates of the program will assume managerial positions. **Class 2, Credit 2**

0608-509 Cost Estimating
An introduction to direct cost estimating for construction projects. The estimating techniques covered include quantity take-off, labor productivity, and pricing (labor, material, and equipment). Drawings, sketches, and specifications are used as a basis for developing quantities involving site work, concrete, masonry, steel, and carpentry. Students also gain experience using Timberline Precision Estimating, an application software package used as a tool in the development cost estimates. (0608-422) **Class 4, Credit 4**

0608-510 Design of Water Treatment Facilities
Principles of water treatment plant design. The course emphasizes the components of common municipal treatment works, although some industrial treatment processes are also covered. (0608-420, 0608-438) **Class 2, Credit 2**

0608-511 Design of Wastewater Treatment Facilities
Principles of wastewater treatment plant design, conceptual and hydraulic design of activated sludge and trickling filter plants are studied. Tertiary treatment facilities, such as nitrogen and phosphorous removal are discussed. Process, plant design, and construction elements are stressed. (0608-432, 0608-438) **Class 1, Recitation 2, Credit 2**

0608-514 Land Use Planning
The environmental and social aspects as well as the engineering and cost considerations of land-use planning are covered. Topics included are zoning concepts, master plans, subdivision regulations and design criteria, flood plains, environmentally sensitive areas, wetlands, other planning and control tools, solar access planning, and urban revitalization. Students are involved in an independent project consisting of a concept design for a subdivision or other land-use project. Extensive use is made of field trips and attendance at appropriate meetings or work sessions. (0608-211, 220, 320, 340, 432) **Class 4, Credit 4**

0608-525 Civil Engineering in Resource Recovery and Waste Management
An introduction to civil engineering aspects of dealing with resource recovery and "waste" management, on source reduction and resource recovery. Topics covered are the history of the problems, societal reaction and legislation, minimizing, and recovering "wastes." Emphasis is on those aspects in which the civil engineer plays a role such as municipal solid waste landfills and hazardous waste permanent storage facilities, land application of biosolids, composting, and environmental protection projects, including the "brownfields" program. Use is made of lectures, reading materials, outside speakers, field trips, and certain projects. A section of the course focuses on international aspects of resource recovery and waste management. (0608-438) **Class 4, Credit 4**

0608-527 Soil Mechanics and Foundations
A study of physical, mechanical and engineering properties of soils; methods of determination of bearing capacity; stress distribution within soil mass and settlement; spread footing analysis and design; lateral earth pressure and retaining walls analysis and design; pile foundation analysis and design principles and slope stability; (0608-360, 404; 0608-528 Soil Mechanics Laboratory, must be taken concurrently) **Class 3, Credit 3**

0608-528 **Soil Mechanics Laboratory**
The soil mechanics laboratory is to be taken concurrently with 0608-527. Exercises include tests in internal friction by direct shear, unconfined compression, triaxial compression, and consolidation. **Credit 1, Lab 2**

0608-530 **Transportation Engineering**
This course exposes students to the fields of highway, airport, and rail engineering. The areas of administration, planning, design, construction, maintenance, and operation are covered. After the introductory material is presented, stress is placed on specific skills needed in these fields, including highway, rail and airport standards; geometry and alignment; drainage; earthwork; safety standards; and structures. Ample field exposure to all elements is part of the formal structured program. Each student is required to perform an independent project consisting of the design of a section of highway. (0608-303, 0608-340; corequisite: recitation section) **Class 3, Credit 4, Lab 2**

0608-535 **Pavement Design**
This course works in conjunction with Transportation Engineering, providing detailed engineering knowledge on asphalt and Portland cement concrete pavement design. Included with the theoretical knowledge will be the development of, and practice in, the necessary design skill. The course includes the design of new pavements, and also addresses the very active programs in pavement recycling, bridge, and pavement rehabilitation, and strengthening. Problems are attacked in a practical manner, utilizing the expertise of national organizations and state highway departments involved in this work. (0608-330) **Class 4, Credit 4**

0608-544 **Contracts and Specifications**
This course includes a fundamental overview of contract law, followed by the application of this material in the contracts for construction. Subsequently, the student is exposed to construction specifications. Substantial use is made of actual documents such as those of the New York State Department of Transportation, the Construction Specification Institute and trade standards such as ANSI, ASTM, and others. Students are required to develop and assemble a mock-up set of contract documents. Arbitration, design-build, and partnering are discussed. **Class 2, Credit 2**

0608-546 **Professional Principles and Practice**
A treatment of legal and ethical aspects of the profession; review of codes of ethics and current professional problems. Features several guest speakers representing different segments of the civil engineering technology field. **Class 1, Credit 1**

0608-560 **Construction Project Management I**
An introduction to construction management. Topics include the various project delivery systems for building construction, along with planning, project organization, bonds, insurance, change orders, submittals, and contract documents. CPM scheduling is covered in detail. Students gain experience using Primavera Inc's Suretrak, a Windows-based application software package used for construction project planning and scheduling. (0608-509, 0608-422) **Class 4, Credit 4**

0608-570 **Principles of Dynamics in CET**
Study of the basic principles of engineering dynamics. Topics include kinematics of particles, force, mass, and acceleration, work and energy, force impulse and momentum, and an introduction to vibrations and structural dynamics. Applications to practical engineering problems are emphasized. (0608-404, 0608-490) **Class 4, Credit 4**

0608-599 **Independent Study**
A supervised investigation within a civil engineering technology area of student interest. Consent of the sponsor and departmental approval are required. Students are limited to a maximum of four quarter credit hours of independent study projects and two sections in any quarter, plus a maximum of eight quarter credit hours of independent study credits earned toward degree requirements. **Credit 1-4**

Electrical Engineering Technology

0609-051 **ECTET FYE I**
This course provides first-year students an opportunity to develop skills necessary to succeed in the ECT Engineering Technology Program. Through interactions in a small group environment, students will make friends with other students in their major, create a stronger bond with RIT, and develop a working relationship with their academic adviser. The students will become more knowledgeable about the ECT Engineering Technology disciplines, career options, and ethical issues. Students are required to successfully complete both quarters of ECTET FYE.

0609-052 **ECTET FYE II**
This course, a continuation of ECT ET FYE, I provides first-year students an opportunity to develop skills necessary to succeed in the ECT Engineering Technology Program. The ECT Engineering Technology First Year Enrichment Course (ECT ET FYE) will focus on providing you with proven strategies to enhance your personal, academic and professional success and facilitate your transition to the ECT ET and RIT community. (Students are required to successfully complete both quarters of ECT ET FYE. Upon completion of ECT ET FYE I and II the student will fulfill the wellness graduation requirement.)

0609-214 **Circuit Theory I**
An introduction to DC circuit analysis techniques. Topics include resistance with circuit techniques of Ohm's Law; current and voltage division; simplification of series, parallel, series-parallel circuits, bridge and ladder networks, Kirchhoff's source conversions, Branch Analysis, ELEC. Pow and Measurement; Mesh analysis. (Corequisite 1016-230) **Class 2, Lab 2, Recitation 2, Credit 4**

0609-215 **Circuit Theory II**
A continuation of Circuit Theory I continues the development of circuit analysis and design techniques including Thevenin, Norton, and superposition theorems and nodal analysis. Inductance and capacitance are introduced and transient circuits are studied. An introduction to AC circuits is included. (0609-214) **Class 2, Lab 2, Recitation 2, Credit 4**

0609-216 **Circuit Theory III**
A continuation of Circuit Theory II with emphasis on the characteristics and analysis of AC circuits. Including the topics of reactance, impedance, AC power and power factor, resonance, maximum power transfer, frequency, and bandwidth. (0609-215 C or better) **Class 2, Lab 2, Recitation 2, Credit 4**

0609-333 **Concepts in Systems and Signals**
Continuous-time and discrete-time linear, time-invariant, and causal systems are examined throughout the course. Theoretical concepts covered are: the Fourier representation of a periodic waveform; the Laplace transform; convolution; signal sampling; and the z-transform. MATLAB is presented and used extensively. (0609-216, and 1016-262, corequisite 1016-304) **Class 3, Credit 4, Recitation 2**

0609-337 **Electric Machines and Transformers**
Topics include power concepts, magnetism, electromagnetic force, fields, armature, commutators, rotors, stators, brushes, starters, controllers, DC machines, AC motors, alternators, single-phase and three-phase dynamos, three-phase circuits, phasors, transformer properties, isolation, efficiency and voltage regulation. (0609-216 or 0609-411) **Class 3, Lab 2, Credit 4**

0609-360 **Electronics I**
An introduction to electronic circuits using semiconductor diodes and bipolar junction transistors. Emphasis is placed on device characteristics and specifications, biasing circuits, transistor modeling and applications in small signal amplifiers. (0609-216 with a grade of C or better) **Class 3, Lab 2, Credit 4**

0609-361 **Electronics II**
A continuing course in the analysis and design of electronic circuits. Emphasis will be on the characteristics, operation, and biasing of both insulated gate field effect transistors and the use of small signal parameters. Students are introduced to frequency response of circuits, differential amplifiers and power electronics, including class A, B, and D amplifiers. (0609-360 or with a grade of C or better) **Class 3, Lab 2, Credit 4**

0609-362 **Electronics III**
The operational amplifier is covered in detail. A wide range of its application are explained and explored, including many amplifiers and comparators. DC and AC characteristics are studied. Frequency responses of RC and op-amp circuits are covered. (0609-361 with a grade of C or better) **Class 3, Lab 2, Credit 4**

0609-363 **Electronics IV**
This course applies the concepts of circuits and electronics to basic analog communication circuits for amplitude and frequency modulation. Topics studied are RF amplifiers, Fourier Analysis, AM and FM transmission and reception, phase-locked loops, synthesizers, oscillators, DSB and SSB communication systems, antennas and EM wave propagation. (0609-362) **Class 3, Lab 2, Credit 4**

- 0609-403** **Advanced Circuit Theory**
An introduction to advanced circuit analysis techniques, including signal decomposition by Fourier Series, circuit characterization in the plane using Bode straight line approximation or pole zero plots, Laplace transform methods for solution of circuit transients, and investigations of active circuit stability. (0609-216, 0609-333, 1016-304 all with a grade of C or better) **Class 4, Credit 4**
- 0609-404** **Control Systems I**
Closed-loop control systems are analyzed with respect to their stability, steady-state accuracy, and transient response. The design of compensation to improve system performance is included. (0609-403, 1016-304) **Class 3, Lab 2, Credit 4**
- 0609-407** **Career Orientation**
This course is an introduction to the cooperative educational placement process at RIT, the programs in the department, and RIT resources. Topics include engineering technology vs. engineering, review of resources available at RIT, the co-operative education placement process, the ethical expectations of employers for co-op students, and RIT during a job search. (Third-year student in Electrical, Computer, or Telecommunications Engineering Technology during the current academic year.) **Class 1, Credit 1**
- 0609-408** **Transmission Lines**
Development and application of the general transmission line equation starting from the distributed lumped LC model. Topics include the propagation of electromagnetic waves in a coaxial line; voltage, current and impedance; graphical methods for analysis; transmission lines as circuit elements. (Grade of C or better in 1016-304, or 0609-216 and, 0609-403) **Lecture 3, Lab 2, Credit 4**
- 0609-410** **Patents and Trade Secrets**
This course explores the legal characteristics and limitations of intellectual property rights protected by patents and trade secrets through study of relevant statutes, court decisions, and inventor behavior. The course is appropriate for anyone who anticipates involvement in the creation or management of intellectual property rights. Note: A party's legal rights depend upon their unique and specific factual situation. This course does not provide legal advice or direction. (Third-year status or permission of instructor) **Credit 4**
- 0609-411** **Electrical Principles I**
A service course offered to non-electrical majors studying in the technical disciplines. Topics covered include basic electrical circuits, network theorems, power and energy concepts, power factor correction, and basics of transformers. The laboratory is an integral part of the course, where the experiments complement lecture material. (1016-204) **Class 3, Lab 2, Credit 4**
- 0609-412** **Electrical Principles II**
An introductory survey course in the basics of analog and digital electronics. Analog topics include basic semiconductors, transistor circuits and operational amplifiers. Fundamental digital logic concepts include an introduction to combinational and sequential logic. Various transducers and associated circuits are introduced. (0609-411) **Class 3, Lab 2, Credit 4**
- 0609-413** **Applied Microprocessors**
Applications of a contemporary microcontroller will be used to teach engineering technology students digital logic, assembly programming and microprocessor interfacing. This course is intended as a service course for non-electrical majors who have not taken digital fundamentals. The laboratories for this course use an assembler terminal emulator and download software. (0609-411) **Class 3, Lab 2, Credit 4**
- 0609-414** **Basic Electrical Principles**
This is a basic study of important electrical concepts for both AC and DC circuits. Topics covered include AC/DC circuit theory, single and three-phase power distribution, power factor, line losses, efficiency, AC motors and transformers, energy costs, wiring methods, instrumentation, and circuit protection. (1016-232) **Class 3, Lab 2, Credit 4**
- 0609-416** **Automated Data Acquisitions**
This course is an introduction to automated data acquisition and analysis, the LabVIEW software package is introduced and used to perform data acquisition, analysis of data, and control of instrumentation. (0609-202 or 0609-216 or 0609-411) **Class 3, Lab 2, Credit 4**
- 0609-426** **Analog Simulation Seminar**
Analog Simulation Seminar is an introductory course in schematic entry simulation, and simulation results interpretation of analog circuit designs. The analog simulation tool will be used to perform DC, time domain, and frequency domain analysis of both passive and active analog circuits. (0609-216) **Class 1, Lab 2, Credit 2**
- 0609-430** **Clean Energy Power Systems**
Develops the skills to analyze and develop modern alternative energy systems. This course will cover a range of energy sources such as hydroelectric power, wind energy, combustion turbines, active and passive solar, photovoltaic systems, fuel cells, combined heat and power systems, biomass, geothermal, ocean and nuclear energy. Power electronic components (inverters and converters) and components necessary for the connection to the electrical power grid will be discussed. Alternative energy storage systems will be analyzed. Also, economics, global warming, Government regulations and tax initiatives for clean energy products will be discussed. (Physics)
- 0609-435** **Process Control and Instrumentation Systems**
A study of methods used for sensing and controlling physical and industrial processes such as found in a nuclear power plant or manufacturing facility; topics include transducers that measure pressure, flow, liquid level and temperature, automatic control, analysis of open and closed-loop systems that include stability, steady-state error and transient response, programmable logic controllers and digital control systems. (0609-215 or 0609-411)
- 0609-442** **Advanced Electronics**
Operational amplifiers and special purpose integrated circuits are used in signal generation, regulation and active filtering. The use of discrete power devices (SCRs, diacs, and triacs) and optoelectronic components (LEDs and photodiodes) are studied. (0609-362 or equivalent) **Class 3, Lab 2, Credit 4**
- 0609-499** **Electrical Technology Co-op**
One quarter of appropriate work experience in industry. (0609-362, 0618-438, 0609-407, or permission of course coordinator) **Credit 0**
- 0609-511** **Laser Technology**
This course in laser technology focuses on laser sources, laser drive electronics, temperature control and, laser optics. In the laboratory students create real images using a laser and electronics they design. Motion control and image data synchronization techniques are discussed and utilized in creation of a working printer. Laser safety training will precede lab work. **Class 3, Lab 2**
- 0609-534** **Communication Systems I**
Analog modulation schemes and systems, and the Fourier Series are reviewed. The Fourier transform is introduced. The noise figure, noise temperature and signal-to-noise ratio of a system are introduced. Phase-locked loop concepts and applications to communications systems and an introduction to digital communication signals and systems are presented. (0609-363, 0609-333) **Class 3, Lab 2, Credit 4**
- 0609-547** **Digital Signal Processing**
A practical applied course in the processing of signals using digital techniques. Starts with foundational concepts in sampling, probability, statistics, noise fixed and floating point number systems and describes how they affect realworld performance of Digital Signal Processing (DSP) systems. Fundamental principles of convolution, linearity, duality, impulse responses, and discrete Fourier transforms are developed and applied to FIR and IIR digital filters design. In the corequisite lab, students get an integrative experience writing DSP code that executes in real-time on DSP hardware. (1016-304, 0609-333) **Class 3, Lab 2, Credit 4**
- 0609-550** **Power Systems I**
Basic elements of a power system, energy sources, substation configuration, load cycles, balanced and unbalanced three-phase circuits, power factor correction, transmission line configurations and impedance, voltage regulation of transformers, and the per unit system are studied. Load flow and economic operation are introduced. (0609-337 or 0609-411 and permission of instructor.) **Class 3, Recitation 2, Credit 4**
- 0609-552** **Power Systems II**
Load flow and economic operation of power systems are studied. The symmetrical component method of three-phase circuit analysis is used for fault analysis. Power system relay protection, supervisory control, power quality and system stability are introduced. (0609-550) **Class 3, Recitation 2, Credit 4**

0609-554 **Electronic Optic Devices**
Lecture topics to be covered include: light measurement and units, optics and optoelectronic transmitters and drivers. Radiometric and photometric units, black body radiators, optical flux and intensity of LEDs will be calculated using numerical and definite integration. Reflection and refraction from mirror and lens surfaces will be studied. LEDs and laser theory of operation and applications will be analyzed. Laboratory topics to be covered include: fiber optic construction, splicing, connector application and polishing, testing, bends and OTDR, theory and advanced operation. (0609-362) **Class 3, Lab 2, Credit 4**

0609-580 **Senior Project**
Selected independent study of design project by Electrical Engineering Technology students with the approval of the department. Approval must be granted first week of fall or winter quarter for spring quarter registration. **Class/Lab as required, Credit 4**

0609-596 **Honors Independent Study**
This course allows upper-class Electrical Engineering Technology honors students the opportunity to independently investigate, under faculty supervision, aspects of the electrical industry that are not currently covered in existing courses. Proposals for an honors independent study must be approved by the sponsoring faculty, the electrical engineering technology program chair and ECT-ET Honors advocate. **Credit variable 2-4**

0609-599 **Independent Study**
This course allows upper-class Electrical Engineering Technology students the opportunity to independently investigate, under faculty supervision, aspects of the electrical industry that are not currently covered in existing course. Proposals for an independent study must be approved by both the sponsoring faculty and the electrical engineering technology program chair. **Credit variable 2-4**

Mechanical Engineering Technology

0610-211 **Introduction to Materials Technology**
This is a survey course of engineering materials and how these materials are matched to the service requirements of components. Emphasis is on metals; their structure, properties, heat treating, and applications. (0610-304 concurrently) **Class 3, Credit 3**

0610-220 **Design Dimensioning and Tolerancing**
This course focuses on dimensioning and tolerancing of parts and assemblies. Geometric dimensioning and tolerancing is emphasized throughout lectures, CADD exercises, and physical measurement of parts. The course is project-based where the students examine an assembly to produce free-hand sketches, 3D models of the assembly and its parts, 2D prints, and a bill of materials. Emphasis is placed on proper dimensioning and modeling techniques. (0617-220, 262) **Class 3, Studio 2, Credit 4**

0610-302 **Introduction to Statics**
An introduction to the analysis of static structures covering free-body diagrams, forces, moments, vectors, equilibrium, friction, and analysis of structures and machine members. Applications are drawn from mechanical and civil engineering technology. (1017-211) **Class 4, Lab 1, Credit 4**

0610-303 **Strength of Materials**
Students study how forces and moments affect axial, shearing, and bending stresses and deflections of structural and machine members. The relationships between stress and strain, for both axial and torsional loading are explored. Beams, shafts, bolted or pinned joints and columns are analyzed and designed based on stress and deformation. Combined stress states are analyzed, including using Mohr's circle. Applications are drawn from the fields of mechanical and civil engineering technology. (A grade of C or better in 0610-302) **Class 4, Lab 1, Credit 4**

0610-304 **Materials Testing**
This laboratory course deals with the equipment, instrumentation and ASTM Standard Test Procedures used to perform physical tests on various materials, and the preparation of laboratory reports. (0610-211 concurrently) **Class 0, Lab 2, Credit 1**

0610-305 **Pneumatic and Hydraulic Systems**
This course involves the study of the basics of fluid power. Areas of study are pressure viscosity, turbulence, flow, thermal properties, and displacement. Hydraulic/pneumatic components such as pumps, actuators, valves accumulators, lines, directional controls, sealing devices servomechanisms, hydraulic fluids, and fluid containers are studied. (0610-302 concurrently) **Class 3, Lab 2, Credit 4**

0610-309 **Computational Methods for Engineering Technology**
Students develop proficiency in solving simultaneous equations, numerical differentiation and integration, and curve fitting of data using mathematical and computational techniques. These applications are evaluated critically and students develop the ability to select the most appropriate methodology for a given problem. Students critically evaluate the solution results while working on project assignments in teams. (Corequisite 1016-232) **Studio 2, Credit 1**

0610-312 **Macro and Micro Aspects of Metal Fusion**
This course introduces students to the different aspects of different types of welding. Students will experience and learn welding techniques such as MIG, TIG, Stick and oxyacetylene welding. Actual practice with technologies such as MIG and TIG will reinforce concepts and provide practical hands-on experience. Several sample test parts will be welded in a lab and broken with a tensile tester to evaluate the calculated load compared to the welded joint strength. Weld samples will be microscopically inspected to determine the heat affected zone of the material. Oxyacetylene and plasma cutting will be experienced. Interpreting weld symbols on drawings will be learned and applied. Lab Fee: \$75.00 payable to welding company. Student receives safety glasses, welding gloves, and lab coat, which they keep. Lab is held offsite. Transportation required. (0610-211, 0610-304) **Lecture 1, Lab 2, Credit 2**

0610-315 **Principles of Mechanical Design I**
This course provides design fundamentals for mechanical systems that utilize components such as brakes, clutches, shafts, gears, and pulleys. This project based course will use reverse-engineering techniques to investigate component form, fit, and function along with parts reduction, fabrication alternatives, and feature improvements. Parts fabrication vs. catalog selection will be discussed. Ethics, as it relates to mechanical design, and life long learning skills, will be enforced through examples of job expectations and direct student practice in the classroom. (0610-220, 303 and 0617-220) **Class 3, Lab 1, Credit 4**

0610-399 **Independent Study**
A supervised investigation within a mechanical technology area of student interest. Consent of the instructor and departmental approval are required. **Credit 1-8**

0610-403 **Failure Mechanics**
In this course, the modes of failure of mechanical parts: static, fatigue, and surface are studied. The mechanisms of the different failure modes are presented, as well as the different models used to predict behavior of mechanical parts under various loading conditions. Concepts are applied to the analysis and design of mechanical components. The computer is used extensively in the design process. (0610-303, 1016-231) **Class 3, Studio 2, Credit 4**

0610-405 **Applied Dynamics**
The principles of dynamics and the solution of practical engineering problems are studied. The two-dimensional dynamic analysis of particles and rigid bodies are performed using the three fundamental analytical methods. These problems are also solved using computer simulation software. (0610-302 and 1016-231) **Class 3, Studio 2, Credit 4**

0610-406 **Dynamics Machinery**
A study of the kinematics and kinetics of machine elements. Applications in robotics mechanisms are studied. Both graphical and computer methods are used. (0610-405) **Class 3, Lab 2, Credit 4**

0610-407 **Mechanical Engineering Technology Lab**
This is a course in mechanical laboratory techniques and the preparation of laboratory reports. Experiments utilize principles of statics, strength of materials and dynamics. Students work independently and in groups to prepare formal and informal reports and an oral presentation. (0610-303 or 408, 0610-405 or 410) **Class 1, Lab 2, Credit 2**

0610-408 **Applied Mechanics I**
Elements of statics and strength of materials. Topics include plane equilibrium, friction, stress, strain, torsion, and the bending of beams. Offered as a service course to electrical engineering technology students and electrical/mechanical engineering technology students. (1017-211) **Class 3, Recitation 1, Credit 4**

0610-409 **Mechanical Engineering Technology Lab II**
Students characterize polymers, ceramics, and composites by performing tests of mechanical and processing properties according to ASTM standards. Emphasis is placed on analyzing experimental results and preparing professional-quality laboratory reports (1011-208 and 0610-416 concurrently) **Class 1, Lab 2, Credit 2**

- 0610-410 Applied Mechanics II**
The basic concepts of statics and strength of materials are briefly reviewed. Additional strength of materials topics are introduced with the view of developing basic analytical procedures for the preliminary design of engineering structures and machine components. Topics include combined stress, transformation of plane stress, principal stresses and maximum shear stress, Mohr's circle, thin walled pressure vessels, columns and structure stability. The fundamentals of kinematics and kinetics of particle motion are developed, including the study of Newton's Laws of Motion, energy methods, and impulse and momentum. Offered as a service course to electrical engineering technology and electrical/mechanical technology students. (0610-408, 1016-232 concurrently) **Class 3, Recitation 1, Credit 4**
- 0610-416 Materials Technology**
The interrelation of properties, structure, processing, and performance for non-metallic materials is studied. Emphasis is placed on materials and process selection for design application. Failure mechanisms are discussed, along with ways to minimize the effects of these mechanisms. (0610-211, 1011-208) **Class 4, Credit 4**
- 0610-432 Computers in Mechanical Technology**
This course reviews the use of fundamental operations and features of the Microsoft Windows operating system. A set of projects are assigned to utilize the most commonly used features of Word, Excel, and PowerPoint and to introduce other features which are important to engineering analysis and related report generation. The basic capabilities of MathCAD are utilized to perform calculations to generate graphs and to solve equations, as well as to organize and document solutions to a variety of engineering analysis problems. **Class 1, Lab 2, Credit 2**
- 0610-440 Applied Thermodynamic I**
This is the first course in the first and second laws of thermodynamics and their applications. Thermodynamic properties of fluids including ideal gases and pure substances are studied. Thermodynamic processes and applications of the thermodynamic principles to steam cycles and refrigeration cycles. (1016-232 or permission of adviser) **Class 3, Recitation 2, Credit 4**
- 0610-441 Thermodynamics and Heat Transfer**
The first and second laws of thermodynamics and their applications. Thermodynamic properties of fluids, including ideal gases and pure substances, are studied. Introduction to heat transfer by conduction, radiation, and convection. Selection of heat exchangers. (1016-232 or permission of adviser) **Class 3, Recitation 2, Credit 4**
- 0610-442 Heat Transfer**
The first course in heat transfer. The theory and application of the fundamentals of heat conduction, convection and radiation. The design and application of heat transfer apparatus. (0610-440 0610-460) **Class 3, Lab/recitation 2, Credit 4**
- 0610-451 Vibration and Noise**
A study of the basic concepts of vibration and noise. Designing equipment for survival in vibration and shock environments. Methods of reducing noise in machinery structures. Environmental tests for vibration and shock. Methods of vibration and noise analysis will be demonstrated. (1016-304, 0610-405) **Class 4, Credit 4**
- 0610-460 Applied Fluid Mechanics**
The fundamentals of fluid statics and dynamics are studied. This includes the principles and applications of fluid statics, fluid kinematics, fluid kinetics, the energy conservation principle, dimensional analysis and fluid momentum. Also covered are laminar and turbulent flow in pipes and products, fluid machinery, fluid meters, and lifting vanes. (1016-304) **Class 3, Recitation 2, Credit 4**
- 0610-465 Thermo Fluid Lab**
Students perform laboratory experiments in thermodynamics, fluid mechanics and heat transfer. Students will do a group project involving the design of an experiment, its instrumentation, method of test, data analysis and final report presentation. Special emphasis is placed on report preparation and computer-aided data reduction. (0610-440, 460) **Class 1, Lab 3, Credit 3**
- 0610-499 Mechanical Engineering Technology Co-op**
One quarter of appropriate work experience in industry. (0606-099) **Credit 0**
- 0610-506 Machine Design I**
The static theories of failure and mechanical fatigue analysis are reviewed. These concepts are applied to the selection, analysis, and design of power transmission shafts, power screws, fasteners, springs, and spur gears. The design and selection of both hydrodynamic and rolling element bearings are studied. (0610-403) **Class 3, Studio 2 Credit 4**
- 0610-508 Machine Design II**
The study of the machine design principles in a design team environment to conceptualize design, build and test a product or mechanical system. Group projects from industry or school laboratory are emphasized. (0610-405, 506) **Class 3, Lab/Project 2, Credit 4**
- 0610-509 Product Design**
Integrates product development and design processes with establishing a need for the product; developing concepts; generating and evaluating the product concepts; developing specifications and design reviews; considering production, service and retirement. Special emphasis is placed on team work (concurrent engineering), determining customer requirements (quality function deployment), design for manufacturing and assembly (DFMA) and quality/reliability. Students learn how to reduce material and part costs, assembly time and the number of parts in the product. **Class 4, Credit 4**
- 0610-512 Computer Integrated Mechanical Design**
The use of computer simulation and finite element method in solving mechanical design problems, such as stress concentration, dynamic impact, thermal stresses. Industrial projects are emphasized. (0610-405, 506) **Class 2, Lab 3, Credit 4**
- 0610-515 Plastics Processing Technology**
Various methods used to manufacture plastics products. Topics include compression molding, rotational molding, extrusion, injection molding, blow molding, and thermoforming. (Fourth-year status) **Class 4, Credit 4**
- 0610-516 Plastic Product Design and Materials Selection**
The study of design guidelines for plastics products based on the interrelationships between product design, the material selected, the manufacturing process selected, and the tooling to be used. (0610-515 or permission of the adviser) **Class 4, Credit 4**
- 0610-517 Product Ideation and Concept Solution**
This course introduces the principles utilized in the early phase of the design process. Topics include the process of generating and formulating an idea, developing a Voice of the Customer (VOC) survey, utilizing a House of Quality (HOQ) matrix for developing a product requirements document, brainstorming and ranking concepts through the Plough Concept Selection Matrix technique, among others. Patenting and intellectual property issues will be discussed and selected ideas will be evaluated against patent searches. This is planned to be the first in a series of three courses that will result in the completion of a product utilizing these methods. (Third-year status or permission of instructor) **Class 4, Credit 4**
- 0610-518 Development and Design of New Products**
This course is designed to offer the student an experience of what it is like to develop an idea into a real product. In this second of three courses the student will be responsible for taking the info from a previously selected concept and developing that into a working design. This design process will require the student to perform a design feasibility study, develop a product specifications document, and be responsible for defining a preliminary manufacturing and assembly feasibility assessment. CAD will now be the "tool-of-choice" where all work will be documented and handled with a standard release procedure that parallels industry protocols. It is expected that this product phase will require the implementation of many foundation principles from previous courses. (Third-year status or permission from the instructor) **Class 3, Credit 4**
- 0610-519 Product Realization**
This course is intended to offer the student an experience of what it is like to develop an idea into a real product. In this third of three courses the student will be responsible for taking a project that is in the final design phase (from the Development and Design of New Products course) and provide the support necessary to develop models and working prototypes. The student will be responsible for applying design, manufacturing, and assembly analysis along with other appropriate disciplines such as Value Analysis and Process control. The results of these disciplines will guide the student into developing a fabrication process that will actually produce products at a reasonable quantity to sell. The student will also be responsible for setting up test procedures and evaluating the product for robustness according to a Product Specification Document. (Third-year status or permission from instructor) **Credit 4**

0610-523 Instrumentation and Characteristics in Plastics
This course is intended for fourth or fifth-year students interested in understanding fundamental instrumentation used for the characterization of plastics. Major emphasis is on interplay between analytical and experimental methods in the solution and development of plastic products. In addition to theory and basic principles, the instrumentation and apparatus necessary for methods are examined in polymer permeability testing, and characterization by differential scanning calorimeter (DSC), thermogravimetric analysis (TGA), Fourier transform infrared spectroscopy (FT-IR), and mechanical testing in an environmental chamber. **Credit 4**

0610-530 Instrumentation
The design and use of force, torque, pressure, flow, temperature, acceleration, velocity, and displacement instrument transducers. Laboratory experiments demonstrate calibration and set-up techniques and analysis of data. Principles of uncertainty, dynamic response, signal conditioning and computerized data acquisition are explained. (0609-411, 1016-304) **Class 4, Credit 4**

0610-540 Applied Thermodynamics II
The application of thermodynamics to vapor power cycles, internal combustion engines, compressors, refrigeration, air conditioning, psychometrics and combustion processes are studied. Emerging technologies such as distributed generation, cogeneration and total energy plants are covered. (0610-440) **Class 3, Lab 1, Credit 4**

0610-542 HVAC System Engineering
Principles and applications of refrigeration, air conditioning, comfort heating and ventilating are studied. Thermodynamics of air conditioning processes, psychometrics, moisture calculations and load estimating and operating costs are covered. (0610-440, 460) **Class 4, Credit 4**

0610-543 Energy Management
Technical, management and cost aspects of energy conservation. Technical aspects of reducing energy consumption in utilities, processes, buildings, heating, air conditioning and ventilation systems. Special topics such as furnace efficiency, heat recovery, heat pumps, pumping and piping, and architectural considerations. (0610-542 or permission of instructor) **Class 4, Credit 4**

0610-555 Land Vehicle Dynamics
Dynamic modeling of land vehicles, including tire mechanics and suspension and steering systems. Both cars and motorcycles will be analyzed, modeled and tested. Students will develop computer models and do physical testing for real vehicles. (0610-405) **Class 3 Lab 2, Credit 4**

0610-570 Robust Design
The fundamental principles of robust design are developed. The history of the robust design engineering methodology is presented. The concepts of the loss function, concept selection, parameter design and tolerance design are covered in detail. A structured design engineering methodology is taught with strict attention to the importance of linking engineering knowledge to Taguchi's approach to designed experiments. Metrics and analysis techniques are developed to optimize the performance of product or process components in spite of the variability of their design, manufacturing or customer use environments. Specific attention is paid to a number of case studies to reinforce the students' conceptualization of the methods and their focus on engineering of optimized products and processes. (Fifth-year student or department approval) **Class 4, Credit 4**

0610-596 Honors MET Independent Study
A supervised investigation within an advanced mechanical engineering technology area of student interest. The student must be a registered CAST/RIT honors program student. Consent of the instructor and department approval are required. **Credit variable 1-4**

0610-599 Mechanical Technology Independent Study
A supervised investigation within a mechanical technology area of student interest. Consent of the instructor and departmental approval are required. **Credit 1-8**

0610-630 Tolerance Design
This is a comprehensive course on the topics of analytical and experimental development of design and production tolerances. The course covers worst case and statistical tolerance analysis, 6 Sigma methods for tolerancing, Monte Carlo Simulation Sensitivity Analysis of systems, and Taguchi's approach to tolerance design. Special emphasis will be given to developing tolerances for complex aggregations of technologies. System tolerance and cost balancing is covered in detail. The use of tolerance design in critical parameter management will be covered. Students will conduct a project in computer-aided tolerance analysis. (Permission of instructor) **Credit 4**

Telecommunications Engineering Technology

Telecommunications Engineering Technology

0614-250 Fundamentals of Audio Engineering
This four (4) credit course provides an introductory level study of the technology used in recording, production, and distribution of sound. Topics include Microphone design types; selection and application, digital recording; the mixing console and mixing techniques, introduction to signal processing equipment and associated techniques, an introduction to the concepts relating to digital audio technology such as sampling, the Nyquist Theorem, Alias frequencies, quantization, dynamic range, compression and their applications will be covered. (1016-204, 1016-225) **Class 4, Credit 4**

0614-270 Introduction to Cable Networks and Technology
Like all providers of telecommunications services today, the cable industry has evolved over the decades to become an integral part of a dynamic and competitive industry. It has adopted and pioneered technologies and applications for delivery of various types of content from voice to multimedia. This course provides a technical overview of the architectures and technologies that have been employed during the first days of Community Access Television (CATV) to those used by Multiple Service Operators (MSOs) of today to offer voice, data, video, and wireless services. **Credit 4**

0614-271 Telecommunications Fundamentals
A survey of and introduction to the structure and regulation of the telecommunications industry. The basics of data communications, telephony, switching systems, ISDN, multiplexing and networks are introduced. Data communication components, codes and techniques are identified. Methods for selecting, implementing and managing a computer network or telephone system are reviewed. **Class 4, Credit 4**

0614-325 Introduction to Digital Audio Production
This four (4) credit course presents the fundamentals of the technology implemented in recording, editing, mixing and mastering audio. Pro Tools, by Digidesign, is the industry standard platform, as it is the most widely used application for music and post-production in today's audio engineering environment. Topics include basics of digital audio, session creation, importing media, introduction to MIDI, and basic techniques in recording, editing, mixing and mastering. (0614-250) **Class 4, Credit 4**

0614-345 Intermediate Digital Audio Production
Provides an intermediate level of study of the technology used in recording, editing, mixing, and mastering audio. Pro Tools by Digidesign is the selected platform as it is the most widely used application for music and post-production in the world today. Students are introduced to core concepts and skills necessary to operate a Digidesign Pro Tools LE 7.4 system running large sessions with up to 48 tracks. Topics include optimizing host-based Pro Tools performance, control surface operation, managing session data and media files, recording MIDI and audio, working with timebases and virtual instruments, editing and time-adjusting MIDI and audio, audio editing techniques, mixing, and automation. (0614-325) **Class 4, Credit 4**

0614-440 Management Topics for Engineering
This course provides future engineers with a sound foundation in business principles. It will encompass four main topics in one course: engineering economics, ethics, diversity, and project management with business principles covered as part of each topic. This topic will primarily be covered in one two-hour lab each week. The first half of the "traditional" lecture series will introduce and develop a keen understanding of core engineering economics. The second half of the course will introduce and develop business engineering ethics and the role of diversity in the workplace. (Third-year or higher, at least one co-op block, knowledge of a spreadsheet application like EXCEL, and knowledge of algebra.)

0614-450 Principles of Digital Video Processing for Networked Communications
This course will explore the creation, processing, and distribution of raw and compressed digital video formats over different communication networks such as wireless, cable, and fiber. The course will have a special emphasis on digital television applications such DTV, HDTV, and IPTV. The course will also explore different video distribution network topologies and protocols for the Internet, cable, and enterprise networks for video conferencing. (0614-271 Telecommunications Fundamentals or instructor permission) **Credit 4**

0614-464 **Voice Communication Systems**
Voice is perhaps the most basic form of communication and modern networks must continue to support high-quality voice communication. This course examines the basic characteristics of voice in both the time and frequency domain and shows on-line how these characteristics affect the requirements of communication networks. Both analog and digital representations of voice signals are considered, including advanced voice coding (e.g., G 729) for wireless and VoIP systems. The course covers baseband and carrier-based transmission of voice as well as Real Time Protocol (RTP) for VoIP. Signaling protocols for call processing for both circuit-switched and packet-switched communication are also covered. This course is similar to 0614-465, but it has no associated laboratory course and it requires a research paper. Students may not take both this course and 0614-465 for credit. (0614-271) **Credit 4**

0614-465 **Voice Communication Technology**
Voice is perhaps the most basic form of communication and modern networks must continue to support high-quality voice communication. This course examines the basic characteristics of voice in both the time and frequency domain and shows how these characteristics affect the requirements of communication networks. Both analog and digital representations of voice signals are considered, including advanced voice coding (e.g., G 729) for wireless and VoIP systems. The course covers baseband and carrier-based transmission of voice as well as Real Time Protocol (RTP) for VoIP. Signaling protocols for call processing for both circuit-switched and packet-switched communication are also covered. Students may not take both this course and 0614-464 for credit. (0614-271) **Credit 3**

0614-466 **Voice Telecommunications Lab**
This course provides the laboratory component for material presented in 0614-465 and 0614-464. Day and evening sections are offered in sequence with offerings of course 0614-465. Distance learning sections are offered as an intensive weekend lab in conjunction with Distance Learning section 0614-464. Distance Learning students must have completed either prerequisite prior to attending the scheduled RIT intensive weekend lab. On-campus day and evening students may register concurrently with on-campus offerings of 0614-465. **Class 0, Lab 2, Credit 1**

0614-475 **Switching Technologies**
This course covers modern and current switching, protocol, transmission, signaling and transport concepts used in public and private telecommunications networks. MPLS, GMPLS, Signaling System #7, SONET, optical, packet and circuit switching fabrics are studied. Circuit switching, frame relay and ATM are introduced for comparison. (0614-465 and 0614-466 or 0614-464, 0614-477) **Class 4, Credit 4**

0614-477 **Networking Technologies**
This course provides a practical study of voice and data communications from the point of the OSI seven-layer and the TCP/IP five-layer protocol model. Traditional circuit switched telecommunications as well as VoIP are studied. This course covers the operation of the lower four layers in detail by examining some of the foundation laws including Nyquist and Shannon as well as selected protocols. Emphasis is placed on data internetworking, local-area networking and wide-area networking. This course is a problem-based course in that students apply the learning to various computer and networking mathematical problems. Lab work ensures a level of networking competency and provides reinforcement of concepts developed in the lecture. (1016-319, 1016-261, 0614-271 or permission of the instructor)

0614-479 **Network Management**
Modern telecommunication networks include powerful network elements that can be remotely configured and that collect a large amount of information about the status and performance of the network. Network management is the process of configuring, controlling and monitoring a network, usually from a remote location. This course provides both a general overview of network management and an in-depth study of network management using the Simple Network Management Protocol (SNMP). The course includes laboratory exercises using the facilities in the REDCOM Telecommunications Systems Laboratory. (0614-465/466 or 0614-464, 0614-477 or permission of the instructor) **Credit 4, Class 3, Lab 2**

0614-480 **Introduction to Telecommunications Policy**
This course provides an introductory overview of domestic and international telecommunications policy and issues with special emphasis on domestic policy, regulation and law. Current issues, trends and standards will also be discussed. The course starts with a basic definition of telecommunications and why policy, regulation/deregulation and law are important to understand. It then moves to the history of U.S. telecommunications development with emphasis on the regulatory environment and continues with discussions of current U.S. regulatory policy at the state and federal levels. Current sweeping changes in the regulatory and legal arenas and the move to a new U.S. and world model will be discussed. **Credit 4**

0614-483 **Telecommunications Transmissions Systems**
Fundamentals of transmission systems are introduced. Different types of transmission systems such as coaxial, fiber optic, microwave, and satellite systems are studied and compared. At the end of this course students will be able to apply transmission system theory to the analysis and design of copper, fiber optic, and wireless transmission systems. (0609-333, 1016-304) **Class 3, Lab 0, Credit 3**

0614-484 **Telecommunications Transmissions Lab**
Laboratory and applications experience with transmission system concepts and analysis is provided to complement the lecture material in 0614-483 Telecommunication Transmission Systems. Students will use circuit simulation software, spreadsheet software, and laboratory equipment to analyze, measure and characterize transmission system hardware components. (0614-483) (On-campus offerings allow concurrent registration in 0614-483) **Class 0, Lab 2, Credit 1**

0614-499 **Telecommunications Engineering Technology Co-op**
One quarter of appropriate work experience in a telecommunications-related industry. (0609-407, 0614- 464, 465 and 0609-363), **Credit 0**

0614-520 **Fiber-optic Telecommunications Technology**
An introduction to fiber optic telecommunications technology. Review of basic optics including ray, wave and quantum optics. Light propagation through multi-mode and single-mode fiber attenuation, dispersion and nonlinear effects. Introduction to optical components used in communications systems including light emitting diodes, laser diodes, photodiodes and passive optical components. Optical amplifiers and wave division multiplexing. Emphasis on reading and understanding manufacturers' data sheets for fiber and optical devices. (0614-483 or 0609-408, 1017-212/272 and 1016-304) or equivalent courses) **Class 4, Credit 4**

0614-561 **Telecommunications Network Engineering**
Today's telecommunications networks rely on timing and synchronization, Quality of Service and capacity engineering. This course studies current and next generation methods and practices in the implementation of the above mentioned topics with respect to carrier networks that handle real time and non-real time traffic. Routing protocols and layer 3 addressing are also covered with respect to IP networks. (0614-475, 0614-477, 1016-304; corequisite 0614-562) **Class 3, Credit 3**

0614-562 **Telecommunications Network Engineering Lab**
This course provides the laboratory experience to complement 0614-561 Telecommunications Network Engineering. IP-based voice switches and routers are configured and tested for interoperability between traditional voice, IP telephony, data and transport equipment. (Corequisite 0614-561) **Lab 2, Credit 1**

0614-574 **Network Planning and Design**
This course teaches the art and science of metropolitan and wide area network design for both modern delay (data) networks and traditional blocking (voice) networks; the greatest emphasis is on modern delay networks. Both qualitative and quantitative approaches are used as the student progresses through the network analysis, architecture and network design processes. (0614-561, 0614-562, 0614-475 or permission of the instructor. This is a fifth year undergraduate course.) **Credit 4**

0614-596 **Honors Independent Study**
This course allows upper-class telecommunications engineering technology honors students the opportunity to independently investigate, under faculty supervision, aspects of the telecommunications industry that are not currently covered in existing courses. Proposals for an honors independent study must be approved by the sponsoring faculty, the telecommunications engineering technology program chair and ECT-ET Honors Advocate. **Credit variable 2-4**

0614-598 **Special Topics in Telecommunications**
Special topics in telecommunications is an experimental upper level course that will allow innovative topics in the rapidly changing telecommunications field to be offered and evaluated as potential permanent components of the ET curriculum. **Class 4, Credit 4**

0614-599 **Independent Study**
This course allows upper-class telecommunications engineering technology students the opportunity to independently investigate, under faculty supervision, aspects of the electrical industry that are not currently covered in existing course. Proposals for an independent study must be approved by both the sponsoring faculty and the telecommunications engineering technology program chair. **Credit variable 2-4**

Manufacturing Engineering Technology

0617-220 **Manufacturing Processes I**
This course will focus on the understanding and application of basic manufacturing processes. Students will be challenged to discover and learn how typical industrial piece parts and assemblies are constructed. Topics include material properties, powder metal processes, bulk deformation processes, metal removal processes, and sheet metal forming processes. **Class 3, Lab 3, Credit 4**

0617-262 **Solid Modeling and Design**
This course introduces students to the engineering design process and solid modeling. Students learn visualization skills, parametric solid modeling and creation of engineering drawings which meet industrial drafting standards. Design projects are used to reinforce concepts and provide practical design experience. **Class 3, Lab 2, Credit 4**

0617-271 **Fundamentals of Solid Modeling**
This course is intended for transfer students who have a background in a solid modeling package other than is used in 0610-220. Students will learn the fundamentals of Solidworks, in preparation for taking 0610-220. (Permission of instructor) **Lab 2, Credit 1**

0617-410 **Computers in Manufacturing**
A course dealing with concepts in data acquisition and control and application of computers for manufacturing process integration. This course will introduce the concepts in digital and hexadecimal number systems, digital logic, parallel and serial communication, microcomputer architecture, sensors and actuators and real-time programming. Concepts in networking and distributed systems will also be introduced. Students will use C or C++ programming language to control experimental setups in the laboratory. (C or C++ Programming) **Class 3, Lab 2, Credits 4**

0617-420 **Manufacturing Processes II**
This is the second of two courses that teaches manufacturing processes. The first covers basic traditional processes and this course goes on to cover what are commonly referred to as nontraditional manufacturing methods. Within this category are processes such as electrical discharge machining, water jet machining, photochemical machining, ultrasonic machining, lasers, plasma cutting, rapid prototyping, etc. This is a project-based course; the student will individually, or in a team, investigate one of the processes in depth, and how it is applied to a specific part. (0617-220) **Class 4, Credit 4**

0617-436 **Engineering Economics**
A study of techniques required to make economic decisions. Topics covered in the course include cash flow analysis, present worth analysis, annual worth analysis, rate of return evaluations, benefit cost analysis, break even analysis, replacement analysis, bonds, the effect of tax on cash flows, and sensitivity analysis. **Class 4, Credit 4**

0617-440 **Productions and Operations Management I**
This course in production and operations management focuses on operations terminology, operations strategy, design for manufacturing, project planning/control, value analysis, and statistical quality control. (1016-319) **Class 4, Credit 4**

0617-441 **Production and Operations Management II**
This course is designed to provide the student with knowledge of the latest theories and practices of operations management employed by world class manufacturing organizations. Topics include TQM, MRP, JIT, lean manufacturing, six sigma, theory of constraints, work simplification and operations research. **Class 4, Credit 4**

0617-455 **Introduction to Surface Mount Electronics**
This course will provide a thorough understanding of the technology, components, equipment, design and manufacturing process for surface mount electronics manufacturing. As an introductory course, it will provide students with a strong foundation needed for advanced work in surface mount technology (SMT). The laboratory demonstrations will provide the students an orientation and familiarization of the manufacturing equipment and process for printed circuit board assembly **Class 4, Credit 4**

0617-456 **Advanced Concepts in Electronic Packaging**
This course deals with advanced topics in surface mount electronics packaging. Topics include: electronics packaging standards, single-chip and water level packaging technologies, advanced passive component technology, high density interconnection and microvia technology, thermal management, thermomechanical behavior of packaging, solder metallurgy and joint formation for packaging, failure modes, mechanisms and reliability testing. (0617-455) **Class 2, Lab 2, Credit 4**

0617-457 **Electronics Packaging Lab**
This laboratory class will provide the hands-on training in surface mount electronics packaging. Students will learn to set-up and operate production scale equipment, understand process parameters and their influence and characterize the entire PCB assembly process. Lab experiments will also include analytical evaluation of raw materials such as solder paste viscosity, tackiness, wetting, component and board solder ability, solder balling, etc. **Class 0, Lab 2, Credit 1**

0617-460 **Computer-Aided Design**
CAD is introduced as an integral part of the computer integrated manufacturing process. Basic concepts of CAD software and hardware, interactive graphics, CAD Applications, CAD Economics and the interrelationship of CAD and CAM are discussed. The course work gives the student the skills needed to create 3D Solid Models using a Parametric 3D Solid Modeling application. Emphasis is placed on laboratory work such as creating solid models and assemblies containing solid models with limited view creation and dimensioning. **Class 4, Credit 4**

0617-470 **Controls for Manufacturing Automation**
This course deals with the principles and application of programmable logic controllers (PLC). Topics include PLC hardware, programming and application of PLCs in a computer integrated manufacturing (CIM) environment. Students will also be exposed to man-machine interface (MMI) and PLC networks. (0609-411) **Class 3, Lab 2, Credit 4**

0617-471 **Computer Numerical Control**
An advanced course in Computer Numerical Control. Emphasis is placed on machine language and computer aided parts program generation, tool path verification and program editing. Students create three axis programs for CAD, generate models, then moderm their instructions to CNC machine tools to actually cut the finished part from raw stock. CAD/CAM integration and Product Lifecycle Management (PLM) concepts are presented. (0617-220 or 460) **Class 2, Lab 2, Credit 4**

0617-472 **Tool Engineering**
The course teaches the principles of design for industrial tooling. The course discusses the concepts of jig, fixture, measurement, die and automated equipment design, engineering analysis and manufacture. Workplace locating, supporting and clamping systems are emphasized. (0617-420, 262) **Class 2, Lab 2, Credit 4**

0617-475 **Computer Aided Manufacturing**
This course deals with the design and evaluation of manufacturing systems and the use of computers in support of integrated product design, development and manufacturing activities. Group technology, process planning, shop floor control, concurrent engineering and flexible manufacturing systems are the principal topic areas while Computer Integrated Manufacturing (CIM) is the primary theme. Lab activity is focused on integrated product/process development and process improvement. (0617-440, 470, 485) **Class 3, Lab 2, Credit 4**

0617-485 **Robots in Manufacturing**
This course deals with the technology and application of robots in a computer integrated manufacturing (CIM) environment. It will provide a thorough understanding of robotic hardware and software. The hardware aspects include robot configurations, drive mechanisms, power systems (hydraulic, pneumatic and servo actuators), end-effectors, sensors and control systems. The software aspect deals with the various methods of textual and lead through programming. Digital interfacing of robots with other CIM components such as programmable logic controllers, computer-controlled machines, conveyors, etc. will be introduced. Robotic cell design and the socio-economic impact of robotics will also be discussed. A strong laboratory hands-on training component is part of the course. (0610-302 or permission of instructor) **Class 3, Lab 2, Credit 4**

0617-499 **Manufacturing Technology Co-op**
One quarter of experience in a job related to the student's major. (0606-099) **Credit 0**

0617-510 **Process Design**
A project-oriented capstone course to enable students to design, develop, implement, and test a computer-integrated manufacturing (CIM) Cell. The students are required to work in teams and identify suitable product and process concepts that fit into a CIM environment. The students must demonstrate successful operation of the cell to receive a satisfactory grade. (0617-475 must be taken immediately prior to this course) (0617-436, 440, 441, 485) **Class 1, Lab 4, Credit 4**

0617-530 **Special Topics in CIM**
This course is designed as a technical elective offered to enable students to pursue subjects of special interest to themselves. Subject matter is limited to the area of CIM. Students will be given the opportunity to present a proposal outlining their goals for the course. Upon approval by the course instructor students will be given wide latitude to investigate their CIM area of interest to a breadth and depth not available in a structured course. Students will be expected to work in areas and on problems of concern to the manufacturing industry. Acceptable projects will include those undertaken in response to specific requirements of an industry contact, individual research or research in conjunction with faculty or fellow students, library research, intercollegiate competitions, or investigative or original (innovative) papers suitable for publication. **Credit 2-5**

0617-596 **Honors Manufacturing Engineering Technology Independent Study**
A supervised investigation within an advanced manufacturing engineering technology area of student interest. The student must be a registered CAST/RIT honors program student. Consent of the instructor and the department approval are required. **Variable credit 1-4**

0617-599 **Independent Study**
A supervised investigation within a manufacturing technology area of student interest. Consent of the instructor and department approval are required. **Credit 1-8**

Computer Engineering Technology

0618-200 **Digital Fundamentals AP**
This course is used ONLY for the purpose of transferring advanced placement (AP) credit for Digital Fundamentals (0618-301). Transfer credit will only be granted to students who receive a letter grade of B, or better in Project Lead The Way's Digital Electronics course. **Credit 4**

0618-206 **Computers and Their Applications**
This is an introduction to the fundamental concepts and problem areas of computers and their applications through a survey of the major sub areas of the field. Students will learn the nature of programming and how to create simple programs using HTML. Students will also spend time using Word, Excel, and other applications. Since this course is a combination of concepts of computers and applications, students will also study the history of computing, how computers are built, the internet, automation and control systems, the future of computers and ethical and social issues associated with computers and their applications. **Class 4, Credit 4**

0618-213 **Excite—Introduction to ECT-ET**
In this course, the Electrical, Computer and Telecommunications Engineering Technology freshmen will construct a TekBot, an autonomous robot platform. Through engaging hands-on activities, the TekBot will be used to excite and inform students about their chosen program of study and expose them to the basic concepts utilized within. These topics include: systems of units and notation, voltage, current, resistance, component identification, circuit construction, and schematic entry. **Credit 4**

0618-231 **Technical Programming I**
The first course of a three-course sequence in developing software for the solution of technical applications. Specifically, procedure-oriented programming of the C++ language will be employed to develop software solutions for engineering and scientific applications. Object-oriented programming will be introduced by the use of predefined objects. **Class 3, Lab 2, Credit 4**

0618-232 **Technical Programming II**
The second course of a three-course sequence in developing software for the solution of technical applications. Specifically, object-oriented programming of the C++ language will be employed to develop software solutions for engineering and scientific applications. Fundamental data structures (arrays, pointers, records) will be introduced. (0618-231) **Class 3, Lab 2, Credit 4**

0618-233 **Technical Programming III**
The final course of a three-course sequence in developing software for the solution of technical applications. Specifically, classical data structures and advanced data types (lists, strings, stacks, queues, trees, and graphs) will be studied and employed to develop software solutions for engineering and scientific applications. These applications will include an introduction to numerical methods (i.e., root finding, bisection method, secant method, numerical integration, trapezoidal rule, and Simpson's rule). (0618-232) **Class 3, Lab 2, Credit 4**

0618-301 **Digital Fundamentals**
A first course in digital fundamentals. Topics include binary arithmetic, Boolean algebra, logic gates, Karnaugh mapping, sequential and combinational logic circuits, and an introduction to state machines. (0618-213 or equivalent) **Class 3, Lab 2, Credit 4**

0618-303 **Microcomputers**
An introductory course involving the hardware and structure of a basic microcontroller. . Emphasis will center on the hardware characteristics, design considerations, trouble shooting skills and interfacing principles. (0618-301 and a formal, structured programming course) **Class 3, Lab 2, Credit 4**

0618-339 **Microcontrollers**
An advanced course in interfacing microcontrollers to sensors, actuators, and input/output devices. Topics include: the measurement of light and temperature levels, interfacing issues related to keypads, LCD panels and LED display modules, and concepts of analog to digital conversion, pulse width modulation and serial communications. It is assumed that the student is already familiar with assembly and machine language programming of microprocessors. (0618-301 and 0618-303) **Class 3, Lab 2, Credit 4**

0618-371 **Special Topics**
Special Topics is an experimental lower-division course intended as a means for offering innovative topics not reflected in the current curriculum. **Class, Credit variable**

0618-438 **Digital Systems Design**
An advanced course in the design techniques of complex combinatorial and sequential logic circuits CMOS static and dynamic electrical properties and input/output structures will be analyzed. The internal structure of FPGAs (Field-Programmable Gate Array) and CPLDs (Complex Programmable Logic Device) will be discussed. Emphasis is on the use of systematic design procedures for implementing combinatorial and sequential designs using VHDL. (0618-303; corequisite 0609-360) **Class 3, Lab 2, Credit 4**

0618-439 **Principles of Electronic Design Automation**
An introductory course in the VHSIC Hardware Descriptive Language (VHDL). The course provides an in depth coverage of the language and describes the VHDL design environments that will be used for synthesis and verification. Topics include the behavioral, dataflow, and structural modeling of both combinatorial and sequential logic, design methodologies, synthesis and optimization. An IEEE-1076 standard VHDL development system will be extensively utilized to synthesize VHDL for PLD, CPLD and FPGA applications. (0618-438, 0618-231 or a formal, structured programming course) **Class 3, Lab 2, Credit 4**

0618-499 **Computer Engineering Technology Co-op**
One quarter of appropriate work experience in a computer related industry. (0618-303, 0618-233, 0609-407) **Credit 0**

0618-502 **Verilog Design I**
An introductory course in the Verilog Language. The course provides an in-depth coverage of the language and describes the Verilog design environments that will be used for synthesis and verification. Topics include the behavioral, data-flow, and structural modeling of both combinatorial and sequential logic, design methodologies, synthesis and optimization. Verilog development system will be extensively utilized to synthesize FPGA applications. (0618-438, and a formal, structured programming course) **Credit 2**

0618-503 **Verilog Design II**
An advanced course in the Verilog Language. The course provides an in-depth coverage of the language and describes the Verilog design environments that will be used for synthesis and verification. Topics include the behavioral, advanced testbenching techniques, file IO, memory models, clock generation models, selfchecking testbenches, regression testing, and synthesis techniques—designing for speed and cost. Project-based labs targeting the Spartan II family of Xilinx FPGAs. Advanced FPGA techniques, delay lock loops, IO configuration, constraints and static timing, and gate simulations. Complex RTL Design project using hierarchy and multiple designers on a project. Configuration management and coding standards. (0618-502) **Credit 2**

0618-561 **Embedded Systems Design I**
An introductory course in embedded systems architecture. This is the first in a three-course sequence. System design principles are developed and analyzed. Formal modular assembly language and C are studied for embedded systems. Focus is on monitor operations and peripheral interfacing. Students design and debug hardware and software to augment an existing system. (0618-438, 0618-439 and a formal, structured C or C++ programming course) **Class 3, Lab 2, Credit 4**

0618-562 **Embedded System Design II**
This is the second of a three-course embedded systems sequence. General embedded hardware and software principles are expanded upon as students develop hardware and software for a 32-bit soft-core microprocessor-based system. A hardware description language is used for extensive hardware development and debug. Various performance enhancement techniques such as dynamic memory allocation, hardware accelerators and cache memory are studied in detail. Interfacing to peripherals including, but not limited to, VGA, CODEC, LCD display and PS/2 is implemented in the laboratory assignments. (0618-561 with a C or better) **Class 3, Lab 2, Credit 4**

0618-563 **Embedded System Design III**
This is the final of a three-course embedded systems sequence. Students expand upon the 32-bit microprocessor based system they built in 0618-562. More complex peripherals, cache principles, multi master systems, arbitration and resource sharing, and bus standards are covered in detail. (0618-562 and a formal, structured C or C++ programming course) **Class 3, Lab 2, Credit 4**

0618-580 **Senior Project**
A course that provides the motivated student an opportunity to pursue a supervised design project of mutual interest to him/herself and the sponsoring faculty. The design project must be within the computer engineering technology discipline. (Fifth-year status in the computer engineering technology program) **Credit 4**

0618-596 **Honors Independent Study**
This course allows upper-class computer engineering technology honors students the opportunity to independently investigate, under faculty supervision, aspects of the computer industry that are not currently covered in existing courses. Proposals for an honors independent study must be approved by the sponsoring faculty, the computer engineering technology program chair and ECT-ET Honors advocate. **Credit variable 2-4**

0618-599 **Independent Study**
This course allows upper-class computer engineering technology students the opportunity to independently investigate, under faculty supervision, aspects of the electrical industry that are not currently covered in existing course. Proposals for an independent study must be approved by both the sponsoring faculty and the computer engineering technology program chair. **Credit variable 2-4**

Hospitality Management

0619-220 **Survey of Service Industry**
Seminar designed to define career opportunities in the hospitality, nutrition, and service management industries. Students receive guidance in developing career objectives. Leading industry executives participate. **Class 2, Credit 2**

0619-221 **Basic Computer Applications**
This course teaches students basic computer applications used in the service industry. Emphasis is on word-processing, spreadsheets, and computer-developed presentations. Students have projects and tests in each of the three areas. **Class 2, Credit 2**

0619-320 **Global Standards in the Service Industry**
Globalization of commerce carries with it increasing global standards. This course examines different kinds of standards, especially those related to international trade and commerce. Students are expected to identify situations in which standards are mandated, identify the relevant standards, and then describe the applications of the appropriate standards. The course also looks at current issues and emerging trends in standards. **Credit 4, Class 4**

0619-322 **Service Management in a Global Economy**
This course is an introduction to the basic concepts of Service Quality Management and the service economy in the United States and world-wide. A large proportion of the U.S. economy is based on purchase of services, including information, hospitality, business, education and training, financial, design, consulting, and legal services. Demand for quality service experiences is expanding globally. Developing and managing appropriate high-quality, personalized service offerings is critical to business success. Concepts of designing, implementing, monitoring, and evaluating quality in services delivery will be explored. **Credit 4**

0619-410 **Assessing Service Quality**
Excellence in customer service is the hallmark of success in service industries. But what exactly is service excellence? This course surveys the various issues related to measuring customer satisfaction. It examines those issues that cause service quality problems and what service organizations can do to solve these problems and improve service. Guidelines for developing questionnaires are discussed, with emphasis on issues of reliability and validity. The role and mechanisms associated with focus groups are addressed. (1016-301 or permission of instructor) **Class 4, Credit 4**

0619-426 **Technology in Service Systems**
Predicting the future...adapting to change...connecting and communicating...lifelong learning... A fundamental societal revolution has begun which is changing the nature of work and leisure. Explore the emerging and future work worlds, consumer trends, and the technologies that are changing the way society works. Emphasis is on technologies impacting the food, nutrition, hotel and travel service industries. Technologies explored may include those associated with communication, information retrieval, imaging, marketing, employee training, product quality, production customization, customer service, security, health, entertainment and customer interface, as time permits. Student teams will chart the flow of product/service systems and identify technologies to enhance them to meet customer needs. Individual (personal) and team (business) websites will be constructed. **Class 4, Credit 4**

0619-470 **Leadership in Service Culture**
The leadership and executive development course prepares you to assume leadership and management roles as you prepare to enter the work force. Principles, applications and exercises specifically designed around hospitality and tourism industry examples will enable you to more effectively progress as future leaders and managers in the hospitality and tourism industries. You also will begin to establish your own personal leadership and management style based on examples and exercises. The course makes extensive use of lectures, laboratories and industry expertise. (Junior status or permission of instructor) **Class 4, Credit 4**

0619-480 **Human Resource Management**
This course presents hospitality and service management students with a complete repertoire of human resource management (HRM) issues. It addresses all the current HRM topics and is designed to enhance the student's ability to deal effectively with HRM topics. The laboratories attempt to develop conceptual thinking abilities. The course also focuses on HRM training techniques—an area of specific concern in the hospitality industry. By emphasizing various training techniques and practices, highly skilled graduates can immediately employ one of the hospitality industry's most valuable tools—training to aid in the retention and management of human resources. The course makes extensive use of lectures and laboratory exercises. **Class 4, Credit 4**

0619-490 Senior Project
A capstone course that explores the integration of disciplines in addressing problems and issues facing the service/hospitality industries. Students have the opportunity to identify and investigate (as individual projects) challenges to these industries. Various modes of research, problem-solving techniques and presentation styles are utilized. Students also have the opportunity to select a faculty mentor. The class culminates with a presentation made by the student to peers and faculty. **Class 4, Credit 4**

0619-501 Service Management
This course is designed to evaluate management software applications, new service technologies, and best management practices and implementation of strategies in hospitality and service organizations. Students will interact with departmental managers, Hospitality and Service Management faculty, and various market segments in order to gain experience in a service environment. **Class 1, Lab 3, Credit 2**

0619-506 Franchising in the Service Sector
Franchising has been a successful method for business expansion. This course covers the advantages and disadvantages of franchising as well as the key factors in obtaining, developing, and operating a franchise operation that meets specific customer needs. Legal and financing issues are also covered. Major project developing a franchise plan is required. **Class 4, Credit 4**

Food Management

0621-221 Food Identification and Assessment
The focus of this course is on experiencing essential aspects of important food categories. The experiences will include tasting and touching the foods, describing the sensory characteristics of each, observing aspects of production and preparation, and some hands-on opportunities for cooking. The food items will be related to the Food Pyramid nutrition guidelines of the USDA and to current and anticipated food trends and issues. Projects, videos, and field trips will be used to maximize student learning. Because foods are rarely eaten alone, information on pairing of various food items with each other and with wines will be included. Food categories will include fruits, vegetables, meats, seafood, dairy products, oils, chocolate, breads, pasta, grains, and rice. Common specifications, safety issues, cultural connections, and information on processing will be covered as appropriate to each category. **Credit 4**

0621-225 Principles of Food Production
Introduction to the basic principles involved in the preparation of high-quality food. Topics include product identification, market forms, varieties availability, composition, standards of quality, preparation techniques, and function of foods and ingredients. Standard methods of preparation will be introduced. Professionalism in appearance and work habits, self-organization, sanitation, management, team work, and techniques for efficient food production are stressed. Uniform and professional knife and pastry kits are required. **Class 2, Credit 4, Lab 4**

0621-314 Sanitation and Safety
Survey of micro-organisms of importance to the food industry; emphasis on causes and prevention of food spoilage and poisoning. Responsibilities of management to provide and establish safe working conditions and policies; discussion of current problems confronting the industry as a result of recent legislative developments as they relate to safety and health. **Class 2, Credit 2**

0621-315 Foodservice Marketing
Provides students with a business-to-business perspective of the marketing of products to the foodservice industry. Also provides an understanding of distribution systems and foodservice marketing environments. Both macro and micro marketing environments and issues are explored. The class considers various marketing mix elements as they relate to segments of the foodservice industry. Case studies and readings are utilized to give students realistic opportunities to analyze and develop practical solutions. **Class 4, Credit 4**

0621-318 Food and Beverage Marketing
An introductory course involving the basic principles involved in the management of food and beverage operations. Topics include food and beverage marketing, menu planning, nutrition principles, staffing, cost, production and preparation procedures, service and design. Both commercial and non-commercial food operations will be discussed. **Class 4, Credit 4**

0621-324 Food Purchasing
Principles of foodservice purchasing; selection and procurement, distribution systems and the purchasing function and activities. Topics include measurement, foodservice purchasing terminology, organization, specifications, recipe standardization, recipe conversion, optimal purchasing practices and purchasing principles for major food commodity categories including government and industry standards. **Class 2, Credit 2**

0621-331 Restaurant Operations
Entry-level production and service skills for line positions currently used in the hospitality industry. Laboratory assignments are in the operation and maintenance of Henry's, a full-service restaurant modeled after industrial, hotel and restaurant operations. Students are assigned to defined job descriptions in production and service on a rotating basis. (0621-225, 314) **Class 3, Credit 6**

0621-334 Integrated Service Management
Students will develop management, marketing and customer service skills appropriate for current and future hospitality industry environments. Laboratory assignments are designed to develop front of the house operation and management skills, including the adaptation of new technologies to food service businesses. Henry's, a full-service restaurant modeled after industrial, hotel and restaurant operations, is the laboratory setting. Students will be asked to define roles needed to operate and market Henry's Restaurant and to create individual professional goals and objectives that they will meet during the quarter. **Class 4, Credit 4**

0621-410 Food Processing and Quality Assurance
An introduction to traditional and contemporary food processing methods with emphasis on applications to foodservice operations. The effect of these technologies on the storage life and sensory qualities of the products is examined along with common modes of quality loss in foods. Students are introduced to industry-standard quality assurance measures. **Class 4, Credit 4**

0621-416 Product Development
Students will explore their creativity through instructor and student-planned experiments involving sensory and objective evaluation of food quality, recipe development, problem-solving, experimental design, written and oral communication of research. Individual research projects focus on assessing new ingredients or technologies, creating new products and/or evaluating the marketability of new products. (0621-225) **Class 2, Credit 4, Lab 4**

0621-499 Cooperative Education
Career-related work experience. Employment within the hospitality and service management industry monitored by the office of cooperative education and career services and the hospitality and service management program. Designed for the student to experience progressive training on the job as related to the academic option. Freshmen begin co-op the summer following their first-year studies. Graduation requirement. **Credit 0**

0621-501 Wines of the World
An introduction to wines: history, points of origin, production, handling techniques, flavor characteristics and commercial value. Includes guest speakers and sampling of products. Lab fee required. **Class 2, Credit 2**

0621-504 Wines of the World II
A further exploration into wines: history, places of origin, production, handling techniques, flavor, characteristics, and commercial value. Includes guest speakers and sampling of products. Lab fee required. **Class 2 Credit 2**

0621-506 Wine Connoisseur
The technical aspects of wine production and marketing are presented by a variety of experts in their field. Topics include: the annual crop cycle in the vineyard, Terroir—the effects of environmental factors on the grapes and wine, a comparison of European and American wine production techniques, blending and aging of wine—including oak barrels vs. stainless steel vats, the wine business, wine trends and wine futures. Lab fee required. (Wines of the World I) **Class 2, Credit 2**

0621-508 Beers of the World
An introduction to Beers: History, the brewing process, distribution systems, production, flavor characteristics, partnering with foods, handling and serving techniques. Beers produced from the major beer brewing centers of the world will be tasted and compared with similar brews from different countries. The way alcohol is processed in the human body is considered as well as the economic impact of brewing and distributing beer will be explored. A lab fee is required. **Class 2, Credit 2**

0621-509 **Foods of the World**
This course is an introduction to many different cuisines from around the world. An exploration of indigenous ingredients, dishes, growing conditions. Customs and special food techniques of various cultures will be addressed. A lab fee is required. **Class 2, Credit 2**

0621-513 **Wine and Food Pairing I**
This course is an introduction of food and wine pairing. Students will experience "What Grows together, goes together," and discover how regional wines and food pairings have a natural affinity for one another. Students will design their own four course menu. This course experience includes sampling of food and wine, cooking demonstrations and guest speakers. Lab fee required. **Class 2, Credit 2**

0621-525 **Restaurant Management**
Students develop entry-level management competence through the operation of a full-service restaurant with beverage operations. Students rotate through various management positions for exposure to four major areas: planning, organization, leadership, and control. Use of the school's computer lab in planning is an integral part of the course. **Class 2, Credit 6**

0621-554 **Senior Career Seminar**
A variety of courses are offered under this course number. Titles will appear in the course listings each quarter. The course may be taken more than once as the topics change. Contact the department for a course description of a specific title. **Credit 1-4**

0621-599 **Independent Study**
The student will work independently under the supervision of a faculty adviser on a topic not covered in other courses. The proposal must be signed by a faculty member. **Credit 1-6**

Hotel and Resort Management

0622-200 **Hotel Operations**
Introduction to the distinctive nature of hotel operations through identifying the standard functions that interrelate to produce the whole hotel service. The hotel's principal product, the guest room, is given detailed study as well as the various forms of business organization that comprise the accommodation sector of the hospitality industry. **Class 4, Credit 4**

0622-205 **Hospitality Industry Real Estate**
Provides the student with insight into the development of hospitality real estate and the elements that contribute to decisions on construction, development and expansion of properties. Attention is given to site selection and development processes as they relate to the commercial hotel, resort, foodservice and travel locations. Contributing elements of market conditions, financial feasibility, construction needs and property sizing are explored. **Class 4, Credit 4**

0622-210 **Hotel Marketing and Sales Management**
Introduces the student to the application of the marketing concepts in hotel operations and the visitor industry. Included are conventions and visitors bureaus, hotels, and convention centers. This is accomplished by defining the marketing function, situation analysis, marketing organization, sales office work flow, customer contact methods and servicing procedures generally practiced in the hotel industry. **Class 4, Credit 4**

0622-310 **Resort Development and Management**
Gives the student an understanding of how resort and hotel properties are developed as tourist and business destinations. Focus is on the planning, development, operation, design, and special needs of recreational surfaces and financing of such properties. As part of this study, students select a specific type of property and analyze the methods used to develop it. **Class 4, Credit 4**

0622-315 **Facility and Property Management**
Provides the student with information on the maintenance and engineering discipline in hotel and resort facilities. Management and administrative practices, life safety concepts, energy monitoring, computer applications and budgeting in the realm of hotel maintenance are studied. **Class 4, Credit 4**

0622-355 **Financial Management for Hotels**
Presents hospitality and service management students with accounting and finance concepts that are essential in hospitality management. Hotel accounting principles, income statement analysis, industry-accepted ratio analysis, operational forecasting and budgeting strategies are examined. (0101-301 or permission of instructor) **Class 4, Credit 4**

0622-420 **Hospitality Law**
This course introduces the student to contract, tort and agency law as they relate to the hospitality industry. The course covers the legal rights and responsibilities of patrons and owners as they relate to public accommodations, providers of transportation and livery and common law. The course focus is on civil rather than criminal law. A considerable amount of case work is anticipated in this course and this should enable students to develop a preventative attitude toward liability and assumption of responsibilities. **Class 4, Credit 4**

0622-510 **Convention Management**
Provides the student an opportunity to explore the function of conventions from the point of view of the convention center manager. Consideration is given to various methods used to sell a location to a planner and the servicing of large groups. Also included are the identification of vocabulary and the role of the meeting planner as a force in the marketing of conventions. Trade shows, floor layouts and local codes affecting conventions also are reviewed. **Class 4, Credit 4**

0622-540 **Risk Management**
An examination of the environment in which the hospitality manager functions. Focus is on the management of risk as part of operations. The implications of tort and contract law specifically relating to the industry are undertaken, and an explanation of how persons may avoid exposure to risk is made. This includes forms of insurance, hold-harmless clauses and management decisions on the importance of coverage given different degrees of risk. **Class 4, Credit 4**

0622-550 **Casino Management I**
This course gives students an advanced introduction to the casino environment. After satisfactorily completing this course, students will have a strong working knowledge of casino operations and the interrelationship of the casino with other major departments (lodging, food, beverage, entertainment, etc.). Topics include the history of gaming in America, recent trends that impact growth and acceptance rates of legalized gaming, the rules and protection of table games, the various types of "slots," the role of computerized information systems, layout and design within a casino operation, surveillance in a casino environment, casino accounting and back office procedures, consumer behavior, casino marketing strategies, gaming regulations, and economic impact issues. **Class 4, Credit 4**

0622-552 **Casino Management II**
This course gives students an advanced introduction to the casino environment. After satisfactorily completing this course, students will have a strong working knowledge of casino operations and the interrelationship of the casino with other major departments (lodging, food, beverage, entertainment, etc.). Topics include casino marketing strategies, gaming regulations, and economic impact issues. **Class 4, Credit 4**

Travel and Tourism Management

0623-206 **Distribution Systems**
A functional approach is used to describe the market distribution channels for service industry inputs and products/services. The role of retail and business travel agents, tour wholesalers and operators, and specialty channelers such as meeting planners, convention bureaus and corporate travel buyers, food processors, producers, distributors and transportation suppliers are discussed. Various economic models are examined in order to analyze the pricing structure associated with the selling and distribution of service industry inputs and outputs. The service philosophy and its application to distribution in the travel/tourism and foodservice industries are explored. **Class 4, Credit 4**

0623-375 **Travel Destinations**
Geographers are concerned with the physical, political and cultural composition of the world. Geography is a field in which the concerns of both the social and physical sciences converge in the study of specific places. Touristic geography applies these themes to the travel, tourism and transportation industries. It is also concerned with the social, cultural and economic environmental aspects of places. The identification of major touristic locations as attractors of people's leisure time, energies and interests is the basis of this course. **Class 4, Credit 4**

0623-410 **Meeting and Exposition Management**
Introduces the student to the field of meeting management. We take the point of view of a corporate or independent meeting planner in examining the various phases of meeting planning. Students also examine the formulation of goals and how meetings may be evaluated from both a return on investment perspective and the satisfaction of the attendees. Computer programs are investigated and tested, and a variety of budget strategies are examined. **Class 4, Credit 4**

0623-418 Corporate Travel Planning Marketing
This course focuses on the specific goals and objectives required to develop control and evaluate guidelines established by corporate travel departments and how to market these programs to the organization. Three major orientations of corporate travel are examined: purchasing travel services, the corporate travel communications process and the evaluation and acceptance of globalized corporate travel service. Emphasis will be placed on the forging of partnerships within these relationships. **Class 4, Credit 4**

0623-438 Tourism Planning and Development
Examines the processes involved in planning and developing a tourist destination, including the required infrastructure. A major focus is on benefits and impacts associated with tourism development, as well as the strategies for maximizing benefits and minimizing adverse effects. **Class 4, Credit 4**

Human Resource Management

0626-234 Interviewing Techniques
A practical approach to interviewing techniques with emphasis on role plays and case studies. Coverage includes employment, disciplinary, counseling, and performance appraisal interviews. **Class 4, Credit 4**

0626-427 Employment Law
Employment Law provides knowledge of legislation relevant to Human Resources, including the Fair Labor Standards Act, Equal Pay Act, Title VII of the Civil Rights Act of 1994, Age Discrimination in Employment Act, Occupational Safety and Health Act, Americans with Disabilities Act, Family Medical and Leave Act and legislation relevant to labor relations, including the Wagner and Taft-Hartley Acts. Students learn the legal status, their application in an employment context, ramifications of not complying with the law, and how the courts have interpreted the laws. (Human Resource Management 0619-480). **Class 4, Credit 4**

0626-428 Training Design and Delivery
The new workplace requires new solutions. In this environment, training that is well planned, presented, and meets organization needs takes on a critical strategic role. This course is aimed at managers, team leaders, HR specialists, and those involved in the continuous, self-directed, formal and informal learning needed to help their organizations improve their business success. Core topics include design and delivery of training, the needs assessment process, job and core competencies analysis, targeting learner needs, training program design and program development issues. **Credit 4**

0626-434 Advanced Human Resources Administration
Study of application of advanced principles and techniques of personnel administration to particular firms and special personnel problems. Extensive use of both individual and group projects as well as case studies. (0626-239 or equivalent) **Class 4, Credit 4**

0626-554 International Human Resources
This distance learning course provides upper-level students with perspectives and competencies necessary for international business, emphasizing international human resource operations in service industries including travel, hospitality and tourism. **Credit 4**

Environmental Sustainability, Health and Safety

0630-200 Environmental Health and Safety Seminar
This is an introductory course for all Environmental Sustainability, Health and Safety students to provide a foundational understanding of environmental sustainability, health and safety issues, and functions and concerns of environmental health and safety professionals in the workplace. (Enrollment in ESHS or permission of the instructor) **Class 2, Credit 1**

0630-201 Principles of ESHS
This is a required course for all Environmental Sustainability, Health and Safety students, designed to develop and understanding in the basic principles underlying the ESHS discipline and to help students think critically about current environmental sustainability, health and safety issues. (Enrollment in ESHS or permission of the instructor) **Class 4, Credit 4**

0630-350 Solid and Hazardous Waste Management
An examination of strategies and technologies to move an organization toward environmental sustainability, including: resource use reduction, material substitution, process and product modification, and waste minimization; and for handling and managing wastes including: treatment, storage, transport, and disposal storing solid and hazardous waste. Associated environmental impacts, regulatory concerns, technical feasibility and costs are considered. (0630-201, 1011-215, 216, 202, 1017-212) **Class 4, Credit 4**

0630-352 Industrial Wastewater Management
Investigates characteristics and sources of industrial wastewaters, related environmental impacts, regulatory implications, and technical considerations of current treatment and disposal methodologies. Students learn to identify appropriate methods, technologies and sequences for source reduction, treatment and pretreatment, direct discharge and management of treatment residuals. (0630-201, 1011- 202, 215, 216) **Class 4, Credit 4**

0630-354 Air Emissions Management
This course will present an overview of industrial air pollution management; its sources, methods of reduction, control and management. Students will become familiar with the history of air pollution, the chemistry and effects of pollutants, regulations and standards, and control technologies, as well as developing analytical and quantitative skills necessary in air emissions management decision making. (0630-201, 1011-202, 215, 216, 1017-212) **Class 4, Credit 4**

0630-360 Environmental Monitoring and Measurement
An in-depth view of environmental monitoring and measurements, giving the student the knowledge to plan, execute and interpret a sampling project. Covers techniques for sampling air, soil, surface water, and groundwater with an emphasis on remedial investigations and contaminated sites. Students learn to plan sampling events, collect quality assurance/quality control samples, determine correct sampling technique and specify analysis. (1011- 202, 215, 216; 1001-201; 0630-380, 382) **Class 4, Credit 4**

0630-370 Environmental Geology
This course covers many subtopics within the broad field of geology. Students will learn the theoretical background, and practical applications of the science. Topics include internal earth forces, geological materials and resources, surface processes, and geologic waste disposal. Geology has important applications to environmental management, and these applications will be highlighted in the class. Geology is a descriptive science so students will learn a great deal of new vocabulary, and will come to understand the mechanisms and results of continuous change to our planet. **Class 3, Credit 3**

0630-372 Environmental Geology Lab
Laboratory to accompany 0630-370, Environmental Geology. Lab includes field trips to significant local geologic features and mines. (Credit or co-registration in 0630-370) **Class 2, Lab 3, Credit 1**

0630-380 Introduction to Hydrology
This course will cover most subdisciplines within the broad field of hydrology. Students will learn the theoretical background, and practical applications of selected aspects of the science including the hydrologic cycle, surface water calculations, vadose zone flow, groundwater hydraulics, groundwater monitoring, water chemistry and groundwater contaminant transport. The class culminates in an investigation of a mock contaminated site in which the students apply aspects of all of the above mentioned topics. Hydrology has important applications for environmental managers, and these applications will be highlighted in the class. (0630-370, 372) **Class 3, Credit 3**

0630-382 Introduction to Hydrology Lab
Laboratory to accompany 0630-380, Introduction to Hydrology. The lab focuses on field and computational techniques. Field activities include stream gauging and well installation. (0630-370, Credit for or co-registration in 0630-380) **Lab 3, Credit 1**

0630-444 Remedial Investigation/Corrective Action
Delineates and describes the sequence of events required in remedial investigations (RI), feasibility studies and corrective actions at hazardous waste sites. Explains the process flow logistics, concepts and rationale behind each RI action. Investigates the strategies, technologies and methodologies commonly in use for site investigation and characterization and corrective action. Explores current issues of "how clean is clean?" and "Superfund" liability. Students learn to develop conceptual site characterization plans; effective solicitations for RI proposals; review and evaluate work plans, procedures and operations plans, and contingency plans. (0630-350, 370, 372, 380, 382 Open only to fourth-year environmental management majors or with departmental approval.) **Class 4, Credit 4**

0630-450 Occupational Health
This course will provide students with an overview of the fundamentals of industrial hygiene. Emphasis will be placed on the toxicological effects of various industrial substances on the body; monitoring and personal sampling for these substances and personal protection against such substances. (1011-202, 215, 216;1004-212, 1017-211) **Class 4, Credit 4**

0630-451 Occupational Health Lab
Hands-on practical hazardous material response. (Corequisite 0630-450 or with permission of the instructor). **Credit 1**

0630-454 Occupational Safety
This course is an overview of the safety management tools utilized in today's industry. Students are expected to have a foundational knowledge of safety management techniques upon completion of this course. Topics examined include recordability and safety indices; incident investigation; guarding, electrical and material handling; welding, fire prevention, excavation; medical surveillance and worker's compensation; inspection techniques and auditing; committee's incentives and voluntary programs. **Class 4, Credit 4**

0630-461 Principles of EHS Accident Causation and Prevention
Historical and modern accident and incident causation models and theories will be covered. Students will learn how to identify and prevent unsafe acts and conditions that can lead to accidents and incidents. The application of management system controls, including operational controls to prevent accidents and incidents will be reviewed. In addition, students will learn how to investigate accidents and incidents and how to develop accident and incident investigation written programs. (Fourth-year status in ESHS). **Class 4, Credit 4**

0630-463 Social Responsibility and Environmental Sustainability
This course will introduce social responsibility concepts and approaches presented in key documents like the ISO 26000 Social Responsibility Standard and the Universal Bill of Human Rights, and will explore the web of relationships in which an organization or a community exists, with the objective of providing the foundational knowledge necessary to plan a strategy for closing the gap between the activities, products and services of the organization or community and the ecosystem within which it exists. (Fourth-year status in ESHS or permission of instructor) **Class 4, Credit 4**

0630-465 Product Stewardship
This course examines the principles of product stewardship. The ethical, legal, liability and economic issues which product manufacturers face will be covered. In addition students will be exposed to the methods used to identify and manage product environmental, health and safety (EHS) issues in today's world. The concept of sustainability will be covered and students will learn the principles of product life cycle assessment. Students will also learn and use specific EHS analysis techniques. Case studies will also be reviewed. This course is open to fourth and fifth year ESHS, engineering technology, packaging science, safety technology and environmental management and technology students who have completed at least one co-op or with permission of the instructor. **Class 4, Credit 4**

0630-480 EHS Law
An overview of environmental, health and safety (EHS) related law with an emphasis on legislative law. Topics include a review of the historical and modern sources for EHS law, the emergence of administrative law and the responsibilities of the separate branches of government. Major EHS related legislation will be covered. Open only to fourth-year or fifth-year ESHS students. **Class 4, Credit 4**

0630-490 Project Management
This course has been designed to give the student an overview of the fundamental concepts of modern project management. Areas of focus include: the Project Life Cycle (PLC), the Project Management Body of Knowledge (PMBOK), Review Technique (PERT), Critical Path Method (CPM) and various budgeting and resource allocation techniques. Discussion of project management organizations, negotiation and conflict resolution and project termination will be included, along with an introduction to Project Management Institute (PMI) and Microsoft Project for Windows. (Fourth- and fifth-year ESHS students.) **Class 4, Credit 4**

0630-500 Environmental Study Elective
Special topics are courses offered periodically. Watch for the titles in the course listing each quarter. Examples include alternative energy, contaminate hydrology and wetland delineation. **Class 4, Credit 4**

0630-515 Corporate EHS Management
Presents the fundamentals of how companies manage their environmental issues. Explores regulatory and environmental motivations and strategies for corporate environmental management. Identifies organizational considerations in managing corporate environmental programs. Introduces concepts of total quality management and its applications to corporate environmental problem solving. The course focuses on elements of environmental management systems including: environmental policies, codes of conduct, setting objectives and targets, implementing programs, and evaluating and auditing environmental performance. The course also addresses the environmental manager's role in training and corporate environmental reporting. (Open only to fifth-year environmental management majors.) **Class 4, Credit 4**

0630-570 Environmental Risk Management and Communication
This course focuses on an overview of risk management systems, risk management systems, risk management and risk reduction strategies, implementation of risk management and risk reduction strategies, and discussion of the principles of risk perception and risk communication. Leading-edge topics such as product stewardship, sustainability, and life cycle analysis are covered in detail including interesting case studies embodying real-life decisions in a corporate environment. Additional discussions on risk analysis, technological risk, cost benefit analysis and decision-making under uncertainty and case studies embodying real life decisions in a corporate environment. (Fourth and fifth year ESHS students) **Class 4, Credit 4**

0630-590 ESHS Capstone Proposal
This is the first of a two-course, faculty-designed capstone team project course for ESHS seniors. It presents students with one or more identified EHS need(s) and challenges them to work together to plan and schedule a project to design and develop socially responsible and environmentally sustainable solutions. The project may vary from offering to offering reflecting current trends and developments. (Fifth-year status, 0630-463) **Class 2, Credit 2**

0630-591 ESHS Capstone Project
This is the second of a two-course, faculty-designed capstone team project course for ESHS seniors. It presents students with a defined EHS need and challenges them to work together to design and develop a socially responsible and environmentally sustainable solution. The project may vary from offering to offering reflecting current trends and developments. (Fifth-year status, 0630-530, 0630-590) **Class 2, Credit 2**

0633-401 Fire Protection
Introduces fundamental concepts in protection of industrial workers and property from fire and explosion. Fire chemistry, control of ignition sources in industry, and properties of combustible materials are discussed. Fire detection and extinguishment are covered along with building construction for fire prevention, life safety, fire codes and related topics. (ESHs and engineering technology students only or permission of department; 0630-454) **Class 4, Credit 4**

0633-505 Construction Safety
The course is designed to cover construction health and safety hazards and study OSHA regulations in depth. Students get to assess and investigate construction safety issues. The topics covered will allow the students to receive an OSHA 30 hour construction outreach training card. (Corequisite 0608-506). **Class 3, Credit 3**

0633-506 Construction Safety Lab
This course is designed to cover construction health and safety hazards, and study OSHA regulations in depth. Students investigate construction safety issues. The topics covered will allow the student to receive an OSHA 30-hour construction outreach training card. (Corequisite 0608-505) **Class 2, Credit 1**

0633-526 Exposure Assessment and Analysis
This course covers exposure measurement, control processes, sampling strategies, environmental, public health and inspection/audit protocol skill building for each mode of exposure. Culminates in a one-week block of emerging issues in occupational/public health. The course features actual field sampling using a wide range of industrial hygiene instruments and statistical sampling analysis. Technical reporting requires professional written and oral communication of results. (0630-450) **Class 4, Credit 4**

0633-530 **Mechanical and Electrical Controls and Standards**
Discussion of machinery safety with emphasis on hazard analysis, risk estimation, safeguarding techniques and electrical considerations. Particular attention will be paid to applicable OSHA regulations, ANSI, NFPA and EN standards as they relate to wood, metal, films and automation. A portion of the course will change regularly to reflect emerging issues in industry. (ESHS and engineering technology students only or permission of the department; 0630-454) **Class 4, Credit 4**

0634-311 **Earth Science**
This is the first course in the Emergency and Management Disaster Certificate. Students gain a theoretical understanding of the causes of extreme geological and meteorological events such as earthquakes, volcanoes, landslides, floods, hurricanes, and tornados. Students also research the likely effects these disasters have on populations, infrastructure, and the environment. Significant emphasis is placed on emergency response and the role of the emergency manager in each type of extreme event. **Class 4, Credit 4**

Reserve Officer Training Corps—Army

0640-201 **Introduction to Military Science/Personal Development**
Introduces students to the personal challenges and competencies that are critical for effective leadership. You will learn how the personal development of life skills such as goal setting, time management, physical fitness, and stress management relate to leadership, officership, and the Army profession. Provides a practical introduction to the basic military organization and rank structure; the historical basis for customs and traditions found in the military and current discussions on the military and its impact upon society. Enrollment must be approved by the Professor of Military Science. **Class 2, Lab 2, Credit 2**

0640-202 **Introduction to Military Leadership**
The purpose of MS 202, Introduction to Military Leadership is to develop basic knowledge and comprehension of Army leadership dimensions while gaining a big picture understanding of the ROTC program, its purpose in the Army and its advantages for the students. Topics of primary interest include the organization of the U.S. Army, the National Guard, the Army Reserve, career branches, and the role of an officer. Students will explore the many facets of the demanding world of an effective Army Officer. Enrollment must be approved by the Professor of Military Science. **Class 2, Lab 2, Credit 2**

0640-203 **Introduction to Tactical Leadership**
Overviews leadership fundamentals such as setting direction, problem solving, listening, presenting briefs, providing feedback, and using effective writing skills. You will explore dimensions of leadership values, attributes, skills, and actions in the context of practical, hands-on, and interactive exercises. Other topics of interest are military writing, map reading, orienteering, introduction to tactics, and weapons and marksmanship training. Enrollment must be approved by the Professor of Military Science. **Class 2, Lab 2, Credit 2**

0640-301 **Military Geography**
A study of military land navigation with special emphasis given to navigation using a map, compass and protractor. Geographic concepts and realities are studied as they apply to the solution of military problems. Major topics for discussion include identification of terrain features, use of grid coordinates, polar coordinates, military correspondence and first aid tasks. Stresses practical application rather than theory; leadership lab. Enrollment must be approved by the Professor of Military Science. **Class 2, Lab 2, Credit 2**

0640-302 **Psychology and Leadership**
Provides the student with the basic principles of leadership and management of human resources; motivation, morale and communication. Develop knowledge of leadership philosophies and how to integrate this knowledge into practical application and team building. Special emphasis is on applying the theories and models of the behavioral sciences and personnel management to leadership as it functions in a military environment; leadership laboratory. Enrollment must be approved by the Professor of Military Science. **Class 2, Lab 2, Credit 2**

0640-303 **Military and American Society**
Examines the challenges of leading tactical teams in the complex contemporary operating environment (COE). This course highlights dimensions of terrain analysis, patrolling, and operation orders. Continued study of the theoretical basis of the Army leadership framework explores the dynamics of adaptive leadership in the context of military operations. Cadets develop greater self awareness as they assess their own leadership styles and practice communication and team building skills. COE case studies give insight into the importance and practice of teamwork and tactics in real-world scenarios. Leadership laboratory. Enrollment must be approved by the Professor of Military Science. **Class 2, Lab 2, Credit 2**

0640-401 **Military Tactics**
Stresses practical exercises on basic map-reading skills and provides working knowledge of fundamentals and principles of combat operation as planned for and executed at light infantry squad and platoon level; leadership laboratory. Enrollment must be approved by the Professor of Military Science. **Class 2, Lab 2, Credit 3**

0640-402 **Military Communications**
Provides knowledge and training of basic military skills essential for junior officer; an introduction to military communication equipment and techniques; the leadership communication process. Leadership laboratory. Enrollment must be approved by the Professor of Military Science. **Class 2, Lab 2, Credit 3**

0640-403 **Military Operations**
A continuation of military skills training with emphasis on military intelligence/security; operations at the small-unit level; staff functions and leadership laboratory; field training exercise. Students must register for lab under the department of physical education. Enrollment must be approved by the Professor of Military Science. **Class 2, Lab 2, Credit 3**

0640-501 **Army Training System**
An introduction to the U.S. Army's training philosophy and training system. Students learn how to assess, develop, plan, and evaluate training. Provides instruction in how to plan, conduct and assess a training meeting. Both short and long-range training plans are developed. A field training exercise is conducted. The importance and use of the After Action Review process is stressed and continued refinement of proper military briefing techniques is emphasized; leadership laboratory. Enrollment must be approved by the Professor of Military Science. **Class 2, Lab 2, Credit 3**

0640-502 **Military Administration and Logistics**
Includes discussions and seminars on the Army training management system, military justice, supply and property accountability, maintenance management, officer-enlisted personnel management; leadership laboratory. Enrollment must be approved by the Professor of Military Science. **Class 2, Lab 2, Credit 3**

0640-503 **Military Ethics**
Examines the ideas and issues that define the role of the military in our larger society. Emphasis is on the professional and ethical standards required of the military officer. Other topics include planning and conducting meetings, teaching and counseling, active duty orientation, preparations for commissioning; leadership laboratory and a field training exercise. Enrollment must be approved by the Professor of Military Science. **Class 2, Lab 2, Credit 3**

0640-520 **Survey of American Military History**
A study of American military history from the 1700s to the present day. Discussions will show how military actions affected U.S. history; how developing technologies impacted U.S. military doctrine, tactics and strategy; and the change of the U.S. military from a part time civilian volunteer militia to a professional full time force. Enrollment must be approved by the Professor of Military Science. **Credit 4**

Reserve Officer Training Corps—Air Force

0650-210 **The Air Force Today I**
A three-course series designed to introduce students to the United States Air Force and Air Force Reserve Officer Training Corps. Featured topics include mission and organization of the Air Force, officership and professionalism, military customs and courtesies, Air Force officer opportunities, and an introduction to communication skills. **Credit 1 (per quarter)**

0650-211 **The Air Force Today II**
A three-course series designed to introduce students to the United States Air Force and Air Force Reserve Officer Training Corps. Featured topics include mission and organization of the Air Force, officership and professionalism, military customs and courtesies, Air Force officer opportunities, and an introduction to communication skills. **Credit 1 (per quarter)**

0650-212 **The Air Force Today III**
A three-course series designed to introduce students to the United States Air Force and Air Force Reserve Officer Training Corps. Featured topics include mission and organization of the Air Force, officership and professionalism, military customs and courtesies, Air Force officer opportunities, and an introduction to communication skills. **Credit 1 (per quarter)**

Electrical Mechanical Engineering Technology

0660-222 **Principles of Manufacturing Processes**
This course will focus on the understanding and application of basic manufacturing processes. Students will be challenged to discover and learn how typical industrial piece parts and assemblies are constructed. Topics include material properties, casting processes, forming processes, material removal processes, and joining processes. This course is for online students in Electrical/Mechanical Engineering Technology and Safety Technology. Credit may not be given for this course if credit has been given for 0617-220. **Credit 4**

0660-401 **Thermal Fluid Science I**
First course in Thermal Sciences sequence. Properties of pure substances, gas laws, first and second laws of thermodynamics are studied and applied. Thermal-Fluid Science I, II, and III are a sequence offered exclusively in DL or blended format. The course is required for Electrical/Mechanical majors and may be an elective for other majors. This course is not for MET majors. (1016-231 or equivalent) **Credit 3**

0660-402 **Thermal Fluid Science II**
Continuation of Thermal-Fluid Science sequence covering fluid statics, fluid kinematics and fluid dynamics. The course has an emphasis on those elements of fluid mechanics with particular relevance to conduit flow, head loss and future heat transfer applications. The Thermal-Fluid Science I, II, and III courses are a sequence offered exclusively as distance or blended learning. The course is required for Electrical/Mechanical students and may be an elective for other majors. This course is not for MET majors. (Thermal Fluid Science I or equivalent) **Credit 3**

0660-403 **Thermal Fluid Science III**
Third course in the thermal-fluid science sequence. Thermal-Fluid Science III focuses on heat transfer mechanisms and heat exchanger performance and selection. Thermal-Fluid Science I, II, and III are a sequence offered exclusively for distance and/or blended learning. This course is not for MET majors. (Thermal-Fluid Science II or equivalent) **Credit 3**

0660-405 **Laboratory Practicum for
Electrical / Mechanical Engineering Technology**
This course will provide a single on-campus laboratory experience for online learning Electrical/Mechanical Engineering Technology students. The course focuses on testing of engineering materials. Components of electrical and manufacturing labs are also included. Cannot also receive credit for 0610-304 and 409. (One week on-campus, prerequisites: 0610-211, 0610-416, 0617-220, 0609-337, 0609-411) **Credit 2**

0660-419 **Experimental Methods Problem Solving
in Electrical-Mechanical Engineering Technology**
This is a course in experimental and laboratory techniques and the preparation of laboratory reports. Experiments utilize (but are not limited to) principles of statics, strength of materials, dynamics, electronics and controls. Students will be given problem statements and will develop and perform experiments to solve, or gain insight to possible solutions. Students work independently to prepare formal and informal reports and an oral presentation. Cannot also receive credit for 0610-407. (0610-303/0610-408, 0610-405/0610-410, 0610-432, 0535-403) **Class 2, Lab 2 Credit 3**

E. Philip Saunders College of Business

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Course numbering: RIT courses are generally referred to by their seven-digit registration number. The first two digits refer to the college offering the course. The third and fourth digits identify the discipline within the college. The final three digits are unique to each course and identify whether the course is noncredit (less than 099), lower division (100-399), upper division (400-699), or graduate level (700 and above).

Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's schedule of courses, published by the Office of the Registrar. Prerequisites/corequisites are noted in parentheses near the end of the course description.

Accounting

0101-301 **Financial Accounting**
An introduction to the way in which corporations report their financial performance to interested stakeholders like investors and creditors. Coverage of the accounting cycle, generally accepted accounting principles, and analytical tools help students become informed users of financial statements. **Credit 4**

0101-302 **Management Accounting**
Introduction to the use of accounting information by managers within a business. Explores the value of accounting information for the planning and controlling of operations, assessing the cost of a product/service, evaluating the performance of managers, and strategic decision making. Designed for non-accounting majors. (0101-301) **Credit 4**

0101-345 **Accounting Information Systems**
Emphasis is on developing a conceptual understanding of accounting information systems. This course combines information systems concepts, computer technology, and accounting issues. Topics include computer security, information privacy, accounting cycles, specialized journals, systems development, computer crime, database applications, e-commerce and other information systems issues. Discussion of current literature and use of a computerized accounting system will be included. Students analyze accounting information systems topics through problem solving, essays, presentations, exams and case studies. (0101-301) **Credit 4**

0101-408 **Financial Reporting and Analysis I**
Extensive exposure to the accounting cycle with full integration of the data flow in an accounting information system. Accounting theory developed by accounting standard-setting bodies is covered in depth. Generally accepted accounting principles are discussed as they apply to the preparation of financial statements and the recognition and measurement of financial statement elements (0101-301 and 0101-302 ; junior status) **Credit 4**

0101-409 **Financial Reporting and Analysis II**
In-depth consideration of generally accepted accounting principles and theory as they apply to the recognition and measurement of noncurrent assets, liabilities, and owner equities, including partnership accounting. Issues related to convertible securities and the computation of earnings per share are discussed. (0101-408, 0104-350, junior status) **Credit 4**

0101-431 **Cost Accounting**
Development and use of cost data for external reporting and internal planning and control. Topics include cost estimation and prediction, job costing, process costing, joint product and by-product costing, service department cost allocation, standard costing, activity-based costing, and transfer pricing. Development of relevant cost information for special purposes is also considered. (0101-302, 0104-350, 1016-319) **Credit 4**

0101-494 **Cost Accounting in Technical Organization**
A first course in accounting for students in technical disciplines. Topics include the distinction between external and internal accounting, cost behavior, product costing, profitability analysis, performance evaluation, capital budgeting, and transfer pricing. Emphasis is on issues encountered in technology intensive manufacturing organizations. (This course is not intended for Saunders College of Business students, junior status) **Credit 4**

0101-522 **Personal and Small Business Taxation**
A basic introductory course in federal income taxation. Emphasis is on taxation of individuals and sole proprietorships. Topics include income measurement and deductibility of personal and business expenses. (0101-301, junior status) **Credit 4**

0101-523 **Advanced Taxation**
A continuation of Personal and Small Business Taxation. Emphasis is on tax treatment of property transactions and taxation of business entities. Also covers the use of technology to prepare complex returns and to research tax issues. (0101-522) **Credit 4**

0101-530 **Auditing**
A study of the legal, ethical and technical environment in which the auditor works. Current auditing theory, standards, procedures and techniques are studied. The audit process is studied to ascertain how it leads to the development of an audit opinion (0101-409) **Credit 4**

0101-540 **Advanced Accounting**
This course investigates the application of generally accepted accounting principles to corporations with investments in subsidiaries. Issues involving consolidated financial statements, including international topics, are considered. Also examined are objectives for not-for-profit and governmental entities, and how these objectives affect their financial accounting and reporting. (0101-409, junior status) **Credit 4**

0101-550 **Financial Accounting and Reporting Issue**
A study of complex issues facing preparers and users of financial statements and how these issues are resolved. Topics include revenue recognition, accounting changes, deferred taxes, pensions, and post employment benefits, leasing, cash flow statements, interim reporting and segment disclosures. (0101-409) **Credit 4**

Management

0102-250 **The World of Business**
Designed for first-year business students, this course provides an overview of the functions and processes of business organizations. Topics include the role and responsibility of the manager, the processes and functions of business, the impact of technology, delivering quality products and services, doing business in global environments, and career exploration. (Not for students who have previously taken Business 1, 2, 3-freshman sequence) **Credit 4**

0102-260 **Business 1: Ideas and Creativity**
This is the first of a three-course sequence in which students learn to take a business idea from inception to launch. In Business 1 students will conceive new business ideas that will be developed through the remainder of the sequence. The course provides students with a solid grounding in the different functional area of business. **Credit 4**

0102-265 **Business 2: Business Plan Development**
This is the second of a three-course sequence in which students learn to take a business idea from conception to launch. In Business 2, students will develop a detailed business plan for the ideas generated in Business 1. At the end of the quarter groups will finalize and present their business plans to a review board. (0102-260, corequisite 0112-270) **Credit 2**

0102-305 **Careers in Business**
This course consists of a series of workshops designed to introduce business students to the skills needed to be successful in job and co-op searches and applications to graduate schools. Students will establish their career goals, create material needed to achieve these goals (e.g., resume, cover letter), and become successful interviewers. SCB students only. (Sophomore status) **Credit 1**

0102-310 **Air Force Management and Leadership I**
Integrated management and leadership courses emphasize the concepts and skills required of the successful young officer, manager and leader. The first course includes applied written and oral communication techniques, coordination, history of management theory, analytic methods of decision-making, strategic and tactical planning, various leadership theories and followership. The second course stresses organizing, staffing, controlling, counseling, human motivation and group dynamics, ethics, managerial power and politics, managing change, career development and performance appraisal. Actual Air Force case studies are used to enhance the learning process. (ROTC) **Credit 5**

0102-311 **Air Force Management and Leadership II**
Integrated management and leadership courses emphasize the concepts and skills required of the successful young officer, manager, and leader. The first course includes applied written and oral communication techniques, coordination, history of management theory, analytic methods of decision-making, strategic and tactical planning various leadership theories, and followership. The second course stresses organizing, staffing, controlling, counseling, human motivation and group dynamics, ethics, managerial power and politics, managing change, career development, and performance appraisal. Actual Air Force case studies are used to enhance the learning process. Note: Other Air Force ROTC course listings can be found under the College of Applied Science and Technology. **Credit 5**

0102-320 **Organizational Behavior**
An introductory course in managing and leading organizations, this course provides an overview of human behavior in organizations at the individual, group, and organizational level with an emphasis on enhancing organizational effectiveness. Topics include: individual differences, work teams, motivation, communication, leadership, conflict resolution, organizational culture, and organizational change. (Sophomore standing) **Credit 4**

0102-415 **Digital Entrepreneurship**
Digital Entrepreneurship brings together state-of-the-art knowledge in digital business practices with basic instruction in entrepreneurship and business planning. This highly interactive, applied experience will allow students to develop business ideas, discover RIT resources that support new ventures, network with and learn from industry experts, and complete a professional plan to communicate and advance a digital business venture. Student work for this course will involve research and analysis of electronic marketplaces and, ultimately, the design and development of competitive digital startups. (Junior status) **Credit 4**

0102-421 **Design Thinking and Concept Development**
Design thinking is a process that aids collaboration among designers, technologists, and business professionals. The process provides a structured creative process for discovering and developing products and services for profit and non-profit applications. Students will apply a wide range of design tools in a hands-on project. Topics include problem-framing, end-user research, visualization, methods for creative idea generation, and rapid prototyping. (Junior status) **Credit 4**

0102-438 **Business Ethics**
Awareness of core principles of ethical business behavior is an essential component for effective participation in business organizations. This course develops an understanding of ethical reasoning and how it is applied to current business issues. An important focus of the course is the development of ethical leaders. Students are exposed to several ethical and moral dilemmas, which are used to guide debate and discussion of issues such as: advertising, affirmative action, human resource decisions, product liability, etc. **Credit 4**

0102-455 **Human Resources Management**
An overview of the human resource function in both large and small organizations. This course emphasizes how managers can utilize human resources to achieve organizational goals. Major topics studied include employee selection, compensation, training and development, performance evaluation and managing diversity. (0102-320, junior status) **Credit 4**

0102-460 **Leadership in Organizations**
Modern organizations are in search of effective leaders, who can guide organizational members toward the attainment of organizational goals. This course will explore the character, personal attributes, and behaviors of effective leaders in modern organizations. The course includes an overview of leadership research, theory, and practice. (0102-320) **Credit 4**

0102-490 **Entrepreneurship**
This course studies the process of creating new ventures with an emphasis on understanding the role of the entrepreneur in identifying opportunities, seeking capital and other resources, and managing the formation and growth of a new venture. It addresses the role of entrepreneurship in the economy and how entrepreneurial ventures are managed for growth. (Junior status) **Credit 4**

0102-507 **Business, Government and Society**
This course illuminates the role of ethics, social ideology and government policy and regulation in guiding business decisions and in enhancing business competitiveness. Special attention is given to the role of business in assessing technological opportunity and risk, managing product liability and victim compensation, directing the corporations in a manner consistent with public policy on the natural environment and developing policies that assure fair treatment of diverse individuals in the workplace. (Senior status) **Credit 4**

0102-530 **Managing Innovation and Technology**
This course focuses on commercializing technology, and gives students the chance to work on real business projects involving new technology. Topics covered include the drivers of innovation, technology-driven entrepreneurship, managing different types of innovation, and the construction of technology strategy for a firm or business unit. Students learn how to understand both technology and business perspectives as well as how to formulate a profitable technology strategy. Projects focus on current situation in real companies, including, on occasion, student-owned startup companies. (Junior or senior standing, or permission of instructor) **Credit 4**

0102-545 **Applied Entrepreneurship and Commercialization**
This course enables students to gain course credit, in association with the RIT Student Development Lab, for advancing a business concept, working on a multi-disciplinary product commercialization team, or working with an entrepreneurial venture. Students must apply for admission into this program and follow the guidelines provided by the RIT Entrepreneurship Program. (Instructor permission). **Credit 4**

0102-547 **Field Experience in Business Consulting**
Students nearing the completion of their program work in consulting teams to assist startup ventures and/or small businesses. Problems are isolated and solutions then developed. Affiliated course projects may focus on a number of areas. For example, they may seek to develop commercialization plans for specific technologies, products or services; focus on unique problems associated with small businesses and develop growth strategies. (0102-490, junior status or permission of instructor) **Credit 4**

0102-551 **Strategy**
A capstone course drawing upon all the business functions including: accounting, finance, marketing, operations management, and organizational theory. The course provides an integrated perspective of business organizations toward the achievement of enhanced profitability and a sustainable competitive advantage. Topics include the analysis of business environments, industry attractiveness, competition, and the value chain. Students learn how to formulate and implement effective business-level and corporate level strategies. (0102-320, 0105-363, 0104-350, 0106-401, senior status) **Credit 4**

Finance

0104-220 **Personal Financial Management**
Examines financial decisions people must make in their personal lives. Covers personal taxation, housing and mortgages, consumer credit, insurance (including life, health, property and casualty) and retirement and estate planning. Also reviews the common financial investments made by individuals, including stocks, bonds, money market instruments and mutual funds. This class involves extensive use of the Internet for access to information. (Finance majors may use this course only as a free elective, not as a course creditable towards the major.) **Credit 4**

0104-350 **Corporate Finance**
Basic course in financial management. Covers business organization, time value of money, valuation of securities, capital budgeting decision rules, risk-return relation, Capital Asset Pricing Model, financial ratios, global finance and working capital management. (0511-402, 1016-319, 0101-301, and in second quarter of sophomore year or higher) **Credit 4**

0104-359 **Financing New Ventures**
Financing New Ventures focuses on financial issues affecting an entrepreneur. The course emphasizes, identifies and follows the wealth creation cycle. The wealth creation cycle begins with an idea for a good, product or service, progresses to an initial company startup, passes through successive stages of growth, considers alternative approaches to resource financing, and ends with the harvesting the wealth created through an initial public offering, merger or sale. Identification and valuation of business opportunities, how and from whom entrepreneurs raise funds, how financial contracts are structured to both manage risk and align incentives and, alternative approaches by which entrepreneurs identify exit strategies are reviewed. **Credit 4**

0104-361 **Financial Institutions and Markets**
This course provides a comprehensive survey of the major financial markets and institutions in the U.S. and abroad. This course analyzes the important structural features of the major markets and notes the interaction of the financial markets with the decisions of financial institutions, corporations and the government. (0104-350) **Credit 4**

0104-452 **Managing Corporate Assets and Liabilities**
Advanced course in financial management. Covers project cash-flow analysis, issuance of securities, cost of capital, debt policy, dividend policy and marketing efficiency. (0104-350) **Credit 4**

0104-453 **Intermediate Investments**
Focuses on the financial investment problems faced by individuals and institutions. Theoretical topics include asset pricing, hedging and arbitrage. Application topics include risk management in bond and stock portfolio context. A discussion of options, futures and swaps also is included. (0104-350). **Credit 4**

0104-460 **Financial Analysis and Modeling**
In this course, students learn to obtain and organize financial data and conduct financial analysis such as discounted cash flow analysis, risk analysis and financial forecasting. Sources of data include web based sources and proprietary databases. Excel will be the main software tool. (0104-452) **Credit 4**

0104-504 **Finance in a Global Environment**
Discusses problems posed by the international financial environment in which corporations operate. In particular, students learn to quantify and manage risks arising from shifting exchange rates. Other topics include exchange rate systems, international trade finance, international capital budgeting, country risk analysis and long-term international financing. (0104-350, junior status) **Credit 4**

0104-505 **Advanced Corporate Financial Planning**
This course focuses on strategic financial management of the corporation. It employs pedagogies that emphasize analysis and evaluation of applied financial problems. Topics include working capital management, financial statement analysis, valuation, capital budgeting decisions, and risk management. (0104-452) **Credit 4**

0104-520 **Introduction to Options and Futures**
This course explores risk management from the viewpoint of a finance professional. The primary tools used are derivative instruments such as options, futures and swaps. Students learn about the basic features of derivative instruments: how to value them, how they are traded, and how to use them to mitigate various types of financial risk. (0104-350, junior status) **Credit 4**

Marketing

0105-363 **Principles of Marketing**
An introduction to the field of marketing, stressing its role in the organization and society. Emphasis is on determining customer needs and wants and how the marketer can satisfy those needs through the controllable marketing variables of product, price, promotion and distribution. (Sophomore status) **Credit 4**

0105-440 **Internet Marketing**
Internet marketing is critical to an organization's overall strategy. This course focuses on tactics and strategies that enable marketers to fully leverage the Internet. Topics include the overall Internet marketing landscape, technologies, customer segmenting and targeting, search, analytics and emerging Internet marketing platforms. (0105-363) **Credit 4**

0105-442 **Search Engine Marketing and Analytics**
An examination of search engine marketing strategies to maximize site traffic, lower customer acquisition costs and boost conversion rates. Marketing frameworks provide the basis for the hands-on examination of search engine marketing and web analytics. (0105-440) **Credit 4**

0105-505 **Buyer Behavior**
A study of the determinants of consumer and business buying behaviors. Emphasis is on identifying customer needs, understanding the buying decision process, and maintaining customer satisfaction. (0105-363, junior status) **Credit 4**

0105-520 **Advanced Internet Marketing**
An advanced course that gives students an in-depth knowledge of Internet theories, marketing problems, and processes. The course will enable students to critically evaluate the Internet marketing planning process. It integrates the core principles, tools and tactics necessary to succeed online. (0105-440 and 0105-442) **Credit 4**

0105-550 **Marketing Management**
A capstone course that gives the student an in-depth knowledge of middle- and upper-management-level marketing problems and processes. Topics include tools used by marketing managers in the development, implementation and control of marketing plans. (0105-363, prior or concurrent registration in 0105-551, at least one coop, senior status) **Credit 4**

0105-551 **Marketing Metrics and Research**
A study of research methods used to understand the changing needs of customers in order to guide the decision making of marketing managers. Topics include problem formulation, sources of marketing data, research design, data collection and analysis. (0105-363, 1016-320) **Credit 4**

0105-559 **Professional Selling**
Selling concepts, tools, strategies and tactics are discussed as they apply to both external and internal customers. Students learn and experience some of the problems faced and rewards earned by those in professional sales. Customer relationship management/partnering with customers and truly seeking to meet their requirements are discussed as key to long-term success. (0105-363, junior status) **Credit 4**

0105-560 **Advertising and Promotion Management**
An in-depth view of tools of promotion management: advertising, sales promotion, public relations, personal selling, direct marketing and Internet marketing as well as new and alternative media. Basic concepts of how to use print, broadcast, Internet and out-of-home media are studied. Planning, budgeting, creative strategy and the roles of advertising agencies are also covered. (0105-363) **Credit 4**

Decision Sciences

0106-401 **Operations and Supply Chain Management**
A survey of operations and supply chain management that relates to both service and manufacturing organizations. Topics include operations and supply chain strategies, ethical behavior, forecasting, product and service design, including innovation and sustainability, capacity and inventory management, lean operations, managing projects, quality assurance, global supply chains, and the impacts of technology. (1016-319) **Credit 4**

Business Legal Studies

0110-319 **Legal Environment of Business**
An introduction to legal principles and their relationship to business organizations. Emphasis is placed on the laws and regulations which govern business. Explores the background and origin of the U.S. legal system, its law enforcement agencies and the legal procedures used by the government to enforce its law. **Credit 4**

0110-320 **Commercial Law**
Explores the impact of the Uniform Commercial Code on business operations. Emphasis on topics included on the certified public accounting exam. Topics covered include sales, commercial paper, corporations, partnerships, joint ventures, sole proprietorships, bailment and agency. Topical cases and examples are used to help the student grasp the business implications of the law and its nomenclature. A research project on legal issues is an important aspect of this course. (0110-319) **Credit 4**

Management Information Systems

0112-270 Business Software Applications
This course provides students with hands-on experience with the analytical software tools and techniques that are used in today's businesses. Emphasis will be placed on the application of spreadsheet models for supporting management decision making. A variety of spreadsheet-based cases in market research, financial analysis, accounting applications and other business domains will be utilized to show how to effectively analyze and solve business problems using the spreadsheet tool. **Credit 2**

0112-285 Business 3: Commercialization
This is the third in a three-course sequence in which students learn to take a business idea from inception to launch. In this course students prepare to commercialize their new product or service with the aid of a more detailed business plan, a student-created website, and an in-depth understanding of key business processes and cutting edge technologies. (0102-265, 0112-270) **Credit 2**

0112-300 Business Computer Applications
The primary focus of the course is to provide students with hands-on skills in using computers as productivity tools in the workplace. Students will be exposed to a combination of advanced productivity software including word processors, spreadsheets and presentation graphics applications. Hands-on exercises and assignments will help to develop computer proficiency and problem-solving skills. **Credit 4**

0112-312 Building a Web Business
This course gives students both a conceptual and hands-on understanding of the launching of web businesses. Students will study the full process of web business creation, including domain name registration, frameworks for application creation, hosting of web applications and search engine optimization. Students will apply their knowledge by designing and building a business web application. (Not for Saunders College of Business MIS majors) **Credit 4**

0112-315 Business Information Systems Processes
Managers, professionals and business technologists manage, maintain or participate in business processes. This course is an introduction to the basic business processes involved in organizations and the information systems that support them. Students examine the relationship between business processes and information systems and the qualities of good information. Students observe how these concepts are applied through hands-on exposure to an Enterprise Resource Planning (ERP) system, such as SAP R/3. **Credit 4**

0112-325 Applying Business Technology
In this course, students learn to take a business idea from inception to launch. It covers the major steps involved in commercializing a new product or service with the help of in-depth understanding of key business processes and cutting-edge e-business technologies. Topics covered include idea generation, basic business plan development, computer based market analysis, preparation for business idea implementation, and e-commerce website development. (Not for students that have completed the 0102-260, 0102-265, 0112-270 and 0112-285 sequence. For transfer students only) (Prior business and spreadsheet coursework.) **Credit 4**

0112-331 Developing Business Applications
Development of business applications is transforming from programming to integration of software components using application development environments. Students learn the fundamentals of computer programming and applications development through a set of programming exercises that focus on visual development environments and component integration. These exercises expand into a project where students apply concepts of typical development and project methodologies to complete a comprehensive programming assignment. **Credit 4**

0112-340 Database Management Systems
Transforming data into information is critical for making business decisions. This course introduces students to the concepts of data, information and the business database management systems (DBMS) used by modern organizations. Exercises and hands-on projects are used to model the information needs of an organization and implement and query databases using applications such as Microsoft Access and SQL. **Credit 4**

0112-370 Systems Analysis and Design
Successful organizations utilize a systematic approach to solve real-world business problems through the use of digital technologies. Students who complete this course will be able to design and model business processes. They will learn how to conduct interviews; approach the design or redesign of business processes; model system functions; effectively communicate systems designs to various levels of management; work in a project-based environment and approach the implementation of a new system. **Credit 4**

0112-390 Emerging Business Technologies
This course stresses a business-oriented approach to evaluating, selecting and leveraging emerging information technologies to support an organization's business processes. Students gain hands-on knowledge to design effective and secure networked IT infrastructure systems for business operations. Students also explore management issues such as defining an IT strategy, establishing IT standards, managing IT operations, and outsourcing IT services. **Credit 4**

0112-410 Advanced System Analysis and Design
Object-oriented analysis and design concepts and techniques are covered. Computer-aided software engineering (CASE) software and software quality metrics are introduced. Students that successfully complete this course and the prerequisite Systems Analysis & Design will have acquired knowledge of the full range of analysis and design concepts currently used in systems development. (0112-370, junior status) **Credit 4**

0112-430 Web Systems Development
Students in this class will analyze business problems and develop data-driven web applications to solve them. An industry-level application server will provide the framework for integrating and deploying a set of client and server technologies to create these applications. Development skills will include presenting and receiving information through a website, validating entered information, and storing entered information in text files or databases. Students will design solutions using Hypertext Markup Language, client scripting and server programs for database and file access. (0112-331, 0112-340) **Credit 4**

0112-440 Database Systems Development
This course builds upon the basic concepts from Database Management Systems (0112-340). Students work in a real-world business database development environment and gain hands-on experience in advanced database querying language. Students learn to analyze business processes and using tools such as Oracle, develop fully functioning database prototype systems to support them. (0112-340) **Credit 4**

0112-450 Enterprise Systems
This course explores the role of enterprise resource planning (ERP) systems in organizations. Students analyze cross-functional business processes and ERP systems commonly used to support these processes. Students engage in a hands-on project using a current ERP system, such as SAP R/3, to demonstrate, analyze and design system structures, key data elements and process configurations that support cross-functional business processes, including accounting, sales, material management, production and distribution. (0112-370) **Credit 4**

0112-525 MIS Capstone
This capstone course for MIS majors applies the concepts of project management and techniques for estimating, planning and controlling of resources to accomplish specific project goals. Students complete a team project requiring them to develop an innovative information system while utilizing project management techniques. Students analyze real business situations and develop IT-based innovative solutions for problems encountered. (Completion of all other MIS courses required for the major, senior status) **Credit 4**

International Business

0113-310 Global Business: An Introduction
Broad consideration of global business issues and strategies. Subject areas include the macro issues related to the economic, political and human environments of global business; i.e., how governments intervene in markets, business, etc. In addition the functional operations of a global firm will be examined. **Credit 4**

0113-400 Managing in the Global Environment
This course explores the key implementation issues facing global businesses and those firms wishing to expand into the global arena. An emphasis is placed on issues related to the topic of culture. The course examines its impact on management, individuals, groups and how it affects organizational performance. Leadership styles, in the cross-cultural context, will be deconstructed as will communication, negotiation, risk tolerance and motivation. (0113-310; 0102-320; junior status) **Credit 4**

0113-430

Global Business: Special Issues

This course covers a variety of contemporary special interest topics in the context of global business. Sample topics may include foreign direct investment strategies, regions of the world such as Asia, Europe, etc., evolving institutional factors, or trade disputes.

(0113-310, junior status) **Credit 4**

0113-450

Marketing in the Global Environment

A study of the management challenges of marketing in foreign countries. Topics include the assessment of foreign markets, foreign customer requirements, entry strategies, foreign channel management, promoting internationally, transfer pricing and world-class quality.

(0105-363, junior status) **Credit 4**

0113-500

Strategy in the Global Environment

This course explores the strategic challenges faced by businesses operating in a global environment. It emphasizes the development and formulation of effective corporate strategies within specific global environments. It also addresses the unique characteristics, opportunities, challenges, institutions, and approaches associated with corporate global strategy. (0113-310, senior status) **Credit 4**

B. Thomas Golisano College of Computing and Information Sciences

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Course numbering: RIT courses are generally referred to by their seven-digit registration number. The first two digits refer to the college offering the course. The third and fourth digits identify the discipline within the college. The final three digits are unique to each course and identify whether the course is noncredit (less than 099), lower division (100–399), upper division (400–699), or graduate level (700 and above).

Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's schedule of courses, published by the Office of the Registrar. Prerequisites/corequisites are noted in parentheses near the end of the course description.

4001-211 Introduction to Programming Using C and MATLAB
An introduction to structured programming using C. Basic problem solving techniques and algorithm development through the process of top-down, stepwise refinement are introduced throughout the course. Classical algorithms for the solution of numerical problems encountered in science and engineering are used to demonstrate the development of algorithms and their implementation in C and MATLAB and control structures will be covered. Programming projects will be required. May not be taken for credit by CS, SE, or CE majors. (1016-281 This course is restricted to electrical engineering students only) **Credit 4**

Information Technology

4002-206 Web Foundations
An introduction to Internet and web foundations including basic HTML (Hypertext Markup Language) and CSS (Cascading Style Sheets). Web page design fundamentals, basic digital image manipulation, and website implementation and maintenance. **Class 4, Credit 4**

4002-208 Introduction to Programming
A first course in programming using C++. Topics include elementary data types, arithmetic and logical operators, input/output, control structures, functions with and without parameters, arrays, and an introduction to object-oriented program design and implementation. Emphasis is placed on the development of problem-solving skills. Programming projects are required. (Computer literacy) **Class 6, Credit 4**

4002-210 Programming with Classes
A second course in programming with emphasis on object-oriented programming. Students will first use and then build classes. Topics on classes include information hiding through classes, construction of classes, standard class methods, operator overloading, friend functions, inheritance and polymorphism. Additional topics include files, exception handling, and developing programs with a GUI front-end. Programming projects are required. (4002-208) **Class 6, Credit 4**

4002-217 Programming for Information Technology I
This is the first course in the introductory programming sequence required for all Information Technology students. Topics include elementary data types, arithmetic and logical operations, control structures and error handling, methods and functions, and an introduction to object-oriented programming design and implementation. Emphasis is placed on the development of problem-solving skills. Programming projects are required. (Computer literacy) **Class 6, Credit 4**

4002-218 Programming for Information Technology II
This is the second course in the introductory programming sequence required for all students majoring in Information Technology. Topics include further exploration of classes and objects, programming through composition and inheritance, reusability, input/output, and object-oriented design. Emphasis is placed on the development of problem-solving skills. Moderately large programming assignments are required. (4002-217) **Class 6, Credit 4**

4002-219 Programming for Information Technology III
This is the third course in the introductory programming sequence required for all students majoring in Information Technology. Topics include advanced interface concepts, traditional programming data structures, programming utilities and reusability, introductory project design and management concepts and other concepts as time permits. Emphasis is placed on the development of problem-solving skills. Large programming assignments are required. (4002-218) **Class 6, Credit 4**

4002-248 Introduction to Geospatial Technologies
This course provides a survey of technologies used to represent the earth, collectively referred to as Geospatial Technologies (GTs). Students will gain hands-on experience with GTs, including Global Positioning Systems (GPSs), Geographic Information Systems (GISs), remote sensing, Virtual Globes, and Web mapping mashups. Students also will develop basic spatial thinking, reasoning and literacy skills. **Class 4, Credit 4**

4002-250 Introduction to Informatics
This course introduces students to the world of Informatics and provides them with tools to begin working as an informatician. Students learn the breadth of informatics and the roles informaticians play. Tools for working with XML and building new applications from existing ones (e.g., mashups) are presented. The course utilizes extensive hands-on computing, including a domain specific project, but no programming experience is necessary. (Computer literacy)

4002-306 Digital Image Acquisition and Editing
This course explores the creation and manipulation of digital images intended for use on the Web. Topics include basic digital photography, acquisition of images via scanning, and intermediate image manipulation. (4002-206 or 4002-320) **Class 4, Credit 4**

4002-320 Introduction to Multimedia: The Internet and the Web
This class provides an introduction to key Internet, web, and multimedia technologies. Topics covered include social communication, basic Internet applications such as SSH, SFTP, and the World Wide Web, basic digital image techniques, and web page development and publishing. (Computer literacy) **Class 4, Credit 4**

4002-331 Interactive Programming
This course teaches students how to develop and use interactive multimedia components to create user interfaces and information visualization systems. Students will work with digital media and data to create interactive applications. Students will be introduced to visual layout and design concepts. Programming is required. (4002-218, 4002-320)

4002-335 Introduction to Structured Markup
This course builds on the basic aspects of the Hypertext Markup Language (HTML) and scripting to provide an overview of markup practices and techniques. Markup language development and creation, including standards like the Extensible Markup Language (XML), form the basis for work in transforming documents to other formats like text and/or HTML and to changing the document tree and manipulating node fragments. (4002-320 and 4002-331 or equivalent) **Class 4, Credit 4**

4002-348 Introduction to Geographic Information Systems (GIS)
This course introduces students to Geographic Information Systems (GIS). Course lectures, reading assignments, and practical lab experiences will cover a mix of conceptual, practical and technical GIS topics. Topics include GIS data models, basic cartography, geodatabases, spatial analysis, and geo software. (4002-248 or permission of instructor) **Class 4, Credit 4**

4002-360 Introduction to Database and Data Modeling
A presentation of the fundamental concepts used in data modeling and database implementation. The data modeling process, basic relational concepts, the process of normalization, relational algebra, SQL, and guidelines for mapping a data model into a relational database will be covered. Programming assignments involving the use of a relational database management system will be required. (4002-218 or equivalent and 1016-206) **Class 4, Credit 4**

4002-406 Rapid Online Presence Development
Although large-scale websites still require considerable development effort, there are today several options for establishing a web presence using tools designed for non-programmers. This course gives students understanding of and experience with installing and customizing websites using tools such as blogs, wikis, content management systems, and website toolkits. (4002-206 or 4002-320) **Class 4, Credit 4**

4002-409 Website Design and Implementation
This course builds on the basic aspects of web page development that are presented in 4002-320 and extends that knowledge to focus on theories, issues, and technologies related to the design and development of websites. An overview of web design concepts, including usability, accessibility, information architecture, and graphic design in the context of the web will be covered. Introduction to website technologies, including HTTP, JavaScript, DHTML, PHP, and database dynamic page generation will also be explored. (4002-320, 4002-360 and a two-course programming sequence) **Class 4, Credit 4**

4002-414 Java for Programmers
An intensive survey of the Java programming language for experienced programmers. This course covers the creation of application programs. Topics include basic language concepts (declaring and evaluation of data, statements, expressions, control flow, and input/output), object-oriented fundamentals, GUI interfaces, exception handling, debugging, threads, and the client/server environment. Programming projects will be required. (A two-course object-oriented programming sequence in a language other than Java) **Class 6, Credit 4**

4002-415 Ethics in Information Technology
Ethics in Information Technology is intended to be an introductory course to the various ethical issues which may present themselves in a variety of settings. The class will start with a historical examination of ethics and, through research, presentations and discussions, will provide opportunity to learn why it is essential to understand the ethical implications of our professional activities. Topics include global implications of technology, 1st Amendment, 4th Amendment, security, intellectual property law, privacy and personal responsibility. (Second-year standing) **Class 4, Credit 4**

4002-416 Access and Accessibility
This course will examine the increasingly important problem of accessibility as it relates to the field of computing. Issues to be covered include: accessibility for disabled people, assistive technologies, the effect of poverty on accessibility (the "digital divide"), restrictions on the use of public machines, and the moral, legal, and ethical issues associated with accessibility. (Third-year standing) **Class 4, Credit 4**

4002-425 HCI1: Human Factors
Human Computer Interaction (HCI) is a multidisciplinary field of study concerned with how humans interact with software and hardware interfaces. This course will focus on theories of human information processing, human behavior and their implications for user-centered design of interfaces. Topics include: HCI history, cognitive psychology, user analysis, task analysis, and requirements analysis in the usability engineering process. (Second-year standing) **Class 4, Credit 4**

4002-426 HCI2: Interaction Design
The design of usable interfaces is based on the principles and theories of Human Computer Interaction. This project-based course is focused on the application of the usability engineering process, including analysis, design, prototyping and testing. Additional topics include: what is usability, heuristic evaluation, usability goal setting, interaction design and styles, assessment methods and international user interfaces. Team projects are required. ((4002-425 or 2009-323) and 4002-331 (or equivalent) and preferably a co-op) **Class 4, Credit 4**

4002-448 Geospatial Data Analysis
This course is an introduction to the theory and techniques used for spatial analysis of complex, geographically referenced data. Topics include advanced statistical and spatial data analysis techniques for a variety of problem types that span a broad spectrum of disciplines. In-class and out-of-class assignments will develop students' spatial data analysis skills. (4002-248, 4002-348, and 1016-320 (or equivalent background in statistics) or permission of instructor) **Class 4, Credit 4**

4002-455 Needs Assessment
Complex problems in modern organizations require an information technologist to systematically analyze problem areas to determine the most effective and cost-efficient solutions. This course builds student skills in two different yet interacting areas: needs assessment (requirements analysis) and group problem solving. Students use interviewing and problem-solving techniques to uncover the constraints that surround problem areas. Students learn the questions to ask during needs assessment, along with developing the interpersonal skills to conduct these meetings. Emphasis is on the steps in creative problem solving, the basics of meeting planning to maximize group effectiveness and helping a client to focus concerns into a clearly defined problem. (Third-year standing and co-op experience) **Class 4, Credit 4**

4002-460 Technology Transfer
Technology transfer is an umbrella term that refers to the creation, adoption and consequences of new technologies in a variety of settings. This course looks at how a new idea becomes implemented in a system (an organization or society) and the factors that influence the adoption of a new idea. The course also looks at the influence of individuals and groups within the change process and how they affect the acceptance of new technologies. (Third-year standing and co-op experience) **Class 4, Credit 4**

4002-461 Fundamentals of Data Modeling
Students will survey and master several contemporary graphic techniques used in data modeling and data requirements collection and analysis. Conceptual, logical, and physical modeling will be compared and contrasted. Business rule formation and domain identification will be studied. Advanced functional dependency and higher-order normal forms will be examined in the context of requirements analysis. Object-oriented DBMS concepts and design issues will be surveyed. (4002-360) **Class 4, Credit 4**

4002-484 Fundamentals of Database Client/Server Connectivity
Students will investigate strategies for client-server and server-server communication against single or multiple database servers. Specifically, students will configure, test, and demonstrate successful communication between multiple database servers and multiple clients. Similarities and differences between commercially available connectivity packages, and issues impacting performance will be explored. Programming exercises are required. (4002-360 and 4002-219 or equivalent) **Class 4, Credit 4**

4002-485 Fundamentals of DBMS Architecture and Implementation
Students will be introduced to issues in client-server database implementation and administration. Topics such as schema implementation, storage allocation and management, user creation and access security, data backup and recovery, and performance measurement and enhancement will be presented and investigated. Students will configure and demonstrate successful management of a database server for client access. (4002-360) **Class 6, Credit 4**

4002-486 Implementation of Three-Tier DBMS Application
Students will implement a three-tier DBMS application. Using a standard DBMS product, students will design and implement a database backend. Students will construct a web server and implement client/web server connectivity. Tools to monitor and measure such an implementation will be developed. Client-side, database server-side, and Web server issues associated with such a three-tier implementation will be investigated. Programming assignments are required. (4002-461, 4002-484, 4002-485, and 4002-539) **Class 4, Credit 4**

4002-489 Data Warehousing
This course covers the purpose, scope, capabilities, and processes used in data warehousing technologies for the management and analysis of data. Students will be introduced to the theory of data warehousing, dimensional data modeling, the extract/transform/load process, warehouse implementation, and summary data management. The basics of data mining and importance of data security will also be discussed. Hands-on exercises include implementing a small-scale data warehouse. (4002-360) **Class 4, Credit 4**

4002-495 Honors Capstone Project
The student will work independently under the supervision of a faculty adviser on a topic not covered in other course work. (Completion of all institute honors academic requirements) **Credit 1-4**

4002-499 Information Technology Co-op
A cooperative educational experience is available for those students who participate in order to gain industrial experience. **Class 0, Lab 0, Credit 0**

4002-510 Fundamentals of Instructional Technology
The world of information technology offers the possibility of transforming the way that instruction is designed and delivered. However, few information technology professionals understand the methods and materials of instructional design. As a professional in information technology, a student may be responsible for designing instruction, either in a business, or an educational context. This course enables the student to be able to plan, organize, and systematically develop instructional materials. The course uses an Instructional Systems Design (ISD) model to analyze, design, deliver, and evaluate instruction. (Third-year standing) **Class 4, Credit 4**

4002-512 **Interactive Courseware**
Computer software that teaches is referred to as courseware. This course was designed to help you make the transition from “general” Instructional Design (4002-510) into the actual application of these principles in a computer-based environment. Although the basic principles of instructional design hold true in all media environments, using these teaching and learning principles are somewhat different when developing instruction that will be delivered by computer. This course teaches procedures that have already been successful in the design and development of courseware. (4002-510 and a two-course programming sequence) **Class 4, Credit 4**

4002-535 **Network-Based Multimedia**
This course presents the foundational concepts underlying the design and implementation of multimedia on the Internet. Each concept is explored along with the underlying technology that supports it using hands-on projects. As the technology of interactive multimedia on the Internet changes, this course presents the current practices in preparing multimedia for cross-platform delivery to the massive audience of Internet users. Using the capabilities of current web browser client and http server technology, students will implement interactive multimedia for a variety of applications, including streaming audio and video. (4002-409 or 4002-406) **Class 4, Credit 4**

4002-536 **Web Client-Side Programming**
This course will explore the possibilities and purpose of client-side scripting over the Internet. Students will learn to use both native and plug-in technologies to build interactive interfaces that are both usable and effective. Key features that will be addressed are browser compatibility, object reusability (bandwidth issues), and different scripting environments. Programming is required. (4002-409) **Class 4, Credit 4**

4002-539 **Web Server-Side Programming**
This course focuses on the server-side aspects of web application development. Topics covered include the underlying protocols and technologies of the WWW, dynamic generation of web pages, accessing database content, web services, online content management, and security. By the end of the course, students will be able to architect and develop multi-tiered dynamically generated web sites and services that incorporate server-side programming and a database back-end. (4002-409) **Class 4, Credit 4**

4002-542 **Native Application Development for Mobile Devices I**
This course is an introduction to creating native applications for small form factor mobile devices, such as smartphones. These devices include unique sets of hardware and communications capabilities, incorporate novel interfaces, are location aware, and provide persistent connectivity. Topics covered include user interaction patterns, connectivity, interface design, software design patterns, and application architectures. Programming projects are required. (Completion of the required programming sequence in student’s degree program or permission of instructor. Third-year standing) **Class 4, Credit 4**

4002-546 **Web Client Server Programming**
When building sophisticated web applications, client and server technologies are used together to create the best possible web-based applications. This course will explore the creation of such integrated applications, exploring topics such as dynamic creation of web technology-based applications in a client-server environment. Programming projects are required. (4002-536 and 4002-539) **Class 4, Credit 4**

4002-549 **Usability Testing**
This project-based course will focus on the formal evaluation of user interfaces. Topics include: usability test goal setting, recruitment of appropriate users, design of test tasks, design of the test environment, test plan development and implementation, analysis and interpretation of the results, and documentation and presentation of results and recommendations. (4002-426 and 1016-319) **Class 4, Credit 4**

4002-571 **Application Programming**
This course will illustrate advanced programming topics using an object-oriented language. It will build on the material covered in the introductory programming courses. Topics include the use of common programming tools, working with component models, simple graphics programming, application development spanning multiple languages, and security models. Emphasis will be on the development of problem-solving skills. Programming assignments will be required. (Third-year standing and either 4002-219 or 4002-414) **Class 4, Credit 4**

4002-572 **Distributed Application Programming**
This course will expose students to advanced programming topics using an object-oriented language. It will build on the material covered in the introductory programming courses. Topics include distributed programming using various APIs and the development of server side applications. Emphasis will be on the development of problem-solving skills. Programming assignments will be required. (Third-year standing and either 4002-219 or 4002-414) **Class 4, Credit 4**

4002-575 **Local Data Integration**
In this course, students will learn how to utilize state-of-the-art techniques such as XML to address the issues of data integration between computer programs of disparate language platforms. Programming projects will be required. (Third-year standing and either 4002-219 or 4002-414) **Class 4, Credit 4**

4002-576 **Remote Data Integration**
Exchange of information between programs running on disparate software and hardware platforms across domains can be a significant problem. In this course, students will learn how to leverage the loose coupling of service-oriented architectures to address the issues of data integration between these types of computer programs when executing across domains. Programming projects will be required. (Third-year standing and either 4002-219 or 4002-414) **Class 4, Credit 4**

4002-590 **Seminar in Information Sciences and Technologies**
Current topics and advances in applications of computer technology for undergraduate students. (Permission of instructor and third-year standing) **Class 4, Credit 4**

4002-599 **Independent Study**
The student will work independently under the supervision of a faculty adviser on a topic not covered in other courses. (Proposal signed by a faculty member and approved by the department chair) **Credit 1-8**

Computer Science

4003-102 **Freshman Honors Seminar**
This course provides an introduction to the Honors program for all freshman GCCIS Honors students. The course provides an overview of GCCIS, its program and the requirements for the Honors program at the institute, college and program level. Honors students will hear discussions of the professional and research interests for faculty members from all five departments. (Restricted to Computer Science Honors Program students in their first year of study at RIT)

4003-203 **Advanced Placement in C++**
This course is only used for the purpose of transferring in Advanced Placement (AP) credit. Amount of credit (either 4 or 8 credit hours) will depend upon the student’s score in the AP exam. Transfer credit of 4 credit hours will be granted for scores representing mastery of the principles of programming. Topics include variables, expressions and assignment, control structures (sequencing, selection and repetition), objects, procedures and functions, parameter mechanisms, recursion, one and two-dimensional arrays. Transfer credit of 8 credit hours will be granted for scores representing mastery of the above principles and basic data structures. These topics would include arrays, records, pointers, dynamic storage allocation, linked lists, stacks, queues, and trees. May not be taken for credit. **Credit 4-8**

4003-204 **AP Java**
This course is only used for the purpose of transferring in (AP) credit. Amount of credit (either 4 or 8 credit hours) and placement will depend both on which version of the AP exam is taken and what score is achieved. Transfer credit will be granted for scores representing mastery of basic programming methodology, general problem solving strategies, common data structures and algorithm development. Topics include: variables, expressions, operators and assignment, control structures, primitive reference types, conversions between types, objects, classes and interfaces (including instance and static, static variables and methods, constructors, parameter passing and returning values), inheritance (polymorphism, overloading and overriding methods), basic exceptions, strings, one and two-dimensional arrays, standard data structures and standard implementations using classes and interfaces found in the collections framework. May not be taken for credit.

- 4003-212 Principles of Computer Science**
This course is designed to introduce students to the central idea of computer science. Students will engage in activities that show how computing changes the world and impacts daily lives. Students will develop step-by-step written solutions to basic problems and will be required to implement these solutions on a computer using a programming language. Assignments will be completed both individually and in small teams. Students will be required to demonstrate oral and written communication skills. Computer Science majors may take this course only with departmental approval. **Class 4, Credit 4**
- 4003-241 Problem-based Introduction to CS**
This course serves as an introduction to computer programming using a problem-centered approach. Specific topics covered include problem solving approaches including brute force search; expression of algorithms in pseudocode and a programming language; functional and imperative programming techniques; control structures; problem solving using recursion; basic searching and sorting; elementary data structures such as lists, trees, and graphs; and correctness, testing and debugging. Assignments (both in class and for homework), requiring a pseudocode solution, a programming implementation, or both, are an integral part of the course. **Credit 4**
- 4003-242 Data Structures for Problem Solving**
An introduction to data structures and their use in representing and solving problems. Specific topics include: algorithm design and analysis (including divide-and-conquer and dynamic programming), data structures (stacks, queues, maps, trees and graphs), and advanced searching and sorting. In and out-of-class problems requiring solutions expressed using pseudocode or computer programs are an integral part of the course, including a quarter-long project in which students work on a challenging, open-ended problem within a group. (4003-241, Problem-Based Introduction to Computer Science) **Credit 4**
- 4003-243 Object-Oriented Programming**
This course is an introduction to object-oriented programming. Key topics include classes vs. objects, inheritance, interfaces, object oriented collection class libraries for abstract data types (e.g. stacks, queues, maps, and trees), static vs. dynamic data types, input and output streams, graphical user interfaces and exception handling. Students will also be introduced to a modern integrated software development environment (IDE). Programming projects will be required. (4003-242, Data Structures for Problem Solving) **Credit 4**
- 4003-263 Computer Science for Transfers**
This course introduces the student to the object-oriented paradigm, the computer science workstation environment, and the Java language. Topics include class design and implementation, inheritance, exceptions, files, threads, swing, and network programming. Students work individually and in small groups on programming assignments, which are an integral part of the course. This course is intended for students with previous programming experience and a background in data structures. Open only to transfer students. Not to be taken as a Computer Science elective. (Departmental approval required) **Class 4, Lab 2, Credit 5**
- 4003-309 C for C++ Programmers**
A study of low-level programming techniques in the C language. Pointer techniques and the use of pointers are emphasized. The course covers C operators, native arrays, strings, unions, and the C library. Techniques for implementing polymorphism and generic data types are covered. Programming projects will be required. (This course may not be taken for credit simultaneously with 4003-406. Students who receive credit for 4003-406 may not later take 4003-309 for credit. (4003-334) **Class 2, Credit 2**
- 4003-334 Computer Science 4**
A course on design techniques and advanced programming. Topics include the software development life cycle, analysis and design techniques, programming in C++, and implementation strategies for external data structures. Students will work individually and in small groups on programming assignments, which will be an integral part of the course. The Unified Modeling Language (UML) and the C++ programming language will be used. 4003-243 or 4003-263. **Class 3, Credit 4**
- 4003-341 Professional Communications**
An introduction to the types of communication that are part of the life of a computing professional. Topics include analysis of purpose of a document or report and writing effectively for the expertise and interests of the intended audience. Writing assignments will cover reports, specifications and user documentation. Oral reports and presentation skills also are emphasized. Small and large group activities will be used to simulate a wide range of work and communications environments. (4003-233 or 4003-263 as a corequisite) **Class 4, Credit 4**
- 4003-345 Computer Organization**
An introduction to computer architecture and assembly language programming concepts and techniques. Topics include Boolean algebra, combinational and sequential circuit design, storage mechanisms and their organization, the instruction cycle in a simple CPU, assembly language programming, programming at the device level, and the role of assembly language in understanding the hardware/software interface. Digital logic and software projects will be required. (4003-334 and 1016-265) **Class 4, Credit 4**
- 4003-380 Introduction to Computer Science Theory**
This course provides an introduction to the theory of computation, including Formal Languages, grammars, automata theory, computability, and complexity. (1016-265 and 1016-366) **Class 4, Credit 4**
- 4003-385 Concepts of Data Management**
This course provides a broad introduction to the theory and practice of modern data management, with an emphasis on the relational database model. Topics in relational database systems include data modeling; the relational model; relational algebra; Structured Query Language (SQL); and data quality, transactions, integrity and security. Students will also learn approaches to building relational database application programs. Additional topics include object oriented and object-relational databases; semi-structured databases (such as XML); data warehousing; data cleaning and preparation; and data mining. A database programming project is required. (1016-265 Discrete Mathematics I and 4003-243 Object Oriented Programming, or permission of instructor) **Credit 4**
- 4003-406 Systems Programming I**
This course is an introduction to systems programming concepts and techniques. Topics include: the Intel system architecture, its assembly language, the C language, and how to use these tools to interact with the low level hardware and the Unix operating system. (Students who receive credit for this course may not later take 4003-309 for credit.) (4003-334 and 4003-345) **Class 4, Credit 4**
- 4003-410 Introduction to Computer Science Research**
This course introduces students to current research topics in Computer Science. It explores writing, reading, presenting, and evaluating research in the computer science discipline. Problem-solving skills in the context of research projects will be emphasized. Students will be provided with an opportunity to attend seminars and presentations by individuals conducting research in computer science. (CS Honors students with third level standing in Computer Science or permission of instructor) **Credit 2**
- 4003-420 Data Communication and Networks I**
This course is an introduction to the concepts and principles of computer networks. Students will design and implement projects using application protocols, and will study transport, network, and data link protocols and algorithms. The course also includes an introduction to local area networks, data transmission fundamentals, and network security. Programming projects will be required. (4003-334 and 1016-351) **Class 4, Credit 4**
- 4003-440 Operating Systems I**
A general survey of operating system concepts. Topics include process synchronization, interprocess communication, deadlock, multiprogramming and multiprocessing, processor scheduling and resource management, memory management, overlays, static and dynamic relocation, virtual memory, file systems, logical and physical I/O, device allocation, I/O processor scheduling, process and resource protection. Programming projects will be required. (4003-334 and 4003-345) **Class 4, Credit 4**
- 4003-450 Programming Language Concepts**
A study of the syntax and semantics of a diverse set of high-level programming languages. The languages chosen are compared and contrasted in order to demonstrate general principles of programming language design. This course emphasizes the concepts underpinning modern languages rather than the mastery of particular language details. Programming projects will be required. (4003-334 and 1016-265; or permission of instructor) **Class 4, Credit 4**
- 4003-451 XML Architecture, Tools and Techniques**
This course is a critical review of the XML standard and its major applications for data description, transformation, storage, and transport, and in its role as a meta language for little languages used within software development and network communication. XML as a tool for language design is compared to a parser-generator based approach. The implementation of XML parsing is compared to other forms of language recognition. Students are expected to complete programming assignments, some involving Java, and give a team presentation about an XML-based technology available from the internet. (4003-233 or 4003-236 or 4003-263 or permission of instructor) **Class 4, Credit 4**

- 4003-455 Artificial Intelligence**
An introduction to the field of artificial intelligence, including both theory and applications. A programming language that allows effective symbolic manipulation (Prolog) is used to demonstrate the capabilities and limitations of the material presented in class. Topics include search strategies and their implementation, logic, networks, frames and scripts, productions, symbolic manipulation and list processing, problem-solving methods, expert systems, natural language understanding, and selections from vision, robotics, planning and learning. Programming assignments are an integral part of the course. (4003-450) **Class 4, Credit 4**
- 4003-457 Introduction to Computer Vision**
An introduction to the underlying concepts of computer vision and image understanding. The course will consider fundamental topics, including image formation, edge detection, texture analysis, color segmentation, shape analysis, detection of objects in images and high level image representation. Depending on the interest of the class, more advanced topics will be covered, such as image database retrieval or robotic vision. Programming assignments are an integral part of the course. (Third-year standing in Computer Science) **Class 4, Credit 4**
- 4003-471 Privacy and Security**
This course provides students with an introduction to the issues surrounding security of computer systems and privacy concerns in an increasingly information-based society. The class will consider numerous social issues in computing, including risks and liability involved in using information as well as ethical concerns. Case studies will be used to illustrate both common and historic problems in computer security. Group and individual programming projects will be used to improve understanding of security issues. Students will research a specific area of interest. (4003-420 and 4003-440) **Credit 4**
- 4003-480 Formal Languages**
Formal language theory and principles. Topics include regular, context free and context-sensitive grammars, finite automata, pushdown automata and Turing machines, and an introduction to unsolvability and computability. (4003-380) **Class 4, Credit 4**
- 4003-481 Complexity and Computability**
This course provides an introduction to the theories of complexity and computability, it covers degrees of undecidability, time and space complexity, reductions, and completeness. (4003-380) **Class 4, Credit 4**
- 4003-482 Cryptography**
The course provides an introduction to cryptography and its relation to security. It covers classical cryptosystems, private-key cryptosystems (including DES and AES), and public-key cryptosystems (including RSA). The course also provides an introduction to integrity and authentication. (4003-334 and 1016-265) **Class 4, Credit 4**
- 4003-485 Database Concepts**
Broad introduction to database management systems (DBMS) and the design, implementation and applications of databases. Topics include an overview of DBMS architectures, concepts and implementation of the relational model, SQL, database design and modeling techniques, and issues such as recovery, concurrency, physical implementation concerns and performance and management aspects. Optional topics include: alternative approaches to designing database systems (for example, object-oriented or extended relational systems), distributed databases, database machines, and database interfaces and languages. A database programming project is required. (4003-334) **Class 4, Credit 4**
- 4003-486 Database System Implementation**
This course covers data structures and algorithms used to implement database management systems. Topics include physical data organizations, indexing and hashing, query processing and optimization, database recovery techniques, transaction management, concurrency control and database performance evaluation. Programming projects will be required. (4003-485) **Class 4, Credit 4**
- 4003-487 Principles Of Data Mining**
This course provides an introduction to the major concepts and techniques used in data mining of large databases. Topics include the knowledge discovery process, data exploration and cleaning; data mining algorithms, and the ethical issues underlying data preparation and mining. Computing projects, presentations, and a term paper are required. (Equivalent of one year experience using an Object Oriented programming language and a statistics course, or permission of the instructor). **Class 4, Credit 4**
- 4003-499 Computer Science Co-op**
Computer Science co-op work block. One quarter of appropriate paid work experience in industry. Four quarters of co-op experience is required. **Credit 0**
- 4003-506 Systems Programming II**
Application of operating system concepts to the design of hardware interfaces for a multiprogramming environment. Laboratory work includes the development of multiprogramming (optionally, multiprocessing) kernel with system call and interrupt handling facilities, and the building of device drivers for a variety of peripheral devices. This course provides extensive experience with those aspects of systems programming that deal directly with the hardware interface. A significant team programming project is a major component of the course. (4010-361; 4003-406; and 4003-440) **Class 4, Credit 4**
- 4003-515 Analysis of Algorithms**
This course provides an introduction to the design and analysis of algorithms. It covers a large number of classical algorithms and their complexity and will equip students with the intellectual tools to design, analyze, implement, and evaluate their own algorithms. (4003-334 and 1016-366) **Class 4, Credit 4**
- 4003-520 Computer Architecture**
Computer Architecture is the study of the design of both modern and classic hardware. Topics include: a review of classical computer architectures; the design of operation codes and addressing modes, data formats, and their implementation; internal and external bus structures; architectural features to support virtual storage and page replacement policies, high-level language features, and operating systems. Students will write programs which simulate the organization of several different processor architectures to help further their understanding of design choices. (4003-440) **Class 4, Credit 4**
- 4003-531 Parallel Computing I**
Parallel Computing is the study of the hardware and software issues in parallel computing. Topics include an introduction to the basic concepts, parallel architectures and network topologies, parallel algorithms, parallel metrics, parallel languages, granularity, applications, parallel programming design and debugging. Students will become familiar with various types of parallel architectures and programming environments. (4003-440 or permission of the instructor) **Class 4, Credit 4**
- 4003-532 Parallel Computing II**
Parallel Computing II is a collaborative learning course. Students will agree on the topics for the course, will prepare and present one of the agreed upon topics, and will lead a discussion session for another lecture. In addition, parallelism will be applied to real-world interdisciplinary projects. (4003-531) **Class 4, Credit 4**
- 4003-541 Data Communications and Networks II**
This course continues the study of computer networks begun in 4003-420. Data Communications and Networks I, emphasizing design principles and theoretical aspects of networks. Topics include the nature of communications media and signaling methods, analog and digital transmission, data link protocols, protocol proof techniques, routing, broadcasting, multicasting, connection, disconnection and crash recovery protocols, internetworking and security, and network analysis and design using graph theory and queuing theory. (4003-420) **Class 4, Credit 4**
- 4003-542 Data Communications and Networks III**
This course will build on topics developed in 4003-420, Data Communications and Networks I, and 4003-541, Data Communications and Networks II, in a lab setting. Students will be required to design and implement a small computer network addressing issues such as routing strategies, virtual circuits vs. datagrams, data link protocols, and user (presentation) level services. (4003-406 and 4003-541) **Class 4, Credit 4**
- 4003-543 Ad-hoc Networks**
This course explores serverless ad-hoc networks. Topics include authentication, confidentiality, routing, service discovery, middleware and key generation and key distribution. Programming projects are required. (4003-233 and 4003-420)
- 4003-544 Operating Systems II**
This course is a more in-depth look at the concepts in Operating Systems I (4003-440). Laboratory work includes implementing components of a pedagogical operating system as a team project through the entire term. Each team will design and implement the software for thread synchronization abstractions, loadable user processes, virtual memory and a file system. An emphasis will be placed on the software engineering of each component as it is added to the overall operating system. (4010-361 and 4003-440) **Class 4, Credit 4**

4003-546 Security Measurement and Testing
Regulatory, financial, and organizational reasons drive the requirement to measure computer systems' security performance. A number of laws site computer system security performance measurement as a requirement. The course will introduce students into the current methods and practical tools applied for system testing in order to evaluate its security. It will combine a theoretical study of the methods and models currently applied for company security evaluation and a practical investigation of computer security through implementation of penetrating testing. The course will review different application areas such as; intrusion detection and monitoring systems, access control and biological authentication, increasing system and information survivability, network attacks and defense, user's practice survey. (4003-420, 4003-440) **Class 4, Credit 4**

4003-553 Biologically Inspired Intelligent Systems
This course examines contemporary topics in artificial intelligence in neuroscience, cognitive science and physiology. Students will focus on developing computer models that are biologically inspired and leverage current knowledge in these areas with the goal to develop systems that understand their environment. A programming project will be required. A background in biology is not required. (Computer science third-year standing or higher, or instructor permission) **Credit 4**

4003-558 Advanced Computer Vision
This course examines advanced topics of current research interest in computer vision including motion analysis, video processing and model based object recognition. The topics will be studied with reference to specific applications, for example video interpretation, robot control, road traffic monitoring, and industrial inspection. A research paper, advanced programming project, and presentation will be required. (4003-457) or permission of instructor. **Credit 4**

4003-561 Programming Skills
The goal of this course is to introduce the students to a programming paradigm and an appropriate programming language chosen from those that are currently important in industry or that show high promise of becoming important. A significant portion of the learning curve occurs through programming assignments with exemplary solutions discussed later in class. The instructor will post specifics prior to registration. With the approval of the program coordinator, the course can be taken for credit more than once, provided each instance deals with a different paradigm and language. (4003-233 or 4003-236 or 4003-263 or permission of instructor) **Credit 4**

4003-570 Computer Graphics I
Computer Graphics I is a study of the hardware and software principles of interactive raster graphics. Topics include an introduction to the basic concepts, 2-D and 3-D modeling and transformations, viewing transformations, projections, rendering techniques, graphical software packages, and graphic systems. Students will use a standard computer graphics API to reinforce concepts and study fundamental computer graphics algorithms. (Third-year standing in computer science or permission of the instructor). **Class 4, Credit 4**

4003-571 Computer Graphics II
This course will investigate the theory of computer synthesis. Seminal computer graphics papers will be used to describe the various components of the image synthesis pipeline and explain just as in photography, how the path of light in a virtual scene can be simulated and used to create photorealistic imagery. This course will emphasize the theory behind various rendering tools and libraries available for image synthesis. The student will put theory into practice via a programming assignment and a capstone project. Topics will include light and color, three-dimensional scene specification, camera models, surface materials and textures, rendering (local, ray tracing, radiosity), procedural shading and modeling, tone reproduction, and advanced rendering techniques. (4003-570 or 4002-502)

4003-572 Computer Animation-Algorithms and Techniques
This course takes a look at computer animation from a programmer's perspective. It will investigate the theory, algorithms and techniques for describing and programming motion for virtual 3D worlds. Approaches that will be explored include keyframing systems; kinematics, motion of articulated figures, procedural and behavioral systems, and the use of motion capture data. This course is a programming-oriented course with major deliverables including the implementation of techniques presented in lecture as well as a final project concentrating on an area of a student's choice. Students enrolling in this course are expected to have proficiency in the use of at least one 3D API (e.g. OpenGL, DirectX, Java3D). (4003-570 or 4002-501 or permission of instructor) **Class 4, Credit 4**

4003-573 Procedural Shading
This course will present the theory and algorithms behind procedural shading in Computer Graphics, as well as techniques for using shaders effectively in creating stunning visual effects. The course will compare and contrast real time vs. non-real time shader architectures and students will gain expertise in both environments. The format of the course delivery will be part lecture, part studio style, with weekly lab assignments based upon the techniques presented in class. During the latter half of the course, students will be assembled into teams to implement, describe, and document a programming solution for a particular special effect based on a written specification. This final, team-based project will serve as the final exam for the course. Students enrolling in this course are expected to have proficiency in either Open GL or Direct X. (4003-571: Computer Graphics II or 4002-502, Foundations of 3D Graphics Programming or permission of instructor)

4003-580 Language Processors
This course introduces students to issues in the design of language processors and translators. Topics include lexical, syntactic and semantic descriptions, analysis tools and programming techniques, as well as environment-, stack-, and heap-based interpreters and at least the principles of code generation for typical computer architectures. Teams of students will be required to design and implement a small programming language. (4003-450 or permission of instructor) **Class 4, Credit 4**

4003-590 Seminar in Computer Science
Current advances in Computer Science. (Bridge course; set by instructor) **Class 1-4, Credit 1-4**

4003-598 Honors Project
The honors project enables upper-level computer science honors program students to gain further depth in an area of their choice under the supervision of a computer science faculty member. Deliverables of the project include a scientific paper and a presentation open to the community. (4003-590) **Credit 2**

4003-599 Independent Study
A supervised investigation of selected topics within computer science. Consent of the sponsor and departmental approval are required. **Credit 1-4**

Medical Informatics

4006-230 Computers in Medicine
This is an introduction to computer technology and its use in the medical field. About half of the course is devoted to the study of computers, their basic components and peripheral devices, the storage and retrieval of data, electronic communications and the Internet. The other half of the course deals with medical data and major applications of computers in medicine, including Hospital Information Systems (HIS), medical imaging, surgery, telemedicine, and pharmacy. **Class 4, Credit 4**

4006-240 Introduction to Medical Informatics
This is an introduction to informatics as applied to the medical field. It is a study of the nature of medical information and its use in clinical practice as well as in medical research and education. It is also an examination of the Electronic Medical Record (EMR) and its impact on health care delivery. The Internet and mobile computing are presented as sources of medical information. Health Care Information Systems are discussed, as well as their development, selection and implementation. The important roles of the computing or informatics specialists in medicine are stressed. The course also includes a thorough discussion of privacy, confidentiality and information security including health care regulatory and accreditation issues and the Health Insurance Portability and Accountability Act (HIPAA). (4006-230) **Class 4, Credit 4**

4006-310 Developing Medical Applications
An in-depth study of the Caché ObjectScript programming language and its database capabilities as used in medical application development. Coverage includes local/global/special variables, developing routines and procedures, screen/printer formatting, string manipulation, pattern matching, concatenation, arrays and trees, multilevel and string subscripts, input/output using devices, cross-reference files, indirection, objects and classes. Programming projects are required and are taken from the health care field. (4006-230 or permission of instructor) **Class 4, Credit 4**

4006-345 Medical Informatics Seminar
This is an introduction to the use of computers in medical practice, education and research. Every week a different speaker from the medical field gives a presentation. Students also receive information concerning career opportunities and cooperative education. **Class 1, Credit 1**

4006-410 The Electronic Health Record
This is an in-depth study of the acquisition, storage, and use of information in the Electronic Health Record (EHR). Students will learn about the types of information used in clinical care: text, structured data, images, and sounds. Other topics covered include: clinical vocabularies (existing schemes and their limitations); how clinical information is generated and utilized; methods of information storage and retrieval; departmental systems (laboratory, radiology, and hospital information systems); organizational systems (including scheduling, registration and financial systems); and the legal, social, and regulatory problems of EHRs including security and confidentiality. In addition, students will work with the Caché post-relational database management system. Programming assignments will be required. (4006-310 and 4002-360) **Class 4, Credit 4**

4006-420 Medical Database Architectures
This is an in-depth study of database architecture used in the medical field. Students will learn about the different types of database architectures in support of medical education, clinical research and clinical applications. Database design and programming assignments will be required. (4006-410) **Class 4, Credit 4**

4006-430 Medical Application Integration
This course will provide students with an understanding of application integration in healthcare. Java programming assignments will be required. Students also become familiar with medical business processes and how they impact data integration within a hospital. Middleware message brokers will be examined along with the use of the HL7 messaging standard. Web services and other forms of data integration will be studied. (4006-410, 4003-233 or 4002-219) **Class 4, Credit 4**

Software Engineering

4010-101 Software Engineering Seminar
Provides first year students with the skills necessary to succeed at RIT and in the software engineering program. Small group sessions are used to help new students make friends, create a stronger bond with RIT and their program, and become acquainted with the campus and its facilities. In addition, students are introduced to the profession of software engineering and to ethical issues they will face at RIT and throughout their careers. **Credit 1, Class 2**

4010-102 Honors Seminar
This course provides an introduction to the honors program for all freshman GCCIS honors students. The course provides an overview of GCCIS, the programs within the college and the requirements for the honors program at the institute, college and program level. Honors students will hear discussions of professional research interests from faculty members from all three departments. **Class 2, Credit 0**

4010-350 Personal Software Engineering
This is a project-based course to enhance individual, technical engineering knowledge and skills as preparation for upper-division team-based coursework. Topics include adapting to new languages, tools and technologies; developing and analyzing models as a prelude to implementation; software construction concepts (proper documentation, implementing to standards, etc.); unit and integration testing; component-level estimation; and software engineering professionalism. (4010-361) **Class 4, Credit 4**

4010-361 Software Engineering
An introductory course in software engineering, emphasizing the organizational aspects of software development and software design and implementation by individuals and small teams within a process/product framework. Topics include the software life cycle, software design, user interface issues, specification and implementation of components, assessing design quality, design reviews and code inspections, software testing, basic support tools, technical communication and system documentation, and team-based development. A term-long team-based project done in a studio format is used to reinforce concepts presented in class. (4003-233 or 4003-243) **Class 4, Credit 4**

4010-362 Engineering of Software Subsystems
An introduction to the principles of the foundations of contemporary software design. Topics include software subsystem modeling, design patterns, design tradeoffs, and component-based software development, with a focus on application of these concepts to concrete design problems. The relationship between design and related process issues such as testing, estimation, and maintenance are also discussed. (4010-361 and either 4010-350 or 4003-334) **Class 4, Credit 4**

4010-420 Methods of Specification and Design
Introduction to the development of mathematical models of software systems, and the application of such models to the analysis of system properties and verification of design and implementation decisions. Topics include a brief review of logic and set theory, the use of formalism such as Z or VDM, the development of models using the formalism and analysis via simulation or proof of a model's properties. The application of other formalisms, such as state machines and regular expressions, is also surveyed. (1016-366, 4010-362) **Class 4, Credit 4**

4010-441 Principles of Concurrent Software Systems
Issues and structures common in the construction of concurrent software systems. Emphasis is on fundamentals repeated in the design and development of systems with closely coupled systems concurrently executing components. Topics include modeling, synchronization, and coordination techniques and common architectures for concurrent software systems. Other issues include problem decomposition and analysis of deadlock safety, and liveness. (4010-362) **Class 4, Credit 4**

4010-442 Principles of Distributed Software Systems
Issues and structures common in the construction of distributed software systems. Emphasis is on fundamentals found in systems of this type. Topics include remote object invocation, middle ware technologies, and common architectural and design patterns. Quality factors will be discussed, including responsiveness, throughput, and extensibility. Team projects are done in a studio format to reinforce concepts presented in class. (4010-362) **Class 4, Credit 4**

4010-443 Principles of Information Systems Design
Issues and structures common in the construction of information systems. Emphasis is on fundamentals repeated in most systems of this type. Topics include historical review of methods of organizing and accessing information, high-level modeling techniques, performance and security concerns, implications of storing new data types (e.g., sound, pictures) and new dimensions (e.g., time) on information systems architectures. Team projects are required. (4010-362) **Class 4, Credit 4**

4010-444 Engineering Methods for Software Usability
This course introduces quantitative models and techniques of human computer interface analysis, design and evaluation, which are relevant to the Software Engineering approach of software development. Contemporary Human Computer Interaction (HCI) techniques are surveyed, with a focus on when and where they are applicable in the software development process. Students will deliver usable software systems derived from an engineering approach to the application of scientific theory and modeling. Other topics may include: usability evaluation planning, methods of evaluation, data analysis, social and ethical impacts of usability, economic justification, prototyping and tools. (4010-362, 1016-351 or 1016-314) **Class 4, Credit 4**

4010-450 Software Process and Product Quality
This course covers advanced topics in software engineering relating to software quality, with processes and metrics being viewed as a means of achieving quality. Quality is interpreted broadly to include all project and organizational objectives, including business objectives. Software metrics help a software organization on two main fronts: quality assessments of its process and products, and assessment of its progress towards its main goal, the production of software artifacts. (4010-456, 1016-314 or equivalent, one quarter co-op) **Class 4, Credit 4**

4010-452 Software Testing
Concepts and techniques for testing software and assuring its quality. Topics cover software testing at the unit and system levels: Static vs. dynamic analysis: functional testing: inspections and reliability assessment. (4010-361) **Class 4, Credit 4**

4010-456 Software Process and Project Management
An introductory course to software process and related software project management issues. Emphasis is on the study, use, evaluation, and improvement of the software development process. Topics include software development methodologies, software project planning and tracking, change control, software quality assurance, risk management, and software process assessment and improvement. (4010-361) **Class 4, Credit 4**

4010-461 Real Time and Embedded Systems
This course provides a general introduction to real-time and embedded systems. It will introduce a representative family of micro controllers and require students to program on these devices. Fundamental material on real-time operating systems, such as requirements specification, design patterns, scheduling algorithms and priority inversion avoidance will be presented. The features of a commercial real-time operating system will be discussed and used for course assignments. (4010-441 or 4003-440) **Class 4, Credit 4**

4010-462 Modeling Real-time Systems
This course introduces the modeling of real-time software systems. It takes an engineering approach to the design of these systems by analyzing system models before beginning implementation. UML will be the primary modeling methodology. Non-UML technologies will also be discussed. Implementations of real-time systems will be developed manually from the models and using automated tools to generate the code. (4010-441 or 4003-440) **Class 4, Credit 4**

4010-463 Perform Engineering of Real-Time and Embedded Systems
This course discusses issues of performance in real-time and embedded systems. Techniques for profiling the resource usage of a system and for measuring the effect of increasing system requirements will be covered. The control of physical systems will motivate the need for performance tuning of a real-time system. Students will write programs running under a real-time operating system that can maintain control of a physical system. The course will discuss and experiment with performance trade-offs that can be made using hardware-software co-design. (4010-441 or 4003-440) **Class 4, Credit 4**

4010-540 Principles of Software Architecture
Examination of the fundamental building blocks and patterns for construction of software systems in the context of a sound design process. The course emphasizes the study and development of software systems that can best be understood in terms of sequential software architectures and their architectural and non architectural quality attributes. Class lectures are reinforced by laboratory exercises and projects. (One term of co-op and one of the following courses: 4010-441, 4010-444, or a design elective) **Class 4, Credit 4**

4010-498 Creativity Innovation Research
Software Engineering CIR Experience. This course may be taken in lieu of one of the four cooperative education blocks to provide experience in non-traditional venues for creativity, innovation and research. Registration conditional on submitted plan of activity and approval of Department of Software Engineering. (4010-362, department permission) **Credit 0, Class 0 (all quarters)**

4010-549 Seminar in Software Engineering Design
Emerging topics of relevance in software engineering design. (4010-362) **Credit 1-4**

4010-555 Software Requirements Engineering
In-depth coverage of the early activities of the software development life cycle commonly called software requirements engineering. Topics include requirement elicitation and definition: requirements modeling and analysis: requirements specification; requirements validation; and requirements management. Team projects are emphasized. (4010-420, 4010-444, 4010-456, and one term of co-op) **Class 4, Credit 4**

4010-556 Agile Software Development
This course is an in-depth exploration of agile software development methodologies. Popular agile methodologies include Extreme Programming, scrum Dynamic Systems Development Method(DSDM) and Crystal. Students work in teams on an end-to-end software project using common agile methods and techniques: users stories, iterative release planning, test driven design, agile modeling, pair programming and refactoring. (4010-456 and 4010-362) **Class 4, Credit 4**

4010-559 Seminar in Software Engineering Process
Emerging topics of relevance in software engineering process. (4010-456) **Credit 1-4**

4010-561 Software Engineering Project I
The first course in a two-course, senior-level, capstone project experience. Students work as part of a team to develop solutions to problems posed by either internal or external customers. Problems may require considerable software development or evolution and maintenance of existing software products. Culminates with the completion and presentation of the first major increment of the project solution. (Fifth-year standing in software engineering, 4 quarters of co-op, 4010-555, and 4010-540)

4010-562 Software Engineering Project II
This is the second course in a two-course, senior-level capstone project experience. Students submit one or more additional increments that build upon the solution submitted at the end of the first course. Students make major presentations for both customers as well as technical-oriented audiences, turn over a complete portfolio of project-related artifacts and offer an evaluation of the project and team experience. (4010-561) **Class 4, Credit 4**

4010-590 Software Engineering Seminar
Emerging topics of relevance to the software engineering field. **Class 1-4, Credit 1-4 (set by instructor)**

4010-598 Honors Independent Study
The honors student will work independently under the supervision of a faculty advisor on a topic not covered in other courses. (4010-362, 1 term co-op) **Class 2, Credit 2**

4010-599 Independent Study
The student will work independently under the supervision of a faculty advisor on a topic not covered in other courses (proposal signed by a faculty member) **Class 1-4, Credit 1-4 (set by instructor)**

Networking, Security, and Systems Administration

4050-102 Honors Seminar
This course provides an introduction to the Honors program for all freshman GCCIS Honors students. The Course provides an overview of GCCIS, its programs and the requirements for the Honors program at the institute, college and program level. Honors students will hear discussions of the professional and research interests from faculty members from all of the departments in the college. **Class 2, Credit 2**

4050-201 Freshman Seminar
This course is a small group seminar for first year students in the Department of Networking, Security, and Systems Administration. Students are exposed to the skills necessary to be successful at RIT and in the Applied Networking and Systems Administration program. These small group sessions are used to help new students form peer relationships as well as create a bond with the faculty, their program and with RIT. Through the use of guest speakers and topical discussions of current issues, students will be introduced to the ethical issues they will face at RIT and throughout their career. Students will also gain a better understanding of the resources and facilities available to them at RIT, the Golisano College, and the Department of Networking, Security and Systems Administration. **Class 2, Credit 2**

4050-210 Network Essentials
This course will teach students how to determine what computer and network equipment is appropriate for use in a home or small office network. Students will learn the basic configurations for a home/small office network and explore in a lab environment the different hardware and software tools and configurations required to establish a personal local area network. **Class 3, Lab 2, Credit 4**

4050-211 C++ for Programmers in Networking and Sec
Introductory application programming with a network-centric nature will be explored. Topics covered include C++ syntax, pointers, file handling, memory management, the standard template library, and object-oriented programming. An emphasis is placed on the development of problem-solving skills. Moderately sized programming assignments are required. Prior programming experience is required. (Successful completion of: 4002-218 or 4002-414 or 4003-232, or demonstrated equivalent programming experience) **Class/Lab 6, Credit 4**

4050-212 Platform-Independent Client Server Programming
Advanced application programming with a network-centric nature will be explored. Topics covered will include; threads, simple thread synchronization, TCP-based client-server programming, and file access and sharing. The use of pointers and pointer manipulation will be addressed throughout. Programming projects will be required. (4002-210 Programming with Classes, 4050-351 Networking Fundamentals) **Class/Lab 6, Credit 4**

4050-220 Cyber Self Defense
This course will teach students how to recognize a potential cyber attacker and identify their own vulnerabilities so that they can defend themselves, their information and their identity. Students will be introduced to the tools and techniques to defend against, react to and recover from a cyber attack. **Class 4, Credit 4**

4050-302 Scripting in Perl
An introduction to scripting in the Perl language. The course will cover basic control structures, data structures, and objects in the language. Examples will include basic graphical programming, GUI programming, and interfacing to an underlying operating system. For much of the course, that system will be Unix or some variant thereof. Perl on Windows will be taught as a short topic. At the end of the course, the elementary scripting concepts of Perl will be mapped to those for BASH shell scripting so that students will have a reading understanding of shell scripts. (4002-218 or 4002-210 or equivalent) **Class 3, Lab 2, Credit 4**

4050-350 Computer System Fundamentals
This course is organized around goals and activities involving computer technology familiar to most students. The examples used to illustrate topics build progressively on each other and bring the student from the basics of the PC's physical construction through the complexities of the operating system. **Class 3, Lab 2, Credit 4**

4050-351 Network Fundamentals
Network technologies and standards are discussed with in-depth coverage of layers 1, 2, and 3. Topics include, but are not limited to, access control, framing, operation of layer 2 protocols including wired and wireless technologies, network protocols (IPv4, IPv6 and IPX), transport protocols (TCP, UDP, and SPX) network security, subnetting, and network hardware. (4050-350, 1016-205) **Class 3, Lab 2, Credit 4**

4050-360 Information Security Policies
With the increased use of computer and network systems comes the increased potential for security violations. Organizations need to be prepared to handle these violations and employees need to be informed of acceptable use, both through preparation and incident response. In this course, students will study the need for information security policies, procedures and standards. Students will write security policies. Other topics include, but are not limited to, trust models, security policy design and incident response. (4050-220 and an approved course in ethics) **Class 4, Credit 4**

4050-365 Cryptography and Authentication
As more users access remote systems, the job of identifying and authenticating those users at a distance becomes increasingly difficult. The growing impact of attackers on identification and authentication systems puts additional strain on our ability to insure that only authorized users obtain access to controlled or critical resources. This course introduces encryption techniques and their application to contemporary authentication methods. (4050-220 and 1016-206) **Class 4, Credit 4**

4050-402 OS Scripting
This course is a survey of tools and techniques used to script common tasks in operating system environments. It will focus on Unix shell script programming. Students will gain experience in writing scripts for Unix and will be challenged to bend traditional programming paradigms to support the writing of effective scripts in the OS environment. Programming projects will be required. (4002-218 or equivalent and 1016-206) **Class 5, Credit 4**

4050-403 Concepts of Wireless Networks
This course is designed to provide the student with an understanding of the principles and concepts of radio and optical communication as they apply to wireless data networking for local area networks and peripherals. Included in the course will be an examination of the modulation techniques, measurement standards, nomenclature, equipment and theory behind transmissions in this portion of the electromagnetic spectrum. (4050-413) **Class 4, Credit 4**

4050-413 Applications of Wireless Data Networks
This course explores wireless data networking technologies and equipment. As its basis it uses the fundamental concepts and technologies learned in Network Fundamentals, and expands upon them to include other contemporary and emerging technologies. In this course we will discuss topics such as wireless local area networks (WLANs), wireless network operation, network integration, construction and network design. (4050-351) **Class 3, Lab 2, Credit 4**

4050-421 Systems Administration I
This course is designed to provide students with essential knowledge and skills in system administration. Basic operating system concepts, such as file systems, processes and threads, memory management, and input/output are covered to provide students with an understanding of the fundamentals of a computer system. Services including Remote Procedure Call (RPC), Network File System (NFS), Network Information Service (NIS), Server Message Block (SMB), and Services for Unix (SFU) are introduced. (4050-302 or 4050-402, 4050-350, 4050 351) **Class 3, Lab 2, Credit 4**

4050-422 Systems Administration II
System administration topics focused on platform integration, the active directory, authentication, and user support services are explored. Topics will include security issues, user and group administration, directory services, electronic system update and maintenance, backup and restoration strategies and techniques, integrated mass storage technologies and alternative client technologies. (4050-421 and 4050-516; corequisite: 4050-422 Lab) **Class 3, Lab 2, Credit 4**

4050-423 Systems Administration III
The provision and management of information technology services in an enterprise environment involves a high degree of complexity due to issues of scale and heterogeneity. This course is designed to enhance students understanding of these issues by building an enterprise context around selected technologies. Students will explore the technologies available to provision computing services in enterprise-scale environments, including virtualization of services, computing grids, and clusters. Students will also discuss issues related to the role of information technology in large organizations and the facilitation of that role by system administrators through the use of policies and procedures, project planning, budgeting and financial analysis, disaster planning, and incident response. (4050 422; corequisite: 4050-423 lab). **Class 3, Lab 2, Credit 4**

4050-460 Introduction to Computer Malware
Computer malware is a computer program with malicious intent. In this course, students will study the history of computer malware, categorizations of malware such as computer viruses, worms, Trojan horses, spyware, etc. Other topics include, but are not limited to, basic structures and functions of malware, malware delivery mechanism, propagation models, anti-malware software, its methods and applications. Students will write an anti-virus program. (4050-220, 4002-218 or 4002-210, 4050-351) **Class 3, Lab 2, Credit 4**

4050-495 Honors Capstone Project
The student will work independently under the supervision of a faculty advisor on a topic not covered in other coursework. (Completion of all Institute honors academic requirements). (May be split across two consecutive quarters) **Credit 4**

4050-499 Co-op in NSSA
Students will gain experience and a better understanding of the application of technologies discussed in classes by working in the field of networking, security, or system administration. Students will be evaluated by their employer. (Third-year status in the program. If a transfer student, one quarter in residence must be completed at RIT carrying a full academic load.)

4050-515 Introduction to Routing and Switching
This course is a laboratory based course that focuses on the standards and technologies used to establish inter-network structures that will support a TCP/IP data stream for higher level services to operate over. It is primarily concerned with the network layer and below. Although the course focuses on the TCP/IP protocol suite and the Ethernet LAN protocol, other protocols may be studied. Students will use their knowledge of how to connect computers (PCs) in a LAN and learn how to connect separate networks together to form an internet. Bridging and switching concepts are investigated (such as the resolution of bridging loops through the appropriate algorithms). Routed and routing protocols and algorithms are studied and implemented. (4050-351) **Class 3, Lab 2, Credit 4**

4050-516 Network Services
An investigation of the tasks of selecting, configuring and administering services in an internetworking environment. Topics include the TCP/IP protocol suite, service administration including DHCP, DNS, and email architecture. Students completing this course will have experience in administering an internetwork of computers with a variety of these services as well as an understanding of the similarities and differences between protocols in the TCP/IP suite (TCP and UDP). (4050-402 and 4050-351) **Class 3, Lab 2, Credit 4**

4050-517 Network Forensics and Security
This course investigates the many facets of network security and forensics. Students will examine the areas of intrusion detection, evidence collection, network auditing, network security policy design and implementation as well as preparation for and defense against attacks. The issues and facilities available to both the intruder and data network administrator will be examined and evaluated with appropriate laboratory exercises to illustrate their effect. (4050-515, 4050-516 and 0501-507 or equivalent; corequisite: 4050-517 lab) **Class 3, Lab 2, Credit 4**

4050-519 Network Troubleshooting
Network administration involves many aspects other than building, configuring, and managing networks. The ability to quickly diagnose and solve network problems is essential to any functional network as is the ability to employ the proper diagnostic tools to predict possible problem areas before network interruptions can disrupt critical transactions. As organizational dependency on network data transactions continues to grow, networks have expanded to meet this need. The complexity of networks tends to grow exponentially with the size of the networks. The ability to cope with this complexity requires keen problem solving skills as well as the ability to utilize available tools. This course is designed to teach problem solving skills, the employment of the available tools, and teamwork. (4050-413 and 4050-515; corequisite: 4050-519 Lab) **Class 3, Lab 2, Credit 4**

4050-521 Perl for System Administration
This course will provide students with the Perl programming language, with examples and problems drawn from the system administration arena. Students will be taught how to create Perl Objects, and install modules, for use on a computing system. Application areas for Perl scripts will include file system walking programs, user account creation and manipulation, and the processing of log files. (4050-302) **Class 5, Credit 4**

4050-523 Security for Wireless Networking
This course is designed to provide the student with an understanding of the principles and concepts of wireless data network security. Students will perform a series of laboratory experiments in order to explore various mechanisms for securing wireless data networks; including physical layer mechanisms, filters, applications, and encryption. Students will engage in attack/defend scenarios to test their deployments against other teams. (4050-413) **Class 3, Lab 2, Credit 4**

4050-540 Network Design and Performance
This capstone course will examine the design and performance of networks. Students will learn to design networks based on identified needs and analyze the performance of that network. The designs include site, campus, and enterprise. WAN technologies will be combined with LAN technologies in the design of enterprise networks. Students will learn to assess the business goals and their application to the network goals. Students will learn to evaluate the security goals of the network and to integrate these goals in the design. (4050-421, 4002-455, 4050-515, 4050-516) **Class 4, Credit 4**

4050-545 Advanced Routing and Switching
Advanced Routing and Switching is a course in advanced networking topics. Technologies available to large enterprises to build a large intranet infrastructure are explored in depth. The topology of the Internet is discussed, along with current and emerging technologies for the implementation of that backbone. Topics include: core routers and routing protocols, queuing, multicast routing and the MBONE, variable length subnet masking, IP address depletion and network address translation, enterprise-wide backbone routers, and emerging protocols. (4050-515) **Class 3, Lab 2, Credit 4**

4050-550 Emerging Network Applications
This course will discuss the changing nature of communication, the requirements of emerging applications, the effect on network design and the security concerns associated with them. The focus is on the evolution of multimedia services (such as voice and video) and Internetworking technologies in support convergence. While examining upcoming technologies and future trends that will impact the direction of IP and broadband technology development, of primary concern will be standards, protocols, deployment, and emerging technologies involved in the Voice over IP and Video over IP systems. (4050-530; corequisite: 4050-550 Lab) **Class 3, Lab 2, Credit 4**

4050-580 Computer System Security
This course proposes to increase the understanding of the student in the areas of liability, exposure, opportunity, ability, and function of various weaknesses and forms of attack, and the detection and defense of the same. The issues and facilities available to both the intruder and administrator will be examined and evaluated with appropriate laboratory exercises to illustrate their effect. (4050-422 and 0501-507/707 or equivalent) **Class 3, Lab 2, Credit 4**

4050-581 Computer System Forensics
An investigation of the tasks of incident response and computer system forensics. Students will learn the basic procedure of incident response as well as tools needed to uncover activities of computer users (deleted and hidden files, cryptographic steganography, illegal software, etc.). Students will also learn to employ the activities needed to gather and preserve this evidence to ensure admissibility in court. (4050-421) **Class 3, Lab 2, Credit 4**

4050-582 Wireless Adhoc/sensor Networks
This course will introduce students to the diverse literature on ad hoc/sensor networks, and expose them to the fundamental issues in designing and analyzing ad-hoc/sensor network systems. Students will study related technologies and standards ranging from networking, OS support and algorithms, to security. Of primary concern will be protocol design, communication and computational challenges posed by these systems. Students will construct ad-hoc/sensor networks, program on the sensor hardware, and study the performance of various protocols. (4050-351, 4002-219 or consent of instructor) **Class 3, Lab 2, Credit 4**

4050-585 Network and Systems Security Audit
This course will provide students with an introduction to the processes and procedures for performing a technical security audit of systems and networks. Students will explore available auditing techniques and apply appropriate tools to audit hosts, servers and network infrastructure components. In addition, students will write and present their audit reports on vulnerability analysis. (4050-421 and 4050-515) **Class 3, Lab 2, Credit 4**

4050-599 Independent Study in NSSA
Students will work with a supervising faculty member on a project of mutual interest. Project design and evaluation will be determined through discussion with the supervising faculty member and documented through completion of an independent study form to be filed with the Department of NSSA. **Credit 1-6 variable**

Interactive Games and Media

4080-221 Game Software Development I
The goal of this course is to introduce students within the domain of game design and development to computing. Students will begin mastering fundamental problem solving skills and learn about the basic elements of game software development, including problem decomposition, the design and implementation of games, and testing/debugging. Programming assignments are an integral part of the course. **Class 6, Credit 4 (F, W)**

4080-222 Game Software Development II
This course furthers the development of fundamental problem solving skills introduced in Game Software Development I. Topics such as graphical user interfaces (GUIs), exception handling, files/streams, linear data structures, threads, and event-driven programming will be covered with an emphasis on their use in game development. Games will be developed through using existing components and appropriate software design patterns will be used. Programming projects are an integral part of the course. (4080-221) **Class 6, Credit 4 (F, W, S)**

4080-223 Game Software Development III
This course builds upon the fundamental problem solving skills presented in Game Software Development II. Students will learn the more advanced data structures and algorithms commonly used in game development. In order to demonstrate knowledge of such techniques within the realm of game development, students will work in teams on a quarter long game development project. (4080-222) **Class 6, Credit 4 (F, W, S)**

4080-229 Foundations of New Media Interactive Development
This course provides an introduction to the development of time-based and interactive media, using an authoring environment such as Adobe Flash. Students will learn to plan, design, and implement short animated and interactive multimedia projects. They will begin with short exercises that provide hands-on practice, culminating in larger projects that develop their design and development skills and offer an opportunity for self-expression. The course will also serve to orient students to the New Media Interactive Development degree program and provide a background on the industry. **Class 4, Credit 4 (F)**

4080-230 Introduction to Programming for New Media
This course provides the students of New Media an introduction to object oriented programming through the creation of event driven, media intensive applications. Students will write classes that employ the fundamental structures of computer programming such as conditionals, loops, variables, data types, functions, and parameters. There is an early emphasis on OOP concepts and design. Programming exercises are required. (4080-229, or 2009-411 or 4080-346) **Class 4, Credit 4 (F, W)**

- 4080-231** **Programming II for New Media**
As the second course in programming for New Media students, this course continues an object-oriented approach to programming for creative practice. Topics will include reusability, data structures, rich media types, event-driven programming, loaders, XML, object design and inheritance. Emphasis is placed on the development of problem-solving skills as students develop moderately complex applications. Programming projects are required. (4080-230) **Class 4, Credit 4 (W, S)**
- 4080-295** **Introduction to Interactive Media**
This course provides an overview of media in historical, current and future contexts. Emphasizing discussion and hands on work with written and visual media assets, students examine the role of written and visual media from both a contextual and practical perspective. **Class 4, Credit 4 (F, W, S)**
- 4080-309** **Introduction to Web Development**
This course provides an introduction to web development tools and technologies, such as X/HTML, CSS, JavaScript and DHTML, AJAX, web platforms and environments, and server-side programming methods. (One programming course and 4080-295) **Class 4, Credit 4 (F, W, S)**
- 4080-310** **Digital Video for the Web**
Web-deployed video is an increasingly important medium. It is used for illustration, instruction, entertainment and marketing. Students working with video for the web require an understanding of its inherent qualities, limitations and how it may be implemented. This course will focus on video and specifically how to create and implement quality work suitable for web delivery. **Class 4, Credit 4 (F, S)**
- 4080-323** **Design of Graphical User Interface**
This course examines the user-centered and interactive design approaches to user interface development for rich media and interactive applications. Lectures, readings from texts and handouts, as well as research will aid in the investigation of both the human factors and visual concepts that lead to good screen design. (2009-213 and 4080-309) **Class 4, Credit 4 (S)**
- 4080-330** **Interactive Digital Media**
This course introduces an event-driven scripting environment to enable the development of highly interactive user experiences. Students learn to manage and edit a wide variety of digital media types, e.g. still- and motion-graphics, text, audio, and video. Students write code to allow users to access, control, and manipulate each of these media types. Students gain foundational skills in media asset creation and in prototyping for applications and interface development. This course requires object-oriented programming. (4080-295 and 4080-223) **Class 4, Credit 4 (F, W, S)**
- 4080-333** **Programming III for New Media**
This course is the third course in the New Media Programming sequence. It expands the emphasis on using programming to develop interactive experiences through the introduction of more advanced concepts in a second programming language. Topics include interfaces, file I/O, exceptions, events, design patterns and GUI components. Programming assignments are an integral part of the course. (4080-231) **Class 4, Credit 4 (F)**
- 4080-334** **Programming IV for New Media**
This course is the fourth course in New Media Programming. It will expand the emphasis on using programming in order to design interactive experiences through the use of more advanced programming concepts. Topics such as networking, animation, and basic graphics will be taught. Programming assignments are an integral part of the course. (4080-333) **Class 4, Credit 4 (W, S)**
- 4080-346** **2D Animation for Interactive Media**
This course provides a theoretical framework covering the principles of animation and its use in game design to affect user experience. Emphasis will be placed upon principles that support character development and animations that show cause and effect. Students will apply these principles to create animations that reflect movement and character appropriate for different uses and environments. (Second-year standing) **Class 4, Credit 4 (F, S)**
- 4080-347** **3D Modeling and Animation for Interactive Media**
This course covers 3D modeling techniques to create environments and character animation. Basic ideas learned within the 2D animation course, such as narrative and movement, are revisited within the 3D environs. Discussion of modeling will include not only how to create models and character animation, but also a study of 3D forms within the domains of sculpture, architecture, animation and games. While students will be taught how they may simulate reality in both modeling and animation, they will also study examples of simplifications, abstractions and hyper-realities in the service of narrative and game development. (4080-346) **Class 4, Credit 4 (W)**
- 4080-380** **Fundamentals of Game Design and Development I**
This course addresses the history of video games as well as the analysis of games as a medium. Topics include the identification and assessment of types and genres within video games as well as how content shapes and is shaped by play in an interactive medium. Activities will include the creation of design documents and the development of playable prototypes. Some projects may require working in groups. (4080-330 or 4080-231) **Class 4, Credit 4 (W)**
- 4080-381** **Fundamentals of Game Design and Development II**
This course builds upon design documents and game assets created in the prerequisite course. The course focuses upon the creation and development of an industry-standard design document and playable levels in a game prototype. Key concepts in game design and development such as game world design, level design, level balancing, and game character development will be addressed. In addition, this course explores issues involving the development of online game communities. Some projects may require working in groups. (4080-380) **Class 4, Credit 4 (S)**
- 4080-387** **Data Structures and Algorithms for Game Programmers I**
This course focuses upon the application of data structures, algorithms, and fundamental Newtonian physics to the development of video game applications, entertainment software, and simulations. Topics include trigonometric functions in game systems, 2D coordinate systems, 3D coordinate systems, geometric primitives, geometric tests, vectors, matrices, principles of transformation, and inclusion tests. In addition, traditional data structures and manipulation techniques will be applied to the context of game and entertainment software. Furthermore, Newtonian principles such as speed, acceleration, force, work, momentum, and motion will be examined in the context of developing game and entertainment software. Programming assignments are a required part of this course. (4080-330, 1016-206, and 1017-211) **Class 4, Credit 4 (S)**
- 4080-417** **Visual C++ for Programmers**
This course covers the basics of C++ development in the Windows environment. Topics covered include the use of an integrated development environment, basic C++ syntax, pointers, and Windows specific programming techniques. Emphasis is placed on the development of problem-solving skills. Large programming assignments are required. Prior programming experience is required. (4080-223 or equivalent) **Class 4, Credit 4 (F, S)**
- 4080-431** **Introduction to New Media Web Technologies I**
New Media has become increasingly synonymous with web-based media and Rich Media Internet Applications (RMIAAs). This course builds on the prerequisite skills of object-oriented programming in the context of a New Media development environment such as Flash and current web development and design practices to teach students fundamental skills required to build web-based interactive applications supported by server-side technologies such as PHP and MySQL. The course uses a working knowledge of HTTP and server technologies like database servers in conjunction with client-side technologies like Flash. Programming projects are required and a basic set of concepts and skill for making RMIAAs are developed. (4080-309 and 4080-333 or equivalent) **Class 4, Credit 4 (W)**
- 4080-432** **New Media Web Technologies II**
New Media has become synonymous with web-based Rich Internet Applications (RIAs). This course builds upon the previous course by making a transition from a GUI IDE to an entirely programmatic environment. It uses a framework such as Flex/MXML and an ECMAScript-compliant scripting language like ActionScript. The course will also make use of a communication protocol to transfer serialized data and objects. The course will also help students learn how to use programming methodologies, such as interfaces to create layers of abstraction and design patterns. (4080-431) **Class 4, Credit 4 (S)**

4080-433 Introduction to Physical Computing
As shown by gestural touch screens, weight-reactive surfaces, and wearable digital devices, there is huge demand for well-integrated devices and services that seamlessly couple people and environments. The designers who create such products are able to interface computers with real-world inputs and outputs and give people new ways of controlling and experiencing their devices and information. This course will provide a rapid and simple technical introduction to basic electronics (components, circuits, microcontrollers, etc.) Emphasis is placed on applying HCI design concepts to physically-interactive product development. Projects that blend electronics, programming and design are required. (Third-year standing in CIAS or GCCIS and one programming course) **Class 4, Credit 4 (S)**

4080-434 Programming for Digital Media
In this course, students will create object-oriented interactive applications in domains such as simulation, gaming, instruction and artificial life. They will build data structures, and classes to create virtual worlds in 2 or 3 dimensions, populated by autonomous agents. Programs will often extend modules created by previous classes or the instructors. Some projects may require working in groups. (4080-330 or 4080-231) **Class 4, Credit 4 (F, W, S)**

4080-445 Humanitarian Free and Open Source Software Development
This course provides students with exposure to the design, creation and production of Open Source software projects. Students will be introduced to the historic intersections of technology and intellectual property rights and will become familiar with Open Source development processes, tools and practices. They will become contributing members of humanitarian software development communities such as the One Laptop Per Child and Sugar communities. Students will actively document their efforts on Humanitarian Free and Open Source software community hubs. (Completion of a two-course programming sequence or permission of instructor) **Class 4, Credit 4 (F)**

4080-487 Data Structures and Algorithms for Game Programmers II
This course continues the investigation into the application of data structures, algorithms, and fundamental Newtonian physics required for the development of video game applications, simulations, and entertainment software titles. Topics covered include techniques for 3D orientation, angular displacement, Euler angles, quaternion representations and operations, barycentric coordinates, classifiers, recursion, clipping, culling, and advanced partitioning techniques. In addition, advanced data structures such as trees and graphs will be investigated from the context of game application and entertainment software development. Furthermore, the course will examine advanced Newtonian principles used in games and simulations. Programming assignments are a requirement for this course. (4080-387 and 4080-417) **Class 4, Credit 4 (W)**

4080-499 IGM Co-op
A cooperative educational experience is available for those students who participate in order to gain industrial experience. **Class 0, Credit 0 (F, W, S, Su)**

4080-501 Foundations of 2D Graphics Programming
Students will explore use of an advanced graphics API to access hardware-accelerated graphics. The course will involve discussion of scene graphs, optimizations, and integration with the API object structure. Students will also explore the advanced use of the API calls in production code, to construct environments capable of real time performance. (4080-434) **Class 4, Credit 4 (W)**

4080-502 Foundations of 3D Graphics Programming
Students will explore use of a graphics API to access hardware-accelerated graphics. The course will involve discussion of the API scene graph, 3D optimizations, and integration between the 2D graphics mode and a 3D immediate mode implementation. This course builds upon students' previous work and extends it in the construction of a fully functional 3D Engine, with library construction for game development. (4080-501) **Class 4, Credit 4 (S)**

4080-527 Introduction to Digital Audio Production
Technologies and techniques for producing and manipulating digital audio are explored. Topics include digital representations of sound, digital audio recording and production, MIDI, synthesis techniques, real-time performance issues, and the application of digital audio to multimedia and Web production. (Third year standing and 4080-309) **Class 4, Credit 4 (W)**

4080-528 Writing for Interactive Media
As more of our media and communications are delivered on interactive, non-linear platforms, the information should be developed in ways that take advantage of these technologies. This course will focus on the creation of a variety of different hypermedia and multimedia such as: blogs, digital storytelling, interactive fiction, and video games. (4080-309, 4080-334, or 4080-330) **Class 4, Credit 4 (S)**

4080-535 Interactive and Game Audio
This course provides students with exposure to the design, creation and production of audio in interactive applications and computer games. Students will become familiar with the use of sound libraries, recording sounds in the studio and in the field, generating sound with synthesizers, and effects processing. Students will create sound designs for interactive media, integrating music, dialog, ambient sound, sound effects and interface sounds within interactive programs. (Third-year standing and 4080-527) **Class 4, Credit 4 (S)**

4080-538 Multi-User Media Spaces
This course will focus on the development of interactive applications that allow multiple users to interact with each other in real-time in an online 3D environment. The course will integrate a variety of technologies dealing with 3D programming concepts, connectivity, data persistence, and object-oriented programming. Important Human-Computer interaction issues will be raised regarding the design and processing of messages and the traffic patterns generated by multi user messaging. (4080-434) **Class 4, Credit 4 (F, S)**

4080-555 Innovation and Invention
In this course, students explore the process and products of innovation and invention. Each term we conceive and develop a different "outside the box" project in a multidisciplinary "tinkerer's lab." Readings, lectures, student presentations, and discussions deal with the interplay of technology, human nature, and a human environment in which emerging technologies and new modes of interaction are pervasive and ubiquitous. Students from multiple disciplines are guided through a series of collaborative experiences inventing, designing, implementing and studying emerging technologies and their educational and artistic potential. Presentations, projects and individual research papers are required. (Third-year standing) **Class 6, Credit 4 (F, W, S)**

4080-560 New Media Team Project I
The first course in a two-quarter sequence designed to engage the New Media major in a capstone production experience. The instructor will form interdisciplinary student teams that will design, plan, and prototype new media projects. (Fourth-year standing) **Class 6, Credit 4 (W)**

4080-565 New Media Team Project II
The second course in a two-quarter sequence designed to engage the New Media major in a capstone production experience. Students continue to work to completion of their new media group production project. Each group is required to test their product with users and provide written feedback and analysis. (4080-560) **Class 6, Credit 4 (S)**

4080-590 Undergraduate Seminar in IGM
This is intended to allow for special one-time offerings of undergraduate topics or to allow faculty to pilot new undergraduate offerings. Specific course details (such as the course topics, format, resource needs, and credit hours) will be determined by the faculty member(s) who propose a given special-topics offering. (Permission of instructor and third-year standing) **Class 4, Credit 2-8 (F, W, S)**

4080-599 Independent Study
The student will work independently under the supervision of a faculty advisor on a topic not covered in other courses. (Proposal signed by a faculty member and IGM Director) **Class 1-4, Credit 1-8 (F, W, S)**

Kate Gleason College of Engineering

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Course numbering: RIT courses are generally referred to by their seven-digit registration number. The first two digits refer to the college offering the course. The third and fourth digits identify the discipline within the college. The final three digits are unique to each course and identify whether the course is noncredit (less than 099), lower division (100–399), upper division (400–699), or graduate level (700 and above).

Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's schedule of courses, published by the Office of the Registrar. Prerequisites/corequisites are noted in parentheses near the end of the course description.

Electrical Engineering

0301-205 Electrical Engineering Freshman Practicum
Introduction to the practice of electrical engineering including understanding laboratory practice, identifying electronic components, operating generic electronic instruments, building an electronic circuit (Wein Bridge oscillator), measuring and capturing an electronic waveform, schematic entry, modeling and simulation of an electronic circuit (SPICE or equivalent), analyzing a waveform using a commercial software package (MATLAB), and emulating an electronic instrument in software (C programming). This studio lab course emphasizes a learn-by-doing approach to introduce the student to electrical engineering design practices and tools used throughout the undergraduate program. Each student will prototype and build a functioning electronic circuit. **Lab 3, Credit 1 (F, W)**

0301-240 Digital Systems
This course introduces students to the basic components used in digital systems and is usually the student's first exposure to engineering design. The laboratory component consists of small design projects that must be constructed and validated by the student. The projects run from traditional combinational logic using SSI chips to small subsystem implementation in a programmable device. **Class 3, Lab 2, Credit 4 (F, W, S)**

0301-346 Advanced Programming for Engineers
This course teaches students to master C++ programming in solving engineering problems and introduces students to basic concepts of object-oriented programming. Advanced skills of applying pointers will be emphasized throughout the course so as to improve the portability and efficiency of the programs. Advanced skills of preprocessors, generic functions, linked list and the use of Standard Template Library will be developed. (4001-211 or equivalent) **Class 4, Credit 4 (F)**

0301-347 Computer Architecture
The purpose of this course is to expose students to both the hardware and the software components of a digital computer system. It focuses on the boundary between hardware and software operations. Students will learn about a computer system from various abstraction levels from the digital logic gates to software applications. This course will also provide a solid foundation in computer systems architecture. The first half of the course should deal with the major hardware components such as the central processing unit, the system memory and I/O modules. The second half focuses on instruction set architectures. The lab sessions cover hardware description language (HDL) implementations of the hardware functional blocks presented in lectures. (0301-240, 365, 4001-211) **Class 3, Lab 2, Credit 4 (F, W)**

0301-360 Introduction to Semiconductor Devices
An introductory course on the fundamentals of semiconductor physics and principles of operation of basic devices for beginning electrical engineering students. Topics include semiconductor fundamentals (statistical physics of carrier concentration, motion in crystals, energy band models, drift and diffusion currents) as well as the operation of p-n junction diodes, bipolar junction transistors (BJT), metal-oxide-semiconductor (MOS) capacitors and MOS-field-effect transistors (MOSFET). (1017-313, 1016-305) **Class 4, Credit 4 (W, S)**

0301-365 Microcomputer Systems
Initial course in microprocessor-based systems. After a review of computer arithmetic, logic operations, number systems and codes, the elements of microcomputer architecture are presented, including a detailed discussion of the memory, input-output, the central processing unit (CPU) and the buses over which they communicate. Assembly-language-level programming is introduced with an emphasis on enabling manipulation of elements of a microcomputer system. Efficient methods for designing and developing assembly language programs are presented. Concepts of program controlled input and output are studied in detail and reinforced with extensive hands-on lab exercises involving both software and hardware. (0301-240, 4001-211) **Class 4, Lab 3, Credit 4 (S)**

0301-370 Nano-science Engineering and Technology
In this course fundamentals of nano-science and engineering are covered. Distinct physical and chemical phenomena at the nano-scale are examined. These phenomena can be uniquely utilized in nano-scale devices and systems. This course emphasizes molecular electronics, nano-electronics and nanobiosystems. Organic and inorganic nanomaterials, as well as nano-fabrication technologies, are studied. Computational nano-technology and nano-CAD are covered in order to perform heterogeneous simulation and data-intensive analysis. This course introduces ethics, social issues, economic impact, leadership and entrepreneurship topics. The proposed course integrates vital components of nano-scale science and engineering in a unified interdisciplinary nano-technology setting. (1016-305, 1017-313) **Class 4, Credit 4 (S)**

0301-381 Circuits I with Lab
Covers basics of DC circuit analysis starting with the definition of voltage, current, resistance, power and energy. Linearity and super position, together with Kirchoff's laws, are applied to analysis of circuits having series, parallel and other combinations of circuit elements. Thevenin, Norton and maximum power transfer theorems are proved and applied. Inductance and capacitance are introduced and the transient response of RL, RC and RLC circuits to step inputs is established. Practical aspects of the properties of passive devices and batteries are discussed, and characteristics associated with battery-powered circuitry. The laboratory incorporates use of computer and manually controlled instrumentation including power supplies, signal generators and oscilloscopes to reinforce concepts discussed in class as well as circuit design and simulation software. (0301-205, 1017-313, 1016-305) **Class 4, Lab 3, Credit 4 (F, W, S, Su)**

0301-382 Circuits II
Covers the fundamentals of AC circuit analysis starting with the study of sinusoidal steady-state solutions for circuits in the time domain. The complex plane is introduced along with the concepts of complex exponential functions, phasors, impedances and admittances. Nodal, loop and mesh methods of analysis as well as Thevenin and related theorems are applied to the complex plane. The concept of complex power is developed. Two-port network theory is developed and applied circuits and interconnections. The analysis of mutual induction as applied to coupled coils, linear ideal and non-ideal transformers is introduced. Complex frequency analysis is introduced to enable discussion of transfer functions, frequency dependent behavior, magnitude vs. frequency and phase angle vs. frequency plots, resonance phenomenon and simple filter circuits. (0301-381) **Class 4, Credit 4 (F, W, S, Su)**

0301-453 Linear Systems I
Linear Systems I provides the foundations of continuous and discrete signal and system analysis including signal and system description and modeling. Topics include: a description of continuous linear systems via differential equations, a description of discrete systems via difference equations, input-output relationship of continuous and discrete linear systems, the continuous time convolution integral; the discrete time convolution sum; application of convolution principles to system response calculations; exponential and trigonometric forms of Fourier series and their properties; Fourier transforms including energy spectrum and energy spectral density. (0301-382, 1016-328, corequisite 1016-420) **Class 4, Credit 4 (F, W)**

0301-473 Electromagnetic Fields I
Study of electrostatic, magnetostatic, and quasi-static fields. Topics: vector algebra, vector calculus and orthogonal coordinate systems—Cartesian, cylindrical, and spherical coordinates, electrostatic fields; Coulomb's law, Gauss's law, the electrical potential, conductors and dielectrics in static electric fields, polarization, electric flux density and dielectric constant, boundary conditions, capacitance, electrostatic energy forces; solution of electrostatic problems, Poisson's and Laplace's equations, methods of images, steady electric currents, conduction current density and resistance, static magnetic fields Ampere's law, vector magnetic potential, Biot-Savart law, the magnetic dipole, magnetization, magnetic field intensity, permeability, boundary conditions, self and mutual inductance, magnetic energy and forces, Faraday's law. (1016-328, 1017-313) **Class 4, Credit 4 (F, W)**

0301-474 Electromagnetic Fields II
Study of propagation, reflection and transmissions of electromagnetic waves in unbounded regions and in guiding structures. Topics: time varying fields, Maxwell's equations, wave equations, uniform plane waves in conductive regions, polarization, the Poynting theorem and power, reflection and transmission at normal incidence from plane boundaries (multiple dielectric interfaces), oblique incidence at plane dielectric boundaries, two-conductor transmission lines (transmission line equations, transients on transmission lines, pulse and step excitations, reflection diagrams, sinusoidal steady state solutions, standing waves, the Smith Chart and impedance matching techniques), TE and TM waves in rectangular waveguides (propagation dispersion characteristics). A few experiments illustrating fundamental wave propagation and reflection concepts are conducted. (0301-473) **Class 4, Lab 2, Credit 5 (S, Su)**

0301-481 Electronics I with Lab
This is the first course in a two-course sequence in analog electronic circuit design. The course covers the following topics: (1) Basic MOSFET current-voltage characteristics; (2) DC biasing of MOS circuits, including integrated-circuit current sources/mirrors; (3) Small-signal analysis of single-stage MOS amplifiers; (4) Multistage MOS amplifiers, such as differential amplifiers, cascode amplifiers, and operational amplifiers; (5) Frequency response of MOS-based single and multistage amplifiers; (6) Diode circuits, including rectifying and clamping circuits, as well as Zener diode-based voltage regulation; (7) Ideal and non-ideal operational amplifier (op amp) circuits in non-inverting and inverting configurations. (0301-381) **Class 4, Lab 3, Credit 4 (F, W, S, Su)**

0301-482 Electronics II with Lab
This is the second course in a two-course sequence in analog electronic circuit design. The course covers the following topics: (1) DC and small-signal analysis and design of bipolar junction transistor (BJT) devices and circuits, including single-transistor BJT amplifier configurations; (2) BJT DC biasing circuits, such as basic current sources and current mirrors, the Widlar current source and the Wilson current source; (3) Two-transistor BJT amplifier stages, such as differential amplifiers, cascode amplifiers, and output stages; (4) Analysis and design of BJT multistage amplifiers and op amps; (5) Frequency response of BJT-based single and multistage amplifiers; (6) Feedback and stability in BJT and MOSFET amplifiers. (0301-481) **Class 3, Lab 3, Credit 4 (F, W, S, Su)**

0301-497 Individual Design Experience
This course is a precursor for the multidisciplinary Electrical Engineering Senior Design Projects course sequence. IDE is focused on individual experiential learning and follows the engineering design cycle including specification, analysis and design, build, test, improve, and documentation. The student selects one of several technology platforms upon which to base their project design. These technology platforms represent popular areas of interest and prepare the student with specific skill sets they can apply in Senior Design. An individual design project demonstration and report are due at the end of the course. (Fourth year status required) **Class 2, Lab 3, Credit 3 (F, W)**

0301-514 Control Systems Design
First course in the design of feedback control systems. Conventional design techniques, root locus and Bode plots, are used to design both continuous and discrete controllers. Topics: review of transfer function models of physical systems, second order system response and transient specifications, its relationship to complex poles in S and Z planes (Laplace and Z transforms), effect of additional poles and zeros, steady state error, error, error constants. Root locus analysis, design of lag, lead and PID controllers (continuous and discrete), Design using frequency response techniques, review of Bode plots, W transform and Bode plots for discrete systems, specifications in discrete controllers using Bode plots. Comparison of continuous and discrete controllers. Practical aspects in controller implementations. MATLAB used in class assignments and lab. (0301-453, 554) **Class 4, Lab 3, Credit 5 (S, Su)**

0301-522 Clean and Renewable Energy Systems and Sources
This course covers the first principles and fundamentals of clean and renewable energy systems and sources. Various quantum-mechanical and electromagnetic devices and systems will be analyzed, designed and examined using software and CAD tools. Topics include geothermal, biofuels, hydro, nuclear, solar, wind, and other sources. Societal, ethical, economic and environmental aspects of nanotechnology-enabled clean energy and power are also discussed. (1017-313, 312) **Class 4 Credit 4 (W)**

0301-523 Energy Conversion
This course covers: (1) The first principles of energy conversion; (2) The fundamentals of electromechanical motion devices relating electromagnetics, electric variables and electromagnetic forces. The basic concepts of energy conversion systems, DC, induction and synchronous electric machines (motors and generators) used in power systems, automotive, industrial, robotics and other applications are presented. The theory of energy conversion and electromechanical motion devices is covered. (0301-381, 382) **Class 4, Credit 4 (S)**

0301-524 Electric Power Transmission and Distribution
This course deals with transmission and distribution of electric power. The course includes transmission line design—economic considerations in the choice of voltages of the transmission lines—different three phase connections—fault current calculations—fault detection—fault protection—choice of circuit breakers. (0301-523) **Class 4, Credit 4 (F)**

0301-525 Advances in Power Systems
This is an introductory course dealing with improvements that can be made in the use of electrical power that will result in better use of the available resources. Topics include adjustments of power tariffs, study of load demand variations during the day, the use of smart sensors and meters to monitor real and reactive power usage, improving the efficiency of power transmission, and the integration of renewable sources such as wind and solar into the grid. (0301-524) **Class 4, Credit 4 (S)**

0301-526 Power System Engineering
This course looks at electric power generation, transmission and distribution as an interconnected system. The course will identify and analyze the problems created by this interconnection of a number of large generating stations—methods of controlling the power, both real and reactive power, from each station—effect of shutting down of one machine—effect of a fault in one the major grid lines - stability considerations. (0301-524) **Class 4, Credit 4 (F)**

0301-531 Mechatronics
Fundamental principles of electric machines are covered. Sensors and actuators are studied. The primary actuators discussed are high-performance electromechanical motion devices such as permanent-magnet DC, synchronous and stepper motors. Topics in power electronics and control of electromechanical systems are studied. High-performance MATLAB environment is used to simulate, analyze and control mechatronic systems. Application of digital signal processors and microcontrollers in mechatronics are introduced. Case studies are covered. (0301-554, 474) **Class 3, Lab 1, Credit 4 (F, W, S)**

0301-534 Communication Systems
This introductory course provides the basics of the formation, transmission and reception of information over communication channels, spectral density and correlation descriptions for deterministic and stationary random signals, amplitude and angle modulation methods (e.g. AM and FM) for continuous signals, carrier detection and synchronization, phase-locked loop and its application. Introduction to digital communication, binary ASK, FSK and PSK. Noise effects, optimum detection, matched filters, maximum-likelihood reception, computer simulation. (1016-345, 0301-453) **Class 4, Lab 2, Credit 4 (S, Su)**

0301-545 Digital Electronics
This course covers the essential concepts and applications of digital electronics circuits, including NMOS, CMOS and BiCMOS technologies. After a basic review of MOSFET devices, NMOS and CMOS inverters are studied from both static and dynamic points of view. Design of combinational and sequential logic networks using NMOS and CMOS technologies is discussed. Dynamic CMOS logic networks, including precharge-evaluate, domino and transmission gate techniques are studied. The discussion of TTL NAND and ECL gates is included for historical reasons. Several special topics are studied as extensions of the foregoing topics, including static and dynamic MOS memory, low power logic, and BiCMOS inverters and logic. (0301-240, 482) **Class 3, Lab 3, Credit 4 (F, W)**

0301-554 **Linear Systems II**
Linear Systems II covers advanced topics in both continuous and discrete time linear systems, including the sampling of continuous time signals and the sampling theorem. A comprehensive study of the Laplace transform and its inverse, the solution of differential equations and circuit analysis problems using Laplace transforms, transfer functions of physical systems, block diagram algebra and transfer function realization is also covered. A comprehensive study of the z transform and its inverse, which includes system transfer function concepts, system frequency response and its interpretation, and the relationship of the z transform to the Fourier and Laplace transform is also covered. An introduction to the design of digital filters, which includes filter block diagrams for Finite Impulse Response (FIR) and Infinite Impulse Response (IIR) filters. (0301-453) **Class 4, Credit 4 (S, Su)**

0301-585 **Robotic Systems**
This course will cover basic electrical and mechanical engineering topics related to Robotics, including but not limited to: basic electrical and electronics components (resistors, capacitors, inductors, diodes, transistors, op-amps, timers) and concepts (sensors, signal conditioning, oscillators) and basic mechanical components (chains, gears, ratchets and pawl belt and chain drives, bearing) and concepts (motion, dynamics equations, and force and torque analysis). In addition, robotics system modeling, control, and applications will be explored. Students will design electronic interfaces and controllers for mechanical devices. Finally, sensor and actuator selection, installation, and application strategies will be explored. (0301-346, 453, 481) **Class 4, Lab 2 Credit 4 (S)**

0301-590 **Thesis**
A research or development project to be carried out under the general supervision of a faculty member. The project need not be of the state-of-the-art type, but a reasonable problem of theoretical and/or experimental investigation. To be arranged with an individual faculty member. **Credit 4**

0301-599 **Independent Study**
A supervised investigation within an electrical engineering area of student interest. (Permission of instructor) **Class variable, Credit variable 1-4**

0301-610 **Analog Electronic Design**
Enhances the student's skills in designing analog circuits. Subjects covered include nonideal characteristics of op-amps, op-amp applications, A/D and D/A conversion, multipliers and modulators, phase-locked loop, frequency synthesis and audio power amplifiers. Students meet in the classroom three hours each week and three hours in the laboratory. The laboratory time is used to discuss and troubleshoot circuits. Students are expected to work on design projects at their own pace outside of class hours. (0301-481, 482) **Class 3, Lab 3, Credit 4**

0301-612 **Advanced Semiconductor Devices**
Continuation of an undergraduate professional elective sequence in semiconductor device physics. Coverage of four major topics: (1) bipolar junction transistor (BJT) fundamentals, including carrier injection, current gain, modes of operation, Ebers-Moll model; (2) BJT advanced topics, including Early effect, high-level injection, Kirk effect, charge-control model, and small-signal models; (3) MOSFET transistor fundamentals, including charge-control analysis, current-voltage characteristics, threshold voltage, and CMOS; (4) MOSFET advanced topics, including channel-length modulation, sub threshold current, velocity saturation, scaled MOS devices, drain induced barrier lowering (DIBL), hot carrier effects and scaling issues. (0301-360) **Class 4, Credit 4 (W)**

0301-615 **State Space Control**
In this course students are introduced to MIMO systems and their designs using state space techniques. Linear algebra: Vectors, linear independent of vectors, vector space and null space, rank of a matrix eigen values and eigen vectors, transformation of matrices, functions of matrices, matrix polynomials, Cayley Hamilton theorem state space formulations, canonical forms, controllability and observability, relations between state space and transfer function models, solution of state equations, state space design (pole placement), comparison with conventional design, and introduction to other forms of state space designs. (0301-514) **Class 4, Credit 4**

0301-630 **Biomedical Instrumentation**
Study of fundamental principles of electronic instrumentation and design consideration associated with biomedical measurements and monitoring. Topics to be covered include biomedical signals and transducer principles, instrumentation system fundamentals and electrical safety considerations, amplifier circuits and design for analog signal processing and conditioning of physiological voltages and currents as well as basic data conversion and processing technology. Laboratory experiments involving instrumentation circuit design and test will be conducted. (0301-382, 482, 554) **Class 4, Lab 3, Credit 4 (W)**

0301-631 **Biomedical Sensors and Transducers I**
Biological entities probably represent one of the most difficult environments in which to obtain or generate accurate and reliable signals. This course will discuss the techniques, mechanisms and methods necessary to transfer accurate and reliable information or signals with a biological target. Various biomedical sensor and transducer types including their characteristics, advantages, disadvantages and fabrication will be covered. Discussions will include the challenges associated with providing a reliable and reproducible interface to a biological entity, the nature and characteristics of the associated signals, the types of applicable sensors and transducers and the circuitry necessary to drive them. (0301-382, 482) **Class 4, Lab 3, Credit 4**

0301-632 **Fundamentals of Electrophysiology**
Investigation and study of the concepts and underlying mechanisms associated with electrical signals in mammalian biology and physiology with a significant emphasis on methods, techniques and understanding of electrical potential distribution and current flow derived from circuit analysis. Intended to provide engineers with insight into the relationship between the study of electricity and its applicability to a wide variety of physiological mechanisms ranging from intracellular communication and control to cognitive function and bodily movement. Successful completion of the course will require generation of a significantly in-depth analysis report on some electrophysiological phenomenon or mechanism. (0301-381, 1026-365) **Class 4, Lab 3, Credit 4 (F)**

0301-633 **Biomedical Signal Processing**
Discussion and study of the methods and techniques that may be optimally employed for the fixed and adaptive processing of information with biological and physiological origin. The challenges and unique features of these types of signals will be discussed and application of known signal processing techniques that accommodate linear, non-linear and stochastic signals for the purpose of analysis, detection and estimation, monitoring and control will be studied. Successful participation in the course will entail completion of at least one project involving incorporation of these techniques in a biomedical application. (Permission of instructor or graduate standing) **Class 4, Credit 4**

0301-636 **Biorobotics/Cybernetics**
Cybernetics refers to the science of communication and control theory that is concerned especially with the comparative study of automatic control systems as in the nervous system and brain and mechanical-electrical communications systems. This course will present material related to the study of cybernetics as well as the aspects of robotics and controls associated with applications of a biological nature. Topics will also include the study of various paradigms and computational methods that can be utilized to achieve the successful integration of robotic mechanisms in a biological setting. Successful participation in the course will entail completion of at least one project involving incorporation of these techniques in a biomedical application. (Permission of instructor or graduate standing) **Class 4, Lab 2, Credit 4**

0301-646 **Power Electronics**
The study of a variety of semiconductor devices generally used for purposes other than signal processing, including thyristors, unijunction transistors, opto-couplers, power MOS and IGBTs. Applications stressed are concerned with the use of electrical power for control of lighting, motion and heat. Particular attention is given to calculating power dissipation, heat sinks and thermal management. (0301-545) **Class 3, Lab 3, Credit 4**

0301-647 **Artificial Intelligence Exploration**
The course will start with the history of artificial intelligence and its development over the years. This course will explore a variety of artificial intelligence techniques, and their applications and limitations. Some of the AI techniques to be covered in this course are intelligent agents, problem-solving, knowledge and reasoning, uncertainty, decision making, learning (Neural networks and Bayesian networks), reinforcement learning, swarm intelligence, Genetic algorithms, particle swarm optimization, applications in robotics, controls, and communications. Students are expected to have any of the following programming skills: C/C++, MATLAB, Java, or any other high level programming language. **Class 4, Credit 4**

0301-650 **Design of Digital Systems**
Deals with the design of both synchronous and asynchronous digital systems. The accent is on design methodologies for final implementation on programmable logic devices. Design techniques are based on top-down design using ASM charts and bubble diagrams along with microprogramming applications. Students also learn how to rapidly develop digital systems with VHDL. Design strategies for testability are discussed along with their impact on performance. The practical aspects of component interconnection (crosstalk, noise, transmission line effects) with effects on performance are also surveyed. The laboratory portion consists of four distinct projects proposed, designed, simulated (two projects require actual hardware implementation), and tested by the student. The design laboratory is supported by the ALTERA MAX+PLUS II VHDL design tools and EPLD/FPGA programmers. (0301-240, 365) **Class 4, Lab 3, Credit 4**

0301-651 **Physical Implementation**
A technical elective that introduces students to the fundamental principles of Application Specific I.C. (ASIC) design. Both circuit design and system design are covered. The student also is introduced to CAD tools for schematic capture, placement and routing of standard cells. The projects are designed and simulated using commercial CAD tools. Top-down design using a hardware description language (VHDL) is included. (0301-650) **Class 4, Credit 4**

0301-677 **Digital Filters and Signal Processing**
A continuation of the topics studied in 0301-554. Topics include study of the design methods for digital IIR filters via s-plane transformations, study of design methods for digital FIR filters, including emphasis on the question of linear phase response, a review of the discrete Fourier transform (DFT) and an in-depth study of fast algorithms (FFTs) for implementing the DFT, including radix 2, radix 4 and mixed radix algorithms, quantization effects in discrete systems; an introduction to digital signal processing computer chips and their use in the implementation of digital processing systems, and applications of digital signal processing, including speech processing and two-dimensional image processing. Includes several design projects in the digital signal processing laboratory. (0301-554) **Class 4, Credit 4**

0301-679 **Analog Filter Design**
A study of the various techniques for the design of filters to meet given specifications. Approximations to the ideal filter characteristic through Butterworth, Chebyshev and other polynomials are discussed in detail. The emphasis is on active network realizations using op amp stages. Topics include review of analysis of op amp circuits and transfer function of networks, magnitude and frequency scaling, ideal filter characteristics, Butterworth, Chebyshev and Bessel-Thompson approximations to the ideal filters, determination of transfer functions to meet given specifications, high-pass to low-pass and band-pass to low-pass transformations, standard op amp circuits for filter realizations, negative impedance converters, generalized impedance converters, and switched capacitor filters. (0301-453) **Class 4, Credit 4**

0301-685 **Principles of Robotics**
An introduction to a wide range of robotics-related topics including but not limited to sensors, interface design, robot devices applications, mobile robots, intelligent navigation, task planning, coordinate systems and positioning image processing, digital signal processing applications on robots, and controller circuitry design. Prerequisite for the class is a basic understanding of signals and systems, matrix theory, and computer programming. Software assignments will be given to the students in robotic applications. Students will prepare a project, in which they will complete software or hardware design of an industrial or mobile robot. There will be a two-hour lab additional to the lectures. (0301-453, 346) **Class 3, Lab 2, Credit 4**

0301-686 **MEMS Design**
Microelectromechanical systems (MEMS) are widely used in aerospace, automotive, biotechnology, instrumentation, robotics, manufacturing, and other applications. There is a critical need to synthesize and design high performance MEMS which satisfy the requirements and specifications imposed. Integrated approaches must be applied to design and optimized MEMS, which integrate microelectromechanical motion devices, ICs, and microsensors. This course covers synthesis, design, modeling, simulation, analysis, control and fabrication of MEMS. Synthesis, design and analysis of MEMS will be covered including CAD. (Fourth- or fifth-year standing for undergraduates, or graduate standing) **Class 4, Credit 4**

0301-688 **MEMS Systems Evaluation**
This course focuses on evaluation of MEMS, microsystems and microelectromechanical motion devices utilizing MEMS testing and characterization. Evaluations are performed using performance evaluation matrices, comprehensive performance analysis and functionality. Applications of advanced software and hardware in MEMS evaluation will be covered. (Senior-standing required) **Class 4, Credit 4**

0301-692 **Communication Networks**
A major portion of today's communication takes place over digital networks. This includes communication between people in the form of voice, facsimile (fax) and e-mail, as well as communication between machines. Digital networks are most likely to be the dominant element of communication links of the future. The current effort in ISDN points to such a trend. This course covers key aspects of the structure of present-day digital communication networks. (0301-534) **Class 4, Credit 4**

0301-693 **Digital Data Communication**
Principles and practices of modern data communication systems. Topics include pulse code transmission and error probabilities, M-ary signaling and performance, RF communications link budget analysis, an introduction to channel coding, a discussion of modulation/coding tradeoffs and a discussion of digital telephony. (0301-534) **Class 4, Credit 4**

0301-697 **Senior Design Project I**
First half of a two-course capstone design experience that simulates an industrial setting. Teams of students pool their knowledge and experience to attack a specific design problem. Emphasis is placed on applying contemporary engineering development models that encourage individual and group accountability through team activities which include group problem solving, design activities and communication skills-oral, written and interpersonal. With faculty guidance, teams develop creative and innovative design concepts, then study the feasibility of each concept to arrive at an optimum design. A design report and oral review before peers and faculty are required. Electrical engineering components may include performance specifications, functional flowcharts, ECAD schematics and PCB layouts, test simulation results, software flowcharts and development tools. **Class 4, Open Lab, Credit 4 (F, W)**

0301-698 **Senior Design Project II**
The sequel to 0301-697, Senior Design Project I. The design created in part I must be constructed, debugged, evaluated and demonstrated against initial specifications. Hardware and software must be integrated to produce a complete working prototype or solution. Design teams manage unforeseen design issues, team issues, schedule, written and oral presentation of the prototype's design and finally a demonstration of its functionality. During the demonstration, the performance specified in the original proposal will be constructed with the special topics related to design. In this second quarter, lectures focus on professional aspects of engineering and special topics related to design and performance of the operational unit. (0301-697) **Class 4, Open Lab, Credit 4 (W, S)**

General Engineering

0302-210 **Introduction to Engineering**
A one credit-hour course for the engineering exploration student that presents information and exercises to introduce the student to the seven engineering curricula offered at RIT. Various aspects of the curricula requirements as well as career opportunities that are available are discussed as they pertain to each major. **Class 2, Credit 1 (F)**

0302-231 **Introduction to Honors Engineering**
This is a KGCOE honors course. In meetings throughout the term, discussions center on the objectives of the honors course sequence in engineering and establish rapport between students and faculty mentors. **Class 1, Credit 0 (F)**

0302-232 **Product Realization I: Concept Development**
This is a KGCOE honors course. Overview of how new innovative products are developed to meet the expanding needs of a global economy. Primary focus in PR I is on concept creation, inspired by customer needs. Key questions to address include, how does one obtain an authentic assessment of customer needs, and why do some products succeed while others fail in the marketplace? **Class 2, Credit 1 (W)**

0302-232 **Product Realization II: Concept to Prototype**
This is the second of a two-part KGCOE honors course sequence focusing on product realization. Students will develop a high level understanding of the process by which engineers translate a product concept into a functional prototype that meets a variety of constraints including manufacturability, human factors such as safety and ease of use, cost containment and intellectual property. (0302-232) **Class 2, Credit 1 (S)**

0302-234 **Manufacturing and Globalization**
This is a KGCOE honors course. This course looks at the effects globalization has on U.S. manufacturing. Topics included are supply chain management and logistics, lean manufacturing, outsourcing, corporations and profitability, and the impact of government policies and monetary issues on globalization. **Class 2, Credit 1 (F)**

0302-235 **Preparation for Honors Domestic Trip**
This course is for KGCOE students planning to participate on the domestic trip. Student teams will research the companies they will visit and report back to the class on their findings. **Class 1, Credit 0 (W)**

0302-236 **Leadership, Ethics and Sustainability**
A series of presentations by guest speakers will address the topics of leadership, ethics and sustainability. **Class 2, Credit 1 (S)**

0302-500 **Study Abroad: INSA Rennes**
College of Engineering students take classes at National Institute of Applied Sciences in Rennes, France as part of an exchange program with the Kate Gleason College of Engineering. Department approval required-contact KGCOE Student Services at 585-475-7994 or mlaeen@rit.edu **Credit variable 1-20**

Industrial Engineering

0303-051 **Discovery-Industrial Engineering**
Gives first-year students an overview of industrial engineering and helps integrate the incoming students into the RIT ISE community. Topics include student success (e.g., transition to the college experience, awareness of campus resources, academic and personal success strategies, information literacy, personal development and responsible decision making), career options in engineering, plant tours, design projects and engineering ethics. Also gives the student an opportunity to interact with ISE faculty, upper-division students and other first-year ISE students. Fulfills the university requirement for FYE. **Credit 1 (F)**

0303-201 **Fundamentals of Industrial Engineering**
An introductory course in industrial engineering for first and second year students. Describes engineering in an overall sense and industrial engineering in particular. Includes an overview of some contemporary engineering topics, and charting and analysis tools used in industrial engineering within the context of the product and process development cycle. The laboratory portion covers hands-on applications relating to topics covered in lectures and group exercises in problem solving within the context of engineering design and analysis. **Class 3, Lab 1, Credit 4 (F)**

0303-204 **Computer Tools for Increased Productivity**
Builds a basic computer competence. Students learn about various computer software programs including computer-aided design (e.g., AutoCAD) and database (e.g., Access) programs. **Class 2, Credit 2 (S)**

0303-302 **Computing for Engineers**
A first course in computer programming for engineers. Involves development of programming skills required in the engineering disciplines. "C++" is the current language of choice. **Class 4, Credit 4 (F, S)**

0303-320 **Production Systems Practicum**
The activities of this course will be largely centered in the Toyota Production Systems Lab. The purpose of this course is to introduce students to the elements of "Lean manufacturing" in the context of a manufacturing or assembly systems environment. Key concepts such as manufacturing processes, cells and their layout, operating efficiencies, just-in-time, and the information flows needed to sustain productive manufacturing will be covered. (Prerequisite: Permission of instructor.) **Lab 2, Credit 1 (S)**

0303-343 **Materials Processing**
A study of the application of machine tools and fabrication processes to engineering materials in the manufacture of products. Processes covered include cutting, molding, casting, forming, powder metallurgy and welding. Students make a project in the lab portion of the course. **Class 3, Lab 2, Credit 3 (W)**

0303-401 **Operation Research**
An introduction to optimization through mathematical programming techniques including linear programming and transportation and assignment algorithms, and their application on problems in manufacturing, health care, financial systems, supply chain, and other engineering disciplines. Special attention is placed on sensitivity analysis and the need of optimization in decision-making. The course is delivered through lectures and a weekly laboratory where students learn to use state of the art software packages for modeling large discrete optimization problems. (1016-331 or permission of instructor) **Class 3, Lab 2, Credit 4 (F)**

0303-402 **Production Control**
A first course in mathematical modeling of production-inventory systems. Topics include: forecasting, aggregate planning, inventory control models, and scheduling. (0303-401, 1016-351 or equivalent, or permission of instructor) **Class 4, Credit 4 (F)**

0303-415 **Ergonomics**
Physiological and biomechanical aspects of human performance. Principles of physical work and human anthropometry are studied to enable the student to systematically design work places, processes, and systems that are consistent with human capabilities and limitations. Topics include repetitive motion disorders, manual materials handling, hand tool design and selection, and job analysis. (0307-361 or 1016-351 or permission of instructor) **Class 3, Lab 1, Credit 4 (W)**

0303-422 **Systems and Facilities Planning**
A basic course in quantitative models on layout, material handling and warehousing. Topics include product/process analysis, flow of materials, material handling systems, warehousing, and layout design. A computer-aided layout design is used. (0303-401 or permission of instructor) **Class 3, Lab 1, Credit 4 (W)**

0303-481 **Engineering Management**
Development of the fundamental engineering management principles of industrial enterprise, including an introduction to project management. Internal organization as well as general economic conditions are considered. Business and project planning is also performed. **Class 4, Credit 4 (W, S)**

0303-483 **Advanced Production Control**
A design course in production control. Each student is asked to design, test and implement a complete production control system for an operating plant. Professional elective. (0303-402) **Class 4, Credit 4**

0303-503 **Simulation**
Queuing theory will be introduced. Modeling and computer simulation of stochastic and dynamic manufacturing and service systems are emphasized. A high level simulation language (e.g., ARENA) will be used to model and examine system performance. (0303-302, 401; corequisite 0307-362 or equivalent) **Class 3, Lab 2, Credit 4 (F)**

0303-510 **Applied Statistical Quality Control**
An applied approach to statistical quality control utilizing theoretical tools acquired in other math and statistics courses. Heavy emphasis on understanding and applying statistical analysis methods in real-world quality control situations in engineering. Topics include hypothesis testing and control charts. Contemporary topics such as six-sigma are included within the context of the course. (1016-351, 352 or 0307-361, 362) **Class 4, Credit 4 (F)**

0303-511 **Applied Linear Regression Analysis**
An applied approach to linear regression analysis utilizing theoretical tools acquired in other math and statistics courses. Heavy emphasis on understanding and applying statistical analysis methods in real-world situations in engineering. Topics include analysis of variance and regression. (1016-331, 0307-361, 362 or 1016-351, 352 or equivalent) **Class 4, Credit 4 (S)**

0303-516 **Human Factors**
Psychological and cognitive aspects of human performance. The human information processing capabilities are studied to enable students to design work places, procedures, products and processes that are consistent with human capabilities and limitations. Topics include the human sensory, memory, attention and cognitive processes; display and control design principles; as well as human computer interface design. (0307-362 or 1016-352 or permission of instructor) **Class 3, Lab 1, Credit 4 (S)**

0303-520 **Engineering Economy**
Time value of money, methods of comparing alternatives, depreciation and depletion, income tax consideration and capital budgeting. Course provides a foundation for engineers to effectively analyze engineering projects with respect to financial considerations.. **Class 4, Credit 4 (F, W, S)**

0303-526 **Design and Analysis of Production Systems**
This course will provide an introduction to concepts and techniques in the design and analysis of manufacturing and service systems. At the end of the quarter, the student will be able to assess and analyze the performance of a given system as well as to provide a framework for system redesign and improvement. Modern aspects such as lean manufacturing are included within the context of the course. (0303-401, 402, or permission of instructor) **Class 3, Lab 1, Credit 4 (S)**

0303-560 **Multidisciplinary Senior Design I**
First course in two-course design sequence oriented to the solution of real-world engineering problems. Multidisciplinary student teams attempt to define, analyze, design and implement solutions to unstructured, open-ended, multidisciplinary engineering problems. (Fifth year standing) **Class 4, Credit 4 (F, W)**

0303-561 **Multidisciplinary Senior Design II**
Second course in a two-course design sequence oriented to the solution of real-world engineering problems. Multidisciplinary student teams attempt to define, analyze, design and implement solutions to unstructured, open-ended, multidisciplinary engineering problems. (0303-560) **Class 4, Credit 4 (W, S)**

0303-599 **Independent Study**
A supervised investigation within an industrial engineering area of student interest. Professional elective. (Permission of instructor) **Class variable, Credit variable**

0303-620 **Engineering Economy**
Time value of money, methods of comparing alternatives, depreciation and depletion, income tax consideration, replacement, retirement and obsolescence, and capital budgeting. Course provides a foundation for engineers to effectively analyze engineering projects with respect to financial considerations. Applied project is required. Cannot be used as a professional elective for ISE majors. **Class 4, Credit 4 (F, W, S)**

0303-626 **Contemporary Production Systems I**
The focus of this course is lean. Lean is about doing more with less: less human effort, less equipment, less time, less space. In other words, lean is about the application of industrial engineering principles and tools to the entire supply chain or value stream. The focus of this course will be learning and applying the principles and tools of lean such as value, value stream mapping, takt, flow, pull, kaizen, standard work, line design, and others, all in the context of continuous process improvement. By the end of the course, the student will possess the essential tools and skills to apply lean in their production system from either a line (supervisor or manager) or staff role. (Theoretical or experiential background in manufacturing processes and production systems is recommended, or permission of instructor.) **Class 4, Credit 4 (F)**

0303-630 **Advanced Systems Integration**
Basic concepts and techniques needed to specify, design and implement systems that are computer controlled. Real-time data, process control as related to computer-integrated manufacturing. Information systems topics will be introduced within the context of systems integration. (0303-302 or permission of instructor) **Class 3, Lab 1, Credit 4 (W)**

Mechanical Engineering

0304-214 **Engineering Design Graphics**
This course is an introduction to graphical communication as a tool in documenting the results of an engineering design. Emphasis is placed on the use of Computer Aided Drafting and 3-D Solid Modeling systems to prepare working drawings packages of basic components and assemblies. Students combine the practice of sketching along with computer-based solid modeling to produce a parametric design. At the conclusion of the course, students will be able to prepare working drawings, with appropriate views, dimensions, title blocks, and bill of materials. **Lab 4, Credit 2**

0304-220 **Fundamentals of Micromachining I**
A hands-on laboratory course designed to give students an introduction to clean room operations and micromachining technologies. Students will fabricate a variety of simple microscopic devices and investigate their mechanical behavior. Topics covered include clean rooms, optical lithography, thin film materials, chemical and plasma etching, and metrology. (This class is not intended for the microelectronics major or minor). **Lab 2, Credit 1**

0304-280 **Measurement, Instrumentation, Controls I**
This course is designed to introduce students to fundamental laboratory techniques and familiarize them with hardware and software tools. Students learn how to obtain and interpret measurements of physical properties such as temperature, pressure, and flow rate. Students learn how to interface a computer to physical devices using analog and digital input/output schemes. The primary vehicle for exploring these concepts is LabVIEW from National Instruments, which is an integrated, graphical programming environment. Classroom demonstrations, hands-on examples, in-class and project exercises provide students with an appreciation for engineering applications. **Lab 4, Credit 2**

0304-314 **Topics in Geometric Dimensioning and Tolerancing**
This course reviews basic dimensioning and tolerancing. Dimensioning mechanical drawings is expanded through form and feature controls to clearly define parts. Based on the ASME Y14.5M-1994 Standard, include geometric tolerancing symbols and terms, rules of geometric dimensioning and tolerancing, datums, material condition symbols, tolerances of form and profile, tolerances of orientation and runout, location tolerances and virtual condition. Tolerances will be applied to CAD parts and drawings. This course may be used towards free elective credit. (0304-214) **Lab 2, Credit 1**

0304-320 **Production Systems Practicum**
The activities of this course will be largely centered in the Toyota Production Systems Lab. The purpose of this course is to introduce students to the elements of Lean manufacturing in the context of a manufacturing or assembly systems environment. Key concepts such as manufacturing processes, cells and their layout, operating efficiencies, just-in-time, and the information flows needed to sustain productive manufacturing will be covered. (Permission of instructor) **Lab 2, Credit 1 (F)**

0304-331 **Mechanics I**
For students majoring in industrial and systems engineering. Statics: equilibrium, the principle of transmissibility of forces, couples, centroids, trusses, frames, machines and friction. Introduction to strength of materials: axial stresses and strains, statically indeterminate problems, torsion and bending. (1017-311) **Class 3, Credit 3**

0304-332 **Mechanics II**
For students majoring in industrial and systems engineering. Topics include dynamics of particles and rigid bodies with an introduction to kinematics and kinetics of particles and rigid bodies, work, energy, impulse momentum and mechanical vibrations. Emphasis is on problem solving. (0304-331) **Class 3, Credit 3**

0304-336 **Statics**
This basic course treats the equilibrium of particles and rigid bodies under the action of forces. It integrates the mathematical subjects of calculus, vector algebra and simultaneous algebraic equations with the physical concepts of equilibrium in two and three dimensions. Topics include concepts of force and moment, trusses, frames, machines, friction, centroids and moments of inertia. (1016-282, or 1016-273, 1017-311) **Class 4, Credit 4**

0304-342 **Problem Solving with Computers**
Introduces students to personal computers for solving science and engineering problems. Students also learn to interpret and analyze their results and document their solutions. The course covers principles and techniques of computer programming to analyze and solve problems and to document both numerically and graphically the results of the analysis. Programming and analysis of problems are implemented using MS Excel, and the scripting languages Visual Basic for Applications (VBA) and MATLAB. (Corequisite: 1016-271 or 1016-281) **Class 2, Lab 2, Credit 3**

0304-343 **Materials Processing**
A study of the application of machine tools and fabrication processes to engineering materials in the manufacture of products. Processes covered include cutting, molding, casting, forming, powder metallurgy and welding. Students do a project in the lab portion of the course. **Class 2, Lab 2, Credit 3**

0304-344 **Materials Science**
The structure and properties of metallic, polymeric, composite and ceramic materials as related to structural imperfections, atom movements and phase changes. Develops a basic understanding of the structure/properties relationship in materials and their behavior in service environments. (1011-208) **Class 3, Lab 2, Credit 4**

0304-347 **Mechanics of Materials**
A basic course in the fundamental principles of the mechanics of deformable media, including stress, strain, deflections and the relationships among them. The basic loadings of tension, compression, shear, torsion and bending are also included. Mechanics of Materials Lab (0304-348) is to be taken concurrently with this course. (0304-336; corequisite: 0304-348) **Class 4, Credit 4**

0304-348 **Mechanics of Materials Lab**
A required laboratory course taken concurrently with 0304-347. Illustrates the mechanical behavior of metallic materials. Students investigate a material's response to axial, torsional and bending loads. In addition students are introduced to reduction analysis of data, basic experimental techniques, and effective report writing. (0304-336; corequisite: 0304-347) **Lab 2, Credit 1**

0304-350 **Intermediate Machining Lab**
This hands-on laboratory course introduces students to the proper use and application of basic machine tools. Students will learn about machine capabilities and capacities, verification and setup procedures, and the system of operations necessary to achieve the required part specifications. Students will also be introduced to CNC machine tools and their applications. This course may be used towards free elective credit. (0304-343) **Lab 2, Credit 1**

0304-360 **Model Aircraft Fabrication Laboratory**
This hands-on laboratory course introduces students to Radio Control model airplane construction. Students learn how to construct their own airplanes from balsa and birch ply, how to install control hardware, and how cover these airplanes using heat-shrink covering materials. Each student may be able to fly with an RC "flight instructor" at the end of the course (weather permitting). Students are required to purchase a kit-of-parts to cover material costs, which will allow them to keep their constructed airframe at the end of the course. Radio control hardware will be provided to students for use during the course, and students will have the option to purchase their own RC hardware to turn their airframe into a fully functional RC model airplane. **Lab 2, Credit 1**

0304-359 **Dynamics**
A basic course in the kinematics and kinetics of particles and rigid bodies. Newton's Laws and the theorems of work-energy and impulse momentum are applied to a variety of particle problems. Systems of particles are employed to transition to the analysis of rigid body problems. Absolute and relative motion are used to investigate the kinematics and kinetics of systems of rigid bodies. Newton's Laws and the theorems of work-energy and impulse-momentum are also applied to a variety of rigid body problems. (0304-336) **Class 5, Credit 5**

0304-413 **Thermodynamics**
A basic course introducing the classical theory of thermodynamics. Applications of the first law of thermodynamics are used to introduce the student to thermodynamic processes for closed and open systems. The Clausius and Kelvin-Planck statements of the second law are then correlated with the concept of entropy and enthalpy to investigate both real and reversible processes and the thermodynamic properties of pure substances. (1016-282 OR 1016-273, 1017-311) **Class 4, Credit 4**

0304-415 **Fluid Mechanics**
Includes the physical characteristics of a fluid: density, stress, pressure, viscosity, temperature, vapor pressure, compressibility. Descriptions of flows: Lagrangian and Eulerian; stream lines, path lines, streak lines. Classification of flows. Fluid statics: hydrostatic pressure at a point, pressure field in a static fluid, manometry, forces on submerged surfaces, buoyancy, standard and adiabatic atmospheres. Flow fields and fundamental laws: systems and control volumes, Reynolds Transport theorem, integral control volume analysis of basic equations for stationary and moving control volumes. Inviscid Bernoulli and the Engineering Bernoulli equation, some applications. Incompressible flow in pipes; laminar and turbulent flows, separation phenomenon. Dimensional analysis: Buckingham's pi-theorem, similitude, model studies. (0304-413, corequisite 0304-359) **Class 4, Credit 4**

0304-416 **Thermal Fluids Lab I**
This laboratory course pertains to topics covered in Thermodynamics (0304-413) and Fluid Mechanics (0304-415). Each laboratory experiment is designed to quantify the differences between real and ideal systems through rigorous system analysis. Students will work in teams to evaluate various thermo-fluid systems. Extensive analysis is used to calculate system characteristics and to graph and predict system behavior. (0304-413; corequisite: 0304-415) **Lab 2, Credit 1**

0304-437 **Design of Machine Elements**
The analysis and theory of machine design in the context of failure theories. Particular emphasis is placed on the design and analysis of machine elements and fatigue. A discussion of engineering professionalism and ethics is also included. (0304-347) **Class 4, Credit 4**

0304-440 **Numerical Methods**
The study of numerical methods as utilized to model and solve engineering problems on a computing device. Students learn to analyze and interpret the numerical solutions obtained. Topics include roots of algebraic and transcendental equations, linear systems, curve fitting, numerical differentiation and integration, and ordinary differential equations. Applications are taken from student's background in engineering, science and mathematics courses. The MATLAB programming language is taught and utilized for computer implementation (0304-342, 347, 1016-318) **Class 4, Credit 4**

0304-460 **Contemporary Issues/ Energy and Environment**
This course lays the foundation for studies in energy and the environment. Topics include an introduction to energy intensive systems and how they interact with the environment. Specific attention is focused on current events both domestically and internationally, and how these events will shape our future energy production and utilization. This course may be used only as a free elective. (Third-year standing in an engineering discipline) **Class 4, Credit 4**

0304-461 **Contemporary Issues in Bioengineering**
This course lays the foundation for studies in bioengineering. Topics include the principles of living systems, fundamentals of biomolecular and cellular engineering, engineering applications, and medical engineering. This course may be used only as a free elective. (Third-year standing in an engineering discipline). **Class 4, Credit 4**

0304-500 **Study Abroad**
01 - Mechanical Engineering Independent Study, Credit 1-8
02 - Mechanical Engineering Free Elective, Credit 1-8
03 - Mechanical Engineering Technical Elective - Design, Credit 1-8

0304-514 **Heat Transfer**
A basic course in the fundamentals of heat transfer by conduction, convection and radiation, together with applications to typical engineering systems. Topics may 347, include one-dimensional steady state and transient heat conduction, radiation between black bodies and gray bodies, correlations for the Nusselt number in forced and natural convection, and an introduction to heat exchanger design by LMTD and NTU methods. (0304-413, 415) **Class 4, Credit 4**

0304-518 **Advanced Computational Techniques**
This extension of Numerical Methods, 0304-440, covers finite element and finite difference techniques and their applications in mechanical engineering (structural analysis, heat transfer, fluid mechanics). (0304-440, 1016-318) **Class 3, Lab 2, Credit 4**

0304-540 **Introduction to Auto Design and Manufacturing**
An introduction to the design and manufacturing practices employed in typical automotive industries. Design practices that are currently being implemented in industry will be emphasized including the use of computer-aided engineering, software, and statistical analysis. The regularly scheduled lecture periods will include guest lecturers from automotive manufacturers to introduce students to current manufacturing technologies. This course may be used only as a free elective. (Third-year standing in ME program, registration preference given to students enrolled in the automotive option) **Class 4 Credit 4**

0304-543 **System Dynamics**
This required course introduces the student to lumped parameter system modeling, analysis, simulation, and experimentation. The determination and solution of differential equations that model system behavior is a vital aspect of the course. System response phenomena are characterized in both time and frequency domains and evaluated based on performance criteria. Laboratory exercises enhance student proficiency with model simulation, basic instrumentation, data acquisition, data analysis, and model validation. (0304-280, 0304-359, 0304-440, 1016-306; corequisite: 0301-381) **Studio Class 6, Credit 5**

0304-550 **Transport Phenomena**
A second course in fluid mechanics, integrating concepts of heat and mass transfer. Use of the differential form of the fundamental equations of the conservation of mass, momentum and energy is derived and used throughout. Topics include potential flow, viscous internal plane and pipe flows, external boundary layers, and the convective transport of heat and mass. (1016-318, 0304-415; corequisite: 0304-514) **Class 4, Credit 4**

- 0304-551 Thermal Fluids Lab II**
A laboratory course based on the materials covered in Heat Transfer I, 0304-514, and Transfer Phenomena, 0304-550. Students perform various experiments of contemporary interest to the fields of heat transfer and transport. Each lab is preceded by a lecture covering an in-depth analysis of the lab experiment. Students are required to work on an assignment related to the experiment using the textbooks and reference material available in the library. After performing the experiments, students perform the required analysis, including error analysis and comments on identifying the sources of error and how to reduce them. Students submit a detailed lab report that is graded on the technical content as well as writing skills. (0304-514, corequisite: 0304-550) **Lab 2, Credit 1**
- 0304-560 Introduction to Aerospace Engineering**
Lays the foundation for studies in aerospace engineering. Topics include the history of aviation, basic aerodynamics, airfoils, wings and other aerodynamic shapes, airplane performance, stability and control, propulsion and aircraft structures. This course may be used only as a free elective. (0304-359, 415, third-year standing in ME program, registration preference is given to students enrolled in the aero option) **Class 4, Credit 4**
- 0304-575 Aerodynamics**
This course presents the essentials of aerodynamic theory. This course is used in place of Transport Phenomena for students enrolled in the Aero Option. Topics include differential equations of fluid mechanics, airfoil theory, wings of finite span, inviscid potential flows, laminar and turbulent boundary layer, Airfoil design is explored through software. A design project is required. (0304-359,415, 560, registration preference is given to students enrolled in the aero option) **Class 4, Credit 4**
- 0304-599 Independent Study**
A student project course encompassing both analytical and experimental work. (Fourth- or fifth-year standing) **Credit variable**
- 0304-604 Design for Manufacture**
The student learns how to design parts for economical manufacture and how to design assemblies with the optimum number of parts. This project-based course includes lectures on the creative process. The student uses both manual and software techniques to calculate assembly design efficiencies and software techniques to determine part and part tooling costs. (0304-344) **Class 4, Credit 4**
- 0304-610 Topics in Mechanical Engineering Design**
In response to student and/or faculty interest, special courses of current interest and/or logical continuation of regular courses are presented. A design project is required. **Class 4, Credit 4**
- 0304-615 Robotics**
An applied course in the fundamentals and applications of industrial robots. Emphasis is placed on the use of microcontrollers to construct mobile robots. Topics include microcontroller programming, industrial robot fundamentals, DC servo and stepper motors, encoders, sensors, programming, gripper design, and safety. A major emphasis is placed in a design project involving the design, build, and test of a mobile robot for an application. (Fourth- and fifth-year standing) **Class 3, Lab 2, Credit 4**
- 0304-618 Computer-aided Engineering**
Introduces the mechanical engineering student to the procedures and techniques used to integrate the computer into the engineering and design cycle. The student is exposed to commercial software used in industry. Topics include solids modeling, finite elements, stress analysis, static and dynamic structural analyses, and heat transfer. A real-world design project is selected from one or more of the topics covered. (0304-437, 518) **Class 3, Lab 2, Credit 4**
- 0304-620 Introduction to Optimal Design**
This course is an introduction to basic optimization techniques for engineering design synthesis. Topics covered include: basic concepts, the general problem statement, necessary conditions of optimization, numerical techniques for unconstrained optimization, constrained optimization through unconstrained optimization, and direct methods. Numerical solutions are obtained using MATLAB software. A design project is required. (0304-437, 440) **Class 4, Credit 4**
- 0304-622 High Performance Vehicle Engineering**
This course explores the engineering aspects of high performance vehicle design. Topics include product design specification, systems design, component and systems optimization, manufacturing and assembly, testing, and safety. Case studies will be used to introduce students to various aspects of the process. Students will participate in hands-on activities surrounding the design, manufacture, assembly, and testing of high performance vehicle components. (Fifth year standing or permission of instructor) **Class 4, Credit 4 (W)**
- 0304-623 Powertrain Systems and Design**
This course will introduce the transmission's primary function of coupling the engine to the driveline at appropriate torque ratios. Subsequent topics include modern transmission design, efficient engine operation through transmission adaptation; and a discussion of the future of the automatic transmission. The course will review manual transmissions, automatic control, and hydro-mechanic decision theory and implementation. Modern designs, such as Continuously Variable Transmissions (CVT), are reviewed to demonstrate a fundamental shift in the way power is transmitted from the primary source (such as the internal combustion engine) to the remainder of the driveline such as the propeller shaft or axle. **Class 4, Credit 4**
- 0304-624 Vehicle Dynamics**
Deals with the fundamentals of ground vehicle stability and control. The contribution of tire lateral force, stiffness, and aligning torque to vehicle stability is discussed. Bicycle and four-wheel vehicle models are analyzed for neutral, under and oversteer characteristics. The effects of suspension geometry, chassis stiffness and roll stiffness on stability and handling are analyzed. (0304-543, registration preference is given to students enrolled in the automotive option) **Class 4, Credit 4**
- 0304-629 Renewable Energy Systems**
This course provides an overview of renewable energy system design. Energy resource assessment, system components, and feasibility analysis will be covered. Possible topics to be covered include photovoltaics, wind turbines, solar thermal, and hydropower. Students will be responsible for a final design project. (Fourth or fifth-year standing or instructor permission) **Class 4, Credit 4**
- 0304-630 Senior Design I**
The first of a two-course capstone design sequence. Students work in multidisciplinary design teams in an environment approximating an industrial setting. Emphasis is placed on teamwork and on developing good oral, written and interpersonal communication skills. In this course, student teams develop their proposed final design of a mechanical system after identifying possible alternative concepts. The final design must be supported by sound engineering analyses and by engineering drawings necessary to build a prototype. This course is intended to be taken as a capstone design experience near the conclusion of the student's program of study. Students must have fifth-year standing, completed three co-op blocks and have consent of the department. Students must submit a departmentally approved plan of study for degree completion. (0304-280, 514, 518, 543, 550) Department approval required. **Class 4, Credit 4**
- 0304-631 Senior Design II**
The second of the two-course capstone design sequence. The same student teams from Senior Design I return to build and test a working prototype of their previously developed final design. Continued emphasis is placed on teamwork and on developing good oral, written and interpersonal communication skills. (0304-630) **Class 4, Credit 4**
- 0304-633 Sustainable Energy Management**
This course, Sustainable Energy Management and the Built Environment, provides an overview of mechanical and associated control systems within buildings with an emphasis on sub-systems which possess the most visible energy signature in terms of energy usage, energy inefficiency, and societal/global impact. Fundamentals of system operation are explored as well as energy management techniques. Using domestic and international case studies which highlight energy management within the built environment, students will explore methods by which engineers have achieved solutions aligned with sustainability. (0304-643, 660) **Class 4, Credit 4**
- 0304-635 Heat Transfer II**
Consists of the numerical solution of heat transfer problems. One- and two-dimensional steady-state as well as transient conduction cases are analyzed. A detailed study of single-phase forced and natural convective heat transfer is presented. Heat transfer during pool boiling, flow boiling and condensation is studied. Design aspects of heat transfer equipment are introduced. The students undertake a major design project. (0304-440, 514) **Class 4, Credit 4**
- 0304-638 Design of Machine Systems**
This is an applied course in the selection of components and integration of those components into electro-pneumatic-mechanical devices and systems. Topics involve all aspects of machine design, including drive components and systems, motion generation and control, and electrical control hardware and strategy. (0304-359, 437; 0301-381) **Class 4, Credit 4**

0304-639 **Alternative Fuels and Energy Efficiency**
This course, Alternative Fuels and Energy Efficiency for Transportation, provides an overview of the potential alternative fuels and energy efficiency technologies for powering current and future vehicles. Alternative fuel production technologies and utilization of fuels such as biodiesel, ethanol, and hydrogen will be covered. The primary technical and environmental issues associated with these alternative fuels will be discussed. Approaches to improving vehicle efficiency will also be explored. Students will be responsible for a final design or research project. (0304-640) **Class 4, Credit 4**

0304-640 **Internal Combustion Engines**
An introduction to the operation and design of internal combustion engines. Topics include engine types and cycles, fuels, intake and exhaust processes, emissions and emission control systems, heat transfer and lubrication. (0304-514, corequisite: 550, registration preference is given to students enrolled in the automotive option) **Class 4, Credit 4**

0304-643 **Control Systems**
Introduces the student to the study of linear control systems, their behavior and their design and use in augmenting engineering system performance. Topics include control system behavior characterization in time and frequency domains, stability, error and design. This is accomplished through classical feedback control methods that employ the use of Laplace transforms, block diagrams, root locus, and Bode diagrams. An integrated laboratory will provide students with significant hands-on analysis and design-build-test experience. (0304-543) **Class 3, Studio 3, Credit 4**

0304-644 **Introduction to Composite Materials**
This course is an applied course in the fundamentals and applications of composite materials. Topics covered include constituents of composite materials, fabrication techniques, micromechanical analysis, macromechanical analysis, and the use of composites in design. Some laboratory work will be done, and a major design project is required. (0304-344, 347, 518) **Class 4, Credit 4**

0304-645 **Introduction to Biomaterials**
This course provides an overview of materials used in biomedical applications. Topics covered include structure and properties of hard and soft biomaterials, material selection for medical applications, material performance and degradation in hostile environments, and typical and abnormal physiological responses to biomaterials. Some experiments will be performed in class and a major project is required. (0304-344, 550, 518) **Class 4, Credit 4**

0304-646 **Biomedical Device Engineering**
This course is an introduction to the design of medical devices and issues that are unique to these devices. Course content includes some historical background, an overview of existing devices and trends, material selection, interfaces of medical devices with biological tissues, product testing, reliability, and regulations specific to the design and validation of medical devices. A substantial part of the course is a project, in which students will be required to work in teams to complete a preliminary design of a novel device, including appropriate analysis and documentation. Analysis methods learned from prior coursework in the students discipline will be applied to this component of the course. The course is open to all engineering majors with at least fourth or fifth year status. (Registration preference is given to students enrolled in the Bioengineering Option) **Credit 4, Class 4**

0304-652 **Fluid Mechanics of Turbomachinery**
Examines the basic principles applicable to all turbomachinery as well as the consideration of the operating and design characteristics of several basic classes of turbomachinery. Includes a major design project. (0304-415) **Class 4, Credit 4**

0304-658 **Engineering Vibrations**
The theory of mechanical vibrations with an emphasis on design applications and instrumentation. Fourier analysis techniques, numerical and experimental analysis and design methods are presented in addition to theoretical concepts. Vibrations of single-degree of freedom systems are covered, including free-damped and undamped motion; and harmonic and transient-forced motion, such as support motion, machinery unbalance and isolation. Modal analysis of multidegree of freedom systems is introduced. In addition to laboratory exercises on vibration instrumentation, an independent design project is assigned. (0304-543) **Class 3, Lab 2, Credit 4 (F, W)**

0304-660 **Refrigeration and Air Conditioning**
A basic course in the principles and applications of refrigeration and air conditioning involving mechanical vapor compression and absorption refrigeration cycles, associated hardware, psychometrics, heat transmission in buildings and thermodynamic design of air conditioning systems. Students are expected to do a design project. (0304-514, registration preference is given to students enrolled in the energy and environment option) **Class 4, Credit 4**

0304-671 **Aerostructures**
The principles of deformable bodies as applied to the analysis and design of aircraft and space vehicle structures. Topics include the study of bending and torsion of thin-walled, multi-cell beams and columns; wing and fuselage stress analysis; and structural stability. Strain energy concepts and matrix methods are utilized throughout the course. (0304-437, 518, registration preference is given to students enrolled in the aero option) **Class 4, Credit 4**

0304-672 **Dynamics of Machinery**
An introduction to the fundamentals and applications of machinery design. Basic concepts such as linkage classification, mobility and motion characteristics are introduced. The kinematic and dynamic analyses of planar lower-pair linkages are carried out using analytical vector methods, and graphical methods. The design and analysis of cams are treated by graphical and analytical methods. Major emphasis is placed on a term project in which a mechanism for specific application is kinematically and dynamically analyzed. (0304-543) **Class 4, Credit 4**

0304-678 **Propulsion**
The fundamentals of propulsion including the basic operating principles and design methods for flight vehicle propulsion systems. Topics include air-breathing engines (turbojets, ramjets, turboprops and turbopfans) as well as liquid and solid propellant chemical rockets. (0304-514 and 0304-550 or 0304-575, registration preference is given to students enrolled in the aero option) **Class 4, Credit 4**

0304-680 **Advanced Thermodynamics**
Advanced design and analysis of gas and vapor power cycles, including cogeneration and combined cycles, using concepts of energy based on the 2nd Law of Thermodynamics and the field of thermo-economics. Emphasis is also placed on determining entropy generation and irreversibility within fuel cells and fossil fuel combustion processes using chemical energy as well as developing equations of state. (0304-413, registration preference is given to students enrolled in the energy and environment option) **Class 4, Credit 4**

0304-682 **Flight Dynamics**
This course deals with the three-dimensional dynamics of aircraft, including general aircraft performance, stability and control, and handling qualities. Topics include mathematical development of equations-of-motion describing full range of aircraft motion; aerodynamic forming term coefficient development, quaternion alternative; linearization of nonlinear aircraft models, determination of range, endurance and rate of climb; simulation of aircraft trajectory; static and dynamic stability; aircraft control; and aircraft handling qualities introduction. (0304-543, 560, registration preference is given to students enrolled in the aero option. **Class 4, Credit 4**

0304-683 **Orbital Mechanics-Mission to Mars**
This course introduces orbital mechanics and space flight dynamics theory with application for Earth, lunar, and planetary orbiting spacecraft. Content includes historical background and equations of motion, two-body orbital mechanics, orbit determination, orbit prediction, orbital maneuvers, lunar and interplanetary trajectories, orbital rendezvous and space navigation (time permitting). The two body orbital mechanics problem, first approximation to all exploration orbits or trajectories, is covered with an introduction to the three body problem. Students develop computer based simulations of orbital mechanics problems including a final mission project simulation from Earth to Mars and home again requiring a number of orbit phases and transfers between these phases. (registration preference is given to students enrolled in the aerospace option) **Class 4, Credit 4**

0304-698 **Independent Study Design Project**
A design-oriented independent study requiring a major design project. (Senior-standing) **Credit 4**

0304-699 **Special Topics**
In response to student and/or faculty interest, special courses that are of current interest and/or logical continuation of regular courses will be presented. (Permission of the supervising faculty member and the department head required) See instructor for more details. **Class 4, Credit 4**

Microelectronic Engineering

0305-201 Introduction to Microelectronics

An overview of semiconductor technology history and future trends is presented. The course introduces the fabrication and operation of silicon-based integrated circuit devices including resistors, diodes, transistors and their current-voltage (I-V) characteristics. Laboratory teaches the basics of IC fabrication and I-V measurements. A five-week project provides experience in digital circuit design, schematic capture, simulation, bread-boarding, layout design, IC processing and testing. **Class 3, Lab 3, Credit 4 (F)**

0305-221 Introduction to Micro/Nanolithography

This course provides an introduction to the fundamentals of micro/nanolithography. Topics include IC masking, sensitometry, radiometry, resolution, contact lithography, projection lithography, photoresist materials and processing. Laboratories include mask making, source characterization, resist characterization, and stepper operation. (1011-208) **Class 3, Lab 3, Credit 4 (S)**

0305-320 Design of Experiments

An introduction to experimental design concepts for engineering applications. Topics covered include statistics, SPC, Process Capability Analysis, experimental design, analysis of variance, regression and response surface methodology, and design robustness. Students will utilize statistical software (JMP IN) to analyze case studies and design efficient experiments. (1016-315 or equivalent) **Class 3, Lab 3, Credit 4 (W)**

0305-350 IC Technology

An introduction to the basics of integrated circuit fabrication. The electronic properties of semiconductor materials and basic device structures are discussed, along with fabrication topics including photolithography diffusion and oxidation, ion implantation, and metallization. The laboratory uses a four-level metal gate PMOS process to fabricate an IC chip and provide experience in device design and layout (CAD), process design, in-process characterization and device testing. Students will understand the basic interaction between process design, device design and device layout. (0305-201) **Class 3, Lab 3, Credit 4 (F, S)**

0305-360 Introduction to Semiconductor Devices

An introductory course on the fundamentals of semiconductor physics and principles of operation of basic devices for beginning electrical engineering students. Topics include semiconductor fundamentals (statistical physics of carrier concentration, motion in crystals, energy band models, drift and diffusion currents) as well as the operation of p-n junction diodes, bipolar junction transistors (BJT), metal-oxide-semiconductor (MOS) capacitors and MOS-field-effect-transistors (MOSFET). Laboratory demonstrations and SPICE models are introduced. (1017-314) **Class 4, Credit 4**

0305-480 Semiconductor Devices I

An introduction to the fundamentals of semiconductor materials and the effects of variations in the material properties of the resulting current-voltage characteristics for two terminal devices (namely resistors and diodes). Topics include electron energies in solids, the statistical physics of carrier concentration and motion in crystals, energy band models, drift and diffusion currents, recombination generation of carriers, continuity equations, and the p-n junction under equilibrium and bias conditions, and metal-semiconductor Schottky and ohmic contacts. Non-idealities associated with real diodes are introduced. Design of integrated two terminal devices and electrical test demonstrations are required. (1017-314) **Class 4, Credit 4 (F, S)**

0305-482 CMOS Electronic Circuit Design

Learn about analog and digital CMOS IC design. Extract SPICE parameters from knowledge of CMOS fabrication process. Test CMOS devices and integrated circuits. Extract SPICE parameters from test measurements. Study integrated circuit design of CMOS op amps, operational trans-conductance amplifiers, bi-quad filters, comparators, RC oscillators, voltage controlled oscillators, dram sense amplifiers, analog switches, basic digital gates, flip-flops, counters, two phase non-overlapping clock, A to D and D to A converters. (0301-481, 0305-560) **Class 3, Lab. 3, Credit 4 (S, Su)**

0305-515 Principles of Electromagnetic Fields

An introduction to the fundamentals of electrostatic, magnetostatic and time varying fields that culminate with the Maxwell's equations, continuity and Lorentz force that govern the EM phenomena. Important of Laplace's and Poisson's equations in semiconductor applications is described. Electromagnetic properties of material media are discussed with emphasis on boundary conditions. Plane wave solution of Maxwell's equations is derived and discussed in loss-less and lossy media. Applications in optics include reflection/refraction and polarization of light. An introduction to transmission line theory that applies to inter-connects is provided through PSPICE simulation. A strong knowledge of vector calculus is desired. (1016-328, 1017-313) **Class 4, Credit 4, (S, Su)**

0305-520 VLSI Design

Introduction to the design of CMOS very large scale integrated (VLSI) circuits. The course makes extensive use of Mentor Graphics software in a networked workstation environment, including homework and design project. Topics include logic design and state machines, schematic capture, electrical simulation, geometrical layout, design and electrical rule checking. Standard cell libraries are used for selected assignments. Emphasis is placed on a further understanding of the fabrication process by discussion of mask layers, rule checks and circuit simulation. (0301-240, 482; 0305-350, 560) **Class 3, Lab 3, Credit 4 (S, Su)**

0305-525 Optics for Microelectronic Engineering

An introduction to the principles of optics in which reflection, refraction and transmission are explained as a result of interference between the excitation field and the atomic oscillations that result in the emission of spherical wavelets (Huygens Principle). Topics include Fresnel Coefficients, imagery due to refraction at a single surface, simple lenses, ray tracing techniques, apertures, mirrors and thick lenses. Both the paraxial case (ideal imagery) and aberrations in spherical lenses are covered. An introduction to physical optics and the topics of diffraction and interferometry is provided. These topics set the stage for understanding ellipsometers, steppers, microscopes, and other optical instrumentation utilized in IC manufacturing. Lab required. (1017-313) **Class 3, Lab 3, Credit 4 (F, W)**

0305-560 Semiconductor Devices II

An introduction to the physical mechanisms that govern the operation of metal-oxide semiconductor (MOS) capacitors, MOS field-effect transistors, and related devices. Special emphasis is given to the relation between the structural parameters of these devices and their electrical characteristics. Modern structures and small dimension effects are discussed. Device design and SPICE models for these devices are investigated. BJTs are covered after a thorough investigation of MOSFETs. (0305-460) **Class 4, Credit 4 (F, W)**

0305-564 Microlithography Systems

A course covering the physical aspects of lithography. Image formation in optical projection, optical proximity, and high energy systems (DUV/VUV, e-beam/SCALPEL, x-ray, and EUV) are studied. Fresnel diffraction, Fraunhofer diffraction, and Fourier optics are utilized to understand diffraction-limited imaging processes. Topics include illumination, lens parameters, image assessment (resolution, alignment and overlay), phase-shift masking, and resist interactions. Lithographic systems are designed and optimized through use of modeling and simulation packages. Current status of the practical implementation of advanced technologies in industry as well as future requirements will be presented. (0305-221, 320, 350) **Class 3, Lab 0, Credit 3 (S, Su)**

0305-574 Microlithography Systems Lab

Laboratory to be taken concurrently with 0305-564. Topics emphasize optical microlithography modeling, illumination systems, reticle enhancement techniques, alignment, and optimization of image capture related to focus, exposure and substrate reflectivity. **Class 0, Lab 3, Credit 1 (S, Su)**

0305-599 Independent Study

A supervised investigation within a microelectronic area of student interest. Proposals for the independent study must be approved by the faculty member and department head and submitted prior to registration. **Class variable, Credit variable 1-4**

0305-632 **Silicon Processes**
The fundamental silicon based processing steps introduced in 0305-350 are expanded upon to cover state-of-the-art issues such as thin oxide growth, atomistic diffusion mechanisms, advanced ion implantation and rapid thermal processing (RTP). Physical vapor deposition (PVD) to form conductive and insulating films is introduced. MOS capacitance voltage measurement and surface charge analysis are studied. These topics are essential for understanding the fabrication of modern IC's. Computer simulation tools (i.e. SUPREM) are used to model processes, build device structures, and predict electrical characteristics, which are compared to actual devices that are fabricated in the associated laboratory. (0305-350, 560) **Class 3, Lab 3, Credit 4 (F, W)**

0305-643 **Thin Film Processes**
This course focuses on the deposition and etching of thin films of conductive and insulating materials for IC fabrication. A thorough overview of vacuum technology is presented to familiarize the student with the challenges of creating and operating in a controlled environment. Chemical Vapor Deposition (CVD) and electroplating technologies are discussed as methods of film deposition. Plasma etching and Chemical Mechanical Planarization (CMP) are studied as methods for selective removal of materials. Applications of these fundamental thin film processes to IC manufacturing are presented. (0305-320, 350) **Class 3, Lab 3, Credit 4 (S, Su)**

0305-650 **CMOS Processing Lab**
A laboratory course in which students manufacture and test CMOS integrated circuits. Topics include design of individual process operations and their integration into a complete manufacturing sequence. Students are introduced to work in process tracking, ion implantation, oxidation, diffusion, plasma etch, LPCVD, and photolithography. Analog and Digital CMOS devices are made and tested. This course is organized around multidisciplinary teams that address the management, engineering and operation of the student run CMOS factory. (0305-632) **Class 2, Lab 6, Credit 4 (F, W)**

0305-666 **Microlithography Materials and Processes**
The course covers the chemical aspect of microlithography and resist processes. Fundamentals of polymer technology will be address and the chemistry of various resist platforms including novolas, styrene and a acrylate systems will be covered. Double patterning materials will also be studied. . Topics include the principles of photo polymerization, including synthesis, photo absorption and emission, processing technologies and methods of process optimization. Also, advanced lithographic techniques and materials and processes are applied to optical lithography. There is an associated laboratory. (0305-221, 320, 350) **Class 3, Lab 0, Credit 3 (F, W)**

0305-676 **Microlithography Materials and Processes Lab**
Laboratory will be taken concurrently with 0305-666. Materials characterizations and process optimizations will utilize experimental design techniques. Processes to be studied include development rate monitoring. DUV resists, BARC, resist silylation and SEM evaluation of imaged resists and etched structures. **Class 0, Lab 3, Credit 1 (F, W)**

0305-681 **Senior Design Project I**
A capstone design experience for microelectronic engineering senior students. Students propose a 10-week project related to microelectronic process, device, component or system, to meet desired specifications within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. The students plan a timetable and write a formal proposal. The proposal is evaluated on the basis of intellectual merit, sound technical/research plan, and feasibility. The proposed work is carried through in the sequel course, Senior Design Project II (0305-691). Each student is required to make a presentation of the proposal. (0305-320, 574, 632, 643) **Class 2, Lab 6, Credit 4 (F, W)**

0305-688 **MEMS System Evaluation**
This course focuses on evaluation of MEMS, micro-systems and micro-electromechanical motion devices utilizing MEMS testing and characterization. Evaluations are performed using performance evaluation matrices, comprehensive performance analysis and functionality. Applications of advanced software and hardware in MEMS evaluation will be covered. (Senior-standing required) **Class 4, Credit 4**

0305-691 **Senior Design Project II**
A capstone design experience for microelectronic engineering senior students. In this 10-week course, students conduct a hands-on implementation of the projects proposed in the previous course, Senior Design Project I. Technical presentations of the results, including a talk and a poster, are required at the annual conference on microelectronic engineering organized by the department in May. A written paper in IEEE format is required and is included in the conference journal. (0305-681) **Class 1, Lab 3, Credit 2 (S)**

Computer Engineering

0306-200 **Introduction to Computer Engineering**
Briefly describes the field of computer engineering and provides a frame of reference for the sequences of computer engineering, computer science and electrical engineering courses that appear in the computer engineering curriculum. Topics include an introduction to computers and computing, basic concepts, nomenclature, historical background and some elements of data representation. Teamwork, communication skills and contemporary issues are addressed. **Class 1, Credit 1 (F)**

0306-201 **Freshman Seminar**
Introduces various topics of interest to computer engineering majors, including teamwork, laboratory exercises and aspects of engineering design. (0306-200) **Class 2, Credit 1 (W)**

0306-250 **Assembly Language Programming**
An introduction to the fundamental computer organization, assembly language programming and input/output techniques of a modern microprocessor system. Covers addressing methods, machine instructions assembler directives, macro definitions, subroutine linkage, data-structures, I/O programming and interrupts. The assembly language program design techniques necessary to write efficient, maintainable device drivers are considered. The Freescale HCS12 microcontroller and Code Warrior Development Environment family of devices are used in most class examples and all required programming projects. (4003-232 or 242, and 0306-341) **Class 4, Lab 2, Credit 4 (F, W)**

0306-341 **Introduction to Digital Systems**
Covers the specification, analysis and design of digital systems including the study of combinational and sequential systems using standard modules such as decoders, multiplexers, shifters, registers, and counters. The laboratory provides more insight into the physical and circuit aspects of the design and implementation of digital systems using SSI, MSI, and LSI components as well as CAD tools. (0306-201 or department permission) **Class 3, Lab 2, Credit 4 (S, F)**

0306-351 **Hardware Description Languages**
This course presents modern approaches to the design, modeling and testing of the digital system. Topics covered are: VHDL and Verilog HDL as hardware description languages, simulation techniques, design synthesis, and verification methods. The theory is exemplified by practical examples and utilizes industry-standard simulation and synthesis tools. Laboratory projects that enable students gain hands-on experience are required. The projects include complete design flow: design of the system, modeling using HDLs, simulation, synthesis and verification. (0306-341 and 4003-232 or 242) **Class 3, Lab 2, Credit 4 (W, S)**

0306-381 **Applied Programming**
An introduction to classical algorithms used in the solution of numerical problems encountered in science and engineering. The C language is introduced as a tool for implementing these algorithms. Topics include an introduction to C, computer number representation and roundoff error, algorithms for finding roots of nonlinear equations, interpolation, numerical differentiation and integration, function approximation and data fitting solutions to systems of linear equations, and general matrix manipulation. (4003-334 and 1016-306) **Class 4, Credit 4 (F, W)**

0306-451 **Digital Signal Processing**
This course introduces basic elements of discrete time signals and systems and fundamental signal processing techniques, such as FIR and IIR Filtering, the z transform and the Discrete Fourier transform. Theory is strengthened through MATLAB based projects and exercises. (1016-306,331, and 0306-381) **Class 4, Credit 4, (F, W)**

- 0306-550 Computer Organization**
Provides an understanding of the information transfer and transformations that occur in a computer, with emphasis on the relations between computer architecture and organization. Topics include design levels and their respective primitives, modules and descriptive media, register transfer and micro-operations basic computer organization and design, central processor organization, control unit and microprogramming, memory organization, input output organization, computer architecture-defining the hardware/software interface, and from architecture to organization. (0306-250) **Class 4, Credit 4 (F, W, S)**
- 0306-551 Computer Architecture**
The course covers various aspects of advanced uniprocessor computer architecture design. Instruction set architecture design alternatives are discussed with emphasis on the Reduced Instruction Set Computer (RISC) architecture. Techniques to enhance CPU performance such as pipelined execution optimizations, conditional branch handling techniques, exploitation of instruction-level parallelism, multiple-instruction issue and dynamic scheduling are studied. Cache and memory hierarchy design and performance issues are presented. The design aspects of efficient and reliable input/output systems are covered. The course concludes with an introduction to concepts of multi-processor systems design. (0306-550) **Class 4, Credit 4 (F, W)**
- 0306-553 Digital Control Systems**
Concentrates on the analysis, simulation and design of control systems using root locus, frequency response and state variable representation. It also deals with implementation of digital filters for control applications. (0306-451) **Class 4, Credit 4 (S)**
- 0306-560 Interface and Digital Electronics**
Introduction to some common transducers, transformations from raw measured quantity to transducer output. Signal conditioning circuits include: Wheatstone bridge, instrumentation amplifiers, active filters, and sample and hold circuits. The course also covers analog-to-digital and digital-to analog conversions processes, logic families including BJT, TTL, CMOS, BiCMOS and their interfaces to each other. Mentor Graphics design tools or PSpice are used to simulate and design active filters. Freescale Semiconductor microcontroller HCS12, CodeWarrior and C code programming are used to design and develop a data acquisition system. The course emphasizes both hardware and software design in a data acquisition systems. (0301-481) **Class 3, Lab 3, Credit 4 (W, S)**
- 0306-561 Digital Systems Design**
Covers the specification, analysis, design and implementation of digital systems. The hierarchical and structured design methodology is introduced. Both synchronous and asynchronous sequential machines are studied. Student designs incorporate MSI/LSI modules, PALS, EPROMS, FPGAs and elements of VHDL. Design for testability is emphasized. (0306-341, 351) **Class 3, Lab 3, Credit 4 (S, Su)**
- 0306-599 Independent Study**
Allows upper-level undergraduate students an opportunity to independently investigate, under faculty supervision, aspects of the field of computer engineering that are not sufficiently covered in existing courses. Proposals for independent study activities must be approved by both the faculty member supervising the independent study and the department head. (Permission of supervising faculty member and department head required.) **Credit variable 1-4**
- 0306-615 Wireless Networks**
This course covers fundamental techniques in design and operation of first, second, and third generation wireless networks: cellular systems, medium access techniques, radio propagation models, error control techniques, hand-off, power control, common air protocols (AMPS, IS-95, IS-136, GSM, GPRS, EDGE, WCDMA, cdma2000, etc.), radio resource and network management. As an example for the third generation air interfaces, wireless Internet and sensor networks are discussed in detail since it is expected to have a large impact on future wireless networks. (0306-694) **Class 4, Credit 4**
- 0306-620 Design Automation of Digital Systems**
This course deals with the design automation of digital systems from modeling and modern logic synthesis methods to fast prototyping of complex systems using FPGAs and VHDL. Topics covered are: VHDL modeling of combinational and sequential logic for synthesis and efficient hardware implementation, modern FPGA devices, methodologies for hardware/software co-design. Laboratory projects in which students acquire a solid capability of Xilinx design tools and FPGA devices are required (0306-561) **Class 3, Lab 3, Credit 4 (F, W)**
- 0306-624 High Performance Architectures**
This course will focus on learning and understanding the available hardware options to satisfy the needs of high performance and computational intensive applications. Special attention will be paid to single platform massively parallel devices, their programming and efficient use of the hardware resources. The course will include hands on work with the actual device, lab work, and technical reports and conference paper reading as a relevant source of information. (0306-381, 551 or department approval) **Class 4, Credit 4**
- 0306-630 Introduction to VLSI Design**
This course will cover the basic theory and techniques of Very Large Scale Integration (VLSI) design in CMOS technology. Topics include CMOS transistor theory and operation, design and implementation of CMOS circuits, fabrication process, layout and physical design, RC and Linear delay model, static and dynamic logic families, Arithmetic sub blocks, testing and verification, and basics of memory design. Laboratory assignments and projects, designed using Mentor Graphics EDA tools which facilitate learning circuit-level design and simulation, layout and parasitic extractions, pre- and post-layout validation, and SPICE level simulations. (0306-561 and 0301-481 or equivalent) **Class 4, Lab 2, Credit 4 (F, W, S)**
- 0306-631 Advanced VLSI Design**
A second course in the design and implementation of very large scale integrated (VLSI) circuits and systems. Emphasis will be placed on the design and use of dynamic precharge and precharge-evaluate CMOS circuitry including Domino, NORA and Zipper CMOS logic, and subsystems. Basic requirements of a clocking system and a general clocking strategy for timing design in both static and dynamic CMOS circuits are investigated. Topics on the design and use of a standard cell library in the implementation of large system designs will be covered. The use of workstations with Mentor Graphics design tools and the Synopsys Synthesis tool suite will be required in laboratory projects leading to the design, VHDL synthesis and testing of an integrated circuit device. (0306-630, 351) **Class 4, Lab 2 Credit 4**
- 0306-632 Low Power Design**
This course covers the theory and practical aspects of low-power integrated circuit design in CMOS technology. Topics include: estimation and modeling power dissipation in CMOS circuits at different design abstractions, power optimization techniques with emphasis on transistor and system level, energy efficient SRAM cells and cache designs, low power design methodology, effect of device scaling, process variations and their impact on power optimization. Emerging architecture using non-classical CMOS Logic will be covered. Assignments and projects focus on designing low-power circuits using Synopsys CAD tools. Presentations and term papers based on recent energy efficient research articles are required. (0306-630, 351, 561) **Class 4, Credit 4**
- 0306-654 Computer Engineering Design Projects I**
The first of a two course undergraduate capstone design sequence. Lecture materials include design process methodologies, team dynamics, engineering ethics, communication skills, current topics, real-time programming techniques, formulating project proposals, and an introduction to the laboratory tools available. Students formulate a proposal for the design of multidisciplinary team project to be completed during the concluding course, and investigate important components of that multidisciplinary design project. (0306-560 and fourth-year standing in computer engineering, completed at least 3 co-ops) **Class 4, Credit 4 (W, S)**
- 0306-656 Computer Engineering Multidisciplinary Senior Design Project I**
This is the first of a two-course capstone design sequence and is taught in an environment that simulates an industrial setting. Students work in multidisciplinary design teams to generate design concepts and prototype solutions to real-world engineering problems. Emphasis is placed on engineering analysis, design and testing methodologies, teamwork and communication skills. Fifth-year standing and completed at least three co-ops. **Class 4, Credit 4 (F, W)**
- 0306-657 Computer Engineering Design Projects II**
The conclusion of a capstone undergraduate design projects course in computer engineering. Students will have prepared for the multidisciplinary team project during the previous course and will have done some detailed project analysis over the intervening period. This course begins with project design reviews presented to the class and selected faculty members. Project performance analysis and reliability are major metrics. (0306-654) **Class 4, Credit 4 (F, S)**

**0306-659 Computer Engineering
Multidisciplinary Senior Design Project II**

This is the second of a two-course capstone design sequence and is taught in an environment that simulates an industrial setting. Students work in multidisciplinary design teams to generate design concepts and prototype solutions to real-world engineering problems. Emphasis is placed on engineering analysis, design and testing methodologies, teamwork and communication skills. (0306-656) **Class 4, Credit 4 (W, S)**

0306-663 Embedded and Real-time Systems

Conducted in a studio class/lab format with lecture material interspersed with lab work, this course presents a general road map of real time and embedded systems. Microcontrollers used as external, in dependent performance monitors of more complex real-time systems. Much of the material focuses on a commercial real-time operating system, using it for programming projects on development systems and embedded target systems. Fundamental material on real-time operating systems are presented, including scheduling algorithms, priority inversion, and hardware-software co-design. (4010-361 and 0306-250 or equivalent and either 4003-440, 4003-713 or 4010-441 or equivalent) **Class 4, Credit 4**

0306-664 Modeling of Real-time Systems

This course introduces the modeling of real-time software systems. It takes an engineering approach to the design of these systems by analyzing a model of the system before beginning implementation. UML will be the primary modeling methodology. Non-UML methodologies will also be discussed. Implementations of real-time systems will be developed manually from the models and using automated tools to generate the code. **Class 4, Credit 4**

0306-672 Special Topics in Computer Engineering

Topics and subject areas that are not among the courses listed here are frequently offered under the special topics title. Under the same title also may be found experimental courses that may be offered for the first time. Such courses are offered in a formal format; that is, regularly scheduled class sessions with an instructor. The level of complexity is commensurate with a senior-level undergraduate/first year graduate technical course. **Class 4, Credit 4**

0306-675 Robotics

This course deals with mobile robotics. The development of the field and an overview of different approaches to mobile robot guidance navigation, vision, machine learning and control will be given. The emphasis of the course will be on algorithms and implementation techniques. Relevant projects and programming assignments will be required. (0306-451) **Class 4, Credit 4**

0306-676 Robust Control

One of the most useful qualities of a properly designed feedback control system is robustness, i.e., the ability of the closed-loop control system to continue to perform satisfactorily despite large variations in the (open-loop) plant dynamics and the environment. This new approach has been successfully applied to high performance servo drive systems, unmanned aerial vehicles, visual feedback systems and mobile robots among others. This course will provide an introduction to state-of-the-art techniques for analysis and design of robust feedback systems. MATLAB will be used extensively for analysis, design and simulation. (0306-553 or equivalent, 1016-331 or equivalent is recommended) **Class 4, Credit 4**

0306-684 Digital Image Processing Algorithms

This is a first course in digital image processing that emphasizes both theory and implementation. Two-dimensional sampling, transforms, and filtering are introduced and used for image enhancement, compression, restoration, segmentation, and applications in color and video processing. Project assignments involve MATLAB implementation of algorithms and paper reviews. (0306-451) **Class 4, Credit 4**

0306-685 Computer Vision

This course covers both fundamental concepts and the more advanced topics in Computer Vision. Topics include image formation, color, texture and shape analysis, linear filtering, edge detection and segmentation. In addition, students are introduced to more advanced topics, such as model based vision, object recognition, digital image libraries and applications. Homework, literature reviews, and programming projects are integrated with lectures to provide a comprehensive learning experience. (0306-451 or permission of instructor) **Class 4, Credit 4**

0306-694 Data and Computer Communication

Provides a unified view of the broad field of data and computer communications and networks. Emphasis is on the basic principles underlying the technology of data and computer networks. Critical issues on data communication networks as well as the current and evolving standards in computer communications architecture are discussed. The topology, access control and performance of various types of networks are studied in detail. A comprehensive student project is required. (1016-345 and at least fourth-year standing or permission of instructor) **Class 4, Credit 4 (F, W)**

0306-695 Network Security

This course covers a set of advanced topics in wireless and wired network security design. It targets deep-level network security protocols design. The topics include applied cryptography fundamentals, Internet security (IPSec, Kerberos, email security, etc.), wireless LAN security, sensor network and security, and ad hoc network security. Class projects include Java/C-based RC4/Hash design, Milinix-based TCP security experiments and Wireless security research. (0306-694 or equivalent) **Class 4, Credit 4**

0306-699 Independent Study

Allows upper-level graduate students an opportunity to independently investigate, under faculty supervision, aspects of the field of computer engineering that are not sufficiently covered in existing courses. Proposals for independent study activities are subject to approval by both the faculty member supervising the independent study and the department head. (Permission of the supervising faculty member and the department head required.) **Credit variable 1-4**

Applied Statistics

0307-315 Statistics for Engineers

Descriptive statistics; probability; measurement techniques; normal distribution and central limit theorem applied to confidence intervals and statistical inference; control charts. Topics will be related to engineering through real-world examples. (Grade of C or better in 1016-283 or grade of C or better in 1016-282 and co-registration in 1016-283) **Credit 4 (F)**

0307-361 Probability and Statistics for Engineers I

Statistics in engineering; enumerative and analytic studies; descriptive statistics and statistical control; sample spaces and events; axioms of probability; counting techniques; conditional probability and independence; distributions of discrete and continuous random variables; joint distributions; central limit theorem. (1016-283 or 1016-274) **Credit 4 (F)**

0307-362 Probability and Statistics for Engineers II

Point estimation; hypothesis testing and confidence intervals; one- and two-sample inference; introduction to analysis of variance, experimental design, control charts and measurement studies. (0307-361) **Credit 4 (W)**

0307-420 Design of Experiments for Biomedical Engineers

Topics covered include: observational versus experimental studies, fundamentals of good design, including randomization, replication, blocking, and blinding; one-factor designs: completely randomized, randomized complete block, and Latin-Square designs; fixed and random effects; analysis of residuals; two-factor and factorial designs; repeated measures designs; two-level factorial and fractional factorial designs. Lectures and assignments incorporate real-world examples and critiques of studies in the literature. Students use Minitab software. (0307-361, 0307-362) **Class 4, Credit 4 (F)**

0307-442 Statistical Computing

This course focuses on the programming language used in SAS statistical software to read in raw data, create and manipulate SAS data sets, and create SAS macros. This course covers the material for "SAS Base Programmer" certification. Students seeking employment in statistical professions are encouraged to attain this certification. Corresponding Minitab commands and macro programming will also be covered. (1016-352 or equivalent). (Cross-listed with 0307-742.) **Credit 4 (F)**

Microsystems

0308-601

Lasers

This course introduces students to the design, operation and applications of lasers (Light Amplification by Stimulated Emission of Radiation). Topics: ray tracing, Gaussian beams, optical cavities, atomic radiation, laser oscillation and amplification, mode locking and Q switching, and applications of lasers. (0301-482) **Class 4, Credit 4**

0308-612

Nonlinear Optics

This course introduces nonlinear concepts applied to the field of optics. Students learn how materials respond to high intensity electric fields and how the materials response: enables the generation of other frequencies, can focus light to the point of breakdown or create waves that do not disperse in time or space (solitons), and how atoms can be cooled to absolute zero using a laser. Students will be exposed to many applications of nonlinear concepts and to some current research subjects, especially at the nanoscale. Students will also observe several nonlinear-optical experiments in a state-of-the-art photonics laboratory. (0301-482) **Class 4, Credit 4**

0308-631

Integrated Optical Devices and Systems

This course discusses basic goals, principles and techniques of integrated optical devices and systems, and explains how the various optoelectronic devices of an integrated optical system operate and how they are integrated into a system. Topics include optical waveguides, optical couplers, micro-optical resonators, plasmonics, photonic crystals, modulators, introduction to semiconductor lasers and optical detectors, optical signal processing systems, design tools, fabrication techniques, and the applications of optical integrated circuits. Some of the current state-of-the-art devices and systems will be investigated by reference to journal articles. (0301-473, 482) **Class 4, Credit 4**

0308-671

Optoelectronics

To provide an introduction to the operating principles of optoelectronic devices used in various current and future information processing and transmission systems. Emphasis in this course will be on the active optoelectronic devices used in optical fiber communication systems. Topics include pulse propagation in dispersive media, polarization devices, optical fiber, quantum states of light, fundamental of lasers, semiconductor optics, light-emitting diodes, laser diodes, semiconductor photon detectors, optical modulators, quantum wells, and optical fiber communication systems. (0301-482) **Class 4, Credit 4**

Chemical Engineering

0309-051

Discovery-Chemical Engineering

Gives first-year students an overview of chemical engineering and helps integrate the incoming students into the RIT Chemical Engineering community. Topics include student success (e.g., transition to the college experience, awareness of campus resources, academic and personal success strategies, information literacy, personal development and responsible decision making), career options in engineering, plant tours, design projects and engineering ethics. Also gives the student an opportunity to interact with Chem E faculty, upper-division students, and other first-year Chem E students. Fulfills the university requirement for FYE. **Class 1, Credit 1 (F)**

0309-181

Chemical Engineering Insights I

This course is intended to provide the foundation for success in the chemical engineering program at RIT and the field of chemical engineering. This course provides an overview of the traditional, contemporary, and future issues facing chemical engineers, the methodology chemical engineers use to solve problems, engineering ethics, and career options in chemical engineering. **Class 2, Credit 1 (F)**

0309-182

Chemical Engineering Insights II

Case studies involving modern problems that are amenable to chemical engineering analysis are proposed and discussed to illustrate the problem solving strategies used in the profession as well as the constraints on design due to product specifications, environmental issues, economics, and engineering ethics. The nature of the analyses will be both qualitative and quantitative. Assignments will involve team settings with results presented to the class, and discussion and debate between teams. **Class 2, Credit 1 (W)**

0309-183

Chemical Engineering Insights III

This course continues the case study approach used in Chemical Engineering Insights II, and focuses on quantitative analysis skills appropriate for first year students. The spreadsheet environment will be introduced as a means of organizing and designing experiments and solving physically-motivated mathematical problems. The course is intended to provide students with essential skills that will aid them in their technical coursework. **Class 2, Credit 1 (S)**

0309-230

Chemical Process Analysis

A first course for chemical engineers, introducing units, dimensions and dimensional analysis, simple material and energy balances for batch and continuous systems in steady and unsteady states with/without chemical reaction, and elementary phase equilibrium in multi-component systems. (1011-216 or equivalent; 1016-283 or equivalent may be taken as prerequisites or as corequisites) **Class 4, Credit 4 (F)**

0309-301

Math Techniques for Chemical Engineering I

Mathematical and statistical techniques necessary for engineering analysis are introduced that augment training from core mathematics courses. The spreadsheet environment is used to implement mathematical procedures and examine data results. The tremendous power, functionality, and user-friendliness inherent in spreadsheets is examined and applied to chemical engineering problems. VBA programming is taught for more complex spreadsheet and mathematical operations. (1016-306; 1016-305 pre- or corequisite) **Class 3, Credit 3 (F)**

0309-302

Math Techniques for Chemical Engineering II

This course introduces the student to more advanced mathematical and numerical methods necessary for engineering analysis. Topics examined include roots of equations, curve fitting, statistics, Fourier analysis, solution of systems of algebraic equations, optimization, numerical differentiation and integration, and the solution of ordinary and partial differential equations. The MATLAB programming environment is utilized to facilitate computation. Techniques are applied to mathematical problems naturally arising in chemical engineering. (0309-301) **Class 2, Credit 2 (W)**

0309-310

Thermodynamics I: Single Component Systems

A course in single phase thermodynamics, continuing with concepts developed in earlier curriculum (Chemical Process Analysis). The first and second laws of thermodynamics and concepts of entropy and equilibrium are examined in open and closed control volume systems. Energy, work, and heat requirements of various unit operations are examined. Equations of states and properties of fluids are explored. The thermodynamic origins of phase transition, as well as the physics of processes incorporating single-component phase equilibrium, are examined. (0309-230) **Class 4, Credit 4 (W)**

0309-320

Fluid Mechanics I

Force and mass balances on control volumes are considered in both static and dynamic situations. Hydrostatic effects in manometers and static forces on submerged objects are calculated. The relationship between energy balances and force balances on flowing systems is examined primarily under isothermal conditions. Forces on solids due to flowing fluids are determined. Head losses and pumping requirements are considered in piping systems. The art of engineering approximation is examined through estimates of forces due to flow on solids, as well as various limiting cases involving internal pipe flows with friction factors. Friction factors for external flows are also studied and utilized in force balances on solids. (0309-230) **Class 4, Credit 4 (W)**

0309-330

Mass Transfer Operations

This course covers the analysis and design of chemical processes for the separation and purification of mixtures. The course will include an introduction to the fundamentals of diffusion and the analogies between heat and mass transfer, leading up to mass transfer coefficients and their use in solving a variety of engineering problems. Design methodologies will be examined for equilibrium based processes (such as absorption, distillation, extraction and crystallization) and rate-governing separations (such as dialysis and reverse osmosis). Fixed bed processes such as adsorption and ion exchange will also be introduced. (0309-230, 1016-306 or equivalent and 1016-305 recommended) **Class 4, Credit 4 (W)**

0309-340 **Reaction Engineering I**
The course provides the fundamental principles of chemical kinetics in single phase systems and their mathematical formalization from a continuum, micro-scale viewpoint. Topics include mass action kinetics and absolute rate theory, series and parallel reaction systems, and the mathematical modeling of various reactor configurations under idealized conditions. Well-mixed and continuous, plug flow reactor systems are analyzed for both single and multiple reaction systems. Continuous versus batch operation under isothermal and adiabatic conditions are examined. (0309-230, 1016-306 or equivalent, and 1016-305 recommended) **Class 4, Credit 4 (F)**

0309-381 **Chemical Engineering Systems Analysis Paper**
This written paper is a requirement for students enrolled in the minor for chemical engineering systems analysis. The topic area is chosen by the student with faculty adviser approval, and must be amenable to analysis using chemical engineering systems methodology and principles (Concurrent with completion of coursework of the minor) **Class 0, Credit 0**

0309-391 **Chemical Engineering Principles Lab I**
This laboratory course reinforces topics covered in Thermodynamics and Fluid Mechanics. Students are introduced to basic equipment and methodologies for designing laboratory experiments, measuring results, interpreting data, and drawing objective conclusions. Students work in teams to design experimental procedures, identify lab equipment, and assemble simple apparatus to achieve specific experimental goals. (0309-410, 420 pre- or corequisites) **Lab 6, Credit 2 (F)**

0309-392 **Chemical Engineering Processes Lab II**
This course extends the laboratory experience from the previous Chemical Engineering Principles Lab, and focuses on unit operations common to engineering practice. Students work in teams to design experimental procedures on existing equipment, and to in some cases, manipulate experimental apparatus to achieve specific experimental goals. (0309-330, 440 pre- or corequisites) **Lab 6, Credit 2 (S)**

0309-401 **System Dynamics and Control**
The dynamic behavior of chemical process components is examined. The mathematics of Laplace transforms are examined extensively as a fundamental underpinning of control theory. Block diagrams, feedback control systems, and stability analysis are introduced. (0309-302) **Class 4, Credit 4 (S)**

0309-410 **Thermodynamics II-Multiple-Component Systems**
Thermodynamics of mixtures and phase equilibrium over control volumes augment single phase knowledge of thermo. Multiple component phase equilibrium is considered, as well as solution thermodynamics and chemical reaction. Concepts are imbedded in more sophisticated examples of applications of the first and second law to chemical engineering processes. (0309-310, 1016-306) **Class 4, Credit 4 (S)**

0309-420 **Fluid Mechanics II**
Fundamentals of fluid flow are examined predominantly on a differential scale. Local differential equations governing fluid flow are derived from corresponding integrals, and linkages to earlier integral control volume balances in Fluid Mechanics I are made. Exact solutions of differential equations are considered under both steady state and transient conditions, as are typical approximations to those equations such as creeping, potential, and boundary layer flows. Forces on surfaces are determined by introducing local solutions into appropriate integrals. This linkage also shows the theoretical basis for friction factors, drag coefficients, and head losses used in coarser scale macroscopic balances. (0309-320, 1016-306; 0309-301 pre- or corequisite) **Class 4, Credit 4 (S)**

0309-421 **Heat Transfer**
Fundamentals of heat transfer are introduced from a point-wise yet continuum perspective involving conduction, convection, and radiation. General local differential equations and boundary conditions describing heat transfer are derived and solved in a variety of configurations. Simplifying approximations of conduction, convection, and radiation dominated heat transfer are introduced, and combined modes of transfer are analyzed. The performance of heat exchangers is analyzed for a variety of common configurations. (0309-310, 420) **Class 4, Credit 4 (F)**

0309-440 **Reaction Engineering II**
The fundamentals of chemical kinetics with the concepts of mass and energy conservation are examined and integrated, from both a macroscopic and microscopic perspective, to develop models that describe the performance of chemical reactors. Homogeneous, heterogeneous, and catalytic systems will be discussed. The conceptual framework and tools are developed to understand and design chemical reactor processes and to interpret experimental data obtained on a laboratory scale to design pilot scale and full scale manufacturing processes. Both continuous flow and batch reactor systems are examined, with a major focus on process techniques for the manufacture of specialty chemicals. (0309-340, 410, 421; 0309-330 pre- or corequisite) **Class 4, Credit 4 (W)**

0309-450 **Micro-Scale Phenomena**
This course introduces the scientific and engineering principles governing phenomena occurring on the smallest continuum scales. Topics include surface tension and related interfacial phenomena, Vander Waals and electrostatic phenomena, colloidal suspensions and their stability, self-assembly in thin films and on solid surfaces, quantum wells and dots, molecular biology, and non-equilibrium solidification phenomena. Conventional chemical engineering analyses topics, such as transport processes and reaction chemistry, are adjusted and extended to the micro-scale. (1013-432 and fourth year standing or permission of instructor) **Class 4, Credit 4 (F)**

0309-550 **Analysis of Multi-Scale Processes**
This course examines the use of larger scale chemical engineering processes to control and manipulate micro-scale phenomena. In an introductory topic, human physiology is examined as a prototypical multi-scale process, and biometric principles are discussed. Langmuir-Blodgett film generation, thin-film breakup and draining, chemical vapor deposition, emulsion based reaction processes to create nano-particles, flow systems involving colloids, porous media flows and membrane separations, and controlled patterning via molecular self assembly are among processes examined. (0309-421, 440, 450) **Class 4, Credit 4 (W)**

0309-590 **Design with Constraint**
This course examines typical constraints on design and their integration with technology. Economics, environmental considerations, ethics, and globalization and supply chain management ideas are among the concepts introduced. Modern examples that integrate knowledge of unit operations and processes with design constraints are examined. (Pre- or corequisite 0309-591 or 592) **Class 4, Credit 4 (W)**

0309-591 **Multidisciplinary Senior Design I**
MSD I is the first half of a two-quarter sequence design course oriented to the solution of real-world engineering problems. The mission is to enhance engineering education through a capstone design experience that integrates engineering theory, principles, and processes within a collaborative environment that bridges engineering disciplines. Working in multidisciplinary teams and following the product development process, students work with a customer to establish needs and develop engineering specifications. Students employ rigorous engineering theory, principles, and processes to evaluate the feasibility of a design prototype and resolve major technical hurdles. The prototype design is carried forward into the second quarter of study in this sequence. (Fifth-year standing and 0309-590 pre- or corequisite) **Class 4, Credit 4**

0309-592 **Multidisciplinary Senior Design II**
MSD II is the second half of a two-quarter sequence design course oriented to the solution of real-world engineering problems. Students continue to work in teams formed in the first quarter of the sequence. The prototype designed in MSDI must be built and fully tested for viability and adherence to engineering principals. Students must document the design and testing process thoroughly. The course culminates with a professional presentation to faculty and to the customer. (Fifth year standing, 0309-591) **Class 4, Credit 4**

0309-599 **Independent Study**
A student project course encompassing both analytical and experimental work. (Fourth- or fifth-year standing) **Credit variable 1-6**

Biomedical Engineering

- 0310-051** **Discovery-Biomedical Engineering**
Gives first-year students an overview of biomedical engineering and helps integrate the incoming students into the RIT Biomedical Engineering community. Topics include student success (e.g., transition to the college experience, awareness of campus resources, academic and personal success strategies, information literacy, personal development and responsible decision making), career options in engineering, plant tours, design projects and engineering ethics. Also gives the student an opportunity to interact with BME faculty, upper-division students, and other first-year BME students. Fulfills the university requirement for FYE. **Class 1, Credit 1 (F)**
- 0310-052** **First Year Enrichment/Freshman Seminar II**
Second in a two-course sequence. Gives first-year students an overview of biomedical engineering and helps integrate incoming students into the RIT Biomedical Engineering community. Topics include student success (e.g., transitions to the college experience, awareness of campus resources, academic and personal success strategies, information literacy, personal development and responsible decision making), career options in engineering, plant tours, design projects, life long learning topics, and engineering ethics. Also gives the student an opportunity to interact with BME faculty, upper-division students and other first-year BME students. Fulfills the university requirement for FYE. **Class 1, Credit 1 (W)**
- 0301-181** **Biomedical Engineering Seminar I**
This weekly seminar provides an overview of the discipline including an introduction to relevant literature, organizations, examples of successes, ongoing going challenges and possible new opportunities. The students also have an opportunity to interact with their curricular adviser and obtain a clear understanding of the program and the possible curricular options. **Class 1, Credit 1 (F)**
- 0310-182** **Biomedical Engineering Seminar II**
Introduction to field of biomedical engineering with the following components: engineering methodology applicable to biomedical problems; statement, research, solution proposal and summary report and presentation of results, team dynamics, organization and interpersonal communication associated with working with a multidisciplinary team, computing tools and methods for data acquisition and processing using application software (e.g. single purpose data acquisition tools, spreadsheets), and programming tools (MATLAB, Labview or equivalent). The concept of signal and environmental noise as an undesirable yet unavoidable measurement artifact, and techniques are taught to minimize or eliminate these artifacts in biomedical systems. **Lab 3, Credit 1 (W)**
- 0310-183** **Biomedical Engineering Seminar III**
Builds on Introduction to BME I with the following additional components: programming as an organized, problem solving method (MATLAB and Labview or equivalent), programming to remove artifacts from measured signals and analysis of relevant statistics. Biomedical engineering related problems are considered that require multi-person team and necessitates a problem statement, research, solution proposal, data acquisition and processing, data analysis, a summary report, and presentation of results. (0310-182) **Lab 3, Credit 1 (S)**
- 0310-200** **Functional Anatomy**
Introduction to the structures and components of the human body as well as their basic functionality. Essential elements of human anatomy and histology will be presented. Students will be encouraged to correlate anatomical structure and function with non-human structures and devices that might be considered as replacements or improvements. Fundamental concepts in biomechanics will be introduced and integrated with relevant topics covered in University Physics I and II. The concepts of normal and exceptional ranges of values are applied to populations, and the resulting variability of dimensions in biomedical devices is examined. Labs focus on the identification, manipulation and relevant measurements of gross anatomical samples. (1017-311, corequisite 1017-312 or equivalent, 1016-283) **Class 3, Lab 3, Credit 4 (W)**
- 0310-250** **Engineering Analysis I**
Integrates the basic sciences with the fundamental tools and methods associated with engineering to enable problem solving. The course provides a formal introduction to the basic analytical and problem solving methods associated with the practice of engineering, and draws on challenging and realistic examples found in biomedical applications. The course also introduces appropriate software tools (e.g., spreadsheets, MATLAB) and stresses program and algorithm development. (1016-283, 1017-312 or equivalent; corequisites: 1004-240, 0310-200) **Class 4, Credit 4 (F)**

0310-330 **Electricity and Magnetism in Biological Systems**
This course builds on the analytical foundations and methods presented in both calculus-based physics and mathematics, and focuses on the fundamental aspects of electrical charge manipulation and magnetic phenomenon associated with biological systems at a variety of scales. Topics include electrostatics, Gauss' law, electric field and potential, capacitance, resistance, constant and transient current circuits, magnetic fields, Ampere's law, and inductance; all topics are presented in the context of biological structures and mechanisms. Lab experiments involve both measurement and generation of biologically relevant electric and magnetic signals and fields. (1017-312; Corequisite: 1016-283, 1004-242) **Class 3, Lab 3, Credit 4 (S)**

0310-370 **Introduction to Biomaterials Science**
This course focuses on the desirable properties and selection of materials used in medical applications. Topics include metals, ceramics, polymers, composites, fundamental composition of biological tissues, the basic processes associated with wound healing, and principles governing the interaction of biological tissues and artificial materials. (1011-217; 0309-310, 0310-320, 1004-242) **Class 3, Lab 2, Credit 4 (S)**

0310-410 **System Physiology I**
The fundamental aspects of electrophysiology, electrically excitable cells and tissue, the operation of the nervous system, and the special senses are examined. The relationship between speed, specificity and sensitivity of signaling mechanisms of the nervous system and the endocrine system will be discussed. Laboratory experiments elucidate the fundamental electrophysiological phenomena as well as the variability inherent in biologically generated electrical signals. Signal processing methods will be applied to physiological signals measured in the lab. (0309-310, 0310-320, 330; corequisite: 0310-440) **Lecture 3, Lab 3, Credit 4 (F)**

0310-411 **System Physiology II**
This course focuses on fluid and gas transport mechanisms associated with the cardiovascular and respiratory systems, as well as their regulation by the human body. The contribution to fluid volume and pressure as well as its fundamental material exchange properties of the kidney are examined. Open-ended problems that clarify the interrelationship between these two systems are analyzed, and suitable compensatory mechanisms to address or eliminate pathological problems are proposed. Laboratory experiments investigate pressure, volume and flow relationships of the cardiovascular and respiratory systems including the inherent variability and dynamic response to perturbations. Signal processing methods are to be utilized to address ubiquitous artifacts found in measured physiological signals. (0310-410, 0309-320, corequisite: 0310-450), **Class 3, Lab 3, Credit 4 (W)**

0310-412 **System Physiology III**
This course focuses on the interaction between organ systems involved in homeostasis. In particular, attention will be paid to physiological mechanisms that involve electrical and chemical feedback and control systems. The interactions between the nervous, muscular, digestive, endocrine, immune, cardiovascular, renal and respiratory systems are examined. The impact of these interactions on growth and metabolism, movement, fluid and electrolyte balance, material exchange and disease are discussed. Labs invoke statistics associated with population based variations, and utilize analysis techniques from Engineering Analysis II. (0310-411, 0307-361) **Class 3, Lab 3, Credit 4 (F)**

0310-440 **Biomedical Signals and Analysis**
This course introduces signal processing techniques, and shows how they are applied to evaluate and manipulate continuous and discrete time signals in the human body. Signals examined are either linear or non-linear, time invariant or varying, and random or deterministic in nature. Laboratory experiments are conducted to obtain, characterize, and process signals from physiological systems. A multi-week project is assigned that consists of acquisition, processing and analysis of atypical biomedical signal. The goal is to provide a robust and consistent evaluation of the signal based on methods discussed both in class and reported on in the literature. (0310-250, pre- or corequisites: 1016-305, 0307-361, 0310-410) **Class 3, Lab 3, Project 1, Credit 5 (F)**

0310-450 **Engineering Analysis II**
This is a continuation of Engineering Analysis, and examines engineering problems requiring advanced techniques and their optimal application. These techniques provide a solid foundation for quantitative and critical evaluation of material to be presented in upper level engineering courses. A systems engineering approach is taught, which involves examining the specific operation of various physiological components in the human body, and examining the interactions between these components. (0310-250) **Class 4, Credit 4 (W)**

0310-550

Dynamics and Control of Biomedical Systems

Engineering analysis, modeling, problem solving and design skills are used to characterize and manipulate the operation of biomedical systems for the purpose of remediating, supplanting, replacing, or enhancing the function of physiological processes. The lab component of the course includes the observation and characterization of typical physiological processes and systems and the generation of models that predicts the operation of that process or system. (0310-412, 450) **Class 3, Lab 3, Project 1, Credit 5 (S)**

0310-591

Multidisciplinary Senior Design Project I

First half of a two-course sequence that teams up students from various engineering disciplines to solve a specific design problem. The design process emphasizes group problem solving skills, oral and written communication skills, and interpersonal skills. With faculty guidance, teams develop creative and innovative design concepts, then study the feasibility of each concept to arrive at prototype design. A report and oral review before peers and faculty are required. (Fifth year standing) **Class 4, Open Lab, Credit 4 (W)**

0310-592

Multidisciplinary Senior Design Project II

This is the second course in the two-course sequence. A prototype based on the design created in Multidisciplinary Senior Design I(0310-591) must be constructed, debugged, evaluated and demonstrated to meet target specifications. Any hardware and software must be integrated to produce a complete working prototype or solution. Design teams communicate the final design through written and oral presentation, and the prototype's functionality is demonstrated. The design experience is augmented with lectures focusing on professional aspects of engineering and special topics related to design and performance of a prototype. (0310-591) **Class 4, Open Lab, Credit 4 (S)**

0310-599

Independent Study

Allows upper-level undergraduate students the opportunity to investigate aspects of biomedical engineering not covered in existing course work (Permission of supervising faculty and department head required) **Credit variable 1-6**

College of Health Sciences and Technology

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Course numbering: RIT courses are generally referred to by their seven-digit registration number. The first two digits refer to the college offering the course. The third and fourth digits identify the discipline within the college. The final three digits are unique to each course and identify whether the course is noncredit (less than 099), lower division (100–399), upper division (400–699), or graduate level (700 and above).

Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's schedule of courses, published by the Office of the Registrar. Prerequisites/corequisites are noted in parentheses near the end of the course description.

Nutrition Management

0620-210 Nutrition and the Mediterranean Diet
The focus of this course is on understanding the unique characteristics of the Mediterranean Diet and the effects of adhering to the Mediterranean Diet on one's health. The course will compare the Mediterranean Diet to other ethnic cuisines and food guide pyramid tools. The student will become familiar with foods typically consumed on the Mediterranean diet and will demonstrate recipes using these foods. The course will evaluate the various oils used in Mediterranean cooking. A culminating experience will involve the student developing a one-week menu featuring the key characteristics of the Mediterranean diet including nutritional analysis. Principles of the Mediterranean diet will be introduced via weekly lecture and labs to provide a hands-on application of topics discussed in the lecture. **Class 4, Credit 4 (F, W, S)**

0620-213 Contemporary Nutrition
The study of specific nutrients and their functions; physiological, psychological and sociological needs of humans for food; development of dietary standards and guides; application of nutritional principles in planning and analyzing menus for individuals of all ages; survey of current health nutrition problems and food misinformation. **Class 4, Credit 4 (W, S)**

0620-300 Sports Nutrition
This course will provide an introduction to the integration between exercise and nutrition-related topics by exploring the intimate link among nutrition, energy metabolism and human exercise response. The course content will sort fact from fiction and help students and practitioners obtain the knowledge they need to give sound advice to athletes and active individuals. (1026-305 or a college science course) **Class 4, Credit 4 (F, W, S)**

0620-402 Dietetic Environment
Introductory supervised practice/practicum course. This course explores the profession of dietetics which includes current dietetics practice as well as practice trends and career options. Students interact with a representative sampling of personnel in all areas of food and nutrition. Students will become familiar with current Academy of Nutrition and Dietetics Scope of Practice Framework, Standards of Professional Performance, and the Code of Ethics in the profession of Dietetics. The development of an outcome based professional portfolio is required. (Junior level with completion of sciences; restricted to Nutrition Management students only) **Class 6, Credit 4 (F)**

0620-510 Nutrition Alternative Medicine
This class offers an overview of controversial and accepted alternative diet therapies, basic medicine guidelines, and vitamin/mineral supplementation. (Restricted to Nutrition Management students only) **Class 2, Credit 2 (S)**

0620-520 Techniques of Dietetics Education
This course prepares dietetics and nutrition specialists to prepare and give presentations for the purpose of informing, persuading, and training a variety of audiences. Topics include communications methods, audience analysis, developing communications and training objectives, selecting media, designing and making presentations, and evaluating communications effectiveness. Students are required to make a presentation as part of the course. (Restricted to Nutrition Management students only) **Class 4, Credit 4 (W)**

0620-525 Medical Nutrition Therapy I
The applied study of metabolism and the interrelationships between nutrients and other biochemical substances in humans. Etiology, symptoms, treatment and prevention of nutritional diseases; evaluation of nutritional status; role of the diet in gastrointestinal, renal, musculoskeletal, cardiac, endocrine, surgical and other diseases. (Restricted to Nutrition Management students only) **Class 6, Credit 5 (F)**

0620-526 Medical Nutrition Therapy II
The applied study of metabolism and the interrelationships between nutrients and other biochemical substances in humans. Etiology, symptoms, treatment, and prevention of nutritional diseases; evaluation of nutritional status; role of the diet in gastrointestinal, renal, musculoskeletal, cardiac, endocrine, surgical, and other diseases. (Restricted to Nutrition Management students only) **Class 4, Credit 4 (W)**

0620-550 Community Nutrition
Study of current nutrition problems and delivery of nutrition information and service in the community. Survey of facilities involved in giving nutrition information or nutritional care. Emphasis on acquiring skills necessary for delivering nutrition information and services in traditional and nontraditional markets. Independent practicums involving nutrition care in community facilities are required. Assignments are arranged by the instructor. Practicum hours by arrangement. (Restricted to Nutrition Management students only) **Class 10, Credit 4 (S)**

0620-554 Nutrition in Life Cycle
An applied course in nutritional needs throughout the life cycle. Emphasis is given to nutrition during pregnancy, infancy, early childhood, adolescence, young and middle adulthood, and the elderly. Practicum in facilities delivering nutrition services to these age groups is required. Practicum hours by arrangement. (Restricted to Nutrition Management students only) **Class 7, Credit 5 (F)**

Health Systems Administration

0635-310 Survey of Health Care Systems
An overview of the development, structure and current forces transforming the health care system. Topics include the status of the national and regional populations, physician practice and payment, private and government health insurance, the impact of medical technology, manpower issues, hospital services and reimbursement systems, ambulatory care and alternative delivery systems, and mental health and long-term care. (Offered on campus and online) (Previous experience or course work in health care and permission of chair) **Class 4, Credit 4**

0635-320 Health Systems Administration
A survey of administration in health care facilities focusing on the application of general management principles in the unique health care environment. Issues such as organizational structures, planning and performance monitoring, personnel management, finance and the respective roles of medical professional and administrator in managing the facility are discussed. (0635-310, previous experience, course work in health care and permission of chair) **Class 4, Credit 4**

0635-351 Health Care Economics and Finance
An introduction to the efficiency, effectiveness and equity of the new economics of health care; a conceptual and practical knowledge of health care finance, including sources of funding, accounting and reporting; and the influence of third-party payers. No previous work in economics is assumed. (0635-310 or 320) **Class 4, Credit 4**

0635-421 Legal Aspects of Health Care Administration
An overview of statute and regulation as they apply to the health care field. Topics include an overview of the American legal system, licensure of institutions, licensure and discipline of practitioners, physician-patient relationship, reproductive issues, the right to die, organ donations, medical records, legal liability, malpractice and labor law. (0635-310 or 320) **Class 4, Credit 4**

0635-431 Health Care Quality Assurance
An introduction to quality assurance in health care. Course explores past and current definitions of quality and competing concepts of quality assurance; reviews existing quality assurance requirements and accrediting organizations, federal and state agencies, and third party payers; describes and explains quality assurance methods and tools and their application in various settings. (0635-310 or 320) **Class 4, Credit 4**

0635-441 Health Planning and Program Development
A review of the methodology of planning effectively for health care services. The use of data systems, forecasting, and identifying and analyzing problems are explored, along with the process of strategic planning, setting priorities, developing projects and allocating resources. Students prepare actual applications for new programs to regulatory agencies. (0635-310 or 320) **Class 4, Credit 4**

Medical Science

1026-200 Freshman Symposium
This course is an introduction to biomedical sciences and the options available with the degree. (Restricted to biomedical sciences students) **Class 1, Credit 1, (F, W)**

1026-205 Introduction to Diagnostic Medical Imaging
This course provides an overview of four diagnostic medical imaging modalities: radiography, magnetic resonance imaging, nuclear medicine, and ultrasound. The history, current uses, and different trends of each modality, as well as comparisons among the modalities, will be discussed. **Class 2, Credit 2 (F, S)**

1026-210 Microbiology in Health and Disease
This course is an introduction to microorganisms; their relationship to the environment and human health; the causes, prevention and treatment of infectious diseases; and the role of microorganisms in the preparation and spoilage of foods. (One year of high school biology or equivalent) **Class 4, Credit 4 (F)**

1026-211 Human Biology I
This course is a general study of human anatomy and physiology. The course includes discussions of cellular biology, skeletal, muscular, nervous and endocrine systems. **Class 3, Credit 3 (F)**

1026-212 Human Biology II
This course is a general study of human anatomy and physiology with emphasis on mechanisms by which the nervous and endocrine systems coordinate and integrate body functions. This second course includes discussion of nutrition, metabolism and respiratory, circulatory, lymphatic, urinary and reproductive systems. **Class 3, Credit 3 (W)**

1026-213 Human Biology III
This is the final course in a three quarter sequence in which we investigate the biology of the human body through an examination of its structure (anatomy), its function (physiology), and the various disease states (pathology) that affect its health. This course focuses on human health and the various systems that work in an integrated fashion to defend us from disease and repair our injuries. The course will explore a wide range of diseases, including infections, genetic disease, metabolic disease, heart disease, cancer and traumatic injury to the body and it will explore recent medical advances in the diagnosis and treatment of human disease. **Class 3, Credit 3 (S)**

1026-221 Health Awareness
This course provides an opportunity to explore the effects of common stressors on lifestyle. Basic structure and function of selected human body systems are discussed and related to factors such as diet, alcohol, drugs, smoking, stress and the environment. Lecture, discussion, demonstrations and student participation are used to explore health related issues. **Class 4, Credit 4 (W)**

1026-231 Human Biology I Laboratory
This laboratory complements the lecture material of 1004-211. Experiments are designed to illustrate the dynamic characteristics of cells, tissues and organ systems. **Lab 2, Credit 1 (F)**

1026-232 Human Biology II Laboratory
A laboratory for dietetic and medical illustration students to complement the lecture material of 1004-212. Experiments are designed to illustrate the dynamic anatomy and physiology of major organ systems. **Lab 2, Credit 1 (W)**

1026-233 Human Biology III Laboratory
This laboratory course complements the lecture material presented in 1004-213. The hands-on laboratory experiments and computer simulations utilize some of the procedures used by scientists and clinicians to diagnose and study a variety of diseases, including bacterial infections, genetic disease, metabolic disease, heart disease, and cancer. (Corequisite 1004-213 or permission of instructor) **Lab 2, Credit 1 (S)**

1026-280 Lab Teaching Experience
This course provides students the opportunity to learn by teaching, as they assist the laboratory instructor in facilitating student learning. (Prerequisite depends upon course, permission of instructor) **Lab 3-9, Credit 1-3 (F, W, S)**

1026-291 Biomedical Research
This course provides an opportunity for in-depth experiential learning through collaborative work on an independent research project. (Prerequisite depends upon project, permission of instructor) **Lab 3-12, Credit 1-4 (F, W, S)**

1026-301 Medical Terminology
This course emphasizes the etymology, definition, pronunciation, and correct utilization of medical terms. Learning the skills to analyze and construct medical terms enables a student to develop a vocabulary essential to the understanding of the language used by medical professionals. **Class 3, Credit 3 (F, W, S, Su)**

1026-305 Sports Physiology and Life Fitness
A contemporary science course that provides a foundation for understanding the importance of nutrition and energy transfer in maximizing the potential for exercise and training. In addition to the basic principles of exercise physiology, a variety of contemporary issues are covered, including use of legal and illegal aids, cardiovascular fitness and disease prevention, training methodologies, and fitness assessment. Particularly appropriate for individuals interested in maintaining their level of physical fitness and wellness, participating in competitive athletics, or working in recreation or physical therapy. (Distance learning offering) **Class 4, Credit 4 (F, W, Su)**

1026-306 Fitness Prescription Programming
This course is designed to help students develop the skills and knowledge necessary to provide safe and appropriate fitness assessments and exercise programs. The American College of Sports Medicine objectives for health fitness instructor certification serve as the core learning objectives. Students will practice exercise testing and prescription skills at various points throughout the course. (1026-305) **Class 4, Credit 4 (F, W)**

1026-307 Exercise Prescription
This course is designed for those who work in the field of exercise/fitness or medical health care who work with individuals and patients with diagnosed disease states or other significant limitations who would benefit from appropriately designed and prescribed exercise programs. The course will review theoretical and diagnostic value of testing, create exercise prescriptions, and understand the therapeutic benefit exercise will have on specific conditions. Some topics to be addressed include: rheumatoid arthritis, diabetes, high blood cholesterol, obesity, pulmonary disorders, coronary heart disease, cystic fibrosis, hypertension, low functional capacity, and aging. (1026-306) **Class 4, Credit 4 (S)**

1026-312 Immunology
An introduction to all of the fundamental facts and concepts related to immunology to include: innate immunity and adaptive immunity; cells, molecules, tissues and organs of the immune "system;" cell communication and interaction; antibody structure and function; and the applications of these concepts to infectious diseases, vaccine design, autoimmune diseases, cancer, transplantation, regulation of the immune response, allergic reactions and immunosuppression. (One year of introductory biology, 1001-311) **Class 3, Credit 3 (F, W)**

1026-315 Medical Genetics
A survey of selected human variations and diseases of medical importance, with emphasis on the underlying genetic principles. (1001 203 or equivalent) **Class 2, Credit 2 (F)**

1026-333 Patient Care
This course is designed for students in the medical sciences and biological sciences. The course will introduce and develop basic skills for providing integrated patient care through assessment, communication, and continuous care. The course will also introduce students to the concept of medical ethics and infection control issues related to their future patients. **Class 2, Credit 2 (W, S)**

1026-350 Anatomy and Physiology I
An integrated approach to the structure and function of the nervous, endocrine, integumentary, muscular, and skeletal systems. Laboratory exercises include histological examinations, anatomical dissections, and physiological experiments using human subjects. (1001-253 or equivalent or permission of instructor for non-science majors) **Class 4, Lab 3, Credit 5 (F)**

1026-359 **Special Topics: Medical Sciences**
This is a course in which the topic varies but is of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and have specified prerequisites, contact hours and examination procedures. **Class variable, Credit variable (F, W, S)**

1026-360 **Anatomy and Physiology II**
An integrated approach to the structure and function of the gastrointestinal, cardiovascular, immunological, respiratory, excretory, and reproductive systems with an emphasis on the maintenance of homeostasis. Laboratory exercises include histological examinations, anatomical dissections, and physiological experiments using human subjects. (1026-350 or permission of instructor) **Class 4, Lab 3, Credit 5 (W)**

1026-411 **Histology**
This course provides a detailed exploration of the microscopic and structural anatomy of normal human tissues and organs, with special emphasis given to the relationships between the cellular architecture of human organs and organ systems and their functions. The course also examines human disease as manifested by alterations in histological features. (1026-350, 360 or equivalent recommended) **Class 3, Lab 3, Credit 4 (S)**

1026-412 **Parasitology**
An introduction to parasites of medical importance and diseases they cause, with an enhanced appreciation for the diverse implications of parasitism in the global community. An investigation of a variety of parasites classified by diseases such as blood and intestinal protozoan parasites, nematodes, trematodes and cestodes. Diseases of importance include malaria, sleeping sickness, elephantiasis, river blindness, leishmaniasis, amebic dysentery, trichomoniasis, babesiosis, etc. Distribution and transmission pathogenesis, clinical signs and symptoms, diagnosis, treatment and control, and the role of parasitic diseases in global economic and health inequities between developed and developing countries is examined. (One year of introductory biology or equivalent, 1001-311) **Class 3, Credit 3 (W)**

1026-415 **Medical Pathophysiology**
This course presents the physiologic and pathologic processes that underlie the spectrum of human disease entities and is taught in the context of clinical scenarios that demonstrate the basic science principles in a real-world context of health care. Material is presented in the context of case studies, utilizing clinical findings and addressing underlying basic physiologic, biochemical and immunologic processes as they relate to patient care and individual patient problem cases. (1026-350, 360) **Credit 4 (F, S)**

1026-420 **Introduction to Neuroscience**
This course will focus on the mammalian central nervous system and how it regulates behavior. Background information on neuroanatomy, cellular physiology, neurotransmission, and signaling mechanisms will pave the way for an in-depth analysis of specialization at the systems level. Our goals will be to understand the cellular and molecular mechanisms underlying normal human behaviors as well as pathogenic states. (1001-251-253 or 1001-201-203; 1001-350, 1026-350, 1026-360 recommended) **Class 4, Credit 4 (W)**

1026-425 **Endocrinology**
This course will combine lecture, literature review and small group discussions/presentations to introduce students to the fundamental concepts of human endocrinology. Topics covered will include: digestion and metabolism; growth and aging; arousal/mood; sexual dimorphism and reproduction; and neuroendocrinology. Discussion of relevant human diseases/disorders will be used to illustrate related biochemical/anatomical pathways and mechanisms. (1001-311, 1026-350) **Class 4, Credit 4 (F, S)**

1026-451 **Introduction to Infectious Diseases**
This course focuses on the mechanisms of bacterial and fungal diseases, including topics in host response to pathogen invasion; subversion of host defenses; virulence factors; clinical signs and symptoms, treatment, diagnosis and prevention. The class will also feature the discussion of various clinical cases found in the Weekly Morbidity and Mortality Report produced by the Center for Disease Control. (1001-312, 1001-404) **Class 4, Credit 4 (W)**

1026-459 **Special Topics: Medical Sciences**
This is an advanced course in which the topic varies but is of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and have specified prerequisites, contact hours and examination procedures. **Class variable, Credit variable (F, W, S)**

1026-462 **Human Gross Anatomy**
This course exposes students to details of human anatomy through cadaver dissection. Lecture material stresses functional and clinical correlates corresponding to laboratory exercises. (1026-350, 360 and permission of instructor) **Class 3, Lab 6, Credit 5 (S)**

1026-501 **Medical Botany**
This course is intended to introduce the student to the subject of medical botany. A detailed study will be made of those members of the plant kingdom that are medically useful in preventing, treating, or curing disease states. Where possible, the active chemical ingredient(s) will be defined for each medicinal plant described. Emphasis will be placed on those plant substances that are useful in the treatment of cancers, nervous system disorders, heart and circulatory diseases, metabolic disorders, sensory organ diseases, dental disease, gastrointestinal disorders, respiratory diseases, urogenital diseases, skin diseases, infections, and mental disorders. When available, the data from clinical trials and clinical studies will be discussed. (1001-203 and 1013-233) **Class 3, Credit 3 (W) (offered alternate years)**

1026-540 **Undergraduate Biomedical Science Research**
An undergraduate level introduction to research that affords students the chance to work under the guidance of a faculty mentor in learning about applications of the scientific method to established scientific problems and questions. Students are required to enroll in at least two quarters of undergraduate research in consecutive quarters and, under guidance of research mentor, to report results in a public forum such as a written report, poster, and/or oral presentation. (Permission of research adviser and approval by biomedical sciences program director) **Class/Lab variable, Credit variable (F, W, S, Su)**

1026-541 **Undergraduate Biomedical Science Research**
An undergraduate level introduction to research that affords students the chance to work under the guidance of a faculty mentor in learning about applications of the scientific method to established scientific problems and questions. Students are required to enroll in at least two quarters of undergraduate research in consecutive quarters and, under guidance of research mentor, to report results in a public forum such as a written report, poster, and/or oral presentation. (Permission of research adviser and approval by biomedical sciences program director) **Class/Lab variable, Credit variable (F, W, S, Su)**

1026-542 **Undergraduate Biomedical Science Research**
An undergraduate level introduction to research that affords students the chance to work under the guidance of a faculty mentor in learning about applications of the scientific method to established scientific problems and questions. Students are required to enroll in at least two quarters of undergraduate research in consecutive quarters and, under guidance of research mentor, to report results in a public forum such as a written report, poster, and/or oral presentation. (Permission of research adviser and approval by biomedical sciences program director) **Class/Lab variable, Credit variable (F, W, S, Su)**

1026-559 **Special Topics: Medical Sciences**
This is an advanced course in which the topic varies but is of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and have specified prerequisites, contact hours and examination procedures. **Class variable, Credit variable (F, W, S)**

1026-599 **Independent Study: Medical Sciences**
Faculty-directed study of appropriate topics on a tutorial basis. Enables an individual to pursue studies of existing knowledge available in the literature.

1040-350 **Premedical Studies**
This course prepares students to navigate the admissions process and interviews for medical osteopathic optometry, podiatric, and dental schools. The preparation will address issues related to the field of medicine, e.g. ethics, financial, and regulatory. (Restricted to students applying to professional schools in the cycle of the following calendar year and permission of department.) **Class 1, Credit 1**

Diagnostic Medical Sonography

1030-409 **Ultrasound Instrumentation I**
Principles of ultrasound physics are directly applied to the use of ultrasound instrumentation in medical imaging. Transducers, signal production, memory systems, data display, manipulation of controls, and artifacts are discussed. Considered as a pivotal course in which the student learns to integrate previous knowledge of anatomy with ultrasound physics and instrumentation. Considered as a prerequisite course for Ultrasound Instrumentation II (1030-410). Emphasis is on the creation of high-quality images on laboratory ultrasound equipment. (Third year in the ultrasound program or permission of instructor) **Class 4, Credit 4 (W)**

1030-410 **Ultrasound Instrumentation II**
This course is a continuation of Ultrasound Instrumentation I (1030-409). It provides a foundation of the basic physical principles of ultrasound and the fundamentals of fluid dynamics, Doppler physics including color, power, and spectral Doppler, quality control, Doppler artifacts, and biological effects. Considered as a pivotal course in which the student learns to integrate previous knowledge of anatomy, ultrasound physics and instrumentation with Doppler skills and techniques. Development of scanning techniques, use of instrument controls, and production of high quality diagnostic images utilizing laboratory equipment are stressed. (Third year in the ultrasound program or permission of instructor) **Class 4, Credit 4 (S)**

1030-412 **Cross-Sectional Anatomy**
Basic sectional anatomy of the abdomen and pelvis is discussed. The course builds on the basic knowledge of anatomy and prepares the student to recognize sectional anatomy of major human structures, especially as they relate to medical imaging techniques. Lectures are augmented with exercises using prepared human sections, organ modeling and diagnostic imaging equipment. (1026-350, 360 or permission of instructor) **Class 4, Credit 4 (W)**

1030-414 **General Vascular Evaluation**
This course addresses the basic knowledge of general vascular sonography. Two-dimensional real-time imaging and Doppler techniques are presented as well as a discussion of other imaging modalities and their use in vascular evaluation. Performance of examinations on laboratory equipment is stressed. This is an internship course. (Fourth year in the ultrasound program or permission of faculty) **Class 4, Credit 4 (S)**

1030-552 **Introduction to Obstetrical Ultrasound**
Provides the ultrasound candidate with basic knowledge necessary to perform obstetrical examinations. High-quality image production, recognition of normal structures and basic pathologic states are stressed. Examination protocols, review of specific anatomy, film reading, and use of other imaging techniques are addressed. This is an internship course. (Fourth year in the ultrasound program or permission of faculty) **Class 3, Credit 3 (F)**

1030-553 **Introduction to Gynecological Ultrasound**
Information necessary to perform basic gynecologic sonographic examinations is presented. Examination strategies for various procedures are explored, as well as the integration of ultrasound into established clinical practices. This is an internship course. (Fourth year in the ultrasound program or permission of faculty) **Class 3, Credit 3 (F)**

1030-554 **Advanced Obstetrical Ultrasound**
Provides information necessary to perform more sophisticated obstetrical procedures utilizing ultrasound. Examination strategies for various procedures are explored as well as the integration of ultrasound into established clinical practices. This is an internship course. (Fourth-year standing in ultrasound program or permission of faculty) **Class 4, Credit 4 (W)**

1030-556 **Abdominal Ultrasound I**
Laboratory simulation and classroom instruction are used to develop practical skills and clinical knowledge necessary to perform basic abdominal examinations utilizing ultrasound. High-quality image production, recognition of normal abdominal structures and basic pathologic states are stressed. Examination protocols, review of anatomy, film reading and use of other scanning techniques are addressed. This is an internship course. (Fourth year standing in ultrasound program or permission of faculty) **Class 3, Credit 3 (F)**

1030-557 **Abdominal Ultrasound II**
A continuation of 1030-556. Laboratory simulation and classroom instruction are used to develop practical skills and clinical knowledge necessary to perform advanced abdominal examinations utilizing ultrasound. High-quality image production, recognition of normal abdominal structures and advanced pathologic states are stressed. Examination protocols, review of anatomy, film reading, and use of other scanning techniques are addressed. This is an internship course. (Fourth year in the ultrasound program or permission of faculty) **Class 3, Credit 3 (F)**

1030-558 **Small Parts Ultrasound**
Provides the classroom and clinical knowledge necessary to perform basic sonographic examination of anatomy classified as small parts, usually utilizing specialized equipment and high megahertz frequencies. Examination strategies for various procedures are discussed, as well as the role of ultrasound in established clinical practices utilizing small parts imaging. This is an internship course. (Fourth year in the ultrasound program or permission of faculty) **Credit 3 (S)**

1030-559 **Introduction to Sonography**
The course provides students with "hands-on" experience by performing basic, general ultrasound examinations. Ultrasound examination protocols, scanning orientations, planes and techniques, review and recognition of basic normal anatomic structures, sonographic medical terminology, ergonomic considerations, hospital administration, patient care principles, medico-legal aspects, and basic applied ultrasound physics are stressed. (Second year in the diagnostic medical sonography program or permission of instructor) **Class 2, Credit 2 (S)**

1030-559 **Ultrasound Scanning**
The course provides students with "hands-on" experience by performing basic and general abdominal, small parts, obstetrical and gynecological ultrasound examinations. Ultrasound examination protocols and techniques, review and recognition of normal anatomic structures, high quality image production, and image interpretation are stressed. (Completion of all required courses in the first two years of the DMS program or students in the DMS Certificate program or permission of instructor) **Class 2, Credit 2 (F, W, S)**

1030-560 **Seminar in Ultrasound**
Candidates prepare a complete plan for an ultrasound department as if they had been hired to establish a new department in a hospital setting. The candidates work together to develop the physical, administrative and financial aspects of a department. This is an internship course. (Fourth year in the ultrasound program or permission of faculty) **Class 2, Credit 2 (W)**

1030-561 **Advanced Seminar in Ultrasound**
Speaking, writing and researching skills are explored. Methods of basic research, developing writing strategies and oral presentations. Students develop or critique a research project and prepare a written document following common publishing guidelines in addition to making oral presentations. This is an internship course. (Fourth year in the ultrasound program or permission of faculty) **Class 2, Credit 2 (S)**

1030-570 **Clinical Diagnostic Medical Sonography I**
Prepares the student for application of classroom knowledge to the practice of ultrasound by means of a clinical internship. Performing basic, general ultrasound examinations in both the laboratory and clinical settings is stressed. Nursing procedures, ethical issues and medico-legal considerations also are discussed as they relate to the practice of ultrasound examination. This is an internship course. (Fourth year in the ultrasound program or permission of director) **Credit 7 (F)**

1030-571 **Clinical Diagnostic Medical Sonography I**
Further prepares the candidate for application of classroom knowledge to the practice of ultrasound by means of a clinical internship. Performing basic, general ultrasound examinations in both the laboratory and clinical settings is stressed. The candidate is expected to perform basic examinations with little, if any, assistance by the end of this course. This is an internship course. (Fourth year in the ultrasound program or permission of director; 1030-570) **Credit 7 (W)**

1030-572 **Clinical Diagnostic Medical Sonography I**
Final development of ultrasound examination skills by means of clinical internship. The candidate is expected to perform general ultrasound examinations with no assistance by the end of this course. This is an internship course. (Fourth year in the ultrasound program or permission of director; 1030-571) **Credit 7 (S)**

Physician Assistant

1032-200

Behavioral Medicine

This course familiarizes physician assistant students with biological concepts and the human life cycle. The course provides students with a foundation in basic psychopathology and its relationship to understanding human illness. In addition, the course addresses the basic principles of patient care in the context of biopsychosocial, cultural, and ethical issues while examining social structures in contemporary Western society. (Third year in the PA program) **Credit 2 (S)**

1032-210

Physician Assistant Seminar

Introduces the student to the role of the physician assistant in relationship to patients, supervising physicians, colleagues and other physician assistants. Emphasis is on developing a high degree of professionalism in conjunction with health care. Topics include legislation, certification, registration, professional organizations, sociomedical issues, ethics, legal and economic aspects of medicine, health care organization and medical records. (Second or third year in the PA program) **Class 1, Credit 1 (W)**

1032-330

Law and Medicine

This course will provide an overview of health care law, principles and ethics as it relates to the health care provider. Lecture topics will cover an introduction to law, criminal aspects of health care, patient consent issues, legal reporting obligations, contracts and antitrust, information management and health care records, HIPAA regulations, legal risk to the health care provider, end of life issues and malpractice issues. (Third year in the PA program or permission of instructor) **Class 2, Credit 2 (W)**

1032-401

Patient History and Physical Exam I

This first part of a three-quarter sequence introduces and develops the clinical psychosocial skills and anatomic/physiologic science involved in interviewing and examining patients. Includes practical medical terminology, attitude development and values clarification strategies to aid students in adopting a humanistic approach, interviewing techniques used during patient interaction, comprehensive database, demonstrated techniques for a complete physical examination of all body systems and explanation/implementation of the Problem Oriented Medical Record (POMR). Weekly patient contact. (Third year in the PA program or permission of instructor) **Class 5, Credit 2 (F)**

1032-402

Patient History and Physical Exam II

This second part of a three-quarter sequence introduces and develops the clinical psychosocial skills and anatomic/physiologic science involved in interviewing and examining patients. Includes performing and writing complete, accurate medical histories and physical examinations with small group instruction. Weekly patient contact. (1032-401) **Class 5, Credit 2 (W)**

1032-403

Patient History and Physical Exam III

This final part of a three-quarter sequence introduces and develops the clinical psychosocial skills and anatomic/physiologic science involved in interviewing and examining patients. Includes a critical analysis of students performing and writing complete, accurate medical histories and physical examinations. Small group instruction. Weekly patient contact. (1032-402) **Class 5, Credit 2 (S)**

1032-406

Medical Microbiology

Provides physician assistant students with the understanding of the biology of human pathogens. The students study how this understanding impacts therapeutic modalities for the treatment of human disease. Students have the opportunity to master specific skills that will be central to their roles as practicing physician assistants. (Second year in the PA program) **Credit 4 (S)**

1032-410

Clinical Skills

Provides for the PA student requisite skills for professional courses and internships. Emphasis is on developing competence in basic skills in conjunction with patient care. (Third year in the PA program or permission of instructor) **Class 3, Credit 1 (S)**

1032-420

Clinical Pharmacology I

A study of the mechanics of medications: indications, effects, distribution, absorption, metabolism, excretion, interactions, pharmacokinetics and administration/dosing. Emphasizes agents commonly prescribed in the diagnosis and treatment of disease. A body systems approach is utilized to study cardiology, pulmonology, infectious diseases, dental diseases, otorhinolaryngology, neurology and ophthalmology. (Third year in the PA program or permission of instructor) **Class 3, Credit 3 (F)**

1032-421

Clinical Pharmacology II

Continuation of 1032-420: Indications, effects, distribution, absorption, metabolism, excretion, interactions, pharmacokinetics and administration/dosing. Emphasizes agents commonly prescribed in the diagnosis and treatment of disease. A body systems approach is utilized to study fluids/electrolytes/nutrition, gastroenterology, nephrology, urology, endocrinology and dermatology. (1032-420) **Class 3, Credit 3 (W)**

1032-422

Clinical Pharmacology III

Continuation of 1032-421. Indications, effects, distribution, absorption, metabolism, excretion, interactions, pharmacokinetics and administration/dosing. Emphasizes agents commonly prescribed in the diagnosis and treatment of disease. A body systems approach is utilized to study hematology, obstetrics, gynecology, orthopedics, surgery, geriatrics, pediatrics and psychiatry. Prescribing and dispensing are discussed. (1032-421) **Class 2, Credit 2 (S)**

1032-424

Pathophysiology I

Pathophysiology is the systematic study of abnormal cell and organ function. The goal in medical practice is to rationally and systematically assess this abnormal function when making a diagnosis, and then to reverse the pathological process using therapy. This course will introduce the physician assistant student to normal and abnormal function of cells in general; and then how these cellular abnormalities affect function of certain organ systems. The systems to be covered include: musculoskeletal, thyroid, liver, pancreas, heart/circulatory and renal. The students will also be introduced to laboratory markers of abnormal organ function. Using the knowledge acquired in this class, the students will predict common clinical and laboratory manifestations of important disease states. (Third-year physician assistant program status; corequisites 1032-401, 420, 440) **Class 4, Credit 4 (F)**

1032-425

Pathophysiology II

This course is a continuation of 1032-424 and will introduce the physician assistant student to normal and abnormal function of cells and organ function. The systems to be covered this quarter include the renal (continued), hematologic, and immunologic systems. In addition, students will be introduced to mechanisms and manifestations of neoplasia, and general principles of cancer diagnosis. The students will be introduced to laboratory markers of abnormal organ function. Using the knowledge acquired in this class, the students will work in small groups and present the results of their critical evaluation of assigned clinical case presentations. (Third-year physician assistant program status) (1032-424, corequisites: 1032-402, 421, 441) **Class 4, Credit 4 (W)**

1032-430

Clinical Diagnostic Imaging

Introduces PA students to the principles of diagnostic imaging: physical foundations, recognition of gross abnormalities, determination of a diagnostic impression and application of different diagnostic procedures. Emphasis is on correlating body systems with findings of specific radiographic studies. (Third year in the PA program or permission of instructor) **Class 1, Credit 1 (S)**

1032-435

Society and Patient Care

In Society and Patient Care, students will explore the many factors that can influence appropriate access to health care. In particular, we will examine how stereotypes and provider's inappropriate/lack of knowledge might contribute to suboptimal care among at-risk patients. Topics that will be explored include issues related to racial, religious, ethnic, and family diversity; sexual orientation; gender identity; limitations in access due to socioeconomic issues and homelessness. We will explore ways in which barriers to appropriate care can be minimized or eliminated. Students will also be given tools to recognize risk factors for and signs/symptoms of child abuse, intimate partner abuse and drug/alcohol abuse. (Matriculation into the third year of the PA program) **Class 3, Credit 3 (F)**

1032-440

Clinical Medicine I

The clinical medicine courses give the PA student the necessary foundation of knowledge and understanding to deal with the patient in the clinical context. This preparation precedes the clinical rotations in which students apply their knowledge in examining patients and expand their expertise in evaluation, clinical procedures and problem solving. A body systems approach is utilized to study cardiology, pulmonology, nephrology, hematology, psychiatry and obstetrics/gynecology. (Third year in the PA program or permission of instructor) **Class 15, Credit 4 (F)**

1032-441

Clinical Medicine II

Continuation of 1032-440. This section covers fluids/electrolytes/nutrition, gastroenterology, neurology, orthopedics, rheumatology/allergy, infectious disease, endocrinology and dermatology. (1032-440) **Class 15, Credit 4 (W)**

1032-442 **Clinical Medicine III**
Continuation of 1032-441. Further areas of study encompass emergency medicine, oncology, ophthalmology, dermatology and preventive medicine, surgery, geriatrics, pediatrics. (1032-441) **Class 15, Credit 4 (S)**

1032-490 **Physician Assistant Clinical Rotation I**
Mandatory rotations are in fields of general clinical practice that build a solid basic understanding and groundwork. These required rotations are inpatient medicine, family practice, orthopedics, emergency medicine, OB/GYN, pediatrics, general surgery, geriatrics, and psychiatry. Students also are able to select one elective rotation. These latter rotations allow students to individualize their experiences according to their own areas of interest. (Fourth year in the PA program) **Credit 12 (Su)**

1032-491 **Physician Assistant Clinical Rotation II**
Continuation of PA Clinical Rotation I. (Fourth-year standing in PA program) **Credit 12 (F)**

1032-492 **Physician Assistant Clinical Rotation III**
Continuation of PA Clinical Rotation II. (Fourth-year standing in PA program) **Credit 12 (W)**

1032-493 **Physician Assistant Clinical Rotation IV**
Continuation of PA Clinical Rotation III. (Fourth-year standing in PA program) **Credit 12 (S)**

College of Imaging Arts and Sciences

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Course numbering: RIT courses are generally referred to by their seven-digit registration number. The first two digits refer to the college offering the course. The third and fourth digits identify the discipline within the college. The final three digits are unique to each course and identify whether the course is noncredit (less than 099), lower division (100–399), upper division (400–699), or graduate level (700 and above).

Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's schedule of courses, published by the Office of the Registrar. Prerequisites/corequisites are noted in parentheses near the end of the course description.

Interdisciplinary Imaging Arts

2001-555 **E.S.P.R.I.T. Production**
Students produce a special-interest publication(s), E.S.P.R.I.T., via print and/or electronic methods. They are required to design and build the publication(s) by working beyond normally scheduled class hours. Lectures and hands-on activities enable each student to discover the applications of electronic imaging; interactive publishing; electronic publishing (CD-ROM or Internet); desktop publishing via print, page and screen design; as well as the procedures necessary to provide quality results. Lecturers include faculty from the schools of Photographic Arts and Sciences, Printing Management and Sciences, Art, Design, School for American Crafts and other Institute disciplines as deemed appropriate. (Matriculated senior- or graduate-level status and instructor's approval based on student's experience and production team's needs) **Credit 4**

Extended Studies: Art, Design

2012-201, 202, 203 **Basic Design I, II, III**
Study of basic elements in design: line, form and shape, focusing upon their application to design principles. Assignments address problem solving that produces two- and three-dimensional design solutions. **Credit 2 per quarter**

2012-211 **Basic Drawing and Media I**
An in-depth study of the fundamentals of drawing using an assortment of appropriate media. Drawings focus on the application and understanding of line, shape, and value, from simple objects to more complex compositions. A variety of black-and-white media will be explored. Emphasis is placed on problems confronting the student who has had little or no drawing experience. **Credit 2 per quarter**

2012-212 **Basic Drawing Media II**
Intermediate in-depth study of drawing that emphasizes an exploration of color media for visual problem solving. Projects range from simple still-life studies to complex compositions. Effective composition is addressed through critique and discussion. These exercises in academic and creative drawing approaches are designed for the student who has had little or no drawing experience. (2012-211) **Credit 2 per quarter**

2012-213 **Basic Drawing Media III**
Advanced in-depth study of drawing fundamentals emphasizes an exploration of both wet and dry media (pencil, charcoal, conte crayon, pastels, water-color). Projects include portrait studies and drawing from the human figure. Class assignments emphasize skill building for the student who has had little or no drawing experience. (2012-211 and 2012-212) **Credit 2 per quarter**

2012-215 **Basic Figure Drawing**
Introductory study of the structural elements needed to visualize human form. Life models and still-life props provide the studio setting for creating drawing compositions that are both concept-based as well as expressive. (2012-211, 2012-212 and 2012-213 or equivalent) **Credit 2 per quarter**

2012-220 **Collage**
A basic study of the history, materials, and techniques used in collage. Students explore a variety of materials used by past and contemporary artists and then apply these techniques to develop their own artwork. May be elected more than once for credit. (2012-201, 2012-202, 2012-203 and 2012-211, 2012-212, 2012-213 or equivalent) **Credit 2 per quarter**

2012-225 **Figure Drawing**
Continued study of figurative drawing that builds on learning acquired in a basic figure-drawing course. Nude and costumed models, as well as skeletons provide students the opportunity to strengthen their basic drawing skills. Varied drawing approaches, techniques, media, and concepts will be introduced. May be elected more than once for credit. (2012-215) **Credit 2 per quarter**

2012-276 **Calligraphy**
The foundational or italic form of lettering will be used to guide students in an exploration of the history, theory, and techniques that have shaped letterforms as we know them today. Emphasis is on developing skills and knowledge by studying historic and contemporary forms as well as through the use of a variety of tools and materials. Areas of study include majuscules, rhythm, spacing, techniques, media, color, design, page layout, and either the mechanics of bookbinding or camera-ready art. **Credit 2 per quarter**

2012-277 **Cartooning**
Various cartooning styles are examined in order to identify and discuss the factors that make cartoons appealing and effective. The focus of the course is the study and practice of cartoon illustration principles. The importance of obtaining good reference materials and maintaining a file of other cartoon art are stressed. Students complete weekly drawing assignments that cover elements of cartooning and building complexity in the work, culminating in the completion of several finished cartoon pieces. (2012-201, 2012-202, 2012-203 and 2012-211, 2012-212, 2012-213) **Credit 2 per quarter**

2012-284 **Airbrush Techniques**
Beginners develop the basic skills and techniques of painting with an airbrush, while experienced airbrushers concentrate on enhancing their skills. Graphic artists, illustrators and photographers can benefit from this exposure to airbrush techniques and applications through demonstration and experiential learning. Class is limited to 10 students. (2012-201, 2012-202, 2012-203 and 2012-211, 2012-212, 2012-213) **Credit 3 per quarter**

2012-286 **Introduction to Painting**
Study of the materials and techniques of painting through use of still life and nature forms. The basic skill development acquired in this class will become the foundation for more advanced painting options. (2012-201, 2012-202, 2012-203 and 2012-211, 2012-212, 2012-213, or equivalent) **Credit 2 per quarter**

2012-288 **Painting**
Painting with opportunities for gifted or advanced students to explore media, seek new skills, and develop a new style of expression. The instructor will work individually with each student so that a personal direction can be identified and built. Models are available on an infrequent basis. Still life and sketches are used for inspiration and reference. This course may be elected more than once for credit. (2012-286 or equivalent) **Credit 2 per quarter**

2012-296 **Introduction to Non-toxic Printmaking**
Investigate the methods, materials, tools, and techniques used by contemporary printmakers. Print processes introduced include woodcut, etching, engraving, stencil/chine-colle, collagraphs, carborundum, monotypes, and Image-on intaglio types. Students are required to pull an edition of prints in one medium. (2012-211, 2012-212 and 2012-213 or equivalent) **Credit 2 per quarter**

2012-376 **Calligraphy Workshop**
Students will continue to study the methods and techniques of calligraphy. Studying a variety of styles and letterforms enriches the artwork assignments produced by the advanced level calligrapher. Personal direction and special project work are encouraged. (2012-276) **Credit 2 per quarter**

2012-377 **Advanced Cartooning**
This course builds upon the foundation established in Cartooning. The value of gesture drawing is stressed, and an exploration of the many cartoon elements is researched. Freelancing pros and cons, along with client-vendor relationships, are on-going discussions. Specific assignments are more comprehensive in content for the advanced sessions. Color, media options, composition, layout, and attention to detail are key considerations in producing the final artwork. (2012-277) **Credit 2 per quarter**

2012-396 **Printmaking Studio**
Further study of methods and techniques of contemporary printmaking provide an in-depth appreciation of etching, lithography, relief printing and intaglio type processes. Students may concentrate in one print medium. This course may be elected more than once for credit. (2012-296) **Credit 2 per quarter**

Foundation Courses

2013-211 **Drawing I**
An introduction to the visualization of form, thought and expression through the drawing process, and the study of line and value as they relate to drawing. Gesture, contour, plane, and the motive qualities of line are studied using linear applications of a variety of black and white drawing media. Line is also used to organize and structure drawings, and to create value and texture. One, two, and three point perspective are included in the study of line. The study of value includes ways to create value and how it can be used to describe volume, texture, plane change, weight, and space. Subjects include human figure, skeletal anatomy, manmade and nature forms, and perspective. Media will include charcoal, conte, graphite, and ink. Class assignments focus on concept development and critiques of work help students to better evaluate their own work and the work of others while learning a vocabulary related to drawing. **Credit 3**

2013-212 **Drawing II**
More advanced study of line and value introduced in 2013-211 and an introduction to color. Subjects include human figure and portrait, manmade and nature forms, and perspective. Media will include charcoal, conte, graphite, ink, pastel, and color pencil. Class assignments focus on concept development and critiques of work help students to better evaluate their own work and the work of others while learning a vocabulary related to drawing. **Credit 3**

2013-213 **Drawing III**
The study of color as it relates to drawing using both linear and broad color media. This will include an analysis of the qualities of color, temperature, intensity, and value, and the study of various color schemes. Color will be used to depict volume, space, and weight, and in symbolic and expressive ways. Subjects will include human figure, manmade and nature forms, and landscape. Media will include pastel, color pencil, and paint. Class assignments focus on concept development and critiques of work help students to better evaluate their own work and the work of others while learning a vocabulary related to drawing. **Credit 3**

2013-215 **Vector Imaging**
This course is an introduction to Adobe Illustrator. It provides the necessary skills and vocabulary to further develop the technical skills associated with vector imaging. Numerous exercises of a basic nature will be given with personal critiques following the completion of each exercise. **Credit 1**

2013-216 **Raster Imaging**
This course is an introduction to Adobe Photoshop. It provides necessary skills and vocabulary to further develop the technical skills associated with raster imaging. Numerous exercises of a basic nature will be given with personal critiques following the completion of each exercise. **Credit 1**

2013-231 **2D Design I**
The two-dimensional design course is a structured, cumulative introduction to the basic elements of design. Organized to create a broad introductory experience, the course focuses on the development of both visual and verbal vocabulary as a means of exploring, developing and understanding two-dimensional compositions; visual comprehension and the ability to organize perceptions are key foundational components to the development of problem solving skills. The fall quarter of two-dimensional design is an introduction to the analysis of visual imagery and the basics of pictorial construction. The principles of organization and relationship are explored through dialogue, experimentation and the use of a variety of achromatic media. Concepts are introduced through lectures, discussions, demonstrations, research, assigned projects and critiques. **Credit 3**

2013-232 **2D Design II**
The winter quarter of two-dimensional design is a continued exploration of the elements and principles of design. This quarter focuses on color theory and application and increasingly complex methods of pictorial organization. Concepts are introduced through lectures, discussions, demonstrations, research, assigned projects and critiques. **Credit 3**

2013-233 **2D Design III**
The spring quarter of two-dimensional design focuses on the application of the elements, principles and methods of organization explored during the previous two quarters. Historical, cultural and content driven issues and themes are explored through a variety of media. Concepts are introduced through lectures, discussions, demonstrations, research, assigned projects and critiques. **Credit 3**

2013-241 **3D Design I**
This course presents a progressive study over three-quarters in terminology, visual principles, exploration, concept generation, process, and techniques of three-dimensional design. Using hands-on problem solving, students will develop an informed understanding of the three-dimensional form with an emphasis on the elements and principles of visual design and their function as the building blocks and guidelines for ordering a three-dimensional composition. A heightened awareness of form and space will be developed through lecture, assigned projects and critiques. Students will also develop a personal awareness of problem solving, experimentation and critical analysis. **Credit 3**

2013-242 **3D Design II**
This is the second-quarter of a yearlong sequential course. The winter term focuses on composing three-dimensional form and its relationship to space. Students will build on their prior term experiences, which include the introduction to three-dimensional principles, materials and building processes. **Credit 3**

2013-243 **3D Design III**
This is the third-quarter of a yearlong sequential course. Students develop the sophisticated skill of conceptualization. More advanced problems will be assigned and students will have the opportunity to explore a wide range of material and process possibilities for their resolution. Throughout the year work will emphasize where an idea comes from and the skills necessary to develop these ideas. **Credit 3**

2013-245 **4D Design**
4D Design introduces students to the basic concepts of art and design in time and space. Computers, video, photo, sound and lighting equipment are used to create short-form time-based work. This work explores the elements of moving images, serial, sequential and narrative ordering, still and moving image editing, sound and image relations, and object and event analysis. The course will address the historical conventions of time in art and their relationship to recent technological advances, which have redefined the fields of Fine Art and Design. In focusing on the relations between students' spacing and timing skills, 4D Design extends and supplements the other Foundation courses, and prepares students for further work with time-based media. **Credit 3**

Art History

2039-225, 226, 227

Survey of Western Art and Architecture I, II, III

A sequential series of courses focusing on the history of Western art and architecture, from Prehistoric times to circa 1950. We will examine the form, style, function and meaning of important monuments of the past, and consider these in their historical and cultural context. We will approach these objects in chronological order, for students first need to learn when, where and by whom (whether a people, or a known individual) a given object was produced before they can attempt to determine why the object was made, what it meant in its time and place (as opposed to what it may mean to us today), and whose ideology it served. Once we know how to classify visual information, we may be able to make historical sense of the surviving evidence. **Credit 3**

2039-300

History of Design

Explores the historical precedents of two- and three-dimensional design, including fine arts, industrial, graphic and environmental design. The course provides a foundation for individual decisions on planning and design to complement and enhance present and future environments. **Credit 3**

2039-306, 307, 308

Architecture, Interiors and Furniture History I, II, III

This course surveys architecture, interiors, and furniture design from the ancient world through the end of the Renaissance. The course will also discuss the social and technological contexts in which different architectural, interior and furniture styles developed. (2039-225, 2039-226, and 2039-227) **Credit 3**

2039-310

History of Crafts

Explores creative thinking and designing in the area of crafts through the ages with special emphasis on clay, fibers, glass, metal and wood. The course highlights the artistic achievements of the craftsmen of the past to enable present students to view their own time in its historical perspective and thereby understand more thoroughly their creative heritage and the efforts of contemporary craftspeople. **Credit 3**

2039-315

Pre-Columbian Art

This is a survey course to examine the development of principle styles of Ancient American architecture, sculpture, painting and ceramics up to the sixteenth century when the Spanish conquistadores defeated the Aztec Empire in Mexico and the Inca Empire in Peru and imposed colonial rule. **Credit 3**

2039-316

Art and Architecture in Florence and Rome 1400–1470

This course will cover significant commissions for painting, sculpture and architecture in Florence and Rome from 1400–1470. Artists from the early Renaissance period to the end of a major period of artistic patronage will be studied. Artists we will study include Filippo Brunelleschi, Lorenzo Ghiberti, Donatello, Luca della Robbia, Michelozzo, Leon Battista Alberti, Masaccio, Fra Angelico, Fra Filippo Lippi and Paolo Uccello. Questions for considerations will include: the nature and meaning of the Early Renaissance, developments in artistic theory and practice, the importance of Antique and Medieval precedents, the increasing attention to the effects of nature, the role of the patron, and the relevance of documents, literary sources and visual precedents for our interpretation of images. (2039-225 and 2039-226) **Credit 3**

2039-317

Art and Architecture in Florence and Rome 1470–1520

Commissions for painting, sculpture and architecture in Florence and Rome from 1470-1520 will be studied. Artists from the beginning of the unofficial rule of Lorenzo the Magnificent (de' Medici) to the death of Raphael, a highly influential artist. Artists will include Sandro Botticelli, Antonio and Piero del Pollaiuolo, Leonardo da Vinci, Domenico del Ghirlandaio, Bernardo Pinturicchio, Bramante, Michelangelo and patrons Lorenzo the Magnificent, the Florentine Republic, Popes Sixtus IV, Alexander VI, Julius II and Leo X. Questions for considerations will include: the nature and meaning of the High Renaissance, developments in artistic theory and practice, the importance of Antique and Medieval precedents, the increasing attention to the effects of nature, the role of the patron, and the relevance of documents, literary sources and visual precedents for interpretation of images. (2039-225 and 2039-226) **Credit 3**

2039-318

Art and Architecture in Florence and Rome 1520–1590

Significant commissions for painting, sculpture and architecture in Florence and Rome from 1520–1590 will be studied; from the ending of the High Renaissance to the Baroque era. Artists will include Michelangelo, Jacopo Sansovino, Jacopo Pontormo, Agnolo Bronzino, Baccio Bandinelli, Benvenuto Cellini, Giorgio Vasari, Bartolommeo Ammannati and Giambologna; patrons will include Grand-Dukes Cosimo and Francesco de' Medici of Florence, Popes Clements VII, Paul III, Julius III and Sixtus V. Questions for consideration will include: the nature and meaning of Mannerism and the Late Renaissance in Italy, developments in artistic theory and practice, the importance of Antique, Medieval, Early Renaissance and High Renaissance precedents, the rising status of the artist, role of the patron, and relevance of documents, literary sources and visual precedents for interpretation of images. (2039-225 and 2039-226) **Credit 3**

2039-320

History of Art Criticism

Art criticism from the Renaissance to the present day. A study of what makes art "good" (philosophical theories of art and the aesthetic experience) and what art criticism is and does (types and principles of art criticism). Lectures, reading assignments and research papers. **Credit 3**

2039-325

Art and Architecture in Venice and the Veneto

The subject of this course is 15th century painting, sculpture and architecture in Venice and the Veneto. We will examine paintings, sculptures and architecture works, such as: the altarpiece, the private devotional image, the portrait, the narrative scene or cycle, the tomb, the palace, the town-hall, the villa, the confraternity building, the chapel, the church and the square. Questions for consideration will also include: the myth of Venice, the importance of Antique Byzantine, Islamic and western Medieval precedents for developments in Venetian art and architecture, the introduction of Florentine Gothic and Renaissance art and ideas into Venice, the impact Venice had upon the art and architecture of the Veneto, and vice versa, and the cultural exchange between Venice and the north. (2039-225 and 2039-226) **Credit 3**

2039-330

Philosophy in Art

Traces the interactions between philosophic thought and artistic styles throughout history. Explores art as a reflection of human values. Lectures, reading assignments and research papers. **Credit 3**

2039-340

Symbols and Symbol Making

A concentrated study of the nature of sign and symbol as visual metaphor paralleling legend, myth, folklore and fairy tale as verbal metaphor; analysis of Freudian and Jungian theories about symbolic/metaphoric communication; and application of the theories to contemporary examples. Designed to help the artist, designer and craftspeople produce more effective visual communication. **Credit 3**

2039-355

Latin American Art

This is a survey course of the historical development of art from colonial times to the present. Included will be a consideration of painting, sculpture, architecture, graphic, and photographic arts. Potential themes to be addressed include the dependence on the European neo-classical academic model; indigenism, nationalism, and the resurgence of 'popular' art; the role of the visual arts in the construction of history; the conflicts and tensions involved in the search for a cultural identity. **Credit 3**

2039-360

18th and 19th Century Art

The development of the arts in these two centuries in the areas of Western painting, printmaking, sculpture, architecture, and the crafts from 1700 to 1900. Lectures, reading assignments, and research papers. **Credit 3**

2039-365

20th Century Art (1900–1950)

A critical study of the art and visual culture of the first five decades of the twentieth century. Major stylistic movements in Europe and America will be examined with special attention to innovations in materials, subject, matter, and philosophy. Central themes include: the relationship between art and politics; abstraction vs. figuration; primitivism and the search for origins; reactions to modernity and the rise of technology; the tension between the avant-garde and popular culture; the institutional critique, and the special role of art and artists in modern society. (2039-225, 2039-226 and 2039-227 or permission of instructor) **Credit 3**

- 2039-368** **Scandinavian Modernism**
This course examines the decorative arts and visual culture of modern Scandinavia from 1860 to present, with special emphasis on the social, economic, and political impulses that have shaped them. Scandinavian modern design plays a significant role in the postwar epoch; it is equated with such leading brands as Volvo, Saab, Ericsson, Nokia, H&M, Electrolux, Orrefors, Georg Jensen, ARTEK, and IKEA. The myths and realities of its success will be examined, as well as its impact on contemporary design. (2039-225, 2039-226 and 2039-227 or permission of instructor) **Credit 3**
- 2039-375** **20th Century Art Since 1950**
A critical study of the art and visual culture of the second-half of the twentieth century. Major stylistic movements in Europe and America will be examined with special attention to innovations in materials, subject matter, and philosophy. Central themes include: Abstract Expressionism, Pop Art, Nouveau Realism, and Arte Povera, Earthworks, Site Specificity, Allegory, Conceptualism, Minimalism, Feminism, Performance, and New Media. (2039-225, 2039-226 and 2039-227 or permission of instructor) **Credit 3**
- 2039-376** **Renaissance Painting in Flanders**
The history of Renaissance painting in the Southern Netherlands from the beginning of the 15th century to the end of the 16th century. We will consider the meaning of the Renaissance in Flanders, the observation and recording of natural appearances, "hidden symbolism" and sacramental themes in Early Netherlandish painting, the connections between Flemish, German, and Italian art, the development of new genres in the 16th century, "originality" and "artistic progress." Lectures, reading assignments, and research papers. **Credit 3**
- 2039-385** **Installation Art**
This course will introduce students to historic, contemporary, and critical issues surrounding installation art. There will be an introduction to the development of installation art as a genre. There will be an emphasis on the development of the concept of an installation project and its relationship to site and/or audience. Both public and gallery spaces will be discussed. (2039-225, 2039-226, 2039-227 and 2039-365) **Credit 3**
- 2039-390** **Native American Art and Culture**
Survey of Native American visual arts within the context of Native American cultures and within a historical and anthropological framework. Native American arts, their roots, traditional expression, changes with European contact and contemporary expressions are examined by culture area. Consideration also is given to materials used, techniques of construction, individual and tribal styles, as well as to the meaning and function of various art forms within Native American societies. **Credit 3**
- 2039-395** **Theory and Criticism of 20th Century Art**
A critical study of theoretical and philosophical texts which ground twentieth century art as well as their impact on artists and art historians/critics. Major issues include: the theory of autonomy and self-reflexivity, the structuralist paradigm, poststructuralist and Marxist critiques of modernism, Feminist approaches to spectacle, spectatorship, and commodity fetishism, and the relation of vision to constructions of identity and power. Key authors to be discussed include: Lessing, Kant, Foucault, Barthes, Benjamin, Saussure, Pierce, Levi-Strauss, Lacan, Bataille, Lyotard, and Baudrillard. (2039-225, 2039-226, 2039-227 and 2039-365 or 2039-375 or permission of instructor) **Credit 3**
- 2039-410** **The Art of Art History**
This course will trace the history of how we look, talk and write about those things that western culture calls "art." The course will concentrate, in a loosely chronological manner, on the development of art history and criticism from its roots in 18th century Germany to a multiplicity of viewpoints of the late 20th century. This inquiry will examine the people behind a tradition within the literature of the visual arts that not only re-examined the same issues, but also challenged, expanded and elaborated on one another's work. The course will show art history and our conception of art as something that is always under revision and is always in flux. (2039-225, 2039-226, 2039-227 and a non-20th Century Art History elective) **Credit 3**
- 2039-415** **Thinking About Making: The Practice of Art in a Global Society**
A discussion based art history elective for upper level undergraduates. The course seeks to bridge the gap between studio practice and contemporary art history. The course will explore very current work and ask questions about what is art, who is the audience, what is "our" art making practice and how does that fit within the larger context of the current state of the global art world. How do we measure success and artistic failure? The course emphasizes observation, critical analysis, and written interpretation. (2039-225, 2039-226, 2039-227 or instructor permission) **Credit 3**
- 2039-423** **The Image**
The image remains a ubiquitous, controversial, ambiguous and deeply problematic issue in contemporary critical discourse. This course will examine recent scholarship devoted to the image and the ideological implications of the image in contemporary culture. Topics will include: the modern debate over word vs. image, the mythic origins of images, subversive, traumatic, monstrous, banned and destroyed images (idolatry and iconoclasm), the votive, the totem, and effigy, the mental image, the limits of visibility, the moving and projected image, the virtual image, dialectical images, image fetishism, the valence of the image, semiotics and the image, as well as criteria by which to assess their success or failure (their intelligibility) and their alleged redemptive and poetic power.(2039-225, 2039-226 and 2039-227) **Credit 3**
- 2039-425** **Public Art Public Space**
This course will introduce students to the contemporary and critical issues surrounding Public Art. There will be an introduction to the history of Public Art. We will examine the changes from public art as monument to public art as place. There will be an emphasis on the new genre of public art, which involves community and historical referencing of site. The debate over public funding for public art will also be discussed; as the question of 'whose art is it' has become a pivotal issue in defining public art for public places. (2039-225, 2039-226, 2039-227 and 2039-365) **Credit 3**
- 2039-430** **Dada and Surrealism**
Explores the Dada and Surrealist movements in Europe and the United States from 1916 through 1968. Emphasis is on identifying the major works of artists involved in these aesthetic developments. Ideology and formal ideas are analyzed in lectures, reading assignments, and research papers. **Credit 3**
- 2039-433** **What is Postmodernism?**
"What is Postmodernism?" will cover the art, politics, culture, and the critical texts that formed the discourses, and their resulting debates, about contemporary society after World War II and especially so after the social unrest of 1968. The course, "What is Postmodernism?" features the question itself. How and why, and by whom, are questions asked and answered? What if the question were to be asked from within the discourse of architecture or music or biology? Would the answers be the same? Would the questions be the same? **Credit 3**
- 2039-435** **Art of the Last Decade**
A critical study of the art and visual culture of the last decade with a strong emphasis on the current American and international scene. The primary focus will be on living artists and artists who remain crucial to contemporary debates with special attention paid to recent, current, and forthcoming exhibitions, their methodological frameworks and historical context, as well as the key critics and curators who are shaping the visual culture of the present. (2039-225, 2039-226, 2039-227 and 2039-365 or 2039-375 or permission of instructor) **Credit 3**
- 2039-438** **Body in Art**
This course is an inquiry into the artistic investigation of the literal human body and the texts that give them meaning. The class will focus on the history, theory and problems of performance art in the latter part of the 20th century. (2039-225, 2039-226, and 2039 227) **Credit 3**
- 2039-440** **Conceptual Art**
This course examines the widely influential mid-1960s art movement which questioned the fundamental nature of art itself by renouncing the material art object as well as the phenomenon of art-making. The definition of art as well as its institutional framework was thereby expanded, and the idea, concept, or intellectual dimension of the work was underscored. Students will be acquainted with the philosophical foundations and critical implications of this global movement across a wide spectrum of works and practices (paintings, performance, installations, books and texts, photography, film, and video) and its relevance to contemporary concerns. **Credit 3**
- 2039-443** **Art and Technology: From the Machine Aesthetic to the Cyborg Age**
This course explores the links between art and technology in 20th century visual culture with special focus on historical, theoretical, and ideological implications. Examples from film (Modern Times, Metropolis, Man with the Movie Camera, Blade Runner) and literature (Frankenstein) will be discussed, as well as a wide range of artists and philosophers. Topics include the industrial revolution, utopian, dystopian, and fascist appropriations of the machine, the machine aesthetic (of Leger and Le Corbusier), engendering the body and machine-eroticism, the principles of scientific management, mass production and the art factory, the technological sublime, Raucshenberg and E.A.T., cyborgs, cyberpunk, and the posthuman. (2039-225, 2039-226, 2039-227, or permission of instructor) **Credit 3**

2039-444 **Illuminated Manuscripts**
Students in this course will examine the history of illuminated manuscripts, learning about the working methods of artists as well as the cultural significance of the illuminated book. Issues of production, style, function, and patronage will be introduced, and students will explore the relationships between images, texts, and readers. **Credit 3**

2039-452 **Art and Activism**
This course will focus on artists using their work for the purpose of changing society. Students will consider work by both individual artists and artists working in groups that cause critics, art historians, other artists and the viewing public to ask if what they are doing is art. Although there will be forays back to the 19th and early 20th centuries, most of the time will be dedicated to artists of the last three decades. We will examine texts that propose art to be a form of activism and persuade artists to be responsible for the way they represent the world and maybe even determine if the goal of art is not to represent it in the first place. The artists we discuss are concerned with problems in our society that affect gender, race, sexuality, poverty, labor issues, and the environment. (2039-225, 2039-226, 2039-227) **Credit 3**

2039-459 **Art and Architecture in Central Italy 1250-1400**
The subject of this course is painting, sculpture, and architecture in Central Italy from the middle of the 13th century to the end of the 14th century. We will approach this material in more or less chronological order as we focus upon different types and media, including the altarpiece, the private devotional image, the pulpit, the tomb, the chapel, the monastic church, the cathedral, the town hall, the private palace, and the urban setting. Questions for consideration will include: Franciscan devotion, the rivalry between Sienna and Florence, early humanist thinking about the arts. Giotto as the paradigmatic Florentine painter, the nature and meaning of the Italian proto-Renaissance, and the impact of the Black Death upon the arts. (2039-225, 2039-226, and 2039-227) **Credit 3**

2039-469 **Baroque Rome**
This course will focus upon Italian artists working in Rome from circa 1590 to circa 1660. Although we will explore painting, sculpture, and architecture in this sequence more or less chronologically, we will often have the chance to consider how these different media coalesce to create an overwhelming visual experience. We will pay particular attention to major commissions given to Annibale Carracci, Michelangelo da Caravaggio, Gianlorenzo Bernini, and Francesco Borromini, as we seek to define the nature and meaning of the Roman Baroque. (2039-225, 2039-226 and 2039-227) **Credit 3**

2039-550, 551, 552, 553 **Special Topics**
A focused, in-depth study and analysis of a selected advanced topic in Art History. Specific topics vary according to faculty assigned. **Credit variable 3-6**

School of Art

Illustration

**Prerequisite for all 300-level illustration courses:
foundation program or equivalent**

2019-301 **Illustration I**
Illustration core for illustration majors and medical illustration majors in their sophomore year. The students approach major elements of technique, application, and theory in relation to becoming illustrators. Studio sessions involve basic anatomy, design and typography for illustrator, figurative expression, photographic tools, and illustrative technique. Class structure allows demonstrations of process and experimentation and critique with illustrative media. **Credit 3**

2019-304 **Anatomical Figure Drawing**
Helps students correlate underlying osseous and muscular anatomy with surface form and structure. Instruction also emphasizes gesture, proportion and balance. Course work requires students to use their figure drawing skills while solving illustration assignments. **Credit 3**

2019-311 **Digital Illustration I**
Provides students with methods of conceptualizing, organizing, and executing illustrations using the computer. Projects will expose students to various types of digital techniques using vector and raster-based software applications, as well as a variety of input and output devices for the creation of professional level assignments. The course will emphasize conceptual problem-solving methodology and the language of visualization while providing a consistent foundation for digital illustration as it relates to professional illustration production. Color systems, digital terminology and pre-press file formats also will be covered. **Credit 3**

2019-323 **Zoological and Botanical Art and Illustration**
This course utilizes resources found in the natural world as subjects for applied art and design. Students work at accurately portraying animal and plant images, which may be used descriptively in print or electronic media. (Foundations) **Credit 3 (S)**

2019-342 **Digital Narrative I**
Instructs students in the use of digital medium for the purpose of visual storytelling. Importance will be placed on the creation of visual narratives with reference to style, content and interpretation. Assignments will involve vector and raster-based software applications and a variety of input and output devices. Conceptual strategies, production methodologies, narrative composition, and color systems also will be covered. (2019-311) **Credit 3**

2019-345 **Illustration Techniques I**
This course will address the wide array of dry media production techniques. Stress will be placed on developing and enhancing drawing skills, appropriate use of media, artist, created photographic reference materials, and use of a structured illustration working process. Further emphasis will be placed on creative thinking, a preliminary view of professional practices and improvement of student portfolios. (Art and design foundation courses) **Credit 3**

2019-361 **Dimensional Illustration I**
Introduces students to an alternative, three-dimensional style of illustration. Emphasis will be placed on planning, preparation, compositional elements in three-dimensional sculptural form and creative problem solving. Students will be encouraged to explore a variety of materials and techniques to complete projects. (Art and design foundation courses) **Credit 3**

2019-363 **Digital Mixed Media I**
Provides students with the opportunity to explore the creative potential presented through the imaginative combination of both traditional and digital media. Students will be expected to utilize and combine skills learned in traditional and digital illustration courses to provide exciting and fresh illustrations unrestricted by a singular medium. (Art and Design foundation courses) **Credit 3**

2019-373 **Character Illustration I**
Instructs students in the conceptualization and production of illustrated characters. Assignments will challenge students to create characters for a variety of purposes and media. Anatomy, design, and style will take final form as frontal, rear, profile and 3/4 view representations of characters. Conceptual strategies will be stressed as they relate to character appearance and function. Assignments will involve production methodologies, character diagramming and color systems. (2019-301 or 2019-311) **Credit 3**

**Prerequisite for all 400-level illustration courses:
sophomore illustration core or equivalent**

2019-406 **Illustrative Design I**
The goal of this course is to familiarize students with professional illustration assignments and the integration of typography, symbols, and other forms of graphic visuals. Assignments will include book and magazine covers, advertisements, and posters; i.e. visuals that, although produced by illustrators, effectively function as total design solutions. The ability to interpret typographic and other non-illustrative components in an illustrative context has become a key to potential employment in our profession. In today's market many career tracks demand that illustrators know how to develop these total solution assignments. **Credit 3**

2019-409 **Symbols in Editorial Illustration**
An in-depth introduction to the field of editorial illustration. Emphasis is placed on brainstorming and concepts. Cultural images and symbols are examined and utilized to express ideas. Students are encouraged to expand in a personal direction while effectively communicating specific information from a given article or story. Efficient and effective time and energy priorities are established. **Credit 3**

2019-422 **Digital Illustration II**
Provides students with advanced methods of conceptualizing, organizing, and executing illustrations using the computer. Through the use of methodology worksheets, the course will emphasize problem solving methods while building on a consistent foundation for digital illustration preparation and production. Projects will allow students to explore advanced digital illustration techniques using vector and raster-based software applications, as well as a variety of input and output devices. Alternative color systems, output paper surfaces, and pre-press file formats also will be covered. **Credit 3**

2019-423 **Digital Editorial I**
This course emphasizes effectively communicating information in a given article or story, from political themes and news stories to plays and poetry. Students explore the computer's ability to make many variations and subtle changes to the images quickly. **Credit 3**

2019-427 **Pop-up Books I**
This course will deal with constructing and illustrating pop-up and mechanical books. Students will study painting, engineering, and illustration for production of pop-ups. The course will be divided into a preliminary section of learning the basic mechanism of pop-up books and a second section that allows students to apply knowledge learned in the first section to the illustration and production of their own book. **Credit 3**

2019-432 **Digital Editorial II**
Expands on the principles learned in Digital Editorial I. Importance will be placed on the advanced conceptual interpretation of editorial subject matter, organization of the composition, and the interjection of humorous, serious, ironic, and other interpretations. Students will apply approaches to creative illustration while closely following reproduction specifications. Students may use vector and raster-based software applications and a variety of input and output devices. Stylistic issues, conceptual strategies, production restrictions, and color systems also will be covered. (2019-423) **Credit 3**

2019-436 **Illustrative Design II**
Applies the principles and methods practiced in Illustrative Design I in more advanced projects. Students will conceptualize, organize, and execute illustrations within a design context and explore basic headline writing, with an emphasis on the use of complex graphic elements in conjunction with various styles of illustrations. Illustration production methods and terminology will be included. Projects will expose students to various real-world print media assignments that will demand the use of traditional illustration methods as well as computer-based production media. Assignments will stress solutions that are typically managed by art directors and designers. (2019-406) **Credit 3**

2019-441 **Sketchbook Illustration**
This course will facilitate the use of sketchbooks as a creative, developmental tool for illustrators and artists. Students will complete assignments by draw on location and in class to explore subjects and environments to create a visual reference material in the form of a sketchbook journal. Material documented in the sketchbook will then provide visual reference for more complete illustrations. **Credit 3**

2019-442 **Digital Narrative II**
Expands on the tradition of verbal concepts to pictorial narrative introduced in Digital Narrative I. Particular emphasis will be placed on illustration sequences, including story-line illustration and thematic series pictorials. Importance will be placed on the digital representation of narrative story telling with reference to style, content and interpretation. Assignments will involve vector and raster-based software applications and a variety of input and output devices. Conceptual strategies, production methodologies, narrative composition, and color systems also will be covered. (2019-342) **Credit 3**

2019-445 **Illustration Techniques II**
This course will address the wide array of wet media production techniques. Stress will be placed on enhancing drawing skills, appropriate use of wet media, artist, created photographic reference materials and refining a structured illustration working process. Further emphasis will be placed on creative concept development, verbal communication, professional practices, and improvement of student portfolios. (2019-345) **Credit 3**

2019-451 **Political Cartooning**
Political Cartooning is an introduction to this very popular, humorous approach of illustration that is widely used by newspaper and magazine publishers. Students will apply humorous, satirical, ironic, etc. content to their illustrations. Research, brainstorming, and exploration of techniques and media are emphasized. The history of visual joke telling is reviewed. **Credit 3**

2019-461 **Dimensional Illustration II**
This course will offer students the option to continue an exploration of three-dimensional illustration. Emphasis is placed on drawing skills, planning, preparation, compositional elements of three-dimensional sculptural form, and creative problem solving. Students are encouraged to explore a singular medium to complete projects in a series to be presented in a consistent style. (2019-361) **Credit 3**

**Prerequisite for all 500-level illustration courses:
junior illustration core or equivalent**

2019-504 **Illustration as a Journalist I**
Illustration problems that require the student to visually report and record a specific happening or event. These projects will be of longer duration and will consist of several major paintings, many drawings, sketches, notes, and photo-references. This journalistic approach to illustration demands that the students attend the event and select those images that will best communicate the atmosphere of the event. Students are encouraged to sharpen their observations in order to clarify or embellish what might be commonplace to the non-visual observer. **Credit 3**

2019-505 **Contemporary History Illustration**
Students are introduced to a sequence of historical events that have had the most lasting effect on 20th century illustration. These events affect the look of illustration and provide a place to begin discussion. The effects on surrealism, on the one hand, and social realism, on the other represent a swing of the pendulum of narrative and representational art. Studio work incorporates ideas embodied in these and other contemporary art trends. Lectures and illustrated talks compare contemporary art and illustration history. **Credit 3**

2019-507 **Illustration for Books**
Explores the basic principles in developing illustrations for books. Composition, conceptualization and storyboard development are covered, as well as finishing art preparation. Emphasis not only on creativity of expression, but also on conceptual and technical experimentation. Work is geared toward books for a variety of age groups and functions. **Credit 3**

2019-510 **Personal Focus I**
A series of illustration projects in which students are encouraged to investigate topical subjects of their choice. Each student's own creativity, self-expression and visual communication skills are stressed. Emphasis is on clarity of concepts and developmental procedures necessary to work as an illustrator. **Credit 3**

2019-513 **Marketing and Business Practices for Illustration**
This course will address the professional practices and issues involved in conducting the business of illustration as related to both freelance and staff positions. Students will consider setting up a business/studio, marketing their work, self-promotion, finding work, pricing, record keeping, legal rights, taxation, and representation. (Junior illustration core) **Credit 3**

2019-516 **Animating Digital Illustration**
An introduction to illustrating for multimedia projects by creating computer-generated animations and presentations. Macromedia Director, in combination with other imaging software, will be used to develop these "movies." The Director movies will investigate not only illustrated animation, but also sound, music, color, and special effects. **Credit 3**

2019-517 **The Interactive Illustration**
Projects will highlight the integration of interactive interfaces into illustrated Macromedia movies, thus allowing responses to choices made by the user. Using scripting and branching, in combination with buttons and menu choices, projects will be programmed to allow some control over a movie and navigation through animations and presentations. **Credit 3**

2019-518 **Time-Based Illustration and Design**
Illustration and design students will be teamed together to develop multimedia projects, i.e., CD-ROMS, animated advertisements, and kiosk displays. The teams will begin with short problems, culminating in final full-scale electronic projects that utilize their respective illustrative and design skills to develop strong, unified solutions. Projects will include both passive and interactive projects, which reinforce the students' knowledge of time-based authoring tools, such as Macromedia Director, QuickTime Movies, and Adobe Premiere. **Credit 3**

2019-527 **Pop-up Books II**
This course will be a continuation of Pop-Up Books I and will deal with constructing and illustrating pop-up and mechanical books. Students will select a singular topic and produce pop-ups and other mechanical devices relevant to telling the story. Emphasis will be placed on creating multiple devices relying on a single source of energy per page for performance. Emphasis will also be placed on visual continuity throughout the story. (2019-427) **Credit 3**

2019-563 **Illustration Portfolio Preparation**
Illustration Portfolio Preparation is the final preparatory course for the illustration major. Its purpose is to provide students with information, strategies, and guided instruction to organize and create their final portfolio. The course will include individual critique and analysis of work created in prior studio classes and progress to the definition of a career agenda. Projects will be individually assigned based on the quality of each student's body of work and his or her career intentions. Presentation methods, formatting and stylization will also be addressed. The final culminating project will be a finished portfolio document. Students will be instructed in job seeking strategies, including interviewing dynamics, resume writing, and correspondence. **Credit 3**

Medical Illustration

2020-215 **Foundation - Illustration/Medical Illustration**
This course provides an introduction to the fields of illustration and medical illustration and the role of these disciplines in the design process. Students develop conceptual skill, experiment with different media, and learn the importance of research, reference materials, models, and props in the illustration process. Career options, self-promotion, and the professional practice of illustration will also be discussed. **Credit 2**

**Prerequisite for all 400-level medical illustration courses:
sophomore medical illustration core or equivalent**

2020-406 **Anatomic Drawing I**
Students are assigned projects to reinforce their knowledge of anatomy while collaborating on dissection and illustration from the cadaver. Problems include oncology from cross sections and x-rays in preparation for surgical and medical/legal art. Mixed media is encouraged. **Credit 3**

2020-407 **Anatomical Illustration: Wet Media Application**
Development of range and mastery of medical wet media illustration techniques. Course work emphasizes transition of anatomical drawing done from dissected cadavers into "instructional anatomical illustrations" designed to be published using halftone and four-color reproduction techniques. **Credit 3**

2020-408 **Computer Applications for Anatomic Illustration**
Advanced application of computer hardware and software to create illustrations in support of anatomical instruction. Course work emphasizes translating on-site drawings from student dissections into digital illustrations. **Credit 3**

2020-409 **Introduction to Interactive Animation**
Building on experience gained in Anatomic Drawing I, students are assigned projects to reinforce their knowledge of anatomy while collaborating on dissection and illustration from the cadaver. Problems include oncology from cross sections and X-rays in preparation for surgical and medical/legal art. Mixed media is encouraged. **Credit 3**

2020-410 **Anatomical Illustration Mixed Media**
Development of range and mastery of airbrush and mixed media illustration techniques. Course work emphasizes creating illustrations aimed at a variety of medical illustration markets, including medical/legal, editorial, and advertising. **Credit 3**

2020-431 **Human Gross Anatomy I**
Dissection and the study of the human body are presented with topics such as developmental, comparative, and applied anatomy. Emphasis is directed toward osteology and radiographic anatomy. **Credit 4**

2020-432 **Human Gross Anatomy II**
The second half of a two-quarter sequence devoted to the study of the human body. Detailed dissection of a human cadaver is supplemented with lectures on the structure and function of the major organ systems. The second quarter begins with a detailed dissection of the head and neck and moves on to the pelvis, perineum, and a lower limb. (2020-431) **Credit 4**

2020-461 **3D Modeling and Animation:
Biomedical and Organic Forms I**
Course explores modeling and animating three-dimensional forms to provide visual support for allied health instruction. Assignments focus initially on modeling geometric forms to create biomedical subjects (i.e., human cells, bacteria, viruses, etc.). Fundamentals of animation and its use as an instructional media are then presented. Additional modeling techniques and expanded lighting and rendering procedures are explored. Students create animation explaining cellular events or depicting the anatomy of a human organ for their final assignment. **Credit 3**

2020-462 **3D Modeling and Animation:
Biomedical and Organic Forms II**
Course employs three-dimensional modeling and animation as a means of providing visual support for biomedical instruction. Assignments focus on constructing models that accurately portray a member of the phylum arthropoda (crustaceans, insects, arachnids). Fundamentals of animation and its use as an instructional media are reviewed. Models are then attached to "skeletons" in order to animate some characteristic action of the chosen species. Forward kinetics, inverse kinetics, and inverse kinetics using a spline handle are compared as means for controlling animation. **Credit 3**

2020-463 **Advanced 3D Modeling and Animation:
Biomedical and Organic Forms**
Course for students who have taken either three-dimensional modeling and Animation of Biomedical and Organic Forms I or II, to develop animations designed to provide health information as a public service displayed on the Web. Course material focuses on advance modeling and animation procedures. In addition to technical animation and modeling skills, student projects are expected to demonstrate independent research methodologies. **Credit 3**

2020-468 **Medical Legal Illustration**
This course deals with the preparation of support materials for medical litigation—personal injury, medical malpractice, and product liability cases. Students learn to read and interpret medical records including operative reports, discharge summaries, radiographs, pathology, and autopsy reports. From these records, students propose effective visual aids to best depict the facts of the case, create preliminary sketches of the proposed exhibits, and then complete the exhibits in a format appropriate for presentation to a jury or arbitrator. **Credit 3**

2020-478 **Molecular Illustration**
Accurate representations of molecular structures are essential to illustrate recent advances in biotechnology, medical genetics, and pharmacology. This course provides a basic overview of molecular biology and introduces the principles of molecular illustration. Students will locate three-dimensional molecular model files on the Internet and manipulate these models to create two-dimensional, three-dimensional and animated representations of molecules and biochemical processes. **Credit 3**

**Prerequisite for all 500-level medical illustration courses:
junior medical illustration core or equivalent**

2020-501 **Advanced Medical Illustration**
Advanced medical illustration techniques. Graphic design related to illustrative and photographic practice. Lab sessions to be scheduled in operating room facilities. Jointly sponsored by RIT and the University of Rochester. **Credit 3**

2020-504 **Surgical Drawing and Illustration I**
This course provides students with the unique opportunity of drawing while observing surgery in local operating suites. Surgical sketches are further developed into final illustrations designed to support instructions. Illustrations created in this course will be produced using traditional and electronic media. **Credit 3**

2020-505 **Surgical Drawing and Illustration II**
This course provides students with the unique opportunity of drawing while observing surgery in local operating suites. Surgical sketches are further developed into final illustrations designed to support instruction, editorialize, advertise, and support courtroom presentation. Illustrations created in this course will be produced using traditional and electronic media. **Credit 3**

2020-506 **Computer Animation Medical Instruction**
Advanced study of hardware and software applications to support medical instruction. Course introduces students to creating two-dimensional computer animations as support for biomedical instruction. **Credit 3**

2020-507 **Marketing and Business Practices Medical**
Course work prepares students for entry into the medical illustration profession. Topics include writing and designing resumes, cover letters, and self-promotional materials as instruments for gaining employment. Additional classroom lectures and demonstrations cover professional ethics, copyrights, contracts and client/illustrator negotiations. **Credit 3**

2020-508 **Medical Illustration Portfolio**
Students receive individual assessments of their current portfolio from faculty. Course work supports construction of "exit" portfolios reflecting each student's strengths and interests. Traditional two-dimensional and electronic portfolios are constructed. **Credit 3**

Fine Arts Studio

**Prerequisite for all 300-level fine arts studio courses:
foundation fine arts studio core or equivalent**

2021-305 Introduction to Painting
Emphasis is on painting and the development of form, space and expression from a variety of sources, including the human figure. Emphasis on basic techniques, materials and concepts for further study in painting and related media. Introduction to the materials and techniques of permanent painting media. Preparation and execution in both direct and indirect painting methods. Safe handling of artists' materials is stressed. **Credit 3**

2021-316 Introduction to Fine Art Drawing
This class is devoted to building upon each student's skills in drawing with attention to use of a variety of mark making materials and surfaces. Drawing uses perceptual and conceptual approaches to creative visual art making. Students engage in issues of representation and abstraction through relationships of marks, lines and other graphic notations. Contemporary drawing can focus on direct observations or imaginative compositions among many other valid approaches. (2013-213, 2013-233 and 2013-243) **Credit 3**

2021-321 Contemporary Drawing
Drawing from the standpoint of being informed, inventive, and contemporary in the use of form concepts and relationships. To encourage freedom of thought, imagination, and inquiry into theory, technology, and the application of drawing as a visual communication. **Credit 3**

2021-331 Figure in Motion
Figure in Motion is a course that studies the fundamentals of drawing the human form in motion. Emphasis is given to sketching and quick studies with a variety of media. Principles of visual perception with also be explored. (2013-213, 2013-233 and 2013-243) **Credit 3**

2021-336 Foundry Practices
This course is designed to introduce or develop students' skills in casting metals with an emphasis on cast iron and the use of a cupola. Advanced pattern-making, mold-making, sprueing, patination, and casting techniques will be introduced. Students will develop their concepts through cast metal sculpture. (2013-242) **Credit 3**

2021-339 Digital Art Printmaking
This course is designed to introduce or develop students' skills in casting metals with an emphasis on cast iron and the use of a cupola. Advanced pattern-making, mold-making, sprueing, patination, and casting techniques will be introduced. Students will develop their concepts through cast metal sculpture. (2021-315) **Credit 3**

2021-361 Introduction to Sculpture Assemblage
This course involves assembling or bringing together parts/pieces to form a whole, one of the most basic approaches to creating sculpture. Spontaneous and immediate contact with unique materials, creative processes, and the degree of sculptural impact may all be characterized as extremely direct. This straightforward confrontation offers no flashy techniques, seductive material or process to hide behind. Instead, at the onset, basic sculptural manipulation must occur. **Credit 3**

2021-362 Introduction to Sculpture Figure
This sculpture course investigates the study of human form through the development of sculptured class figures, working directly from living models. Emphasis is placed on exploring the following sculptural elements: the underlying three-dimensional structure of the human figure; proportions of the human figure; volume, mass and surface anatomy, gesture; support and balance; figurative spatial relationships; expressive qualities of the human form; use and control of basic material and processes related to figure sculpture. **Credit 3**

2021-381 Watercolor
Use and control of the technique of watercolor painting. Exploring watercolor as an illustrative and painting media. **Credit 3**

2021-383 Intermediate Sculpture
Introduction and continuation of basic sculptural practices and processes focusing on modeling and mold-making. Students will work primarily with investigating and basic relief principles while developing these skills to produce a body of work. **Credit 3**

**Prerequisite for all 400-level fine arts studio courses:
sophomore fine arts studio core or equivalent**

2021-401, 402, 403 Fine Arts Studio I
The third year of studio work in the degree sequence. Increased development of the various fine arts media. Emphasis is placed upon individual solutions and expression. **Credit 3**

2021-471 Ideation and Series
In this course students develop appropriate skills and strategies to generate ideas and develop them effectively. Creative flow, having an endless stream of ideas, alternatives, and choices for solutions, helps creative work evolve and reach more advanced levels. **Credit 3**

**Prerequisite for all 500-level fine arts studio courses:
junior fine arts studio core or equivalent**

2021-501, 502, 503 Fine Arts Studio II
The fourth year of advanced studio work completing a major course of study in the fine arts. Concentrated studio production focused upon individual creative solutions. Individual and group critiques lead to the development of a visual portfolio of one's work. (2021-401, 2021-402, 2021-403) **Credit 3**

2021-569 Art Gallery Management
The complex social and cultural role of a fine arts gallery will be explored through actual gallery operations: the installation of experimental and traditional exhibitions, promotion, and marketing for art competitions, student initiatives, and special events tailored to RIT and community art audiences. (On site presentations plus arranged hours in laboratory, gallery setting) **Credit 3**

2021-572 Business Practices in Fine Arts
This class is devoted to business issues that artists face, including portfolio development, pricing and marketing strategies, public relations, grants, and other sources of financial support. Students research exhibition venues and career support services. The class also investigates communication skills necessary for professional accomplishment in the arts. **Credit 3**

2021-578 New Forms Elective
This course provides the conceptual framework for New Forms. Students will learn about some of the contemporary directions fine art has taken beyond the traditional disciplines of painting, printmaking, sculpture, and drawing such as performance, installation, and collaboration. Students will express their own ideas through these new forms. (Restricted to fourth-year CIAS majors) **Credit 3**

School of Design

New Media Design and Imaging

2009-212 3D Form and Space
An introductory course in visualization that extends previous experience and skills to include the third dimension. The course will provide fundamentals for more advanced studies in three-dimensional animation, virtual spaces, and multidimensional navigation spaces. Manual and digital tools will be used for problem solving. Students will be expected to show evidence of growth in three-dimensional understanding from simple objects to more complex environmental spaces. (New media majors or permission of instructor) **Credit 3**

2009-213 Elements of Graphic Design for New Media
This course introduces the student to visual communication and the graphic design profession. Through formal studies and perceptual understanding, including aesthetics, graphic form, and structure, concept development, and visual organization methods, students will design solutions to communication problems. Assignments exploring aspects of graphic imagery, typography, and production, will be included. (New media majors or permission of instructor) **Credit 3**

2009-221 Principles of Imaging for New Media
Imaging for new media design is a project-based course that develops design skills in raster image creation, editing, and compositing for online production. This course introduces digital photographic principles, editing and image manipulation tools. Students will create and edit images, montages, and raster-based design solutions for online delivery. **Credit 4**

2009-311 Typography for New Media
A course designed to introduce students to the fundamentals of text document creation, and to provide the students with the terminology necessary to communicate with a client or originator and the manufacturer of the document. (2009-213 and new media majors or permission of instructor) **Credit 3**

- 2009-312 Information Design for New Media**
Information design for the Web and interactive multimedia integrate content with visual indicators. Legibility and clear communication of information and direction are important to the success of graphical user interface design. This course integrates imagery, type, icons, buttons, color, visual hierarchy, and site architecture to design friendly and functional user interfaces. (New media core or permission of instructor) **Credit 3**
- 2009-313 Introduction to Computer Imaging**
An introduction to the computer as an illustrative tool. Emphasis will be on the application of visual organization methods in the context of electronic media. Exploration of raster and/or vector graphic software programs will serve as the basis in the development of illustrative assignments. (New media core or permission of instructor) **Credit 3**
- 2009-323 Designing Graphical User Interface**
An introduction to designing the interface, both visually and technically, for New Media projects and applications. Good interface design allows the user to accomplish a variety of tasks. It should not force a user to look all over for information and buttons. It should allow the user to operate intuitively, with ease of navigation, and be entertained at the same time, regardless of the information being communicated. Team-taught lectures, presentations, and demonstrations will investigate both the programming and visual communication aspects of developing good interface design. (New media core or permission of instructor) **Credit 3**
- 2009-328 Introduction to Digital Animation**
An introduction to the techniques and practice of graphic and animated film production, this course provides training and practical experience in producing two-dimensional animated sequences using off the shelf multimedia software. Students produce a number of short exercises incorporating original computer generated and non-digital artwork. Topics include key frame and 'tweening, cycling, acceleration, squash and stretch, backgrounds, inking, rotoscoping, sound, masking, multiplane effects, and space-to-time. Screenings of professionally made films will illustrate and provide historical perspective. Proficiency in drawing is not required, but strongly recommended. (Required for new media design and imaging and new media IT second year majors) **Credit 4**
- 2009-401 Advanced Design Networking**
This course extends previous networking experience and skills to emphasize advanced visual Web design layout skill and the incorporation of time-based vector graphics. The emphasis of this course will be away from programming toward the application of software tools and design concepts related to more visual Web page development with interactive, dynamic interfaces. Typical software tools such as, but not limited to, Flash and Dreamweaver will be used. (Completion of new media design sophomore core or permission of instructor) **Credit 3**
- 2009-402 Emerging Multimedia Design and Imaging Tools**
This course will explore and integrate a number of related software packages including, but not limited to, Adobe After Effects, Peak, QuickTime and three-dimensional applications, as well as conceptual development and production. (Completion of new media design sophomore core) **Credit 3**
- 2009-403 Dynamic Information Design**
A study of the application of Information Design theory and practice to the developing area of new media. Cartography and iconography will be viewed in the context of Web and kiosk use. The delivery of consumer information, using interactive, and dynamic media as the vehicle, will be investigated. (Completion of new media design sophomore core or permission of instructor) **Credit 3**
- 2009-411 Time-Based Imaging for New Media**
New media students will develop short animated and interactive multimedia projects, while learning the basics of the time-based authoring software, Macromedia Director and Flash. The students will begin with short exercises, culminating in final larger electronic projects that develop their design and programming skills. Projects will include both passive and interactive components that will support the learning process. (New media freshman core or permission of instructor) **Credit 4**
- 2009-412 Dynamic Typography**
This course will deal with design concepts related to moving type. The impact of type as it moves, rotates, explodes, scales and fades will be considered. Legibility of the message will be studied in relation to this movement. Students will learn how both two- and three-dimensional type can be manipulated in a time-based manner. (Completion of new media design sophomore core or permission of instructor) **Credit 3**
- 2009-413 Advanced 3D Techniques**
This course extends previous three-dimensional experience and skills to include advanced three-dimensional effects such as particles, volumetric textures such as fog, and the movement of three-dimensional objects using both fixed cameras and moving cameras. Gravity, wind, and inverse kinematics will also be considered. (Completion of new media design and imaging sophomore core or permission of instructor) **Credit 3**
- 2009-501 Dynamic Persuasion Design**
An incorporation of commercial practices such as advertising, editorial design and editorial illustration with dynamic media. Dynamic media refers to the inclusion of any audio, video, and animation clips that are used in a project. Dynamic media greatly add to the impact of the message being communicated. The point of message delivery will include the Web, CDs, kiosks, and video teasers and trailers. (Fourth-year new media design and imaging majors or permission of instructor) **Credit 3**
- 2009-502 Virtual Entertainment**
A course dealing with design and gaming concepts, delivery systems and software for the entertainment industry. Working with two- and three-dimensional visual concepts, virtual reality, interactivity, and sound, the student will develop media for the entertainment industry. Environments, characters, gaming strategies, role-playing concepts, navigation and feedback will be part of the information presented within the course. (Fourth-year new media design and imaging majors or permission of instructor) **Credit 3**
- 2009-511 QTVR and Multimedia Design**
This course extends previous multimedia and three-dimensional experience and skills to emphasize advanced multimedia applications using QTVR as a design tool to interactively explore and examine photo-realistic three-dimensional virtual worlds. Attention will be given not only to the mechanics of creating the movies but also to their design, relationship to the other visual elements, and visual communication effectiveness of the movies. (Fourth-year new media design and imaging major or permission of instructor) **Credit 3**
- 2009-516 Career Skills in New Media**
This course is divided into two segments. The first centers on resume development, cover letters, interviewing practices, and portfolio options. The emphasis is on using your present level of experience to enter the job market. The second segment centers on the business and practice of design. This will encompass an overview of the designer/client relationship, design management, marketing, rights, and ethics. (Completion of new media design and imaging junior core) **Credit 3**
- 2009-522 Experimental New Media**
The course will provide for an experimental approach to integrating content with new-media techniques and processes. Students will be encouraged to approach the computer as a medium of creativity to explore issues of narrative, identity, and place, loss of the original and visual reality. Students will also develop planning and organizational skills for experimental interactivity and imaging projects. (Completion of new media design and imaging junior core) **Credit 3**
- 2009-542 New Media Team Project I**
The first course in a two-quarter sequence designed to engage the new media major in a capstone production experience. The instructor will form student teams that will design and complete new media projects sponsored by clients external to the class. (2009-501) **Credit 4**
- 2009-543 New Media Team Project II**
The second course in a two-quarter sequence designed to engage the new media major in a "cap stone" production experience. Students continue to work on their new media group production until completion. Each group is required to test their product with a focus group and provide written feedback and analysis. (2009-542) **Credit 4**
- 2009-550, 551, 552, 553 Special Topics**
Topics of current or special interest designed to broaden and intensify the students' ability to use art and design as a mean of communication and expression. **Credit variable 1-9**

Graphic Design

2010-211

Computer Skills: Raster Imaging

An introduction to basic computer software skills, terminology, and technology as they relate to raster-based computer-imaging software (such as Photoshop). This course provides the skills necessary to use drawing software relative to the design curriculum. The areas of file formats, software tools, image creation, and file output are covered. **Credit 2**

2010-216

Computer Skills: Vector Imaging

An introduction to basic computer software skills, terminology, and technology as they relate to vector-based computer drawing software (such as Freehand and Illustrator). This course provides the skills necessary to use drawing software relative to the design curriculum. The areas of file formats, software tools, image creation, and file output are covered. **Credit 2**

**Prerequisite for all 300-level graphic design:
foundation program or equivalent**

2010-301

Elements of Graphic Design

Introduction to basic visual communication in the field of graphic design. Lectures will cover graphic design topics and information ranging from typographic terminology and design principles to methods of visual organization. Lectures will often be related to assignments that will be undertaken in the studio where hands on introduction to graphic design studio skills and practices will occur. Through formal studies and perceptual understanding, including aesthetics, graphic form and structure, concept development, and visual organization, students will design solutions to communication problems. Assignments will explore aspects of graphic imagery, typography, and layout. Students will refine their computer skills through applications requiring a digital format. **Credit 3**

2010-302

Typography I

Introduction to typography in visual communication. Lectures will cover typographic topics and information ranging from communication principles to methods of visual organization. During studio time students will design solutions to assigned communication problems, which will explore aspects of typography and layout as well as concept development and historical research. Students will refine their computer skills through applications requiring a digital format. **Credit 3**

2010-313

Introduction to Time-based Design

This course introduces students to the fundamental principles of time-based graphic design, including forms of narrative, organizational methods, sequencing, composition, visual and motion variables, and the application of these principles to the solution of specific graphic design problems. Projects will include typography/imagery components, storyboard planning and computer-based applications as they apply to graphic design problem solving. (2010-301, 2010-302, 2010-303) **Credit 3**

2010-363

Women Pioneers in Graphic Design

This course will center on the contributions made by key women designers to the history of graphic design. Emphasis will be placed on their design works, their design process, and the nature of their largely unheralded pioneering efforts. Course will involve lectures, video interviews, assignments, projects, and participatory classroom involvements. Students will utilize digital archival resources for research and study developed in conjunction with Wallace Library. **Credit 3**

2010-372

20th Century Editorial Design

This course will center on the development of editorial design in the 20th century with a focus on the time period from 1930 to 1950. Content will focus on the creators (artists, designers, photographers) and products (magazines, journals) in both a micro and macro view. The genre will include fashion, consumer, entertainment and business, and contemporary magazines. Course will involve lectures, video interviews, assignments, projects, and participatory involvements. Students will utilize digital archival resources for research and study developed in conjunction with Wallace Library. **Credit 3**

**Prerequisite for all 400-level graphic design:
sophomore graphic design courses or their equivalent,
or permission of the instructor**

2010-401

Typography II

Students expand their understanding of basic typographic principles through advanced applied problems focused on typography as the visual representation of language, typographic hierarchy, formal values (syntax) of letterforms, and the typographic grid as a principle organizing systems for providing meaningful structure. (2010-302, 2010-402) **Credit 3**

2010-402

Imagery in Design

Creative problem-solving experiences focus on the selection, generation, and use of imagery in graphic design. Design process skills are enhanced as students learn how to explore the dynamics of image content and meaning, composition, color, scale, cropping, manipulation, and the integration of imagery with typography. (2010-302) **Credit 3**

2010-403

Symbols and Icon Design

The focus of this course is on the principles, theory, and terminology of symbols (primarily pictographic, nonverbal graphic communication) symbol systems, marks of identity, and icon design for computer applications. Also emphasized are the inherent benefits and shortcomings of symbols, the application and use of symbols, and the evaluation or field-testing of graphic symbols to substantiate effectiveness. (Completion of sophomore graphic design core or equivalent) **Credit 3**

2010-404

Design for Publication

Students explore the underlying principles of grid theory, text and display typography, sequence, page layout, and type and image integration as they relate to a range of publication design applications such as instructional materials, brochures, magazines, books, etc. (Completion of sophomore graphic design core or equivalent) **Credit 3**

2010-405

Information Design

Information design is an area of graphic design concerned with understanding reader and user responses to written and visually presented information. These are highly utilitarian problems in which the functional requirements of design are critical in making data and information understandable and accessible to the user. Principles of language, structure, emphasis, diagrammatic interpretation and the visual display of information are explored in the context of applied problems. (Completion of sophomore graphic design core or permission of instructor) **Credit 3**

2010-406

Environmental Design

Challenging, applied problems introduce students to the basic functions of environmental graphic design: to assist users in negotiating or "wayfinding" through a space or environment; to identify, direct, and inform; to visually enhance the environment; and to protect the safety of the public. (Completion of sophomore graphic design core or permission of instructor) **Credit 3**

2010-463

Packaging Design

This course will focus on packaging design as an area of professional study within graphic design. Students will gain an understanding of meeting marketing objectives and creating promotional opportunities, as well as educating consumers in the protection, presentation and inventory management of products. Through hands-on projects, students will engage in field research, the construction of models, graphic solutions, and the execution of final prototypes. (Completion of junior graphic design core or equivalent) **Credit 3**

2010-471

History of Graphic Design

This course will be a thematic approach to graphic design history and provide a necessary historical basis for students in this major. The course will involve lectures on design history, pioneering designers, design from other cultures and countries, graphic design artifacts, and the historical context for this design. In addition to lectures, the course will involve guest speakers, videos, participatory exercises, discussion, and essay writing, which will build critical thinking skills (Completion of sophomore graphic design major courses) **Credit 3**

**Prerequisite for all 500-level graphic design:
junior graphic design courses or their equivalent,
or permission of the instructor**

2010-501

Career Skills and Professional Practices

In this course, students will prepare resumes, cover letters; learn about interviewing techniques, and strategies to focus on their areas of interest as they prepare to enter the job market. Emphasis will be placed on learning about the various types of positions available to designers, the designer/client relationship, and professional ethics and expectations. Information about cooperative experiences and internships will be provided. (Completion of junior graphic design core or permission of instructor) **Credit 2**

2010-502

Corporate Design

This course provides an overview of corporate design as an integrated study within the field of graphic design. Past and present corporate design models will give students historical background as well as provide current and future trends. Corporate design analysis, as well as development, application, and implementation of identity-based projects will be explored. (Completion of junior graphic design core or permission of instructor) **Credit 3**

2010-503 **Design History**
To discover the fundamental ideas, form and design principles governing style in design and art movements. Required is the design of a prototype guidebook on style in a design or art movement. Each student will select one movement from the list provided and develop a work plan for the guidebook, which will involve a proposal and outline. Information gathering and research will be followed by copywriting and the collection of illustrations from the selected style. Copy and visuals will be integrated in a dummy sketch, which then will be developed and refined into a high quality comp for the book. The course will also include lectures, weekly presentations, and critiques. **Credit 3**

2010-504 **Design Systems**
Advanced problems in corporation research and development of concepts that lead to applied projects as related to visual design systems. Packaging systems, advertising, and promotional campaigns are some of the areas investigated. Human factors as related to consumer preferences and audience response are also integrated. Teamwork on projects is expected. (Completion of junior graphic design core or permission of instructor) **Credit 3**

2010-505 **Advertising Design**
Advanced creative problem-solving experiences relating to advertising design and developing a selling tool. Course content and projects include advertising assignments, ethics, research methodology, and production. Concept development and the use of imagery in advertising are stressed. (Completion of junior graphic design core or permission of instructor) **Credit 3**

2010-506 **Concept and Symbolism**
Advanced creative problem-solving experiences emphasize development of effective visual concepts and implementation. The focus is on innovation and application of creative concepts using visual symbolism for communicating specific messages to an audience/user. Areas such as promotion, advertising, and marketing are integrated into the projects. (Completion of junior graphic design core or permission of instructor) **Credit 3**

2010-507 **Design for Marketing**
This course deals with the relationship between marketing and graphic design. It is not a marketing course to teach professional marketing skills and practices but is directed at teaching the graphic designer basic skills and terminology. The goal is to bring into play marketing concepts with design practice, focusing on short and long term marketing and design projects. When possible, specific firms are contacted and engaged as clients/consultants. (Completion of junior graphic design core or permission of instructor) **Credit 3**

2010-511 **Advanced Information Design**
Advanced problems to further extend students' knowledge and experience with complex information design issues. Problems include legal documents, business forms, diagrams, transportation maps, statistical information, charts, graphs and tables, instructional materials, way finding systems, and computerized information systems. (Completion of junior graphic design core or equivalent) **Credit 3**

2010-512 **Introduction to Interactive Media Design**
Students are introduced to the ideas, concepts, uses, and general principles of interactive media on the computer. Several forms of logic and how they can be used in this design process are explored. Included are several projects to develop the students' understanding of software, logic, and aesthetic considerations in this field. Students are expected to complete assigned readings and projects. (Completion of sophomore graphic design core or permission of instructor) **Credit 3**

2010-513 **Senior Projects**
Advanced creative problem-solving experiences relating to visual communication imagery in the form of a self-designed project. This is based on a strong emphasis of formal design values and their utilization for the communication of ideas and information. The faculty mentor will review the project, and modifications may be made based on consultation with the student. The project may be thought of as a senior thesis project. (Completion of junior graphic design core) **Credit 3**

2010-514 **Editorial Design**
Explores the role of the graphic designer in developing an appropriate communicative editorial design. Students interpret and develop concepts for the author's text and point of view for each assigned editorial article. Content includes the relationship and use of typography, imagery, and layout for editorial impact. Some sections of this course will work with the Editorial Photo class on assigned projects to experience the working relationship between the photographer and the designer, particularly in regard to editorial design. (Completion of junior graphic design core or permission of instructor) **Credit 3**

2010-518 **Public and Social Service Design**
Gives the graphic design senior professional experience developing and creating visual communications for nonprofit organizations. Through various community service agencies and in cooperation with the United Way Internship Program, students create design projects requiring skill and the ability to develop concepts through production, with emphasis on message content in relation to its audience. With guidance from the instructor, and by closely working with the organizations, students understand and experience client-designer relationships, budget limitations, and time and project management. (Graphic design senior or permission of instructor) **Credit 3**

2010-523 **Senior Internship**
This course exposes students to the professional environment through outside job opportunities in graphic design studios, advertising agencies, corporate communications departments and other acceptable organizations. Students will be working under the guidance of art directors, creative directors, senior graphic designers or marketing communication managers and performing creative work that is educational and meaningful for their short-term academic goals as well as their long-range career preparation. (Completion of junior graphic design core) **Credit 3**

2010-524 **Portfolio Development and Presentation**
The objective of this course will be to assist the student in developing a professional portfolio and learning how to best present the work contained therein. Evaluation of current work and assessment of strengths and weaknesses will determine the specific actions, revisions, or generation of new work that needs to be undertaken as part of this course. High presentation standards will be expected, as well as objective selection of work for meeting specific career expectations. (Completion of junior graphic design core) **Credit 3**

2010-527 **Advanced Advertising Design**
This course will explore the role of the graphic designer/art director in developing a comprehensive communication plan. All phases of marketing will be explored. Emphasis will be placed on effective communication of the client's message and concept development. Advertising will be addressed in a broad context and the content of the course will include branding, positioning, and the execution of concepts. The course will also address the relationship and use of typography, photographic imagery, and layout for advertising impact. (Completion of junior graphic design major courses and 2010-505) **Credit 3**

2010-561 **Introduction to Web Design**
Students are introduced to the planning, design, and production of interactive projects that are Web-based. Web design concepts and methods in site design, page design, and graphic-user interface design will be explored. The course will include instruction in producing Web pages and creating interactivity with HTML and Web production software. (Completion of sophomore graphic design core and 2010-512) **Credit 3**

2010-562 **Advanced Web Design**
Students expand their understanding of Web design concepts and processes through advanced Web design projects, and continue to develop planning, design, and production skills for the Web. Advanced and dynamic methods in merging content and interactivity design are introduced. (Completion of junior graphic design core) **Credit 3**

2010-563 **Creative Career Search**
In this advanced course in career preparation, students will actively participate in projects, exercises and experiences aimed at identifying and interacting with potential employers including advertising agencies, design studios, publications and publishers, and corporations. Research methods, best practices in professional communications, negotiating compensation packages, and creative marketing will be investigated and utilized. Through hands-on studio projects and industry interaction, students will gain an intense and real-world introduction to the job search process within a creative industry. (2010-501, 2010-524) **Credit 3**

2010-567 **Advanced Interactive Media**
Students expand their understanding of interactive media design concepts and processes through advanced projects. Projects will include advanced concepts and techniques in interactivity design and interface design, and script-writing methods will be introduced. (Completion of junior graphic design core) **Credit 3**

Computer Graphics Design

2014-221

Introduction to 3DDG Modeling

This course is an introduction to the representation of form through modeling in three-dimensional software. The course focuses on the development of visual and verbal vocabulary as a means of exploring, developing, and understanding composition with digital geometry and in virtual spaces. Topics include the basics of lines, planes, contour, transforming lines into form, composing images with a software camera, interaction of light and surface color, lighting, perspective, resolution of geometry, and rendering. Perception and visual thinking are emphasized in the development of projects. Projects will include modeling organic and inorganic forms, composition with multiples, level of detail in the models, and creation of spaces. Structured assignments develop skills in concept generation, basic form making, and craftsmanship. (Corequisite 2014-231) **Credit 4**

2014-222

Introduction to 3DDG Materials

This course is an introduction to the development of surface materials in three-dimensional software, using basic concepts covered in Introduction to 3DDG Modeling. Principles of additive and subtractive color are developed as they relate to the interpretation of physical phenomena within a virtual world. The vocabulary expands to include surface relief, specularly, transparency, and layering as they effect interaction with the quality, color and position lights on surfaces. Projects focus on using color, value and texture to enhance the representation of form. Concepts are introduced through lectures, discussions, demonstrations, research, assigned projects, and critiques. Assignments develop skills in surface design, development and craftsmanship. (2014-221; corequisite 2009-313) **Credit 4**

2014-223

Introduction to 3DDG Motion

Third quarter sequence course introduces students to the use of motion for a variety of applications. Projects include the use of motion to create models, creating motion cycles for games, mechanical motions, motion paths, motions driven by other parameters, developing motion graphics, procedural motion, creating visualization and simulations and developing of virtual worlds. Emphasis is placed on perception and visual thinking as well as composition images in motion. Students will work on a group project with an outside client, which may be a team of students writing a game engine or on a visualization or motion graphics project. Concepts are introduced through lectures, discussions, demonstrations, research, assigned projects, and critiques. Assignments develop skills in the use of motion and implied motion. (2014-221; corequisite 2014-233) **Credit 4**

2014-231

Technical Drawing

This companion course to the Introduction of 3DDG Modeling focuses on developing orthographic and perspective drawings of organic and inorganic forms. Students learn 1, 2 and 3-point perspective drawing techniques as well as methods to develop plans, elevations and sections for objects and spaces. The projects in this course are coordinated with the projects in the Modeling course; students are developing ideas that they will implement in the Modeling course. Simultaneously they will develop a good sense of what is possible within the software and how they might adapt their design for successful completion. Concepts are introduced through lectures, discussions, demonstrations, research, assigned projects, and critiques. Structured assignments develop skills in concept generation, basic technical drawing, and craftsmanship. (Corequisite 2014-221) **Credit 2**

2014-233

Drawing Motion

Students learn methods for representing the motion of machine parts; Human and animal bodies are studied providing a solid understanding of bones, muscles and skin and how they move. Students learn to develop sequential images for texture maps. Methods of representing the motion of a camera within a frame are also included. The content of the course provides a foundation for many other courses within the curriculum and a general understanding of issues related to motion. Concepts are introduced through lectures, discussions, demonstrations, research, assigned projects, and critiques. Assignments develop skills and knowledge in the use of motion. (2014-223; corequisite 2083-206) **Credit 3**

2014-343

Flowcharts and Storyboards

This course helps students develop ideas about building sequences of images or motion. Students plan projects using flowcharts for the interaction and storyboards for short sequential elements like walk cycles for games. (2014-233, 2009-213) **Credit 2**

2014-356

3DDG Modeling

This course contrasts and compares various methods of creating geometry for use in three-dimensional environments including polygons, NURBS, patches, and subdivision surfaces for various purposes. Skills learned can be applied to creating elements for computer and video games, creating virtual environments or in visualization. Students have the opportunity to work on group projects and real world applications. Some models are designed and adapted for input into a game engine or VR software. (Sophomore standing and minimum 3.0 GPA) **Credit 4**

2014-361

3DDG Poly and Subdivision Modeling

This course provides extensive coverage of methods for modeling with polygons and subdivision surfaces. In addition students extend their knowledge of methods for laying out UVs for placing materials on polygonal shapes. With these techniques students create complex models of organic and inorganic forms using polygons and subdivision surfaces. (2014-356) **Credit 4**

2014-362

3DDG Shading

The course focuses on advanced techniques using shading networks to incorporate groups of two-dimensional and three-dimensional textures into realistic and non-photorealistic materials. Students learn to use texture maps instead of detail in models to increase interaction speeds. Textures are also used in order to incorporate simple models into complex scenes. Displacement textures are used to create detail in models. Use of elements in shading networks to control other attributes is covered. Use textures to simulate non-dynamic lights and shadows. Planning for the economical use of textures and for the replacement of models with texture maps in level of detail (LOD) situations will be addressed as well. (2014-356) **Credit 4**

2014-363

Digital Video: Multimedia

Students learn basic digital video shooting and editing along with supporting concepts including compression, resolution, integration of three-dimensional digital graphical elements and use of video within the three-dimensional environment. **Credit 4**

2014-366

3DDG Character Design

This course covers first the design of characters and then the creation of them using three-dimensional software, inverse kinematics, parent and rigid binding, and bone deformers. Students create interpretant matrices, model sheets, sketches, and maquettes of characters followed by development of the character in software. Characters are designed to be incorporated into motion graphics, games, or visualization. (2014-356) **Credit 4**

2014-367

3DDG Interactive Motion

This course covers the use of motion in interactive environments including motion graphics, games, visualization, and virtual reality. Students create motion using key frames, paths, deformation, forward, and inverse kinematics. Cyclical motion is created for integration into games and virtual environments. (2014-356) **Credit 4**

2014-368

3DDG Scripting

This course covers the use of scripts to control various aspects of three-dimensional environments, models, textures, production workflow and more. Students develop scripts to control particles, models, textures, motion, and interaction with the environment. (2014-356, 4009-210) **Credit 4**

2014-371

3DDG Lighting

Students apply standard lighting methods to lighting three-dimensional models and spaces. The interaction of light and pigment, use of light in painting, photography, film, and computer graphics are used as examples. Students apply problem-solving techniques to arrive at a lighting solution for various problems. Examine methods of integrating lighting into shaders for non-dynamic lighting. Methods of planning a lighting scheme for a larger project are addressed as well. (2014-356) **Credit 4**

2014-388

3DDG Rendering

This course covers a contrast and comparison of various methods and resolutions of rendering and outputting information from three-dimensional software for motion graphics, games, and visualization. Primary emphasis is placed on the use of radiosity and advanced rendering options as well as planning for the impact of production choices on rendering times and interactivity. (2014-356 or 2014-362) **Credit 4**

2014-396 **3DDG Character Rigging**
This course covers the design of characters and then the creation of them using three-dimensional software, inverse kinematics, parent and rigid binding, bone deformers, and modeling techniques for correct deformations. Students create interpretant matrices, model sheets, sketches, and maquettes of characters followed by development of the character in software. (2014-366) **Credit 4**

2014-411 **Project Planning**
The course builds on elements from a number of other courses. Students develop design documents, timelines, budgets, marketing plans and supporting material for potential projects. The projects designed may be used in the Introduction to Production Pipeline course or as a Senior Thesis project, but that is not required. (Junior standing in digital studio) **Credit 4**

2014-432 **Senior Thesis Assist**
The course focuses on playing a supportive role in the development of a three-dimensional digital graphics project from the planning stage, through completion and presentation. Emphasis is placed in working as a team effectively and providing leadership in the individual role of the supportive teammate. (Junior standing in digital studio) **Credit 4**

2014-462 **Level and Virtual World Design**
In this course, students design levels for games or virtual worlds for a variety of applications. Once the design is complete, the design will be implemented using high-end three-dimensional software. In most cases the projects will be large and will be executed by teams of students. Versioning systems will be used to keep track of the most recently developed assets. (2014-356) **Credit 4**

2014-463 **Introduction to Production Pipeline**
The course focuses on implementing a three-dimensional digital graphics project in motion graphics, games or visualization from the planning stage through completion and presentation. (Junior standing and 2014-356) **Credit 4**

2014-468 **3DDG Scripting**
This course covers the use of scripts to control various aspects of three-dimensional environments, models, textures, production workflow and more. Students develop scripts to control particles, models, textures, motion, and interaction with the environment. (2014-356 and introduction to graphics programming experience) **Credit 4**

2014-469 **Experimental Digital Workshop**
The course focuses on implementing, advanced, newly developing ideas in three-dimensional computer graphics. The specific topic varies and is determined by the instructor. A specific course outline is provided each time the course is taught. Potential topics include the creation of interactive installations, game asset design, digital performances, cyber fashion, network art, locative media, scientific visualization, information visualization, or a focus on a particular designer. (2014-356 plus others as appropriate) **Credit 4**

2014-471 **Motion Capture**
This course covers the capture and use of motion capture data to control motion in computer graphics. Students create geometry designed to work in real time applications with the data collected or use characters that they have created in other courses. Students also use libraries of motion capture data and adapt it to their specific needs. (2014-356, 2014-468) **Credit 2**

2014-472 **3DDG Curve and Patch Modeling**
This course covers modeling techniques construction curves to generate NURBS patches. Techniques will include the construction of organic and inorganic forms using these techniques. Methods for controlling tangency between patches will be developed. Emphasis will be placed on developing sound topology for static and moving models. Additionally methods of using shading networks to control variations in the placement nodes, dirt maps and other material elements will be developed specifically for the special needs of patches. (2014-356) **Credit 4**

2014-473 **Digital Design Seminar**
A study of current issues relevant to digital graphics design and related media, how they relate to broader historical and cultural issues, and how they might suggest future directions. The central topic of the course will vary as defined by the instructor and will focus on a different issue, designer or development in the discipline. Topics will focus on work in the field, which might predict future directions or opportunities. A course outline will be provided each time the course is taught. **Credit 2**

2014-476 **3DDG Motion Graphics**
Students apply methods such as advanced lighting techniques, and perspective matching used for integrating three-dimensional graphics elements into photographic images, both still and moving. In most cases the project will involve the incorporation of three-dimensional typographical elements as well. (2014-356 and compositing experience) **Credit 4**

2014-478 **3DDG Character Rigging**
This course covers advanced rigging techniques using a variety of binding techniques, deformer's types and IK handles. In addition to realistic rigging, other types of rigs, like toon rigs, will be implemented. (2014-366) **Credit 4**

2014-481 **3DDG Autonomous Figures**
This course covers the creation of autonomous figures with embedded artificial intelligence to be used in virtual worlds and simulations. (2014-366) **Credit 4**

2014-486 **History of Computer Graphics**
As a historical overview of computer graphics, this course will cover the development of digitally based graphics and imagery from its pre history to the present. It will touch on related technology and the growth of the computer industry. Major pioneers and their contributions will be reviewed. The course will trace the use of the digital technology in the creation of graphics for design, interactive media, animation, visualization and other applications. **Credit 3**

2014-511 **3DDG Senior Thesis I**
The course focuses on implementing a three-dimensional computer graphics project from the planning stage, through completion and presentation at the Senior Thesis level. (Senior standing in Digital Studio) **Credit 6**

2014-512 **3DDG Senior Thesis II**
The course focuses on the completion of a major three-dimensional computer graphics project from the planning stage, through completion and presentation. (Senior standing in Digital Studio) **Credit 6**

2014-513 **Portfolio Development**
The course focuses on implementing a three-dimensional computer graphics project from the planning stage, through completion and presentation at the Senior Thesis level. (Senior standing in Digital Studio) **Credit 2**

Interior Design

2015-215 **Interior Design Freshmen Elective**
Students will be given an overview of the field of interior design and an understanding of the educational requirements and expectations of the interior design major. The career options, required skills, and the creative process as they apply to the field of interior design will be presented through lectures, class discussions, design projects, and periodic interaction with professional designers. **Credit 2**

2015-222 **Design Survey**
Provides freshmen with an increased exposure to the fields of graphic design, industrial design, interior design, and new media. The class will provide students with an in-depth awareness of the role of design in society, and a designer's ethical and social responsibilities. The course also describes how the design professions are related to one another, yet presents their distinct and differentiated aspects. Objectives include exposing students to a common vocabulary, increasing their awareness of the individual disciplines, and providing exposure to related contexts, philosophies, and issues. **Credit 2**

**Prerequisites for 300-level interior design courses:
foundation program or equivalent**

2015-305 **Architectural Drawing**
An introduction to interior design through architectural drafting. **Credit 3**

2015-306 **Perspective Rendering**
An introduction to residential interior design and perspective rendering. **Credit 3**

2015-307 **Introduction to Interior Design**
An introduction to interior design with emphasis on basic processes, spatial relationships, and design conceptualization and development. **Credit 3**

2015-308 **CADD Application**
An introduction to the use of the computer as a tool in the interior design process. Use of the computer is required. **Credit 3**

2015-311 Model Building and Human Dimension
Introduction to design conceptualization through model building as well as exploration of the impact of human dimensions on interior space and the requirements of a diverse population of users. **Credit 3**

**Prerequisites for 400-level interior design courses:
sophomore interior design core or their equivalent,
or permission of instructor**

2015-404 Hospitality Design
The applications of design methods and skills to the design of interior space for hospitality use. (Completion of sophomore interior design core) **Credit 3**

2015-405 Applications of Color and Light
Introduction to color and light for spatial development. (Completion of sophomore interior design core) **Credit 3**

2015-406 Retail Design
Introduction to designing interior space for retail use. (Completion of sophomore interior design core) **Credit 3**

2015-407 Building Construction Systems
Introduction of building construction systems for interior design. (Completion of sophomore interior design core) **Credit 3**

2015-408 Office Design and Planning
Introduction to interior design and planning for office use. (Completion of sophomore interior design core) **Credit 3**

2015-409 Interior Design Specifications
Introduction to specifications with emphasis on planning, construction documents, finishes, fire safety and flammability, testing standards, and liability. In addition, the course introduces the use of sustainable materials and shows how materials affect the health and safety of building occupants. (Completion of sophomore interior design core) **Credit 3**

2015-411 Interior Design Elective
An elective offering basic instruction and involvement in design application projects. Each quarter concentrates on a specific topic of design study. **Credit 3**

**Prerequisites for 500-level interior design courses:
junior interior design courses or their equivalent,
or permission of instructor**

2015-504 Multistory/Purpose Design
The application of design methods and skills to professional-level projects in interior design. (Completion of junior interior design core) **Credit 4**

2015-505 Building Codes and Regulations
Application projects concerned with building codes, regulations, fire safety, public safety and health, barrier-free design, and the American with Disabilities Act. (Completion of junior interior design core) **Credit 2**

2015-506 Environmental Control Applications
Application projects involving plumbing, heating, ventilation, electrical, vertical transportation, and acoustic concerns. (Completion of junior interior design core) **Credit 3**

2015-507 Health Care Design
An introduction to designing interior space for health care use. The application of design methods and skills to professional-level projects focusing on health-care facilities. (Completion of junior interior design core) **Credit 4**

2015-508 Interior Design Business Practice
An introduction to professional practices with emphasis on business formation: design marketing, legal and ethical responsibilities. (Completion of junior design interior design core) **Credit 2**

2015-509 Career Planning
Development of a resume and portfolio, as well as job-search techniques with a focus on career planning. (Completion of junior interior design core) **Credit 2**

2015-510 Working Drawings
Professional interior design projects with an emphasis on the construction sequence and construction documentation. (Completion of junior interior design core) **Credit 4**

2015-511 Special Projects
Special projects in interior design emphasizing communication skills, theory, and methods for the professional. (Completion of junior interior design core) **Credit 3**

Industrial Design

2035-215 Industrial Design Freshman Elective
Students will be given an overview of the field of industrial design and an understanding of the educational requirements and expectations of the industrial design major. Career options, required skills, and the creative process as they apply to the development of products, packaging, and systems within the field of industrial design will be presented through lecture, class discussions, design projects, and periodic interaction with professionals in the field. **Credit 2**

**Prerequisites for 300-level industrial design courses:
foundation program or equivalent**

2035-306 Technical Drawing
An introduction to drafting in the field of industrial design. Emphasis is on the basic skills of orthographic drawing and dimensioning, and their application to accurate communication of designs. **Credit 2**

2035-307 Graphic Visualization
Sketching and rendering techniques are developed through exercises that also promote abilities to visualize three-dimensional forms in two-dimensional representations. **Credit 3**

2035-311 Modelmaking
An introduction to modelmaking in the field of industrial design. Course work emphasizes skills necessary for accurate, detailed three-dimensional design and development. **Credit 2**

2035-321 Graphic Visualization I
First of three sequential classes that develop the students' ability to effectively generate, communicate, and present ideas graphically. This is accomplished through concept sketching, detailed perspective, storyboarding, layouts, and hybrid drawing using computer generated enhancements. **Credit 2**

2035-322 Graphic Visualization II
The second of three sequential classes that develop the students' ability to effectively generate, communicate, and present ideas graphically. This is accomplished through concept sketching, detailed perspective, storyboarding, layouts, and hybrid drawing using computer generated enhancements. (2035-321) **Credit 2**

2035-323 Graphic Visualization III
The third of three sequential classes that develop the student's ability to effectively generate, communicate and present ideas graphically. This is accomplished through concept sketching, detailed perspective, storyboarding, layouts, and hybrid drawing using computer generated enhancements. (2035-321 and 2035-322) **Credit 2**

2035-331 Form I
The first of two classes that develop and utilize students' ability to understand and organize design elements, form and space to meet specific human sensory responses through the creation and analysis of abstract relationships. **Credit 2**

2035-332 Form II
The second course of two that develop and utilize students ability to understand and organize design elements, form and space to meet specific human sensory responses through the creation and analysis of abstract relationships. (2035-331) **Credit 2**

2035-348 Sophomore Design Core
Introduction to design methodologies, processes, and research techniques. **Credit 4**

**Prerequisites for 400-level industrial design courses:
sophomore industrial design core or their equivalent,
or permission of instructor**

2035-405 Materials and Processes Applications
The acquisition of a technical and theoretical base in industrial design through a formal introduction to materials and processes. **Credit 3**

2035-406 Consumer Product Design I
The acquisition of a technical and theoretical base in industrial design. Application of communicative and problem-solving skills to comprehensive design projects involving form, processes, and materials. Design development of small products through sketches, quick study mock-ups, and finished form studies. (Completion of industrial design sophomore core) **Credit 3**

2035-407 **Human Factors Applications**
The acquisition of a technical base in human factors for industrial design, emphasizing function and safety. (Completion of industrial design sophomore core) **Credit 3**

2035-408 **Equipment Design**
Application of communication and problem-solving skills to comprehensive design projects involving form, style, function, safety, processes and materials. Design development of tools and equipment through sketches, mock-ups, and technical drawings to finished form studies. (2035-406) **Credit 3**

2035-409 **Product Style**
The study of style, fashion and graphics as they apply to product form, storage, and distribution. (Completion of industrial design sophomore core) **Credit 3**

2035-410 **Consumer Product Design II**
The application of communication and problem-solving skills to comprehensive design projects. Project emphasis on the consideration of style and fashion in determination of product form. (2035-406 and 2035-408) **Credit 3**

2035-418 **CAD Applications II**
Advanced computer modeling and rendering applications for the industrial designer. The emphasis in this course is learning software tools competency through assigned exercises and creative projects. (2035-310 or permission of instructor) **Credit 3**

2035-442 **History of Industrial Design**
A study of the industrial design profession, designers, and designs from 1920 to the present. Students will analyze designs in terms of style, materials, production, technology, ergonomics, and context. (2039-225, 2039-226, 2039-227 or permission of instructor) **Credit 3**

2035-463 **History of Modern Furniture Design**
A study of modern furniture design and its most significant designers. Factors of style, materials, construction, and ergonomics are examined in the context of time, place, and purpose. (2039-225, 2039-226, 2039-227 or permission of instructor) **Credit 3**

2035-464 **ID Hybrid Sketching**
A seminar in freehand sketching techniques using a combination of orthogonal, perspective and computer enhancement as a means of developing and communicating design concepts. (2035-321, 2035-322, 2035-323) **Credit 2**

2035-473 **Graphic Tactics**
A basic course for Industrial Design students in the application of graphic design methods, skills and terminology as related to product design and presentation. Utilizing graphic design principles and problem solving methods, students will gain practice in effective visual communication, and an understanding of the presentation skills and practices appropriate to product design. **Credit 3**

2035-474 **Advanced Computer Modeling Elective**
Advanced computer modeling and rendering applications for the designer. The emphasis in this course is learning higher software competency techniques for modeling complex, and difficult shapes through assigned exercises and creative projects. The objective is an understanding of the most efficient use of professionally preferred tools for electronic surface modeling in degree 3 and higher B-spline curves and surfaces. (Alias Wavefront surface modeling at level or permission of instructor) **Credit 3**

2035-481 **Advanced Model Making**
Advanced model making emphasizes advanced skills and techniques necessary for accurate, detailed, three-dimensional design models and development. (2035-311, 2035-306, or permission of instructor) **Credit 3**

**Prerequisites for 500-level industrial design courses:
junior industrial design courses or their equivalent,
or permission of instructor**

2035-506 **Design Collaborative**
Advanced product development in conjunction with a corporate design program providing technical information, marketing concerns, and outside review of students' work. (Completion of junior industrial design core) **Credit 3**

2035-508 **Furniture Design**
Experience in the design of furniture for a defined market is acquired through a project exercise involving industry collaboration. (Completion of junior industrial design core) **Credit 3**

2035-510 **Professional Practice**
A review, and study of design practices, including contracts, agreements, billings, and business procedures. Resume, portfolio development and employment possibilities also are explored. (Completion of junior industrial design core) **Credit 3**

2035-511 **Product Development**
A special student-interest project in industrial design, usually focused on the areas of sports/recreation products or toys. (Completion of junior industrial design core) **Credit 3**

2035-512 **Advanced Product Design**
The application of design methods and skills to professional-level projects in industrial design. Emphasis is on techniques and competencies common to or expected in the commercial world. (Completion of junior industrial design core) **Credit 3**

2035-513 **Career Planning**
Resume and portfolio completion with informational interviewing and employment advising. (Completion of junior industrial design core) **Credit 3**

2035-522 **Toy Design**
Design of a toy or juvenile product in collaboration with industry representatives. Provides technical information marketing opinions and professional review of work. (Completion of junior industrial design core) **Credit 3**

2035-527 **Package Design**
The design of packaging for the protection and marketing of goods. Aspects of visual, structural, ergonomic and environmental issues are considered in the design of rigid and flexible containers. (Completion of junior industrial design core) **Credit 3**

2035-533 **Exhibit Design**
Design of trade show and similar exhibits involving structure, graphics, lighting, and layout of space. Students will develop concepts into a scale model for presentation. (Completion of junior industrial design core) **Credit 3**

School for American Crafts

Ceramics

2040-215 **Freshmen: Introduction to Ceramics**
An introduction course with an overview of historical perspective, hands on projects and demonstrations, slide talks, introduction to vocabulary and terminology, and discussion of career opportunities. **Credit 2**

2040-251, 252, 253, 254 **Ceramics Elective**
An elementary course in design and techniques in ceramics. Each quarter different techniques are taught, including wheel, handbuilding glaze, and decorating. Materials fee required. **Credit 3**

**Prerequisite for all 300-level courses:
successful completion of foundation program or equivalent,
or permission of instructor**

2040-301 **Materials and Process of Ceramics Sophomore I**
A course with concentration on the fundamentals of pottery making. The student will design and make utilitarian pottery, with emphasis on form, function and surface decoration. The student will primarily focus on high firing techniques. The students will also study clay materials and chemistry. **Credit 6**

2040-302 **Materials and Process of Ceramics Sophomore II**
This course continues to focus on the fundamentals of working with ceramics. The emphasis is working within the vessel format. Primarily students will be working with handbuilding techniques. The students will work at a mid range firing temperature. In the course the student will also learn glaze calculation. (2040-301) **Credit 6**

2040-303 **Materials and Process of Ceramics Sophomore III**
This course investigates the issues involved in ceramic sculpture. Students will primarily investigate issues of form and scale. The primary focus of firings will be low fire and raku techniques. In this course the student will also learn the fundamentals of kiln building and firing techniques. (2040-302) **Credit 6**

Prerequisite for all 300-level courses:
successful completion of all sophomore level courses in ceramics

2040-401 Materials and Process of Ceramics Junior I
A course with concentration on utilitarian ceramics, the fundamentals of pottery making. There will be a focus on the students developing their own aesthetic ideas and independent firing methodology. A continuation of technique development in ceramic making and firing. The students will also work on the connections of their work and ceramics art history. (2040-303) **Credit 6 (F)**

2040-402 Materials and Process of Ceramics Junior II
A course with continuing concentration of working with the vessel. Students will investigate their own methodologies of making and developing their ideas through using the vessel. There will be an emphasis on historical context and personal expression. (2040-401) **Credit 6**

2040-403 Materials and Process of Ceramics Junior III
A course with continuing concentration of developing ceramic sculpture. Working on both large and small scale, and addressing the concepts of presentation. There will be a strong emphasis on developing the student's own aesthetics, personal voice and idea. (2040-402) **Credit 6**

Prerequisite for all 500-level courses:
successful completion of all junior level courses in ceramics

2040-501 Materials and Process of Ceramics Senior I
A course to begin to develop a senior thesis. This is a cohesive body of work centering on a singular theme agreed to by the student and his or her adviser. Students are required to develop their own clays, glazes, and firing methodology and will begin to research information for their written thesis. (2040-403) **Credit 6**

2040-502 Materials and Process of Ceramics Senior II
Students will continue to develop their senior thesis studio work. There will be an emphasis on contemporary and historical context for this work, as well as personal glaze and firing development. Students will begin to address the written element of their thesis and developing a body of work for their senior thesis exhibition. (2040-501) **Credit 6**

2040-503 Materials and Process of Ceramics Senior III
A course where the seniors' final written thesis exhibition is the culmination of their years work. (2040-502) **Credit 6**

Glass

2041-215 Freshmen: Introduction to Glass and Glass Sculpture
This is a survey course for students interested in glass as a medium for artistic expression and design applications. Topics regarding history, contemporary issues, science, and technology of glass are discussed. Students will conceive, design and execute glasswork with engraving, glass blowing, and casting. Emphasis will be placed on introductory learning and career opportunities that are available with the material. The course includes a visit to the Corning Museum of Glass. **Credit 2**

2041-251, 252, 253, 254 Glass Elective
A survey course emphasizing cold, warm, and hot glass working processes as a means of personal expression and appreciation. A portion of the course is a basic investigation of the history, chemistry, techniques, and technical aspects of glass. Materials fee required. **Credit 3**

Prerequisite for all 300-level courses:
successful completion of foundation program or equivalent or permission of instructor

2041-301 Materials and Processes of Glass: Sophomore I
This class will introduce the student to grinding, polishing, lamination, and adhesives. Basic solid and blown hot forming will be covered. The student will acquire practical experience with the operation and maintenance of all cold and hot working equipment in the shops. Materials fee required. **Credit 6**

2041-302 Materials and Processes of Glass: Sophomore II
This class will continue exploring hot and cold glass techniques. Basic color and bit application in molten glass working will be covered. Sand carving and step blasting will be part of this class as students create works for the final presentation. Materials fee required. (2041-301) **Credit 6**

2041-303 Materials and Process of Glass: Sophomore III
The class will introduce the student to techniques of painting and reverse painting on solid, blown, and plate glass. Paradise paints, enamels, and polymers will be used as painting mediums for artistic exploration and decorative purposes. Construction and use of plaster molds for blown glass will be introduced as a way to create sculptural elements for a final project. Materials fee required. (2041-302) **Credit 6**

2041-321 Flameworking and Stained Glass
A survey course emphasizing glass flameworking and stained glass fabrication as means of personal expression and utilitarian design. Basic investigation of the history, chemistry, and technical aspects of glass will be covered. Material fee required. **Credit 2**

Prerequisite for all 400-level courses:
successful completion of all sophomore level courses in glass

2041-401 Materials and Process of Glass: Junior I
The class will introduce the student to sand casting, pate de verre, lost wax casting, billet casting, and gravity casting. Alternative forms of model building, mold making with clay, and wax for casting glass are part of this course. Annealing cycles and the use of the oven controls will be utilized as the student develops solutions to casting problems. Students will explore the history of glass. In Glassblowing, Graal pick-up, and other techniques involving pre formed blanks or elements will be taught. There will be an emphasis on teamwork and experimentation with new techniques. Options for problem solving include mixed media sculpture and the vessel. Materials fee required. (2041-303) **Credit 6**

2041-402 Materials and Process of Glass: Junior II
Utilizing the Corning Museum of Glass study collection and the museum's Rakow Research Library; students will develop a body of work that reflects their specific interests with glass. Students may select a concept from the following or develop an alternative topic: glass equipment construction, building a studio, public commissions, developing a production series, industrial design for glass, colored glass chemistry, creative resource for a sculpture, art education, and the gallery. The student will make a formal presentation related to the selected research topic. Materials fee required. (2041-401) **Credit 6**

2041-403 Materials and Process of Glass: Junior III
Utilizing The Corning Museum of Glass study collection and the museum's Rakow Research Library; students will develop a body of work that reflects their specific interests with glass. Students may select a concept from the following or develop an alternative topic: glass equipment construction, building a studio, public commissions, developing a production series, industrial design for glass, creative resource for a sculpture, art education, and the gallery. The student will make a formal presentation related to the selected research topic. Materials fee required (2041-402) **Credit 6**

Prerequisite for all 500-level courses:
successful completion of all junior level courses in glass

2041-501 Materials and Process of Glass: Senior I
Independent work produced during this quarter will be of an exploratory nature. Working with the instructor, students will identify concepts for senior-level research based on individual interests and visual exploration. Preparation for graduation, including a written thesis, portfolio presentation, artist's statement, and senior exhibition will be a part of this course. Materials fee required. (2041-403) **Credit 6**

2041-502 Materials and Process of Glass: Senior II
Information developed during the previous course will serve as a foundation for in-depth research to be developed during this quarter. A statement describing the nature and intent of the thesis is required before week two of this term. Students will refine and develop a body of work for the senior exhibition and will submit initial draft of the thesis at the end of this quarter. Materials fee required. (2041-501) **Credit 6**

2041-503 Materials and Process of Glass: Senior III
Students' will conclude their senior year with a solo exhibition of their creative work. The specifics of the exhibition including location, installation, opening, invitation announcement, and mailing list will be developed by the senior student. Written thesis, 20- slide portfolio, artist's statement and resume will be presented to the department head before graduation. Alternative or additional prerequisites may be required depending on the individual's thesis. Materials fee required. (2041-502) **Credit 6**

Metals

2042-215 **Freshmen: Introduction to Metals/Jewelry**
This is an introductory course designed to expose the beginning student to the basics and fundamentals of metals/jewelry field as a career path in the field of contemporary crafts. Slide lectures, technical demonstrations, field trips, hands-on experience, and critiques will be used. **Credit 2**

2042-251, 252, 253, 254 **Metals Elective**
An elective course providing an opportunity for introductory study in metals in the area of either holloware or jewelry. Materials fee required. **Credit 3**

**Prerequisite for all 300-level courses:
successful completion of foundation program or equivalent or
permission of instructor**

2042-301 **Materials and Processes of Metals: Sophomore I**
This class will introduce the student to basic jewelry hand tools. Ferrous and non-ferrous metals, their composition and working priorities will serve as the primary topics covered. Materials fee required. **Credit 6**

2042-302 **Materials and Processes of Metals: Sophomore II**
This class will introduce the student to basic machine skills, silver soldering, and gem setting. Materials fee required. (2042-301) **Credit 6**

2042-303 **Materials and Process of Metals: Sophomore III**
This class will introduce the student to basic forming skills for holloware, flatware, and jewelry. Materials fee required. (2042-302) **Credit 6**

**Prerequisite for all 400-level courses:
successful completion of all sophomore level courses in metals**

2042-401 **Materials and Processes of Metals: Junior**
This class will introduce the student to advanced properties of gold as a material, as well as advanced casting and mold-making techniques. Materials fee required. (2042-303) **Credit 6**

2042-402 **Materials and Processes of Metals: Junior**
This course introduces jewelry and holloware rendering, chasing and repoussé, and tool making. Materials fee required. (2042-401) **Credit 6**

2042-403 **Materials and Processes of Metals: Junior**
This course introduces jewelry and holloware design and production through the use of kumboo overlay technique and acid etching. Materials fee required. (2042-402) **Credit 6**

**Prerequisite for all 500-level courses:
successful completion of all junior level courses in metals**

2042-501 **Materials and Processes of Metals: Senior I**
This course concentrates on holloware design and production through introducing spinning, advanced holloware techniques, and rendering. The design and compiling of a professional resume is also a requirement. Materials fee required. Materials fee required. (2042-403) **Credit 6**

2042-502 **Materials and Processed of Metals: Senior II**
This course introduces advanced gem setting and identification, gemstone anatomy, and jewelry mechanisms. Students also begin to pursue the issue of career opportunities by involving themselves in contacting potential employers in a "job search" seminar. Materials fee required. (2042-501) **Credit 6**

2042-503 **Materials and Processes of Metals: Senior III**
This course provides the student with individual research in technique and design. The third quarter senior level students are encouraged to assemble a group show of their four year's work; complete a job search, and a professional portfolio including resume, photography, and renderings. Materials fee required. (2042-502) **Credit 6**

Textiles

2043-251, 252, 253, 254 **Textile Elective**
A basic course in design and techniques in textiles. Each quarter a different area of study is undertaken in quilt making, natural basketry, crochet, soft sculpture or other non-loom textile processes. Materials fee required. **Credit 3**

Wood

2044-215 **Freshmen: Introduction to Woodworking and Furniture Design**
This course is designed to introduce the beginning student to the field of woodworking and furniture design. There will be hands-on involvement with the material as well as a look at career opportunities for a contemporary woods craftsperson. Slide talks, technical demonstrations, field trips, design and design review will be some of the ways we experience this area first-hand. Due to safety reasons, no students may, for any reason, miss the first class. **Credit 2**

2044-251, 252, 253, 254 **Wood Elective**
A non-sequential, elementary course in designing and building wooden projects such as a tray, small box, or small table. More choice of project is afforded students who take the course for a second or third quarter. Materials fee required. Due to safety reasons, no student may, for any reason, miss the first class. **Credit 3**

**Prerequisite for all 300-level courses:
successful completion of foundation program or equivalent
or permission of instructor**

2044-301 **Materials and Processes of Wood: Sophomore I**
This is the first of a three-quarter sequential class covering the fundamental techniques and aesthetics of woodworking. Topics covered include the care and use of hand tools, wood as a material, its basic properties, basic joinery, fundamental techniques of wood fabrication, and finishing. The course includes a machine maintenance program. Materials fee required. **Credit 6**

2044-302 **Materials and Processes of Wood: Sophomore II**
This is the second of a three-quarter sequential class covering the fundamental techniques and aesthetics of woodworking. Topics covered include the continued care and use of hand tools, and the introduction of power equipment. Basic joinery and fundamental techniques of wood fabrication are continued using both hand and power equipment, and additional finishing techniques are studied. The course includes a machine maintenance program. Materials fee required. (2044-301) **Credit 6**

2044-303 **Materials and Processes of Wood: Sophomore III**
This is the third of a three-quarter sequential class covering the fundamental techniques and aesthetics of woodworking. Topics covered include the continued care and use of hand tools, and the further introduction of power equipment. Basic joinery and fundamental techniques of wood fabrication are continued using both hand and power equipment, and additional finishing techniques are studied. The course includes a machine maintenance program. Materials fee required. (2044-302) **Credit 6**

2044-321 **Wood Carving Elective**
This is a non-sequential, elementary course in designing and building wooden projects such as a tray, small box, or small table. More choice of projects is afforded students who take the course for a second or third quarter. Materials fee may be required. **Credit 2**

**Prerequisite for all 400-level courses:
successful completion of all sophomore level courses in wood**

2044-401 **Materials and Processes of Wood: Junior I**
This is the first of a three-quarter sequential class covering the intermediate techniques and aesthetics of woodworking. This course addresses issues surrounding the design and construction of a chair with regards to aesthetics, ergonomics, structure (geometry, triangulation), materials, etc. The course includes a machine maintenance program. Materials fee required. (2044-303) **Credit 6**

2044-402 **Materials and Processes of Wood: Junior II**
This is the second of a three-quarter sequential class covering the intermediate techniques and aesthetics of woodworking. This course addresses the issues of source material used for inspiration in the design process. It requires the investigation and selection of specific source material to be used to design a specific piece of furniture. Additional techniques are also included. The course includes a machine maintenance program. Materials fee required. (2044-401) **Credit 6**

2044-403 **Materials and Processes of Wood: Junior III**
This is the third of a three-quarter sequential class covering the intermediate techniques and aesthetics of woodworking. This course addresses the issues of large, solid, wood carcass construction, as well as multiple drawer construction, through the design and construction of a chest of drawers. Additional techniques are also included. The course includes a machine maintenance program. Materials fee required. (2044-402) **Credit 6**

**Prerequisite for all 500-level courses:
successful completion of all junior level courses in wood**

Crafts Extended Studies

2044-101 Materials and Processes of Wood: Senior I
This is the first of a three-quarter sequential class covering the advanced techniques and aesthetics of woodworking. This course addresses aspects of wood-working students may wish to pursue after graduation. Students select from a menu of topics: jigs and fixtures (shaper, router, etc.), industry-related series production, outdoor, site specific, multiple seating, multimedia, and sculpture. They then develop a proposal for a body of work that may span more than one quarter. Students may select more than one topic. The course includes a machine maintenance program. Materials fee required. (2044-403) **Credit 6**

2044-102 Materials and Processes of Wood: Senior II
This is the second of a three-quarter sequential class covering the advanced techniques and aesthetics of woodworking. This course addresses aspects of woodworking students may wish to pursue after graduation. Students select from a menu of topics: jigs and fixtures (shaper, router, etc.), industry-related series production, outdoor, site specific, multiple seating, multimedia and sculpture. They then develop a proposal for a body of work that may span more than one quarter. Students may select more than one topic. The course includes a machine maintenance program. Materials fee required. (2044-501) **Credit 6**

2044-503 Materials and Processes of Wood: Senior III
This is the last of a three-quarter sequential class covering advanced techniques and aesthetics of woodworking. This course addresses aspects of woodworking students may wish to pursue after graduation. Students select from a menu of topics: jigs and fixtures (shaper, router, etc.), industry-related series production, outdoor, site specific, multiple seating, multimedia, and sculpture. This represents a continuation of the body of work begun in a previous quarter. Students may select more than one topic. The course includes a machine maintenance program. Materials fee required. (2044-502) **Credit 6**

General Crafts Studies

2045-311 Concept Drawing
Freehand concept sketching technique for the crafts major. **Credit 3**

2045-312 Crafts Technical Drawing
Course covers basic drafting technique as it is used for both design and presentation. Topics covered include use of instruments, lettering, standard conventions, dimensioning, basic layout techniques and formats, orthographic projection, sectioning, auxiliary views, axonometric drawings, measured perspective, comprehensive working drawings, and presentation techniques. **Credit 3**

2045-313 Crafts Drawing-CADD
Course covering introduction to basic computer assisted drawing and design (CADD) technique as it is used for both design and presentation. Topics covered include introduction to the computer, basic CADD issues, two-dimensional drafting, the three-dimensional environment, associative views, generating working drawings, printing, and plotting. **Credit 3**

2045-511 Planning a Career in the Crafts
One of three courses covering topics commonly associated with the operation of a small business in fields related to the fine and applied arts. This course covers career assessment, qualitative and quantitative evaluation and assessment of potential career paths through the development of a comprehensive business plan, and employment options. The course includes lectures, group discussions, independent study, studio and business visits, homework, papers and reports, and oral presentations. **Credit 3**

2045-512 Crafts Promotional Package
One of three courses covering topics commonly associated with the operation of a small business in fields related to the fine and applied arts. This course addresses promotional issues including portfolio, photography, resume writing, business cards and stationery, marketing, and client relations etc. Students will create their own comprehensive promotional package. The course includes lectures, group discussions, independent study, studio and business visits, homework, papers and reports, and oral presentations. **Credit 3**

2045-513 Operating a Business in the Crafts
One of three courses covering topics commonly associated with the operation of a small business in fields related to the fine and applied arts. This course addresses day-to-day business operations including: as marketing, contracts and other legal issues, record keeping, banking, insurance, taxes, employees, and location and layout of a business. The course includes lectures, group discussions, independent study, studio and business visits, homework, papers and reports, and a oral presentation. This course is required for all School of American Crafts BFA seniors. **Credit 3**

2046-201 Ceramics
This introductory ceramics course combines wheelthrowing and handbuilding techniques with clay. Through a variety of forming methods, students will learn about making all kinds of ceramic objects. Slide lectures will support and introduce projects. Materials fee required. May be taken more than once for credit. **Credit 2 per quarter**

2046-206 Metalcrafts/Jewelry
Emphasis on basic jewelry-making techniques involving sawing, filing, soldering, hand and machine-finishing, simple stone setting, and more. Design is stressed throughout the course. Materials fee required. May be elected more than once for credit. **Credit 2 per quarter**

School of Film and Animation

2065-201 Introduction to Film Production
A fundamental course in 16mm non-synchronous film production. Filmmaking is presented as a means of interpretation and expression. This course combines technical information in motion picture exposure and editing with a theoretical and practical approach to motion picture continuity. Production is in 16mm (non-sync) format. Students furnish film, tape and processing. Equipment is furnished by SoFA. **Credit 4**

2065-202 Digital Production I
A foundation course in editing theory and practice for motion pictures. Emphasis is on identification and concerns of a variety of approaches to the edited image. The student edits S-Digital format projects designed to address specific editorial concerns. Students provide materials; equipment is furnished by SoFA. (2065-201) **Credit 4**

2065-203 Digital Production II
This is the third course of three for freshmen film/video students. It introduces the nature and importance of the sound component in creating cinematic works. Students are exposed to a variety of possible treatments of sound using historical and contemporary examples in cinema. Students engage in the creation of soundtracks that are rich, complex, and meaningful. They learn the processes, equipment, and techniques, as well as creative and efficient strategies for multi-track soundtrack creation for both film and video. This course is essential for students of the film/video curriculum who must be able to create not only images but also mature and appropriate soundtracks for their film and video works. Also essential for students who wish to pursue sound-related careers in film and video. (2065-201 and 2065-202) **Credit 4**

2065-206 Story and Structure
A discipline specific introductory course designed to introduce first year students to the meaning of "story"; the components of a story, approaches to film structure, and the variety of expressions that a film can take. **Credit 2**

2065-216 Fundamentals of Computer and Imaging
This course will give students basic knowledge in the theory and practice of computer hardware and software. Operating systems including Mac, Windows, and Unix will be described. Networking for e-mail, file transfer, and Web will be studied. Basic theory of imaging and compression technology for pictures, movies, and sound will be covered. File formats and disk formats for internal and removable media will be examined. **Credit 3**

2065-217 Digital Video for Multimedia
Digital video technology democratizes creative moving image editing and manipulation. Broadly, the goal of this course is to teach the basic craft of filmmaking using the most current available digital software/hardware tools. Students will be expected to complete several shooting and editing exercises as well as produce two finished productions. **Credit 4**

2065-221 Materials and Processes of the Moving Image
Familiarizes students with the basic technical concepts of film and video making. Students gain an understanding of the technical theory required to work in these media. (2065-216) **Credit 2**

2065-222 Film Language
A screenings, readings, and writing course designed to give students the opportunity to trace the development of the techniques and forms of communication in what now constitutes the classic cinema. **Credit 4**

2065-231 **Film and Video Materials and Technology**
This course provides a fundamental treatment of photographic processes beginning with the nature of light and light sensitive materials (silver halide film, CCD/CMOS) that are used in motion imaging. Chemical concepts of equilibrium, reactivity, and kinetics within photographic systems will be examined. Exposure and color balance control will be explored. Fundamental technological principles in camera and projection systems will be discussed. Light-sensitive emulsion chemistry and formulation, latent image theory and the associated dynamic processes, as well as development to form color images will be treated. Fundamentals of solid state and digital imaging processes such as telecine and digital projection systems will be explored. A laboratory section will emphasize the application of concepts covered in lectures. **Credit 4**

2065-263 **Single-Frame Motion**
This class is intended to give students a thorough, intuitive understanding of animation motion. Emphasis will move towards hands on exercises without the demands of finished production. Image capture and playback technologies will be immediate so students will see the results of their efforts quickly. The assignments will direct students to shoot pixillation, animation of real objects, cutouts, and pre-made puppets. **Credit 2**

2065-264 **Audio Intro to Media**
Determine successful ways to capture audio and distribute for a variety of media formats. Develop listening and technical skills to manipulate audio for acceptable subjective qualities and meet technical standards. Each student will manipulate different forms of audio and summarize the decisions to accomplish final project. **Credit 3**

2065-316 **Production Processes**
An introduction to all aspects of professional narrative production. Students produce short projects while learning basic shooting and crewing procedures and protocol, equipment handling, and maintenance. (2065-202) **Credit 6**

2065-319 **Production Workshop: Documentary**
Students produce short documentary projects in either 16mm film or video, depending on their prerequisites. Or with consent of instructor, students may work in any medium appropriate to their experience and resources. Students are encouraged to experiment with individual style and while producing their own work also serve as part of a part of a production planning team and production crew for all other projects. Students complete projects for presentation at SoFA public screenings. (2065-203, 2065-316) **Credit 4**

2065-322 **Lighting for Movement**
This workshop is designed to explore creative and technical ways to use lighting to bring a scene 'to life' in the two-dimensional medium of film or video. Proper utilization of a set requires the actors to move within that space, yet the placement of the lighting instruments along with the quality of light is a very complex task. This course will introduce and enhance these skills. (2065-466) **Credit 4**

2065-323 **Digital Post Production Technology**
This class focuses on the specific technologies of motion picture post-production and imaging science. Motion content generated via film or electronic technologies on set are ingested into the post-production chain utilizing various optical, opto-mechanical, and electronic systems. Topics will include video standards, telecine transfer, digital colorspaces, digital intermediate, special effects, color correction, and image processing. Motion content mastering will be explored as an introduction to exhibition technologies to be presented in the final Motion Picture Science course. Particular emphasis will be placed on production testing, data acquisition and image analyses. (2065-521) **Credit 4**

2065-324 **Live-Action Pre-production**
Students will learn the basic pre-production techniques for narrative fiction, experimental, and documentary filmmaking. Students will also prepare a pre-production binder in a genre of their choice to be used in an actual production. Course requires a prepared script or proposal. (2065-203) **Credit 3**

2065-327 **Advanced Production Workshop: Experimental I**
Students produce short projects as experiments in concept, style, or technology and are encouraged to take risks, break "rules" and explore their own unique creative potential without fear of grade punishment for being different. Students may work in either film or video and depending on their proficiencies, or, with consent of the instructor, students may work in any medium appropriate to their experience and resources, such as photography, painting, animation, comic strip, performance, installation, radio or multimedia. Students complete projects for presentation at SoFA public screenings. (2065-203 or 2065-217329 or 2065-319 or 2065-339 or permission of instructor) **Credit 4**

2065-328 **Advanced Production Workshop: Experimental II**
Students produce short projects as experiments in concept, style, or technology and are encouraged to take risks, break "rules" and explore their own unique creative potential without fear of grade punishment for being different. Students may work in either film or video, depending on their pre-requisites. Or with consent of the instructor, students may work in any medium appropriate to their experience and resources, such as still photo, painting, animation, comic strip, performance, radio, or multimedia. While producing their own work students also serve as part of a production planning team and production crew for all other projects. Students complete projects for presentation at SoFA public school screenings. (2065-327) **Credit 4**

2065-329 **Production Workshop: Experimental**
Students produce short projects as experiments in concept, style, or technology and are encouraged to take risks, break "rules" and explore their own unique creative potential without fear of grade punishment for being different. Students may work in either 16mm film or video, depending on their pre-requisites. Or with consent of instructor students may work in any medium appropriate to their experience and resources such as: still photo, painting, animation, comic strip, performance, radio, or multi-media. While producing their own work, students serve as production planning team and production crew for all other projects. Students complete projects for presentation at SoFA public school screenings. (2065-316 and permission of instructor) **Credit 4**

2065-331 **Introduction to Animation I**
This class is a survey of basic techniques and aesthetics of animation and provides training and practical experience in a wide variety of approaches to single-frame motion picture production. Emphasis will be placed on developing timing skills. Students produce a number of short film exercises utilizing cutout, paint and draw animation as well as direct animation. Extensive film screenings illustrate each technique and related aesthetics. (JPHQ or JPHF major or consent of instructor) **Credit 4**

2065-332 **Advanced Animation Tools**
This course in animation techniques and tools provides the student with the training and practical experience necessary for independent operation of animation equipment and the independent production of animated film. A variety of traditional and experimental techniques are explored in depth. These techniques include animation stand as well as three-dimensional animation execution. Students work independently and in group situations, and participate in all phases of animated film production. Students have the opportunity to explore mixed technique approaches, as well as utilize their experiences in photography, graphic arts, painting, sculpture, and other backgrounds and skills. Screenings of films illustrate a variety of different techniques, styles, and production concerns and practices. Proficiency in drawing is not required. (2065-331, course not offered every year) **Credit 4**

2065-333 **Animation Production**
This workshop provides practice in all phases of single-frame film production. Students conceive and produce a short film with sound. Weekly meetings will discuss and critique the progress and merits of then work in progress and the final work. Students will rely only on techniques learned in previous classes. Final film must be screened for the school community. (2065-352) **Credit 4**

2065-339 **Production Workshop: Fiction**
In this course students will produce short fiction projects in either 16mm film or video or HD, depending on their pre-requisites, or with consent of instructor. Students may work in any medium appropriate to their experience and resources such as: still photo, painting, animation, comic strips, performance, radio, or multi-media. Students are encouraged to experiment with individual style and while producing their own work also serve as part of a production planning team and production crew for all other projects. Students complete projects for presentation at SoFA public screenings. (2065-316) **Credit 4**

2065-342 **Scriptwriting I**
This course is the first in a series of courses on the writing of scripts for theatrical and nontheatrical films and television. This course introduces students to the forms and techniques of writing for dramatic media, including a brief introduction to writing for experimental and documentary films. Throughout the course, students keep a creative journal of ideas and characters to be used in story development. Students are responsible for writing a short film or television script of their own choosing and for completing several brief written exercises in areas such as personal storytelling, character development, dialogue, and plot. (2065-206) **Credit 3**

- 2065-343 Scriptwriting II**
This course is the second in a series of courses on the writing of scripts for theatrical and nontheatrical films and television. The class focuses on the scene as the basis of dramatic structure and offers students the opportunity to hone the skills developed in the previous class. Students are responsible for writing a film or television script on a subject of their own choosing and for completing several brief written exercises in areas such as character, dialogue, suspense, subtext, and plot. Class discussion is based on assigned readings, in-class exercises, and in-class reading of student work. (2065-342) **Credit 3**
- 2065-344 Post-Production Process**
This course is designed to teach students the professional workflow of handling digital film and video files through the complex post production process. Areas of study include learning a cinema file database, media management, color correction, HD compositing, visual and time base effects, sound processing and tracking building, and titling and graphics. (2065-316) **Credit 4**
- 2065-345 Acting for Film and Video**
A course in basic acting technique with emphasis on the special problems peculiar to film and video production. The class is taught in conjunction with *Directing the Actor* (2065-347). Class meetings are organized around the presentation of scenes prepared by student actors and directors. (Film and Animation majors; requires permission of the instructor) **Credit 3**
- 2065-347 Directing the Actor**
A course in basic directorial techniques with emphasis on the special problems peculiar to film and video production. Class meetings are organized around the presentation of scenes prepared by student directors. (Film and Animation majors; requires permission of the instructor) **Credit 3**
- 2065-350 Figure Drawing: Animation**
A studio figure drawing class suited specifically to the needs of drawn character animators. Live models will provide frequent short poses, revealing stages of movement, center of gravity, dramatic gesture, and specific movement in dance and sports. Students will draw rapidly and will be asked to conjecture form from unseen shapes and flowing motion. Frame-per-frame video will be examined of live model's movement and compared to students' drawings. (At least one figure drawing class or permission of instructor) **Credit 3**
- 2065-351 Underwater Cinematography**
This course is designed to prepare students to professionally complete cinematography assignments in an underwater environment. To accomplish this, the student will complete basic scuba diving training and achieve scuba diving certification. The student will become familiar with underwater video camera housings and accessories and basic underwater shooting techniques. A facility fee covers all equipment, off campus facility use, texts and insurance. (2065-316) **Credit 4**
- 2065-352 Animation Pre-Production**
Students collect and produce short film ideas and learn to express them in a variety of methods. Short film scripts will be written in a workshop setting and shared with class in critiques. Students will learn how to create digital soundtracks and read digital sound. Students will make animation Bar Sheets for sound/image relationships and timings and Exposure Sheet design. Students will also work with storyboards scanned into the computer and manipulated in time with sound as Animatics as another tool for initializing animation production. (2065-331) **Credit 4**
- 2065-353 Camera Choreography**
This workshop is designed to explore creative ways to bring a scene 'to life' in the two-dimensional film medium. Composition, perspective, camera operation and movement will be studied. These skills will be appropriate for all students studying directing, cinematography, editing and animation. (2065-316) **Credit 4**
- 2065-354 Business of Film and Video**
Examines the business aspects of designing, developing, and producing film/video projects. Emphasis is on development of production projects with interactive problem-solving experiences, in which the instructor and students work as a production team. Special attention is given to script development techniques, estimation and management of production costs, location productions, live broadcasts and the cost/quality considerations of film/video production. Specific issues and situations are used as exercises for student problem-solving activities. (Film and Animation or Digital Camera second-year majors) **Credit 3**
- 2065-355 History and Aesthetics of the Moving Image: Fiction**
An exploration of the history and aesthetics of film. Emphasis is on determining the unique characteristics of the medium, how those characteristics are used as a means of interpretation and expression, and their relevance to other kinds of nonverbal image making. (Film and Animation or Digital Camera second-year majors) **Credit 3**
- 2065-357 History and Aesthetics of the Moving Image: Documentary**
An exploration of the history and aesthetics of film. Emphasis is on determining the unique characteristics of the medium, how those characteristics are used as a means of interpretation and expression, and their relevance to other kinds of nonverbal image making. (Film and Animation or Digital Camera second-year majors) **Credit 3**
- 2065-358 History and Aesthetics of the Moving Image: Animation**
An exploration of the history and aesthetics of animated film. Emphasis is on tracing the major developments in international animation production and determining the unique characteristics of the medium, how those characteristics are used as a means of interpretation and expression, and their relevance to other kinds of nonverbal image making. Film and Animation or Digital Camera second-year majors) **Credit 3**
- 2065-361 Introduction to 3D Computer Animation**
An introduction to three-dimensional computer animation. The basic principles of animation will be addressed within the context of producing three-dimensional computer animation. Students will produce a series of short three-dimensional computer animations as part of the learning process, and then a final short three-dimensional computer animation of their own design. Students will become familiar with a variety of three-dimensional computer animation techniques and applications. (2065-331 or permission of instructor) **Credit 4**
- 2065-363 Acting for Animation**
This course will give character animation students an opportunity to explore a visual language of acting and posing that will help their storytelling abilities. Acting, timing, and pacing are critical elements to any successful character animated film. Identifying and building a library of expressions, poses, and movement for emotional and visual expression is the goal for each student. Students will study reference material from successful silent and animated films. They will also create their own reference material through acting and filming themselves and other students. The class will include demonstrations by practicing actors and animators. (2065-331 or permission of instructor) **Credit 3**
- 2065-366 Scriptwriting for Animation**
Scriptwriting for Animation is a writing seminar designed to provide intensive practice in developing premises, stories and characters in the particular idiom of animation. Readings, in-class exercises, and outside writing assignments emphasize mining one's creative resources, developing fluency in the essential elements of storytelling for animation. (2065-342) **Credit 3**
- 2065-367 Visual Effects: Cinematography**
This course is designed to enhance students' awareness of the creative possibilities inherent to the motion picture camera by giving them "real world" work experience, concentrating on group dynamics within a problem-solving environment. The object is to produce a 16mm motion picture visual effects sequence by students. Students work cooperatively with each other within production units, and with each production unit works cooperatively with the others. Students share their projects during weekly production meetings chaired by the instructor. Working with models and miniatures are involved. Course not offered every year (2065-316) **Credit 4**
- 2065-369 Advanced Production Immersion**
This workshop will provide students with the opportunity to learn more about a particular area of production—editing, cinematography, lighting, sound, etc.—with an industry professional. (2065-316) **Credit 1-4**
- 2065-370 Film and Video in Paris, Summer**
Provides students with the opportunity to creatively explore and experience film and video production for four weeks in Paris, France. Students study the rich history and prehistory of French (and European) cinema. Study includes weekly screenings of many historical and contemporary film works from the film archives at the National Museum of Modern Art in Paris, meetings with French/European filmmakers and historians, museum trips, special film programs at the Cinematheque Française and the Videothèque of Paris, and library research. Both traditional and experimental French cinema are examined. Equipment is provided. Students produce works in 16mm film or HD formats. Open to undergraduates and graduates, majors and non-majors, with or without production experience. (Course not offered every year) **Credit 6**

- 2065-371** **Miniature Sets and Props**
This course gives students hands-on experience in all stages of designing and building miniature sets. Common set construction materials will be introduced and proper techniques explained. Students will design and build basic structures with a variety of surface finishes using organic and artificial forms. Students will evaluate the artistic merits of their designs. Examples from architecture and movies will be provided. Realistic sets with a cultural heritage will be considered, as well as fantasy environments. Final sets will be completed by the class to be used in subsequent classes. (Instructor permission required) **Credit 3**
- 2065-372** **Introduction to Stop Motion Animation**
Explore techniques for producing stop motion animation. Gain familiarity with the use of a variety of materials that may include clay, puppet, foam, and latex. Develop techniques for making armatures and skeletons and creating joints. Learn how to measure movement from frame to frame. Research and write about a stop motion technique or animator. (2065-331) **Credit 4**
- 2065-374** **Seminar in International Film History**
Examines selected, varying film topics in a wider socio-historical context. Seminar themes change each year and may include topics such as post-war German films, films of the Holocaust, Japanese film, surrealist and magic realist film, Soviet film, Native Americans on film, etc. Students are expected to participate actively in the course via class presentations and discussions. (SoFA second-year student or above) **Credit 3**
- 2065-376** **Dramatic Structure in Film and Television**
This course explores the theories of dramatic structure from Aristotle to the present and applies these theories to current and classic dramatic works. The class also explores writing for film and television, including feature film genres, one-hour drama, mini series, soap opera, and sitcom. A segment on the business of writing covers reader's reports, adaptation of material from other media, and acquisition of rights. (2065-343) **Credit 4**
- 2065-378** **Writing the One-hour Television Drama**
A special workshop in writing the one-hour TV drama. Students study the format and structure of current one-hour dramatic programs, then propose and write an episode for an existing program. (2065-343) **Credit 4**
- 2065-381** **Particle Effects**
This course gives students the skills to insert three-dimensional computer special effects into animation and live action footage. Students explore three-dimensional computer particle animation and dynamic simulation using Maya software. In addition students will create short animations using particle effects, soft bodies and rigid bodies to simulate nature effects like fire, rain, and water and physics based dynamic and collision events. MEL scripting is an integral part of this course. (2065-361) **Credit 4**
- 2065-383** **Writing Comedy and Situation Comedy**
A special workshop in writing the situation comedy. Using improv and stand-up comedy techniques, students study the rules of comedy and joke structure. Students also study the format and structure of current situation comedies, then propose and write an episode for an existing program. (2065-343 or permission of instructor) **Credit 4**
- 2065-384** **DVD Authoring**
This course is designed to introduce the design and practices of the DVD development with emphasis on rethinking a completed film project. The student develops a specific DVD based on a film they have completed. Class discussion and presentation is oriented towards new directions for the film story with interactivity and sequencing considerations. The student will acquire development tools to include: menu development, subtitles, audio streams, encoding principals, hybrid DVD creation, web linking (DVD@ccess), and basic scripting. (2065-202) **Credit 4**
- 2065-386** **Film Sound Theory: Effects**
A critical analysis of film sound theory through the study of texts and the viewing/listening of select films. A conceptual understanding of different elements of sound design will be obtained with close examination and focused group discussion. Lectures on the theory and practice of sound will be derived from the readings. (2065-203 or permission of instructor) **Credit 4**
- 2065-387** **Writing the Short Film**
A workshop in writing a short film script. The course focuses on story, proposal and script treatment as well as writing and rewriting a short script. (2065-343) **Credit 4**
- 2065-391** **Programming for Artists and Animators I**
This programming course is designed specifically for artists and animators with little or no programming experience. It is designed so that students are able to produce visual results from writing a program within the first two weeks of the quarter. All of the assignments and examples in class are graphics related. **Credit 4**
- 2065-392** **Programming for Artists and Animators II**
This second course in a two-course sequence gives students the ability to design custom tools and features in Maya by continuing to learn MEL. The course concentrates on algorithm development, leading to the development of MEL code useful for doing creative work in Maya. (2065-391) **Credit 4**
- 2065-393** **Film Sound Theory: Music**
This course is one of three in the study of film sound theory. Through readings, focused group discussion, and the viewing/listening of select films, the course promotes critical analysis of the varied and profound uses of music in sound design. Addressed is the history of music from the silent era to the modern score. The concepts studied include the modal changes in point-of-audition, and positioning across diegeses. Newer topics like audio-visualization and ventriloquism theory are also addressed. Each student gives a presentation on a chosen concept. **Credit 4**
- 2065-396** **Puppets for Stop Motion**
Students will progress from simple to advanced puppet design through the class. At each stage, students will see a completed puppet, design and build one of similar design, and test animate the puppet. Students will use a variety of materials. Students will solve the problems of facial expressions, foot and rig attachment, and clothing. Reparability and usability will be stressed as well as artistic and expressive considerations. (2065-263 and 2065-331) **Credit 3**
- 2065-397** **Methods in Motion**
This course will give animation students an opportunity to explore a visual language of acting, timing, posing and animation principles that will help strengthen their animation abilities. Every animator needs to build a library and understanding of animated movements and timing that they can draw on for all of their future animated films. (2065-263) **Credit 3**
- 2065-398** **Film and Video Community Service**
Allows the student to take film or video production experience to the community. With the assistance of a faculty community service coordinator, community organizations and groups make contact with film and video majors for work toward the production of media necessary to the group's outreach, educational, or promotional efforts. A final written report, screening of the community project and meeting with the faculty coordinator help the student evaluate the production and the experience. (Permission of instructor) **Credit 4**
- 2065-411** **Image Capture and Production Technology**
This course offers a full investigation of image capture technologies used in contemporary motion picture production. Historical image generation techniques will be provided as an introduction to modern media and equipment. Fundamental characteristics of silver halide photochemical imaging systems will be explored with emphasis on typical metrology and imaging properties. Electronic image capture will also be presented in the context of fundamental imaging properties. Standard film and video workspaces and workflows will be examined as a direct introduction to post-production technologies to be presented in subsequent Digital Cinema courses. (2065-231, 1051-320, 1051-350 and 1051-370) **Credit 4**
- 2065-413** **Senior Project Seminar**
A required course for third-year SoFA majors and the prerequisite for Senior Project I (2065-507). Students discuss and generate a written plan for their senior film/video projects and select an adviser from among the film/video faculty. **Credit 1**
- 2065-418** **Advanced Storyboard and Layout**
This course involves creation of in-depth storyboard, layout design and art direction for various media. Students will work on pre-designed characters and scripts or scripts from their own projects. Differing styles of layout, narrative structure, subtext, boarding, and workbook will be explained. (2065-352) **Credit 4**

- 2065-424 Directing a 30-Second Commercial**
Students learn how to direct and produce television commercials beginning with developing the creative idea, experiencing all facets of pre-production including talent casting, selecting crew, and location scouting followed by commercial film or video production through editorial. Students will meet with advertising agency personnel and established industry professionals in order to learn more about the process. (2065-316) **Credit 4**
- 2065-427 2D Computer Animation I**
This class is intended to give students competency in the prevalent two-dimensional software with specific regard to their animation capabilities. Students will gain knowledge in character based action, software integration, the paradigm of specific software designs, and issues inherent in common production pipelines. Students will learn specific task oriented operations common in various animation approaches. (2065-331) **Credit 4**
- 2065-428 2D Computer Animation II**
This class is intended to extend student competency in two-dimensional computer animation software. Object-oriented software will be supplemented with plug-ins and paint animation software. A variety of source media, including live-action video and three-dimensional files will be used. (2065-427) **Credit 4**
- 2065-437 Advanced Animation Workshop I**
Students are given the opportunity to produce, either singly or in small groups, a motion picture with sound using an animation technique or combination of techniques of their own choosing. Students may elect to take this course for one quarter or for two quarters, depending upon the dimensions of the project. (2065-333) **Credit 4**
- 2065-438 Advanced Animation Workshop II**
Students are given the opportunity to produce, either singly or in small groups, a motion picture with sound using an animation technique or combination of techniques of their own choosing. Students may elect to take this course for one-quarter or for two-quarters, depending upon the dimensions of the project. This course is the second course in a two-quarter animation work-shop experience. (2065-437) **Credit 4**
- 2065-441 Drawing Animation: Dynamics**
Three different courses in drawing for animation are offered. Each course provides a different focus and assumes considerable drawing skills. This course focuses on the dynamics of drawn animation. Students will go through and analyze each step required in traditional animation from thumbnails to clean up. One short sequence will be animated with careful consideration to character performance, staging and appeal. (2065-471 or permission of instructor) **Credit 3**
- 2065-442 Drawing Animation: Sequences**
Three different courses in drawing for animation are offered. Each course provides a different focus and assumes considerable drawing skills. This course consists of three intensive exercises based on timing, sound and weight. Students will apply gesture and performance techniques to short animated exercises (2065-441 or permission of instructor) **Credit 3**
- 2065-443 Drawing Animation: Characters**
Three different courses in drawing for animation are offered. Each course provides a different focus and assumes considerable drawing skill. This course focuses on character development for animation of all kinds. Students produce character sheets, turnarounds, and finished style sheets. Students will study anatomical construction and the influences of common character designs as they relate to story. (2065-471 or permission of instructor) **Credit 3**
- 2065-445 Acting II for Film and Video**
An intermediate level acting class working in depth with techniques and approaches introduced in the basic acting class with the additional focus of using external observation to determine appropriate behavior. Class meetings are organized around the presentation of scenes prepared by student actors and directors. The class is taught in conjunction with Directing the Actor II. (2065-345) **Credit 3**
- 2065-446 Directing the Actor II**
This class offers in-depth study of techniques introduced in the basic directing class, with an additional focus on using external observation to determine appropriate behavior. This course emphasizes the special problems peculiar to Film and Video production. Class meetings are organized around the presentation of scenes prepared by student directors using the acting students in the class. Meets in conjunction with Acting II for Film and Video. (2065-347) **Credit 3**
- 2065-447 Experimental Animation Workshop**
Directed toward experimentation and exploration with single-frame motion image making. Students engage in creative conceptual and experimental investigation and processes to discover new expressions and techniques. This activity is not limited to film, video or computer and digital formats, and may include hybrid practices across different art media; performance, installation, fine arts, photographic processes, innovative sound presentation, live action, and more. Students examine past experimental animated works and learn the distinctions and pretexts for the experimental approach, the connections and relationships of experimental works to art, and the role of the experimentalist as discoverer and interpreter of new meaning and animated practice. (Permission of instructor) **Credit 4**
- 2065-451 Avid Advanced Narrative Editing**
Students will receive basic training in working with the Avid Media Composer Editing System including editing workflow, starting a project, preparing an edit, editing a sequence, and outputting a sequence, with special emphasis on narrative and television commercial editing. (2065-344) **Credit 3**
- 2065-452 Sound Recording**
Specialized information and work in sound to give information and lab work beyond the regular course and to encourage the beginning of vocational-level work in sound. Each student prepares a mixed soundtrack to professional quality standards. (2065-202) **Credit 3**
- 2065-454 Writing the Feature I**
A production workshop in developing and writing the outline for a feature length film script or episodic TV series. Can also be taken by students who want to rewrite an existing feature length screenplay. This course focuses on proposing a script and writing the outline for a feature film or TV series. Students work at their own level within the class and discussions provide feedback and incentive. The project can be continued in Writing the Feature II. (2065-343) **Credit 4**
- 2065-455 Writing the Feature II**
The second-quarter of a scriptwriting workshop. Students complete and revise the script begun in the first quarter. Required as the second part of a two-quarter production class for students in the scriptwriting track. (2065-454) **Credit 4**
- 2065-457 3D Computer Animation I: Modeling**
Beginning modeling for animation in three-dimensional software. Students learn modeling technologies and techniques that can be used in the three-dimensional animation course as well as the techniques of digital cinematography that are used to create and light a three-dimensional environment. (2065-331) **Credit 4**
- 2065-461 Alternative Frame-by-Frame**
This course will give all students a chance to explore three different approaches to stop-motion animation. The class will study and experiment with pixilation, relief animation with a "down-shooter", and cutout animation utilizing a composite approach. These techniques will expand the student's knowledge of traditional or character animation and present an alternative means of expression. Students can explore character or experimental approaches to animation with these traditional-alternative approaches. The class will study existing work with these techniques, analyze and discuss them with the instructor and then produce one thirty second example of their own for each approach. (2065-263) **Credit 3**
- 2065-462 Advanced Sound Recording**
Continuing the work in Sound Recording to include the decision level in the employment of various sound equipment, more complex work in multi-track recording and mixing. (2065-452) **Credit 3**
- 2065-464 Business of Animation**
This class is intended to give students an understanding of studio production and freelance animation. Students will learn the basics of running a business. Production issues, particularly related to animation, will be studied. Methods of examining costs and projecting work timelines will be practiced. Students will draw up contracts and negotiate terms. Copyright law as it applies to distribution and contracts will be studied. A business plan will be developed by each student. (SoFA junior or senior status) **Credit 2**
- 2065-466 Lighting for Film and Video**
This course will present the fundamental principles of lighting for film and video production. Current methods and practices of lighting used in the motion picture industry will be explored through demonstration, lectures, and hands-on lab assignments. (2065-202) **Credit 3**

2065-467 **Digital Effects and Compositing**
This course offers a hands-on experience in manipulating live action video and applying digital effects. There is an emphasis on digital compositing using alpha channels and transparency. Composites may be accomplished through green screen shooting, transfer modes, masks, and/or traveling mattes. (2065-316 or 2065-352) **Credit 4**

2065-468 **Building the 3D Character**
This course covers a broad range of 3D animation related topics in a detail-oriented manner. The various topics will be anchored in the design and development of an original 3D character. Topics covered will include but not be limited to modeling, rigging, texturing, and lighting. Students will design and build a 3D character of their own design. Using a variety of 3D techniques, students will create a fully articulate character rig, and produce a short animation demonstrating its functionality, as well as their proficiency in techniques such as lighting, texturing, and rendering. **Credit 4**

2065-471 **Gesture Drawing for Animators**
This course will consist of intensive anatomy and quick-sketch workshops using live models and visualization techniques. Live models will be scheduled for a portion of each class. Students will study kinesiology, the effect of movement on muscle and bone, and sequential movement. Students will learn how to draw and apply basic animation principles. As a final project students will create original imaginary characters based on their class assignments. Most of the course work will be in class drawing sessions. (2013-211) **Credit 3**

2065-472 **Advanced Stop Motion Animation**
Explore advanced techniques for producing stop motion animation. Gain familiarity with the use of a variety of materials, which may include clay, rubbers, aluminum, and more. Develop techniques for making armatures using wire and steel joints. Learn character performance in gesture and expression. Practice methods of miniature lighting and photography as well as digital effects. (2065-372) **Credit 3**

2065-473 **Women's Stories, Women's Films**
This course provides an introduction to women's films. Through screening films and class discussion, the course examines the themes and issues of women's narratives and how they function in the medium of film. The hero's journey and traditional narrative structure are contrasted with the heroine's journey and the more personal feminine storytelling style. The course also considers differences in films made by women and films made by men about women. Students will have opportunity to explore their own creativity. **Credit 4**

2065-478 **3D Computer Animation II: Character**
An introduction to three-dimensional digital character animation. The basic principles of character animation and development will be addressed within the context of producing three-dimensional digital character animation. Students will produce a series of short three-dimensional computer animations of digital characters using inverse kinematics as part of the learning process. Then they will produce a final short three-dimensional digital character animation of their own design. Students will become familiar with a variety of three-dimensional digital character animation techniques and applications. (2065-361 and 2065-457) **Credit 4**

2065-482 **Mixing and Sound Design**
Continue the work from Advanced Sound Recording by mixing multi-track sessions with video to post-produce several different projects to professional standards. Learn how to listen and develop a trained ear while understanding proper equalization and use of effects and digital signal routing. Sessions can include documentaries, dialog and musical productions. Create templates and develop editing/mixing techniques to balance creativity and time constraints of a typical project. (2065-462) **Credit 3**

2065-484 **3D Lighting**
Students will learn to use lighting in digital three-dimensional software. The process for developing projects in class will be critique based. Projects may include modeling and lighting simple objects or spaces, matching a three-dimension object or space to a scanned photographic or video image in lighting, quality and perspective. Elements of the renderer software that relate to lighting will be discussed fully. (2065-457) **Credit 4**

2065-498 **Film and Video Internship**
Provides the students with on-the-job experience in the field of film/video. The student seeks and acquires a school-approved internship position in a business or industry. The working environment provides the forum for learning more about the student's chosen career. A final interview with the internship coordinator assists the student in evaluating the experience. The coordinator should be the faculty member most familiar with the student's internship field. (Permission of internship coordinator) **Credit 1-6 per quarter**

2065-507 **Senior Project I**
In this course students in their final year begin work on a major project. Students work on projects, including narrative fiction, documentary, experimental, animation, scriptwriting or craft that were proposed and approved in the spring quarter of the previous year. Students are in charge of their own work, but they work directly with an adviser to track their progress on the project. At the end of this quarter, students should have completed the tasks laid out in their project schedules. The first course in a three-part sequence. (2065-413 and permission of instructor) **Credit 4-6**

2065-508 **Senior Project II**
Work on the senior project continues. The student will meet at least once a week with his/her faculty adviser. At the end of the quarter, students screen their work for faculty and peer feedback. The second course in a three-part sequence. (2065-507 and permission of instructor) **Credit 4-6**

2065-509 **Senior Project III**
Students complete work on their senior project, creating appropriate distribution media or other appropriate publishable material. Craft students complete their contributions to projects, and prepare and give a presentation to the public. Scriptwriters rewrite their scripts and give a formal script-reading for the public. Experimentalists refine and complete experimental projects and prepare for final exhibition/performance and distribution. Rationale: Variable credits allow students to match credits to the workload for this quarter. The third course in a three-part sequence. (2065-508 and permission of instructor) **Credit 2-4**

2065-512 **Senior Forum**
This course is intended to accompany and complement the SoFA Senior Project II course. Students in this course will meet as a group to screen edited works in progress, discuss postproduction problems, and plan jointly for the use of SoFA production resources. (2065-507) **Credit 2**

2065-513 **Career Preparation**
Career Preparation offers practical advice and assistance in job seeking and life after RIT. The course aids students in preparing their thesis projects for festival entry and distribution. Material produced by the student includes a resume, portfolio, and work reel. (SoFA junior or senior status) **Credit 2**

2065-516 **Motion Picture Science Senior Project I**
In this course students in their final year begin work on a major student project. Students may work on projects including motion picture engineering, image science research or relevant craft. Students are in charge of their own work, but they work directly with an adviser to track their progress on the project. The class meets 1 hour each week to provide discussion on project progress and learning. (Permission of instructor) **Credit 1**

2065-521 **Film Projection and Digital Cinema**
As the final course in the Motion Picture Science core technology sequence, this class completes the study of motion picture technologies, focusing on exhibition and display engineering. Topics covered include traditional mechanical film projection, electronic projection and the color science associated with image appearance. Special focus will be given to evolving exhibition standards, image quality evaluations and emerging techniques. The course will conclude with an investigation of 3D technologies and varied distribution models for motion content. (2065-323) **Credit 4**

2065-550, 551, 552, 553 **Special Topics**
A seminar approach offered on demand when adequate numbers of students and faculty desire to investigate specialized topics not normally offered in the regular curriculum. Available to upper-level students. **Credit variable 1-9**

2065-563 **The Business of Hollywood**
In this interactive role-playing course, students become studio executives, producers, or agents. Participants learn the techniques of identifying movie concepts and selling ideas, the specifics of talent compensation, and the structure of the Hollywood studio system. Perhaps most importantly, students learn methods of negotiation in the film industry and gain an understanding of what it takes to succeed in this business. (Online course) **Credit 3**

2065-611

Graduate Production

A fundamental course in 16mm non-synchronous film and basic digital video production. Filmmaking is presented as a means of interpretation and expression. This course combines technical information, camera technique and editing with a theoretical and practical approach to motion picture continuity. Production is divided into two learning experiences: 16mm (non-sync) format and digital video format. Students furnish film, tape and processing with equipment furnished by SoFA. **Credit 4**

School of Photographic Arts

Biomedical Photography

2061-201

Biomedical Photography I

The first of a three-quarter sequence of study in the fundamentals of photography, with emphasis on the development of strong photographic skills as they relate to the principles of camera optics, choosing and using perspective, lighting, and related aspects of digital photography. Principles of creativity, craftsmanship, applied photographic theory and visual communication and presentation will be used to support the foundation theme of using cameras as a tool used in problem solving for technical and visual communications. **Credit 5**

2061-202

Biomedical Photography I

The second course of a three-quarter sequence of study in the fundamentals of photography, with emphasis on the development of strong artificial lighting skills as they relate to working in the studio. Principles of creativity, craftsmanship, applied photographic theory and visual communication and presentation will be used to support the foundation theme of using 4x5 cameras. (2061-201) **Credit 5**

2061-203

Biomedical Photography I

The third course of a three-quarter sequence of study in the fundamentals of scientific photography, with emphasis on the development of enhanced skills as they relate to working as a scientific photographer. Principles of creativity, craftsmanship, and applied photographic theory as used in the presentation of subject matter relevant to the life sciences industry will be incorporated as part of the foundation for future biomedical photography experiences, where appropriate. (2061-202) **Credit 5**

2061-213

Survey of Biomedical Photo

Following graduation, there are a variety of career directions a BPC graduate might consider as a consequence of the diverse curriculum that has been completed. Survey of Biomedical Photography is one of the program's original courses dating back to 1969. Alumni from various industries are invited to campus and share their careers through an interactive lecture class required for all Biomedical majors. **Credit 1**

2061-276

Fundamentals of Science Photography I

This is a basic photography course for non-photography majors that places emphasis on theory, craftsmanship, and visual communication based in technical photography. Forensic, medical, biological, and other relevant subject matter will be incorporated into this foundation course. Students will explore camera operation and lens selection, depth of field relationships, exposure meters, choosing and using image processing, as well as the use of supplementary artificial light sources. (A strong interest in learning and applying technical approaches to making photographic images for science, forensics and other technical disciplines.) **Credit 4**

2061-301

Applications of Scientific Photo I

The first of a three-course sequence that emphasizes the photographic skills necessary in close-up photography that are used in scientific photo-documentation. Laboratory subjects such as contact lenses, rice grains and other small, challenging 'almost invisible objects' will be explored. Students will investigate lighting required to create new ways to reveal a subject's characteristics. Subjects will be photographed using polarized light and fluorescence techniques demonstrating what cannot easily be observed without photography. The course will also explore appropriate subject management strategies, as well as develop scientific methods to be used as imaging standards during the 10-week class. **Credit 4**

2061-302

Applications of Scientific Photo II

The second course in a series in which students are exposed to illumination and optical considerations required to operate and photograph using a light microscope. Producing Kohler illumination, controlling light in a microscope and following scientific method will be explored as core activities. The final project requires the production of a large educational poster featuring one microscope subject that has been researched and photographed using the microscope. (2061-301) **Credit 4**

2061-303

Applications of Scientific Photo III

The last course of a three-course sequence students investigate the electronic flash as a light source when applied to various situations found in life sciences community. Students are exposed to ophthalmic photography, surgical photography, dental photography, as well as location and public relations assignments. The class final project is a capstone assignment exploring concepts and techniques required in the design and production of instructional media. (2061-302) **Credit 4**

2061-311

Preparation of Biomedical Visuals I

The first course delivered over a two-quarter sequence that will study the basic principles required for the generation of effective visual communication specific to life sciences industry. The emphasis will be placed on choosing and using the correct technology for visuals including aspects of fundamental design required in such a dynamic delivery environment. Assignments have been designed to emphasize the appropriate techniques for producing visuals that exhibit effective design necessary for reproduction using either traditional mechanical or electronic methods. **Credit 3**

2061-313

Preparation of Biomedical Visuals III

This course will study the basic principles for the generation of effective desktop publishing specific to life sciences industry. The emphasis will be placed on choosing and using the correct technology for visuals, including aspects of fundamental design required for electronic publishing. Students will specifically be exposed to core principles required to produce electronic pieces including effective resumes, posters, brochures, and flyers. Assignments have been designed to emphasize the appropriate techniques for producing these visuals, which exhibit effective typography necessary for reproduction using electronic methods. (2061-311) **Credit 3**

2061-316

Digital Media in Biomedical Photography I

Electronic media has replaced traditional photography on many fronts in the life sciences industry. Digital Media in Biomedical Photography is a two-course sequence that explores all aspects of digital media from concept development through production of final product. The first course will examine significant issues found in electronic imaging activities driven by budget, hardware, software, and production issues. Students will execute practical assignments in the production of educational support materials found in a variety of digital media areas, including image capture, processing, hard copy output, and color management. **Credit 4**

2061-318

Digital Media in Biomedical Photography II

This is the continuation of a two-course sequence that explores digital media from concept development through production of final product. The course will examine significant issues found in electronic imaging activities driven by budget, hardware, software and production issues. Students will execute practical assignments in the production of educational support materials found in a wide variety of digital media areas including interactivity, online documents, digital posters, user interface design, web site production, basic two-dimensional animations, and speaker-support materials. **Credit 4**

2061-354

Basic Ophthalmic Photography

Investigates proper patient management and camera/photographic techniques in ophthalmic photography. Diagnostic evaluation of ocular anatomy and physiology utilizing special cameras is presented. (2061-301, 2061-302, 2061-303 or permission of instructor) **Credit 4**

2061-357

Principles and Technology of Photomacrography

A condensed course in photomacrography will examine equipment used and the technical considerations necessary in the photography of subjects 1:1 thru 20:1. Lighting, optics, camera technique and other considerations will be evaluated in the theory and practice. Students will be exposed to interesting problems and lighting equipment not found in other types of photographic work. Many assignments will explore using software to improve where DOF (depth of field) is impossible to achieve. (Completion of first year) **Credit 4**

2061-361

Web Design Using Photography

Photographers have always communicated visually. The accessibility of the World Wide Web creates a potential audience of millions. This course explores the nature of the World Wide Web, web sites and the process of designing, building, and maintaining these sites for business or other applications. Students will explore the use of images and media as they relate to the Web, including bandwidth and quality considerations. Interactivity, design, structure, viability and the successful delivery of ideas will be emphasized. Some quarters, this course is delivered through distance methodology and culminates in individual student websites as the course final project. **Credit 4**

2061-366

Surgical Photography

The role of photography in the digital era has transformed medical photography. With the new collaboration between RIT & RGH, students have a unique access to a hospital, surgical patients, and related medical procedures. Students who might take this course will be exposed to the issues and methods used in contemporary surgical photography. Students will be exposed to the fundamental photographic equipment and procedures used in operating rooms including proper file management in this era of HIPAA regulations. At the end of the course, students will have visited the surgery theater at least three times with the objective of making photographs. **Credit 1**

2061-401

Audio-Visual Production I

The field of information delivery has changed significantly. This course is designed to explore concepts and software required for the production of desktop multimedia. Students explore concepts of scriptwriting, and crafting educational objectives as well as the production of multimedia. **Credit 4**

2061-402, 403

Advanced Photography in Biomedical Communications

Sophisticated and creative applications of photography serving the needs of the scientific community. Students explore a variety of specialized photographic techniques and a variety of philosophies. Assignments are performed that are similar to those encountered in biomedical and research institutes. (2061-303, basic color course) **Credit 4**

2061-454

Intermediate Ophthalmic Photography

Intermediate Ophthalmic Photography goes beyond the shooting of retina fundus photographs or posterior segment photography and concentrates on interpretation of fluorescein angiography films and anterior segment photography. Students investigate external ocular photography, slit-lamp biomicrography, and common corneal anatomy and diseases. (2061-354) **Credit 4**

2061-455

Advanced Application in Ophthalmic Photography

Course provides students with clinical experience in ophthalmic photography. Students work off campus in an ophthalmology clinic performing stereo fundus photography, fluorescein angiography, specular biomicrography, slit-lamp biomicrography, and gonioscopy. The educational experience is balanced with the needs and tolerance of each patient involved, and represents an important clinical education necessary for diagnostic imaging. Students are responsible for their own transportation to and from the site. (2061-354 and permission of instructor) **Credit 4**

2061-463

Photography and the Microscope

This photomicrography course goes beyond the basics of imaging through a microscope. This course investigates optical enhancement techniques, video recording, motion stopping, as well as specimen preparation in various application and sample preparations. (2061-302 or 2076-412 or permission of instructor) **Credit 4**

2061-499

Biomedical Photography Co-op

Provides biomedical photographic communications students with on-the-job experience. The student seeks and acquires a school-approved co-op position in the health care industry. The working environment provides the forum for learning more about the student's chosen career. A final interview with the co-op coordinator assists the student in evaluating the experience. **Credit 0**

2061-501

Photography Concentration

Investigating, planning, organizing, and producing an audiovisual presentation, a learning package, or an informational program for a biomedical communications client. (Completion of Biomedical Photographic Communications AAS degree requirements, at least one upper-division photo elective in media, permission of instructor) **Credit 4**

2061-550, 551, 552, 553

Special Topics

A seminar approach offered on demand when adequate numbers of students and faculty desire to investigate specialized topics not normally offered in the regular curriculum. Available to upper-level students. **Credit variable 1-9**

Photographic Arts

2067-201

Photo Arts 1

The first quarter of the first-year program for the BFA in Photographic Arts presents an introduction to the standards of still imaging in the broad field of documentary, fine art, and photo illustration with a balanced emphasis on practical, technical, aesthetic, and intellectual skill sets. The student will gain general experience in digital photography through lectures, demonstrations, assignments, practice, readings, critiques, and research. The curriculum emphasizes craft, photographic vision, and visual problem solving using a digital SLR, light meters and digital darkroom processes for soft digital display. Visual design concepts along with historical and contemporary photographic images will be stressed. A DSLR is required. **Credit 5**

2067-202

Photo Arts 2

This course, the second quarter of the first-year for the BFA degree in Photographic Arts, will introduce students to a non-destructive digital workflow from capture to output. The course will cover digital file formats and the basic principles of imaging software and output. The photographic studio will be used as an environment to create controlled lighting. The curriculum will continue to emphasize both craft and visual problem solving as it applies to photography used as documentary, fine art, and photo illustration. (2067-201; corequisite 2076-212) **Credit 5**

2067-203

Photo Arts 3

The third quarter of the first-year program for the BFA in Photographic Arts will continue to explore digital processes. Students will continue to learn how to control and manipulate color and monochrome photographs using digital technology. Students will organize their images into an archive. Students will produce a final portfolio with attention to aesthetics, concept, and technique. (2067-201, 202; corequisite 2076-213) **Credit 5**

2067-221

Career Seminar

Career seminar has been designed to introduce second year students to the career fields represented by the Photographic Arts programs. The students will have the opportunity to meet with a variety of professionals representing specific career paths in the discipline, as well as selected faculty in the college. Students will research and discuss lifestyles and operations that are characteristic of a career in photography. This course is intended to assist the student in building a sound knowledge base required for effective career decisions. **Credit 1**

2067-256

Still Photo I

Students become familiar with the 35mm camera, processing, and printing. The work is restricted to black-and-white photography. The aesthetics and basic understanding of photographic practice are covered. This course is available for students who are not majoring in photography. **Credit 3**

2067-257

Still Photo II

A basic studio course for the enthusiast or someone who occasionally uses photography in his or her work. Ideas for portraiture are discussed and explored in a casual (rather than commercial) manner, both of one person and then of two people. The idea of self-portrait is also discussed and explored. (2067-256 or a working knowledge of developing film and making black-and-white enlargements) **Credit 3**

2067-258

Still Photo III

A course in which students determine their own theme of expression using black-and-white photographs. (2067-256, or working knowledge of developing film and making enlargements, and 2067-257, or permission of instructor) **Credit 3**

2067-263

Studio Light

A lighting workshop course that uses visual exercises to teach students how to evaluate light conditions outside, as well as control and reproduce those conditions in the studio. (2067-201, 202) **Credit 5**

2067-264

Introduction to Photography for Non-Photo Majors

An introduction to still photography—principles, methods, theory, and practice for non-photography majors. This course will familiarize the student with the basic skills of still photography. This is a non-darkroom course designed to introduce students to the operation of their camera, flash, and accessories; film selection and exposure variables; light, filters, and basic tone control. Photographic aesthetics/composition, history, contemporary artists, professional applications, and other nontechnical aspects of photography will be addressed through weekly lectures and critiques of photographic shooting assignments. Students are required to have their own adjustable camera and flash unit. Each student will provide his/her own film and processing. Non-photography majors only. **Credit 4**

- 2067-278** **The Spiritual and Mystical Image**
Guides the student toward a tangible perception of a higher self that is compatible with our established perceptions of ourselves as artists. Three major areas to be integrated are self, intellect and spirit. Emphasis on realist and contemporary possibilities and self-discovery through imagination. **Credit 5**
- 2067-301** **Elements of Advertising Photography**
This course will give students an introduction to the field of commercial assignment photography. Students will create images from assignments that relate to projects they will experience after graduation. Portraiture and still life photography will be covered both in the studio and on location. Effective lighting (studio and location) and digital workflow practices will be addressed. Students will also learn about career choices available in the commercial photography area (2067-201, 2067-202 and 2067-203) **Credit 5**
- 2067-302** **Elements of Fine Art Photography**
This course will offer students a preface to the discipline of fine art photography. Conceptually driven projects will be investigated through a variety of photographic techniques; reading, writing, and discussion about the intent and meaning of photographic imagery will be emphasized. Traditional analog photography as an artistic choice and practice will be introduced. Analog to digital workflow procedures will also be explored. The goal of this course is to establish conceptual, aesthetic and technical strategies for the production of photographic artwork. (2067-201, 2067-202 and 2067-203) **Credit 5**
- 2067-303** **Elements of Photojournalism**
This course is an introduction to visual storytelling. Students will be provided a brief history of the field of photojournalism as well as study the field's career options. Lectures, critiques, demonstrations and assignments will provide participants the opportunity to explore the still, audio, video, and multimedia aspects of storytelling. Students will be expected to meet project deadlines and participate in class discussions and critiques. This course is designed to give students the foundation needed to make an informed decision about the evolving field of visual journalism. (2067-201, 2067-202 and 2067-203) **Credit 5**
- 2067-306, 307, 308** **History and Aesthetics of Photography**
Series of courses that cover the history and aesthetics of photography from 1800 to the present, with special emphasis on the development of photographic seeing and its related effect on other media. A survey of the numerous processes and how their development affected the image making of particular periods, i.e., daguerreotypes, collotypes, ambrotypes, etc. Visual lectures also cover topics from surrealism and documentary to conceptual art and post-modernism. **Credit 3**
- 2067-312** **Narrative and Documentary I**
This course will address historical, social, political, and ethical issues as they relate to documentary photography. Within its history, documentary photography has been seen as personal artistic expression, a form of anthropological research, a tool for social change and even propaganda. Documentary photography is also frequently newsworthy, and selected images from more extensive projects have become a part of daily editorial and press coverage. While studying forms, structures and the nature of documentary work, students will complete an in-depth project of sufficient substance to require the application and consideration of these issues. (restricted to 3rd and 4th year Photojournalism majors) **Credit 4**
- 2067-313** **NYC Photojournalism Trip**
This course provides students the unique opportunity to participate in a one-week intensive workshop that travels to New York City, the center of the photojournalism business in the US. The purpose of the trip is to provide a broad view of documentary and editorial photography in the industry and give students an idea of the wide variety of potential job markets that exist for documentary/editorial work. Students will meet with a variety of photographers, art directors, designers, photo editors, photographer agents, including RIT alumni, while visiting print and online publications (magazines and newspapers), photo agencies, photography studios, galleries, and museums. A special course fee will be assessed. (2067-401) **Credit 2**
- 2067-326** **Constructed Image**
This course will introduce students to the concept, theory, and practice of constructed imagery within the context of contemporary photography. Image making will be explored from creating interventions within the landscape to the manipulation of space in and out of studio spaces as a method of creating photographs. Participants will be introduced to the history of constructed imagery and the impact this working methodology has towards the contemporary dialog in photography. (2067-301, 2067-302 and 2067-303) **Credit 4**
- 2067-363** **The Zone System and Fine Print**
A one-quarter introduction to the fundamentals of the Zone System and fine print, using black-and-white photography. Purpose, technique, and aesthetics of the system and printing are the content of the course. Emphasis is on large-format technique. (2067-201, 2067-202 and 2067-203) **Credit 5**
- 2067-364** **Art Direction and Copy I**
A study of art direction and copywriting with emphasis on conceptual thinking as it applies to the photographic image. Some emphasis is placed on basic hand skills, i.e layout, type rendering and paste up. Marketing principles and career possibilities are covered. (Photo student or permission of instructor) **Credit 5**
- 2067-371** **Digital Imaging Artists**
This course is intended for fine art students and others whose primary interest is in digital picture making within the art historical/contemporary art context. Lectures and hands-on activities will permit each student to improve their skills and develop their ideaation as digital artists/image makers. Demonstrations will facilitate learning software techniques and systems of art making. Labs will provide one-on-one assistance with technical problems. Visual lectures will introduce contemporary and historic work by artists that is relevant to today's picture makers. **Credit 4**
- 2067-372** **Avant-garde and Creative Process**
This course will explore the myth that the artist is a precursor, a seer, and that significant work is art that prepares for the future. Students will study how the major political movements of the 20th century—capitalism, democracy, communism, and fascism—have given rise to the concept of subversive innovation among the avant-garde in Europe and America. The course will explore the role photography plays in such avant-garde movements as Dada, surrealism, futurism, photorealism, pop art, conceptual art, and abstract expressionism. **Credit 3**
- 2067-376** **Digital Diary**
A creative exploration of the possibilities of digital imaging in making a visual account of personal experience. Assignments will focus on a variety of ways to photograph, record, document, and illustrate everyday life. Strategies for editing, sequencing, reproducing, and displaying digital images will be examined. Students will considerably expand their knowledge of image manipulation software and employ various methods of soft display and printed output. (2067-301, 2067-302 and 2067-303) **Credit 4**
- 2067-382** **Fashion Photography**
This course will provide students with an introduction to fashion photography and look at fashion from a broad imaging perspective. There will be instruction on lighting, styling, and directing a fashion image, as well as developing concepts for photo shoots. Casting, studio and location practices, and ethics will be discussed. The history of fashion and photography will be addressed. Retouching for fashion photographs will be demonstrated. (2067-301, 2067-302 and 2067-303) **Credit 5**
- 2067-388** **Picture Editing and Layout**
Image selection, usage and design for the printed page. Using images from sources other than your own photographs, we discuss picture selection relative to context and desired impact and how to effectively design the page(s) upon which the image(s) exist(s). Techniques such as scaling, proportion and sizing are related to page design. Typography and its function with photos, including captions and block text is discussed. Students lay out a number of assignments from single pages to essays of varying length. A variety of picture sources is used. A student need not use his or her photos in this course. (Second-, third-, or fourth-year status) **Credit 5**
- 2067-390** **Underwater Digital Photography**
This course is designed to prepare students to photograph assignments in an underwater environment. To accomplish this, students will complete basic scuba diving training and achieve a PADI scuba diving certification. The student will become familiar with basic shooting techniques, underwater photography camera housings, accessories, and equipment care and maintenance. There is a facility fee of \$750 that covers equipments, off campus facilities and insurance. (2067-203 or equivalent) **Credit 3**
- 2067-401** **Photojournalism Portfolio**
This course explores career options, assesses individual skills and temperament, and establishes initial and long-term career goals for each student. Students then develop portfolios with an emphasis on their established goals. Issues in new media and forms of presentation are addressed, as well as building a professional life beyond the entry-level job. Job research, resume development, preparation, application and interviewing skills are incorporated into an examination of the changes in media publications and their use of photographers and photographic images. (2067-302 or equivalent) **Credit 5**

- 2067-402 Photojournalism I: Editorial on Location**
This course is about photographing editorial assignments on location. The assignments will have special technical controls required to strengthen the student's skills of photographing people on location. Particular emphasis will be placed on the control of color and lighting. The editorial assignments are designed to be appropriate for major mass-market general news and special-interest consumer publications. In addition, it is expected that these assignments would satisfy the requirements of many of the major picture agencies, both in the USA and foreign markets. (2067-302 or equivalent) **Credit 5**
- 2067-403 Photojournalism I: Photography for News**
This is a course about photojournalism with specific emphasis on photography for a daily metropolitan newspaper. Students will be required to photograph according to newspaper standards and needs on a weekly basis. This photography will include spot news, general news, features, sports, editorial portraits, and photo essays. Aspects of journalism such as story ideas, research and visual execution will be addressed. Students will be required to write captions for all photographs and generate text to support photo essays. The legal and ethical issues of photojournalism will be researched. (2067-402 or equivalent) **Credit 5**
- 2067-406, 407, 408 Photo as a Fine Art I**
The major emphasis is on the individual's learning to identify and articulate a personal response to his or her environment through the medium of photography. Students design their own projects and work under the guidance of the professor. Digital analog silver mixed media and non-silver photographic techniques may be utilized. Weekly critiques are a focus activity of each course. **Credit 4**
- 2067-411, 412 Advertising Photography I**
A course in visual problem solving with photography. Studio and other controlled environments are stressed. Advertising and editorial solutions and applications are explored. The skills involved with both product rendering and concept illustration are covered. (Photo Arts 1 through 6) **Credit 5**
- 2067-416, 417, 418 Contemporary Issues**
Contemporary Issues courses vary in content as devised by the instructor. Previous offerings have dealt with many thought provoking/controversial issues in photography, from 1950 to the present, through a series of lectures, readings, and discussions. Topics covered include post-modernism, genderism, pornography, censorship, altered images, and connoisseurship. The course format allows review and exploration of such themes as the landscape, the nude, portraiture, conceptual art, trompe l'oeil, and so on. Students prepare visual work, an oral debate or a written term paper. **Credit 4**
- 2067-421 Ethics and Law**
This course introduces students to principles and theories of ethics and their application to editorial photography and photojournalism for mass communications. It establishes a basic understanding of philosophical ethics, social responsibility, and professional practices within the protections and responsibilities of the First Amendment. The course will also review the legal issues relating to photographic practice and access to subjects. The course examines a wide range of case examples for discussion and analysis to build a foundation for professional practice. (2067-303) **Credit 4**
- 2067-426 Multimedia for Photojournalism I**
This course teaches students how to tell stories in the digital world. Students will learn the skills necessary to gather and edit audio and how to combine audio, images, and text for compelling online storytelling. In addition to basic technical skills, the course will explore contemporary concepts for effective multimedia storytelling. (2067-401) **Credit 5**
- 2067-432 Multimedia For Photojournalism II**
This course provides students with advanced multimedia techniques and introduces photographers to storytelling and reporting using still cameras with video and sound capture features. Students will research and produce multimedia work in class. (2067-426) **Credit 5**
- 2067-415 On Location Photography**
Covers the techniques and equipment necessary to complete an on location assignment for a corporate report, brochure or audiovisual presentation. Students are encouraged to meet professional standards while developing a strong personal point of view. (Photo Arts 1 through 6) **Credit 5**
- 2067-456 Retouch and Restore**
This course will explore the techniques, tools, practices, and workflows used in image restoration and retouching. We will begin with historical images to practice basic retouching and restoration techniques. We will then apply these skills to contemporary images and discuss the importance of the collaborative role of the image maker and the re-toucher. One of the primary goals is to help students craft a personal or signature imaging style. (2067-301, 2067-302 and 2067-303) **Credit 4**
- 2067-458 Food**
Instruction covers basic means and methods of preparing a food photograph: shopping for the proper ingredients; consultation and working with prop and food stylists/chefs/home economists; how the approach to a food photograph differs from other photographic assignments. Students learn the basic methods of preparing food for photography, as opposed to food for eating. Assignments range from simple raw-ingredient shots to pour shots to building a sandwich to making a salad. (Third- or fourth-year status) **Credit 5**
- 2067-461 Editorial Photography**
This editorial photography course is an investigation into images that are created to illustrate magazine articles. Students will have the option of working with still life, people, location, documentary, and/or fashion photography. Current events will be discussed for "picture possibilities." The majority of the assignments will be done in collaboration with students in the Graphic Design Department. Historical and contemporary studies of layout and style will be examined. (2067-412) **Credit 5**
- 2067-464 Contemporary Portrait Photography**
Brings together the skills of the first two years of photographic study and encourages the student to develop a personal approach to portrait photography through a quarter-long, self-directed project. **Credit 4**
- 2067-465 XI-summer Advertising Core**
A five-week intensive summer course that allows students to work for extended periods of time in the studio on projects that are self-generated but deal with subjects/topics related to advertising, editorial, and fine-art photography. Students are granted the conditional use of their own personal studio for the duration of this course. Marketing techniques and analyzing student portfolios are integral to the course. (2067-302 or permission of instructor) **Credit 6**
- 2067-466 Lighting: Manipulation and Controls**
This course deals with the control and manipulation of light. We will light people, locations, and things in ways that will bring out and enhance our photographic intentions, whether for advertising, editorial or problems of personal expression. In-depth studio demonstrations will be a particular feature of this course. (2067-301, 2067-302 and 2067-303) **Credit 5**
- 2067-467 Digital Photo Workshop**
This workshop is a creative exploration of the basics of the hybrid technology between traditional film based photography and digital imaging. Students will use film as well as digital cameras for image capture, gain knowledge of proper Color Management techniques, considerably expand their knowledge of image editing software, and employ various methods of soft display and printed output. (2067-301, 2067-302 and 2067-303) **Credit 4**
- 2067-469 Environmental Portraiture**
A course involving the selection of various persons as subjects and learning of their skills and specialties. The student interviews subjects, defines what they do and where they do it, and designs a photograph that shows the viewer the subject's job or avocation and the environment in which the subject operates. (Upper-level photography major) **Credit 5**
- 2067-471 Advertising and Design Photography**
This course teams photographers and graphic designers in the production of advertising layouts/campaigns, posters and brochures. Students have the option of working with still life, people, location, and/or fashion photography. Current advertising campaigns will be discussed and analyzed. Emphasis will be on producing multiple or sequential images. Historical and contemporary studies of layout and style will be examined. (Advertising photography major or permission of instructor) **Credit 5**

2067-472 **Art and Censorship**
Students will analyze and debate the art and issues propelling censorship in the arts, beginning with the 1989 cancellation of the Mapplethorpe show by the Corcoran Gallery and continuing through the present debates. Students will view and discuss the artworks of this period as well as historic art, ideas, and events that have generated censorial conflict. Students will investigate censorship in terms of the underlying, opposing social values that define American culture. (Third- or fourth-year status) **Credit 4**

2067-473 **Portfolio Development**
Designed for third- and fourth-year students who are ready to present themselves and their work to potential employers. Weekly assignments move students closer to their stated goals. To begin this course, students must be able to answer two career-related questions: What is it they wish to do, and where do they wish to do it? **Credit 5**

2067-476 **Media and Art Principled Position**
Students will investigate the development of time-based media art and its evolution from photography, sculpture, dance, performance, and writing. Students will explore work of significant contemporary and historic artists through the Media Café collection. They will research the various strategies artists developed through the '60s to the present as this new perceptual tool helped create significant social change. At the end of the quarter, students will present portions of their research, papers, and selections from the collection in the Media Café during the final week of class. (Third-or fourth-year status) **Credit 4**

2067-477 **New York City Advertising Field Trip**
This course will provide advertising photography students the unique opportunity to participate in a one-week intensive workshop that travels to New York City, the center of the advertising photography industry. Through this field trip and accompanying lectures and studio visits, students will experience an introduction to the field of professional photography and related industries in New York City. The purpose of the trip is to provide a broad view of advertising and editorial photography within the city. Students meet with a variety of photographers, art directors, designers, filmmakers, photo editors, photographer agents, assistants, and RIT alumni. Photography studios, advertising agencies, design-studios, magazines, galleries, and museums will be visited during the one-week field trip. (2067-411) **Credit 2**

2067-478 **Architectural Photography**
An image-making course for advanced students with a specific interest in architectural exterior and interior photography. Assignments are designed to emphasize the development and exploration of professional techniques and styles. (Completion of second-year courses or permission of instructor) **Credit 4**

2067-483 **Introduction to Fashion Photography**
This course provides advertising students with basic experience in fashion photography. Students will be taught the concepts, aesthetics, and processes of fashion work, casting and directing the model, studio and location shooting, ethics (especially with regard to women's issues). Digital imaging, including both capture and postproduction, will form an integral part of the course. (2067-302) **Credit 5**

2067-485 **Moving Media I**
Students taking this tools course will work with still photographs, electronic images, video footage, and camera recorded sound to create new work that merges the disciplines of photography and video. Students will use media software to produce work that weaves photography and video into electronic canvases. Students will explore nontraditional narratives, conceptual constructions, and performance. They will work with traditional photography processes, electronic media, and projection equipment to create and display their projects. Each student will produce a final project for public presentation in the Media Café during the final week of class. (Photo Arts 1 through 6) **Credit 5**

2067-486 **Moving Media 2**
Moving Media 2 follows Moving Media 1. Students work with electronically produced imagery to develop advanced technical skills. Students bring their intellectual studies into practice with a mastery of complex editing techniques and the introduction to sound recording and sound editing techniques. Students work on assignments and self generated projects. Students view contemporary work and they analyze the various strategies artists use to convey their values and ideas. Each student will produce a final project for public presentation in the Media Café during the final week of class. The work of each student will be stored in the Media Café collection at Wallace Library. (2067-485) **Credit 5**

2067-487 **Moving Media 3**
Students taking this seminar course will continue their work within still photographs, electronic images, and video footage to create new work that moves across the disciplines of photography and video. The course emphasizes the preparation and manipulation of media to materialize the students' growing understanding of the significance of electronic art in the information era. Students will design and produce quarter long projects. They will work with installation and non-traditional exhibition environments. Students taking this course will analyze and interpret the work of contemporary artists. They will develop a meaningful practice of critique and evaluation as they develop a body of research and writing that supports their critical, analytical and interpretive skills. (2067-485) **Credit 4**

2067-488 **People Illustration/Studio**
Advanced study of people photography focusing on the development of the photographic and social skills of the studio photographer. Learning to orchestrate the tangible and emotional studio environments is a major goal of the course. Studio lighting, camera techniques, and the selection and direction of models are the subjects of lectures, demonstrations and assignments. Many of the course assignments are open-ended, which gives the student freedom to generate independent projects. (2067-411, 2067-412 or permission of instructor) **Credit 5**

2067-493 **Problems and Projects/Still Life**
The still life as a medium for creative expression and visual experimentation is examined. The tools and techniques particular to the still life photographer are investigated and demonstrated. The special manipulations possible—choice of lighting, perspective, camera angle, surface propping, set rigging, multiple exposure, front projection and other esoteric techniques—are discussed, demonstrated and applied to assignments. Projects are in a practical vein, relating to actual typical problems that are the daily routine of a working studio. Assignments investigate the overlapping relationships of fine art, editorial and commercial still-life photography. Large- and small-format cameras may be used; assignments are produced both in and out of the studio. **Credit 5**

2067-496 **Photographing People**
An advanced study of people photography, this course will focus on the development of the photographic and social skills of the commercial photographer. This course will examine the effects of light, camera choice, and subject pose on reproducing the human form as a photograph. The student will learn to develop strategies for photographing people, build upon lighting skills, and improve photographic styling techniques. Casting and directing models, as well as the role of a professional photographic team will be included in the lectures, demonstrations, and assignments.(2067-301, 2067-302, and 2067-303) **Credit 5**

2067-497 **Visual Media Career Research**
This course will introduce students to the practical methods for researching possible careers and opportunities after graduation. Using Internet and library research, students will identify a career field that might interest them. Further investigations will focus on the realities of working in that environment so that further decisions can be made leading to that career. This course is required for all 3rd year Visual Media majors. (2067-203) **Credit 2**

2067-506 **Photo as a Fine Art II**
Emphasis is placed on a student setting goals, selecting themes and projects, and expansion of work on their own aesthetic terms. Lectures and experiences are oriented to encourage awareness of shared concepts in the other arts, goals set by working artists, and the relevance of the history of the visual arts to the student's work. Weekly critiques are a focused activity of each course. (2067-408) **Credit 4**

2067-512 **Visual Media Capstone**
Students will submit a proposal for a major project incorporating their visual media focus as well as photography. Faculty from two disciplines will sponsor the research and development of the final project. This activity will be a demonstration of students' capabilities in their chosen areas of study. The project will be designed, developed and completed during the quarter. Completed projects will constitute a substantial portfolio piece. (12 credits of Visual Media Focus required) **Credit 4**

2067-521 **Narrative and Documentary II**
This course will introduce students to the practical methods for researching possible careers and opportunities after graduation. Using Internet and library research, students will identify a career field that might interest them. Further investigations will focus on the realities of working in that environment so that further decisions can be made leading to that career. (2067-312) **Credit 4**

2067-531 **D.C. Photojournalism Trip**
This course provides photography students the unique opportunity to participate in a one-week intensive workshop that travels to Washington, D.C., the center of the photojournalism business outside of New York City. The purpose of the trip is to provide a broad view of documentary and editorial photography in the industry and give students an idea of the wide variety of potential job markets that exist for documentary/editorial work. Students will meet with a variety of photographers, photo editors, and designers, including RIT alumni, while visiting print and online publications (magazines and newspapers), governmental agencies, photo agencies, photography studios, galleries, and museums. A special course fee will be assessed. (2067-501 or 2067-388) **Credit 2**

2067-550, 551, 552, 553 **Special Topics**
Advanced topics of current or special interest, varying from quarter to quarter, selected from the varied field of professional photographic instruction. Special topics announced in advance. (Not offered every quarter. Consult coordinator of the professional photographic illustration program.) **Credit variable**

2067-554 **Advanced Digital Photography**
This lecture and laboratory course gives the advanced student of electronic photography an in-depth look at the tools and techniques of electronic imaging systems. Students pursue research projects in either the visual communications or technical aspects of electronic photography. Each student's final project is self-defined. (2067-475 or permission of instructor) **Credit 4**

2067-555 **Gallery Management**
A basic, hands-on course in art gallery operation, to include gallery management, lighting, planning, publicity, and aesthetics. Course work is done with actual shows in the SPAS photo gallery and other local galleries where appropriate. **Credit 3**

2067-566, 567, 568 **Photo Media Workshop**
Photo Media Workshop emphasizes visual problem solving utilizing alternative (non-silver) photographic processes. The first quarter features work with emulsions on various surfaces, the second deals with visual books, and the third quarter covers generative systems, including electrostatic, offset printing and other methods of altering images. The series is best when taken in order, but students may join in at any quarter. (Third- or fourth-year status) **Credit 4**

2067-575 **Archival Photographics**
An introductory course surveying current findings in photographic conservation with an emphasis on acquiring and applying skills for archival processing, presentation, transportation and storage of photographic images. Laboratory sessions include research visits and field trips. **Credit 4**

2067-576, 577, 578 **Color Photo Workshop**
Emphasis is on the creative and aesthetic aspects of color photography and other color imaging systems. Students are provided with an opportunity to explore the variety of ways in which color photographs can be produced, reproduced, sequenced, displayed, and preserved. A personal portfolio of work presented as color prints, color transparencies, a digital presentation, and an exhibition, or as an art book, is required for each quarter. (Third- of fourth-year status) **Credit 4**

2067-582 **Production Photography**
Production Photography is the storytelling side of professional illustration. Assignments for the course will include recreating historical events, inventing futuristic scenes, creating believable period pieces—all with an emphasis on narrative illustrations. The course introduces the skills, concepts, and preparation required to shoot still life and model photography in the studio and on location. Students work as production teams to simulate the professional production environment. (2067-411, 2067-412 or permission of instructor) **Credit 5**

Imaging and Photographic Technology

2076-200 **Photography I**
An intensive 10-week summer course for students entering the transfer programs in biomedical photographic communications and photographic technology. This is the minimum photographic education needed to gain entry to second-year standing and replaces 2061-201, 202, 203 and 2076-201, 202, 203. Since this course is such an intensive offering, previous photographic experience is highly advisable. **Credit 12**

2076-201, 202, 203 **Photography I**
An intensive three-quarter sequence concentrating on the fundamentals of black-and-white and color photography. The application of digital cameras in various formats is at the core of this course. It includes project based topics such as portrait, architectural and product photography intended for corporate use. Professionally equipped upper-class studios are used all three quarters. Principles of creativity, craftsmanship, visual communication, presentation, preproduction planning and postproduction analysis are taught. Concepts learned in Materials and Processes of Photography are put to practical application in this class. **Credit 4**

2076-210 **Materials and Processes of Photography**
An intensive 10-week summer course for students entering a transfer program in biomedical photographic communications or imaging and photographic technology. Replaces 2076-211, 212, 213. (Either this course or the 2076-211, 212, 213 sequence is also a requirement in the professional photographic illustration program.) **Credit 6**

2076-211, 212, 213 **Materials and Processes of Photography**
Basic study of the technology of photography, with emphasis on applications to real world photographic problems. Among the topics studied are lenses, image formation and evaluation, perspective, light sources, light-sensitive materials, exposure, film processing, digital systems and post-processing, tone reproduction, digital workflows, color theory, color management, variability, quality control and photographic effects. **Credit 3**

2076-301 **Photographic Sensitometry**
This is a course about quantitative photographic image quality. The photographic imaging system, from light source to output, will be investigated, component-by-component, for the effects each has on system image quality. Students will characterize the image quality of various photographic components, such as exposure, film, paper and processing. Input-output relationships for each component subsystem will be investigated. Component responses will be collectively used to determine system image quality (based on tone reproduction). Related topics, radiometry, photometry and color sensitometry will also be covered. (2076-201, 2076-202, 2076-203; 2076-211, 2076-212, 2076-213) **Credit 4**

2076-302 **Photographic Chemistry**
Provides both a fundamental and advanced treatment of the photographic process at the molecular level. Light-sensitive emulsion chemistry and formulation, latent image theory and the associated dynamic processes, as well as developer formulation and mechanisms of chemical action, will be treated. Extension and comparisons to solid state and digital imaging processes and materials are investigated. An intensive laboratory component will emphasize application of concepts covered in lectures. (2076-211, 2076-212, 2076-213) **Credit 4**

2076-303 **Photographic Optics**
Provides both fundamental and advanced treatment of the optical processes related to image formation. Particular emphasis is on an understanding of what light is and how it interacts with matter, how lenses form images, discussions of common optical systems, and factors that affect image sharpness. This course also covers wave optics, interference, diffraction, and role that diffraction plays in digital image processing. An intensive laboratory component will emphasize applications of classroom concepts. (2076-211, 2076-212, 2076-213; 1016-204; 1017-211, 1017-212, 1017-271, 1017-272) **Credit 4**

2076-311 **Color Photo Design**
Exploration of color images through the application of visual elements principles and attributes, including the key and quality of light in the making of photographs. Color contrast and rendition, and comparison of rendition with different photo materials. **Credit 4**

2076-312 **Color Printing Theory**
Introduction to color theory and the exploration of color processes utilizing practical laboratory procedures and photographic color reproduction processes. Supports lectures and readings on applied color theory relating to both color photography and its applications. Important topics, in addition to color materials and processes, include color vision, psychological aspects of color, color terminology, and color measurement and specification. **Credit 4**

2076-313 **Color Measurement**
Equipment and methods used for the measurement of color are discussed and demonstrated in the laboratory. Topics covered include light sources, radiometry, spectrophotometry, color order systems, color difference formulas and reproduction of color. **Credit 4**

2076-363 Historical Photographic Processes
Historical Photographic Processes provides a fundamental treatment of the early photographic processes at the molecular level. Chemical concepts of equilibrium, reactivity and kinetics within photographic systems will be examined. Light-sensitive chemistry and formulations, as well as processing chemicals formulations and mechanisms of chemical action, will be treated. An intensive laboratory and darkroom component will emphasize application of concepts covered in lectures and allow students to explore contact printing using Silver Halide, Cyanotype, Van Dyke, and other early and recently-revived historical and alternative processes. (Third year SPAS major) **Credit 4**

2076-401 Systems Design for Graphic Presentation
This is a foundation course in photographic imaging systems. The fundamental imaging concepts and technologies surrounding system components such as sensors, cameras, scanners, displays and printers are presented. Image processing pipelines from capture to output are discussed. These components are then collectively presented in the context of an imaging system. Image quality metrics such as OECF, MTF and color fidelity will be introduced. Presentations and lab reports are required. Students are required to read scientific papers and literature as assigned. **Credit 3**

2076-411 Imaging Systems
This course is a foundation course for a three-quarter course sequence. Fundamental language of digital imaging technology will be introduced. The content will focus on the technology and business issues surrounding imaging systems. The workings of cameras, scanners, image processing software, displays and printers are presented. Students will also gain experience in the operations issues associated with an imaging services laboratory. Book layout and design are introduced and the students will be required to generate a book explaining the workings of the various components of an imaging system. Presentations and lab reports are required. Students are required to read technical literature as assigned. (2076-213) **Credit 4**

2076-412 Color Management for Photographers
This is an introductory course in color management, presented from a photographer's perspective. Basic color science concepts are presented. Students will learn about and use color instrumentation such as spectro-radiometers, spectro-photometers as well as a variety of color management software. Students will characterize (profile) devices such as cameras, monitors and printers. This course also provides opportunities for the students to study the issues and practice the approaches related to the accurate reproduction of images from "scene" to output. Digital cameras and high end scanning backs as well as output devices such as large-format printers will be characterized in this course and an "optimum color management workflow" will be developed from a photographer's perspective. A basic knowledge of digital cameras and Adobe Photoshop is assumed in this course. (2076-411 or equivalent) **Credit 4**

2076-413 Imaging Workflows
This course provides an opportunity for students to study, investigate and propose solutions to problems encountered in various imaging applications. Different scenarios and business models ("case studies") are used to illustrate the imaging challenges that photographers and printers face when outputting their images. We will observe and analyze the operations of professional labs and by utilizing analytical and problem-solving skills, students will be required to propose optimum solutions to their challenges. Team projects are required. Students work to reproduce image collections in the form of a high quality published book on digital presses such as the HP Indigo. (2076-412) **Credit 4**

2076-461, 462, 463 Photographic Instrumentation Seminar
The student is exposed to a variety of technical, industrial and/or applied photographic experiences in order to gain a fuller understanding of the scope of photography and its applications. Simplified approaches to photographic instrumentation applications are emphasized. Photographic topics that emphasize scientific and technical applications, where photography functions as a tool of measurement and visualization of events that are beyond the range of normal photographic equipment are discussed. **Credit 4**

2076-471, 472, 473 Nature Photography
Students learn the fundamentals of professional nature photography as exhibited by such magazines as Audubon and National Wildlife. Topics include selection and care of equipment, use of strobes, adapting to adverse weather conditions, sales of photographs, copyright law, free lancing and more. Students are required to spend several hours each week shooting in natural environments. (2076-201, 2076-202, 2076-203 or permission of instructor) **Credit 4**

2076-487 Special Effects Photography
A course for practicing photographers and students in which photographic effects beyond those encountered in everyday situations in illustrative, commercial and advertising photography are discussed and practiced. Among the topics covered are stroboscopic, peripheral, scanning, high-speed flash, matte box and combination flash/tungsten photographic techniques. (For upper-division SPAS students) **Credit 4**

2076-491 Introduction to Digital Imaging
Exploration of the technology, theory, and application of digital image processing techniques, particularly in relation to photographic processes. Fundamental image processing algorithms are presented. Applications such as noise removal, histogram manipulations, contrast enhancement, edge sharpening and smoothing are included. Fundamental binary math and complex numbers will be taught. Fourier transforms are introduced and Fourier filtering and image convolution algorithms will be taught. This is a programming course. Students will be required to complete weekly programming assignments in programming languages such as IDL or MATLAB which are also taught as part of this course. (2076-213, 2076-401) **Credit 4**

2076-492 Electronic Sensitometry
This is a course about electronic image quality. The student will work with and characterize the image quality for various electronic I/O devices such as scanners, electronic cameras, printers and other display devices. The electronic imaging system, from light source to output, will be investigated, component-by-component, to discover the effect each component has on total system image quality. Input-output relationships for each component subsystem will be investigated, and the component responses will be collectively used to determine system image quality. (2076-211, 2076-212, 2076-213, 2076-491) **Credit 4**

2076-499 Imaging and Photographic Technology Co-op
Provides students with on-the-job experience in the field of imaging and photographic technology. The student seeks and acquires a school approved co-op position in business or industry. The working environment provides the forum for learning more about the student's chosen career. A final interview with the co-op coordinator assists the student in evaluating the experience. **Credit 0**

2076-501 Introduction to Research
Prepares students for their senior research project. Covers basic research methods, including experimental design, unobtrusive evaluation and selection of an appropriate statistical treatment for the research to be conducted. Chi-square, two-tailed t-test, linear regression and nonparametric statistics are taught as pertinent evaluation tools. (Senior status or permission of department chair) **Credit 3**

2076-503 Non-conventional Imaging Systems
A survey of imaging methods and imaging systems not normally encountered in other technical photography courses, including UV, IR, 3D, holography, electrophotography, X-ray and non-silver applications. (Upper-level photo technology majors or by permission of instructor) **Credit 3**

2076-511 High-speed/Time Lapse
The theory and practice of photographic systems designed to permit analysis of events of very short or extended duration. Included are operational characteristics of time-lapse cameras, sequencing and timing control devices, time magnification relationships. Also, characteristics of intermittent and rotating prism cameras, rotating mirror and drum cameras, synchronization system and timing controls and high-speed flash and spark gap systems. Students gain experience not only in the use of the basic equipment but also in proper planning, setup and data reduction techniques through a series of practical experiments. (Upper-level photo technology majors or by permission of instructor) **Credit 3**

2076-550, 551, 552, 553 Special Topics
A seminar approach offered on demand when adequate numbers of students and a faculty member agree to study a subject not normally offered. Available to upper-level students. **Credit variable 1-9**

2076-572 Scanning Electron Microscopy
A proficiency-oriented course designed to train students to operate and take photographs with a scanning electron microscope (SEM). Emphasis is on understanding and optimization of the instrumental and photographic parameters associated with the SEM. (2076-211, 2076-212, 2076-213, and 2076-303 or 2061-403 or permission of instructor) **Credit 4**

School of Print Media

Media Arts and Technology

2081-359

Bookbinding

The introduction of digital printing processes has created the need to bind single or small quantities of printed products. This course is an introduction to the many different binding options ranging from saddle-stitched pamphlets to hardcover books, as well as the wide range of materials available. Contemporary procedures of finishing on demand publications are part of this course. Students are encouraged to bring with them some personal projects for binding. No prerequisites are required; however, good manual dexterity is desired. **Credit 3**

2081-367

Lithographic Process I

This course provides detailed fundamentals of the equipment and materials that are used in the lithographic process. Topics include press, the image carrier and its chemistry, inks and paper, and process control. **Credit 3**

2081-386

Gravure Process

This course analyzes the infrastructure as well as the print production workflows in the gravure printing industry. Students will study the business of gravure for publication, packaging and special product applications. In addition to learning the gravure process and technology, students will meet and interact with gravure industry professionals during RIT Gravure Day and may take an extensive industry field trip to visit cylinder engravers and gravure printers. (2082-371 or 2083-346) **Credit 3**

2081-409

Image Processing Workflow

This course concentrates on the image processing variables and techniques required for producing high-quality color reproductions for a variety of output technologies. Emphasis will be placed on optimizing both image quality and workflow efficiencies from digital capture to final output. Topics include file formats, image processing strategies, color conversion, and effective proofing techniques. (2083-206) **Credit 3**

2081-454

Print Finishing Management

Planning for successful print finishing requires in-depth knowledge of production phases from design through prepress planning, press, bindery and distribution. Emphasizes cost-effective planning and management, based in part on an awareness of the mechanical limitations involved in print production and in a contemporary print finishing environment. **Credit 3**

2081-458

Ink Chemistry and Formulation

This course exposes the student to the historical, scientific, and technical aspects of ink discovery and formulation. Students will learn how inks were developed dating back to the Middle Eastern/Asian cultures, at the dawn of civilization to the present. Students will also synthesize and formulate those inks and test their properties. Analysis methods for modern inks will also be introduced; and students will conduct experiments using those methods. (2083-346 and 1011-215, 1011-271, or equivalent general chemistry knowledge) **Credit 3**

2081-467

Lithographic Process II

This is an advanced course in web offset. There is an emphasis on process color printing and on solving problems involving advanced press and process variables that impact quality and productivity. Lithographic process problem solving skills are developed using multicolor presses. (2081-367) **Credit 3**

2081-577

Printing Process Control

Test targets are tools used in optimizing and calibrating various components in a color reproduction system. This course will integrate many technical disciplines (e.g., metrology, statistics, process control) to make a color imaging system repeatable and predictable. Emphasis will be placed on selecting test targets in conjunction with color measurement tools for evaluation of device-level and system-level performance. (2082-407 or 2083-346 or instructor's approval) **Credit 4**

2082-303

Professional and Technical Writing

This course prepares students to engage in a variety of written and oral communications necessary in academic and business environments. Students are expected to produce appropriate audience-centered written materials that achieve a desired purpose based on techniques, organization, format, and style. A formal technical report and presentation are required. Students must pass this course with a grade of B or higher prior to graduation or pass the Writing Competency Test given each quarter. (0502-227) **Credit 4**

2082-311

Packaging Solutions

This course introduces students to the package printing industry. Topics covered in this class will include flexography, gravure, digital printing, plate making, packaging substrates, color workflows, specialty coatings, and production planning. Students will initiate projects that take a package from creation to final printed product production. (Junior status) **Credit 4**

2082-313

Media Distribution and Transmission

In this course students gain extensive knowledge of the various methods and techniques used to electronically and physically distribute information. Students will also study planning, scheduling, inventory management, and customer fulfillment. **Credit 4**

2082-337

Digital Asset Management

This course exposes students to all the elements encompassing Digital Asset Management (DAM). It will explore a variety of ways that companies create and utilize a DAM system. Students will learn to identify and access files, which extend to four areas within a company: finding images and data, systematizing the workflow, collaboration, and managing rights. **Credit 3**

2082-367

Media Industries Analysis

This course provides students with an understanding of the major industries closely allied with the printing industry: advertising, publishing, and packaging. The intent is to give students in-depth knowledge of (1) the structure of each of these industries; (2) channels and methods through which and by which each distributes its products and services; and (3) the major customers/clients of its products and services. Particular attention will be devoted to investigating the business models for the use of print to create value in advertising, publishing, and packaging. (2083-201) **Credit 4**

2082-371

Principles of Printing

This course surveys the materials and processes used in print reproduction. Students will learn the basic theory of image reproduction embodied in the available analog and digital printing processes and learn to identify the process origins of print samples. Additionally, students will learn the chemical and physical properties associated with the consumables in order to obtain an understanding necessary to make informed decisions about use and application. **Credit 4**

2082-387

Substrates for Printing

This course covers the science and technology of the many kinds of printing substrates used by various printing processes. Students will learn the basic concepts of the substrate composition, structure, manufacture, optical and appearance properties, and testing of printing substrates, with an emphasis on factors which relate to print quality and press runnability. Students will learn to identify the full range of printing substrates and their applications. **Credit 3**

2082-401

Digital Print Process

This course provides students with an opportunity to learn the principles and applications of digital printing. It presents the technical aspects of the major digital print engines and compares digital printing to conventional printing processes. The strategic use of digital printing is emphasized from a digital workflow standpoint. Variable data personalization and on-demand printing are studied from both technical and marketing perspectives. **Credit 3**

2082-407

Color Management Systems

This course addresses the science and technology of color management systems in achieving quality color reproduction and scanner-monitor and proof-print agreement. Students will study the role of color measurement for device calibration, device characterization, and building an ICC-based color management system. Students will also perform color image rendering from digital capture to print, investigate digital proofing, soft and remote proofing, and evaluate color management system performance. Process control tools and analysis of control targets will also be covered. (2083-216 or permission of instructor) **Credit 4**

2082-413

Operations Management for Graphic Media

A study of the topics/factors affecting the efficiencies and effectiveness of graphic media operations. Includes consideration of both external (i.e., OSHA, environmental, legal) factors and internal factors (i.e. scheduling, plant layout, training) that directly affect operations. Addresses the importance of a quality program as well as emerging workflow systems. **Credit 4**

2082-417

Database Publishing

This course introduces the fundamental design elements of databases constructed for the activities that support the advertising process. Topics include the process of building databases comprised of information and digital assets needed to create and distribute personalized documents through the web and in print. **Credit 4**

2083-010 **Co-op Orientation**
Lectures will provide the fundamentals of job searching strategies using RIT Job Zone and other tools. Students will have the opportunity to register for and use Job Zone to facilitate online job searching. Students will apply the theory of effective interviewing by the use of mock interviews. Students will apply the theory of effective resume writing by producing an approved resume for conventional and electronic dissemination. Guest speakers and SPM senior class student panels will be used to enrich the learning experience. **Credit 0**

2083-201 **New Media Perspectives**
This course introduces students to the graphic and new media industries by studying the history, culture, technology, markets and workers in these industries. It establishes a basic understanding of the current technologies by examining the industry and businesses that employ them. Students will study the businesses and roles that exist in the various industries and see an overview of industry structures and the effect of new media. **Credit 3**

2083-206 **Imaging for New Media**
Imaging for New Media addresses the skills and competencies necessary to create and manipulate digital images. This course introduces students to the creation, acquisition, filing, storage and production, manipulation and output of raster images. (2083-216) **Credit 4**

2083-216 **Digital Foundations**
This course provides an orientation to the production concepts, working environments, hardware and software tools, languages, standards, and culture that the students will use as a foundation for the core courses in Media Arts and Technology. **Credit 4**

2083-217 **Typography and Page Design**
The course provides an introduction to the theoretical and practical foundations of typography and page design. Students will study the history, aesthetics, and technology of typography. Projects will include design and production methods, using current software tools and fonts for typography in print and screen display. Students will apply their acquired knowledge to make informed decisions in the practice of typography. (2083-216) **Credit 4**

2083-317 **News Production Management**
News media production from a holistic viewpoint is examined. This is a course that brings together all the elements of news media publishing technologies such as various computer platforms, digital photography and other multi-media content (rich media content) and distribution mechanisms. This is the micro companion to the macro digital news systems management course. This course focuses on the management of these elements rather than the specific technologies. The lecture portion focuses on the specific application of managerial principles to news media production while the lab portion is based on group news production exercises. **Credit 3**

2083-323 **Multimedia Strategies**
This course is designed to explore all of the available mass media and customized communications technology options for effectively reaching consumers. It will explore advertising, personalized direct mail, the Internet, and mobile applications. The emphasis will be on development of the right mix of marketing communications techniques to drive both new business and customer retention. (Sophomore status) **Credit 4**

2083-328 **Information Architecture for Publishing**
In this course students will research current and emerging publishing information technology trends and apply them to create publishing solutions across a variety of platforms. Projects will emphasize aggregation and reuse of content across multiple distribution channels. (4080-230 or 4002-405) **Credit 4**

2083-346 **Print Production Workflow**
Students will learn industry best practices for printing applications. Students will prepare content to be printed across a variety of printing platforms. (2083-217) **Credit 4**

2083-361 **Introduction to Book Design**
Introduces history, aesthetics, and technology of book design, with emphasis on typography, digital methods and digital print media. Projects include page design, typographic investigation, and print production. Includes class visits to archival collections and publishing centers. Students will create and print a book as an independent project. **Credit 4**

2083-368 **Advanced Imaging: Retouching and Restoration**
This course demystifies the process for digitally enhancing, retouching, and restoring images in the industry standard raster software. This class is designed for image makers who have a solid working knowledge of the current industry standard raster software and are interested in advancing their skills in digital image enhancement, retouching and restoration. This course includes image acquisition and specialized image manipulation techniques used to retouch, reconstruct, restore, and enhance images. (Permission of instructor) **Credit 3**

2083-402 **Media Law**
Media law offers an opportunity to investigate the philosophical and constitutional foundations of free expression as it relates to speech, writing, image making and publishing. First Amendment principles will be studied with respect to personal protection boundaries. The course will also provide a survey covering defamation issues. Students will form educated opinions about libel and slander boundaries. Since the publication discipline involves the creation of original work, a study of copyright, patent and trademark law will be provided. **Credit 3**

2083-412 **Digital News System Management**
This course surveys the breadth and links of both conventional and digital news outlets but concentrates on magazine, newspaper, and online news services. The lectures focus on the various models, values, skills, and general management systems used in the industry, imparting the fundamental planning knowledge required of all managers in the news business. This course prepares the student for a more advanced co-op experience in a complex digital news organization. **Credit 4**

2083-416 **Media Business Basics**
This course introduces business principles, such as accounting, finance, and marketing, that are essential to developing or growing a media venture. Students will develop a business plan and identify potential financial supporters. **Credit 4**

2083-499 **Media Arts and Technology Co-op**
Provides students with on-the-job experience in the new media publishing industry. The student seeks and acquires a school approved co-op position in business or industry. The working environment provides the forum for learning more about career choices within the industry and gives the student the opportunity to test his or her skills in a competitive environment. A final report on the students' work experiences must be electronically submitted to the co-op coordinator. **Credit 0**

2083-542 **New Media Team Project I**
The course is designed to engage the new media major in a capstone production experience. The instructor will form student teams that will design and complete a multi-media campaign for organizations selected by the instructors. **Credit 4**

College of Liberal Arts

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Course numbering: RIT courses are generally referred to by their seven-digit registration number. The first two digits refer to the college offering the course. The third and fourth digits identify the discipline within the college. The final three digits are unique to each course and identify whether the course is noncredit (less than 099), lower division (100–399), upper division (400–699), or graduate level (700 and above).

Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's schedule of courses. Prerequisites/corequisites are noted in parentheses near the end of the course description.

Criminal Justice

0501-201 Seminar in Criminal Justice
This course covers the principles of the criminal justice system including the relationship between system components, their effectiveness, and theories of operation and reform. Consideration is also given to specific problems within the branches of the criminal justice system. This seminar course involves extensive reading, writing and discussion. It acquaints students with key resources for criminal justice research. Restricted to criminal justice majors. **Class 4, Credit 4 (offered annually)**

0501-307 Investigative Techniques
Presents an in-depth study of the substantive and procedural law as it affects convicted offenders. Considerable attention is devoted to the study of constitutional rights and privileges, how they apply to convicted offenders and the methods employed to secure these rights. Conviction and its consequences are explored, as is the sentencing process. The rights of prisoners, probationers and parolees are reviewed. In addition, the various remedies for enforcement of these rights are discussed, including direct appeals, collateral attacks and a variety of post-conviction remedies. Intended for students who wish to pursue a career in law enforcement, corrections, probation, parole or law. However, students interested in some other aspect of criminal justice that deals with convicted offenders may find this course useful. Professional elective for criminal justice majors. (Junior or senior status) **Class 4, Credit 4 (offered occasionally)**

0501-400 Criminology
A survey of the field of criminology with emphasis on major forms of contemporary crime, definition of crimes and criminality, theories of criminality, the extent of crime, criminal typologies and case processing through the criminal justice system. Required course for criminal justice majors. Part of the criminal justice concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered regularly)**

0501-401 Research Methods I
This course is the first of two courses designed to provide students with a foundation in social science research methods. Through lecture, discussion and activities associated with a research proposal, the different methods of conducting research are presented. Stress is on issues of deducting hypotheses from theoretical frame works, variable construction, experimental design, sampling methodology and the techniques and methods of data collection. Students will formulate a written research proposal that details a research question and the research question and the research design appropriate for addressing that question. Restricted to criminal justice majors. **Class 4, Credit 4 (offered annually)**

0501-403 Field Experience
Internship practicum is for all criminal justice students. It gives the student first-hand experience in the field of criminal justice in an appropriate organization that meets the needs of the student's career objectives. Students are closely supervised at selected organizations, developing their pre-professional skills while learning the organization's programs and methods. Restricted to criminal justice majors. (Junior or senior status) **Class variable, Credit 8 (offered annually)**

0501-405 Major Issues in Criminal Justice System
Focuses on contemporary issues and topics not otherwise distinctly incorporated in established criminal justice courses. It concentrates on student discussion and interaction surrounding required readings on topics such as deviance, crime prevention, and issues in the prosecution/court system. Recent examples include prostitution and vice, cyber law; prisoner re-entry, wrongful convictions, criminal analysis; international crime; legal controversies in the law, seminar in sexual violence; stress in the CJ system; substance abuse; terrorism and hostage taking; legal research. Elective course for criminal justice majors. Part of the criminal justice concentration and minor and the legal studies minor. May also be taken as an elective. **Class 4, Credit 4 (offered regularly)**

0501-406 Technology in Criminal Justice
This course develops understanding of theories, management processes, organizational capabilities and social implications of criminal justice technologies. Many categories of technology are considered, including tools and techniques used for: communications and records management, transportation and traffic management, apprehension and detention of suspected offenders and criminals, crime scene investigations and laboratory forensics, telephonic and physical surveillance, and weapons, special assault and protection tactics. Students consider the role of industry, government, and user groups in the historical development and legal/ethical use of specific technologies including less-than lethal. Special attention is given to information technology. Required course for criminal justice majors. Part of the criminal justice concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0501-409 Legal Rights of Offender
Presents an in-depth study of the substantive and procedural law as it affects convicted offenders. Considerable attention is devoted to the study of constitutional rights and privileges, how they apply to convicted offenders and the methods employed to secure these rights. Conviction and its consequences are explored, as is the sentencing process. The rights of prisoners, probationers and parolees are reviewed. In addition, the various remedies for enforcement of these rights are discussed, including direct appeals, collateral attacks and a variety of post-conviction remedies. Intended for students who wish to pursue a career in law enforcement, corrections, probation, parole or law. However, students interested in some other aspect of criminal justice that deals with convicted offenders may find this course useful. Professional elective for criminal justice majors. (Junior or senior status) **Class 4, Credit 4 (offered occasionally)**

0501-410 Management in Criminal Justice
Presents the history and development of the principles of management and organizational theory as they have been applied to the field of criminal justice. This developmental evaluation is followed by a presentation of principles and philosophies of agency administration that have been effective in business, industry and government, with the intention of discussing their applicability throughout the criminal justice system. Required course for criminal justice majors. (Junior or senior status) **Class 4, Credit 4 (offered annually)**

0501-415 Domestic Violence
The course examines the problems related to domestic conflict and violence. Included is a study of the dynamics of violence as reflected in child abuse, incest, marital rape, spouse and parental abuse, and violence among siblings. Part of the criminal justice and women and gender studies concentrations and minor. Elective for criminal justice majors. **Class 4, Credit 4 (offered occasionally)**

0501-440 **Juvenile Justice**
This course examines the concepts, theories and environmental influences of juvenile offenders, the impact of the judicial system, control and corrections on juvenile justice. The course also examines the role of forces in the system including police, courts, community resources and treatment. Required course for criminal justice majors. Part of the criminal justice concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0501-441 **Corrections**
This course is an introduction to the basic organizations of the correctional system, their functions and performance. Prisons and jails, as well as probation and parole agencies, are discussed with the context of historical and contemporary philosophy. Attention also is focused on decision-making functions, the role of various personnel within the correctional system and the population of offenders within it. Strategies for rehabilitation and their effectiveness are surveyed. Required course for criminal justice majors. Part of the criminal justice concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0501-443 **Law Enforcement in Society**
The social and historical origins of the various police systems; police culture, role and career; police in the legal system; social and legal restraints on police practices; police discretion in practice; police and community; police organization and community control mechanisms. Required course for criminal justice majors. Part of the criminal justice concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0501-444 **Concepts in Criminal Law**
Concepts in criminal law deals with the substantive and procedural criminal law. Emphasis will be placed on various concepts of criminal law and practice; how ideas, laws and community perception influence the criminal justice system. Characteristics of crimes against people and property will be examined; including: the nature of criminal conduct, intent, and causation. Required course for criminal justice majors. Part of the criminal justice concentration and minor and the legal studies minor. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0501-445 **Minority Groups and Criminal Justice**
This course will investigate the roles played by racial minorities—African-Americans, Native Americans, Hispanic Americans, and Asian Americans—at each level of the criminal justice system in the United States of America. The experience of African-Americans will be emphasized since this group has been the subject of more extensive research by criminologists and criminal justice practitioners. Professional elective course for criminal justice majors. Part of the criminal justice concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0501-446 **Women and Crime**
Deals with women as criminal offenders and as victims of crime, focusing upon theories about women in crime; types of crimes committed; patterns of criminality; and the treatment of women offenders. Also examines the role of women as law enforcement officers, judges, lawyers and correctional officers in the criminal justice system. Elective for criminal justice majors. Part of the criminal justice concentration and minor and the women's and gender studies concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0501-456 **Courts**
This course provides students with an understanding of the recognized functions of courts in the American criminal justice system. Jurisdiction, policies and procedures of courts in the administration of criminal justice, including trial and appellate courts, will be discussed. Courts will be examined at the local, state and federal levels. Required course for criminal justice majors. Part of the criminal justice concentration and minor and the legal studies minor. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0501-460 **Current Issues in Criminal Justice**
This course involves year-long participation in, and written critique of, a designated set of lectures, roundtables and presentations on topics covering current issues in criminal justice. The goal is to engage students in discussion of current issues with their peers and with experts in the field. Students must sign up in the criminal justice office for fall, and register for the course in the spring quarter. May be taken up to four times. Restricted to criminal justice majors as an elective. **Class 2, Credit 2 (offered annually)**

0501-499 **Criminal Justice Co-op**
This experience provides the student with first-hand experience in the field of criminal justice in an appropriate organization that meets the needs of the student's career objectives. The co-op does not carry academic credit. **(offered annually)**

0501-506 **Evidence**
This course provides the student with an awareness of what types of evidence are admissible in a criminal trial. Includes a comprehensive analysis of the most frequently used rules of evidence. There are readings and discussions pertaining to the nature of real, testimonial, hearsay and circumstantial evidence. Examines rules concerning the cross examination of witnesses, exceptions to the exclusion of hearsay evidence, the burden of proof, the provinces of the judge and of the jury, legal presumptions and the exclusion of illegally obtained evidence. Elective for criminal justice majors and part of the legal studies minor. (0501-444) **Class 4, Credit 4 (offered occasionally)**

0501-507 **Computer Crime**
This course provides definitional, theoretical, and operational context for understanding computer-based competition, conflict and crime in the information age. Students study the history, nature and extent of computer-related crime, as well as differing types of computer criminals, their motivations and the methods they use to threaten, attack, compromise or damage physical and cyber assets. The course considers legal and regulatory environments and the impact these have on policies and practices related to ethics in the management of information security, data encryption, privacy, and numerous other special topics. Part of the criminal justice concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0501-510 **Interviewing and Counseling in Criminal Justice**
This course instructs the student in the various contemporary dynamics of interviewing and counseling criminal justice and related human service clients. Issues discussed revolve around counseling and supervision strategies and conflicts among agencies, between administrators and staff, and clients. Presents both the practical and theoretical aspects of these issues as well as devotes attention to surveying prospective counseling strategies for accomplishing desired behavioral change. Restricted to criminal justice majors. (Junior or senior status) **Class 4, Credit 4 (offered annually)**

0501-511 **Alternatives to Incarceration**
Analyzes possible sentencing options available to the criminal courts as well as pre-adjudicatory alternatives for both adults and juvenile offenders. The variety of dispositions evaluated include probation, parole, halfway houses, work-release, study-release, prison furloughs, pretrial release, pre-probation alternatives (fines, suspended sentences, conditional discharge and a variety of diversion programs). Special emphasis is placed on a critical evaluation of the alternatives as they compare to the more traditional methods of handling offenders. Field trips and guest lecturers from nontraditional programs are typically included in the course. Professional elective for criminal justice majors. **Class 4, Credit 4 (offered occasionally)**

0501-517 **Comparative Criminal Justice System**
Examines, in a comparative analysis, the criminal system and the penal methods of Europe and the United States. Major emphasis is given to the issues of intent, criminal responsibility, individual and public interests, purposes and modes of prevention, repression and punishment, methods of trial, punishment and pardon. Professional elective course for criminal justice majors. (0501-400) **Class 4, Credit 4 (offered occasionally)**

0501-522 **Victimless Crime**
Familiarizes the student with many of the implications and ramifications of efforts to control "victimless" crimes. Discussions concentrate on the illegal activity associated with prostitution, gambling, homosexuality, drug use and pornography. The social, moral, legal and practical consequences of legalizing such activities are examined and evaluated. Professional elective for criminal justice majors. (0501-400) **Class 4, Credit 4 (offered occasionally)**

0501-523 **Crime and Violence**
Focuses on the outbreak and increase of violent crime and criminal trends in the United States as one of the more serious realities in this century. In addition to an historical review, contemporary problems are explored, covering such topics as violence in the streets, terrorism, riots, vigilantism and the role of various criminal justice agencies in attempting to control these problems. Professional elective for criminal justice majors. (0501-400) **Class 4, Credit 4 (offered occasionally)**

0501-526 Seminar in Criminal Justice and Public Policy
This course is a critical analysis of some of the current issues, problems and concerns in criminal justice. Conflicts between theory and practice are examined and analyzed. Restricted to criminal justice majors. (Junior or senior status) **Class 4, Credit 4 (offered annually)**

0501-527 Seminar in Law
Seminar in law focuses on the nature, function and limits of the rule of law. This course traces the history and development of the 4th, 5th, 6th and 14th Amendments of the United States Constitution. This will be accomplished by reading and discussing approximately 100 United States Supreme Court decisions from the early 1900's through the present. Students will also be introduced to the concept of briefing a case. Elective for criminal justice majors. Part of the legal studies minor. **Class 4, Credit 4 (offered occasionally)**

0501-528 Theories of Crime and Criminality
A comprehensive survey of historical and contemporary theories of the causes of crime. Included are theories that derive from biological, psychological, sociological, geographic, economic, and political perspectives. The development of criminological theory is reviewed. Fundamental distinctions between classical and positive theories and between theories of crime and criminality are discussed. Restricted to criminal justice majors. (Junior or senior status) **Class 4, Credit 4 (offered annually)**

0501-537 Legal Aspects of Security
An examination of the federal and state case law and statutory provisions that regulate the private security field. The distinction between public and private enforcement, as well as the possible criminal and civil liabilities of private security personnel under the law of Willful Torts, including false arrest and imprisonment, nuisance, defamation and invasion of privacy. Professional elective for criminal justice majors. (Junior or senior status) **Class 4, Credit 4 (offered occasionally)**

0501-541 Research Methods II
This course is the second of two courses designed to provide students with a foundation in social science research methods. Through lecture, discussion and activities associated with a research project, emphasis is placed on the creation of null hypotheses, identification of the relationships among variables, establishment models, and analysis of data using both parametric and non-parametric statistics. The required research projects typically include data gathering and coding procedures, entry of the data to a file, the use of application software (e.g. SPSS, MINITAB, SAS) and preparation of a final report. Required course for criminal justice majors. (0501-400) **Class 4, Credit 4 (offered annually)**

0501-542 Honors Research
For students interested in research applications beyond basic scientific analysis and design. Included in the course are advanced statistical techniques of criminal justice data and qualitative field methods. Three projects are required. First, an analysis of a multi-group design experiment must be performed using an available criminal justice database. Second, an ongoing qualitative field study must be completed utilizing classical observation methodology. Third, the student must complete a draft of a formal research proposal for a sponsoring agency. A group field visit to the research foundation is included in this assignment. The course is in seminar format and includes case discussion and method critiques. Professional elective for criminal justice majors. **Class 4, Credit 4 (offered annually)**

0501-599 Independent Study
A combined student/faculty-member effort on a chosen topic beyond the normal sequence of course selections. It provides the qualified, self-motivated student with a creative orientation the opportunity to develop an autonomous and personal sense of academic growth and achievement. **Class variable, Credit variable**

Writing

0502-100 Basic Writing
Basic Writing is designed to help students placed into the course develop the literacy practices needed to be successful in writing seminar. Particular attention will be given to critical reading, information management, synthesis of source materials, academic writing conventions, and revision. The small class size promotes frequent student-instructor and student-student interaction. The credits earned do not comprise part of the student's normal liberal arts general education core curriculum, nor may the course be substituted for writing seminar. May be taken as a general education elective. **Class 4, Credit 4 (offered quarterly)**

0502-110 Written Communication I
This first course in a two-quarter basic writing course sequence for NTID supported students develops the writing skills necessary to complete 0502-227 writing seminar successfully. It services students who need additional time to meet RIT's freshman writing competency requirements as well as students who need to develop skills prerequisite to Writing Seminar. It focuses on the conventions of expository essay writing and critical reading. Registration by permission of the department of liberal studies. A grade of C or better in this course is required for students to register for Written Communication II. **Class 4, Credit 4 (offered regularly)**

0502-111 Written Communication II
This second course in a two-quarter basic writing course sequence for NTID supported students develops the writing skills necessary to complete 0502-227 writing seminar successfully. It serves students who need additional time to meet RIT's freshman writing competency requirements as well as students who need to develop skills prerequisite to writing seminar. It focuses on research paper writing using primary and secondary source materials, introduces the conventions of persuasive writing and reinforces the conventions of expository essay writing presented in Written Communication I. Registration by permission of the department of liberal studies. **Class 4, Credit 4 (offered regularly)**

0502-227 Writing Seminar
This is a one-quarter, four-credit seminar limited to 19 students per section designed to develop first-year students' proficiency in analytical writing, critical reading, and critical thinking. Students will read, understand and interpret a variety of texts. Texts, chosen around a particular theme, are designed to challenge students intellectually and to stimulate writing for a variety of contexts and purposes. Attention will be paid to the writing process, including an emphasis on teacher-student conferencing, self-assessment, class discussion, peer review, formal and informal writing, research, and revision. (Liberal Arts Qualifying Exam for students who scored below 560 on verbal portion of SAT, below 6 on SAT essay portion, and below 23 on the ACT.) **Class 4, Credit 4 (offered quarterly)**

0502-325 Honors Writing Seminar
This class is an intensive introduction to college writing. Using texts chosen around a particular theme, students will develop proficiency in analytical writing, critical reading and critical thinking, by writing within a variety of contexts and with a variety of purposes. Students will develop writing strategies they will draw on throughout their academic careers. There will be particular attention to the writing process including an emphasis on teacher-student conferencing, self-assessment, class discussion, peer review, formal and informal writing, research and revision. **Class 4, Credit 4 (offered quarterly)**

0502-443 Written Argument
All fields and professions require us to present arguments that support formal and informal statements and proposals. In this course students will apply the elements of reasoning to their written argument, and learn how to make claims, provide evidence, explore underlying assumptions, and anticipate and address counter-points. The course also includes reading arguments, assessing effectiveness and recognizing particular means of argumentation. Students will apply principles of argumentation to a documented research project, developing an original argument of their own. Part of the writing studies concentration and minor and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered quarterly)**

0502-444 Technical Writing
Provides knowledge of and practice in technical writing style; audience analysis; organizing, preparing and revising short and long technical documents; designing documents using effective design features and principles, and formatting elements using tables and graphs; conducting research; writing technical definitions, and physical and process descriptions; writing instructions; and individual and group editing. Required course for communication majors and a professional elective for advertising & public relations majors. Part of the writing studies concentration and minor; the communication minor; and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered quarterly)**

0502-445 The Evolving English Language
What makes the English language so difficult? Where do our words come from? Why does Old English look like a foreign language? This course surveys the development of the English language from its beginning to the present to answer such questions as these. Designed for anyone who is curious about the English language or the nature of language change. May be taken as a professional elective for communication majors. Part of the writing studies concentration and minor and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered annually)**

0502-449 **Worlds of Writing**
In this course students will read, analyze and practice diverse genres of writing, possibly including but not limited to: personal narrative, oral history, documentary, analytical research and literary interpretation. Through its comparison of different types of writing, the course raises questions about how language and writing are shaped by social context; about how language and writing shape our views on reality; and about the politics of these representational practices. Part of the writing studies concentration and minor and the science writing minor. May also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0502-451 **Creative Writing: Poetry Workshop**
An exploration of the techniques of writing poetry in both open and closed forms. Professional elective for professional technical communication majors. Part of the creative writing minor and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered quarterly)**

0502-452 **Creative Writing: Fiction Workshop**
An exploration of some of the most important contemporary techniques of prose fiction in the short story form. May be taken as a professional elective for communication majors; part of the creative writing minor; the advanced writing concentration, and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered annually)**

0502-453 **Advanced Creative Writing Workshop**
This course is for students who have completed a creative writing workshop and want to explore in-depth a literary genre or add to their skills as a creative writer whether interested in poetry, fiction, non-fiction or a combination of genres. The focus will be on the creation of a significant piece of writing for a final project. In addition to planning and producing a single, sustained creative work, students will complete other exercises and assignments in order to experiment with other genres. Through reading and discussion they will see their own writing in a larger context. Weekly class critiques will provide the opportunity to give and receive helpful feedback. May be taken as a professional elective for communication majors; part of the creative writing minor; and may also be taken as an elective (0502-227 or equivalent, 0502-451 or 452 or equivalent) **Class 4, Credit 4 (offered quarterly)**

0502-455 **Writing the Self and Others**
This course focuses on forms of writing about the self and others, primarily memoir and oral history. Students learn about the relationships between orality and texts, about how we know ourselves through others, and others through ourselves. The course emphasizes the reflective process of memoir writing, moving from short exercises into longer, peer-reviewed papers. There is instruction on the process and techniques of oral history through careful listening, transcribing and editing with an emphasis on the historical awareness necessary to recreate history. Students will read from culturally diverse memoirs and oral histories, study concepts of narration, view photographs and films. Part of the writing studies concentration and minor and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered annually)**

0502-456 **Rhetoric of Science**
In this course students will read the writing of some of the most influential scientist-rhetoricians who have had to persuade both professional and public audiences of the validity of their science. We will discuss some history of science, possibly including but not limited to Royal Society papers and contemporary journal arguments. Other possible course content includes students' own favorite figures and texts in the history of science, ongoing controversies in contemporary scientific debates, and the representation of science in popular culture. Part of the writing studies concentration and minor and the science writing minor. May also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered annually)**

0502-457 **Language, Dialects, and Identity**
In this course we will examine varieties of language that result from regional and social factors (gender, race, ethnicity and class). We will also explore the ways in which language is tied to our identity and marks our place in society as a result of such variation. Topics could include but are not limited to: dialects of American English, language and gender, bi/multilingualism, attitudes toward non-standard and standard varieties of English, and language policy (e.g. the movement to declare English the national language; Ebonics). Part of the writing studies concentration and minor and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered every other year)**

0502-459 **Creative Nonfiction Workshop**
This course is an intensive workshop in writing creative non-fiction. Students' ongoing work taken through several drafts will be discussed in weekly clinics which will not only move the work forward, but teach each participant to become a better editor. With a continual practice of writing and reading, students will explore the many possible formats of non-fiction. Part of the writing studies concentration and minor; the creative writing and the science writing minor; and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered annually)**

0502-460 **Science Writing**
Artificial intelligence, chaos theory, space radiation... If science is to successfully move from the lab or the field to the public and popular press, it will need to be delivered by writers who can make challenging information accessible. A good science writer crafts specialized material into compelling stories with graceful—even poetic—prose. This course will not teach you how to write scientific research papers. Instead, students will read various models of science writing, from the science sections of various newspapers, from magazine articles, as well as from essays in periodicals. You don't need to be a science major, just bring a basic interest in science and its work. Part of the writing studies concentration and minor and the science writing minor. May also be taken as an elective (0502-227 or equivalent) **Class 4, Credit 4 (offered twice annually)**

0502-461 **Editing the Literary Magazine**
This course covers all aspects of creating a literary and art magazine, with emphasis on developing an editor's eye for literary judgment, as well as examining the little magazine at RIT and elsewhere. Students will engage in a hands-on practicum focusing on production of the student-designed magazine, SIGNATURES, RIT's oldest continuous literary publication. Part of the creative writing minor and may also be taken as an elective. (0502-227 or equivalent) Instructor's permission required to register (jfrgla@rit.edu). **Class 4, Credit 4 (offered annually)**

0502-462 **Advanced Science Writing**
Elaborating on principles and skills learned in science writing, students will gain more intensive experience with research and revision. Students will learn to use multiple sources to bring a recent scientific development to several different kinds of audiences with varying expertise and with varying stakes in the issue. Students will learn to find, evaluate and analyze sources in several genres, and interpret their information for a different audience than originally intended. Students will undertake a coherent research project supported by specialized scientific knowledge and undergoing several revision stages. Part of the science writing minor and may also be taken as an elective. (0502-227 and 0502-460). **Class 4, Credit 4 (offered twice annually)**

0502-463 **Language and Brain**
Students are introduced to topics that illuminate the way language is represented in the human mind: neurolinguistics (where in the brain language is localized), the language 'instinct' or innateness of language (how the human brain is biologically programmed for language), psycholinguistics (how language is acquired and processed), language and thought (whether our thoughts are controlled by the particular language we speak), language disorders (atypical language due to aphasia, autism, etc.), and language evolution (how language first evolved, from sign to speech). Students will read in depth yet accessible research from the field and will write on these topics in cognitive science. Part of the writing studies concentration and minor; the science writing minor, and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered annually)**

0502-560 **Special Topics**
A focused, in depth study of a selected topic in writing. Specific topics vary according to faculty assigned. Part of the writing studies concentration and minor, the creative writing minor, and the science writing minor depending on the topic offered. Topics will vary. (0502-227 or equivalent) **Class 4, Credit 4 (offered occasionally)**

Literature

0504-210 **Literary and Cultural Studies**
This course will examine literary and cultural texts selected from traditional literature to contemporary media and culture (e.g. literature, film, graphic novels, television, advertising, anime). Students will analyze these texts from a variety of perspectives and become familiar with current debates about literature and/or culture as arenas of human experience. This course will fulfill a humanities core requirement. (0502-227 or equivalent) **Class 4, Credit 4 (offered regularly)**

0504-319 **AE: Writing the Discipline**
This course highlights the processes and practices of writing and research specific to a particular discipline or across disciplines such as film studies, photography and visual cultures, ethnography, literary studies, creative writing, or mythology. It asks how their modes and objects of inquiry—for instance, film, photography, digital media, oral history, or narrative—shape and transform the discipline and its inquiries over time. Students have the opportunity to develop a critical understanding of important conversations within a particular area of study and to write about those topics. (0502-227 or equivalent) **Class 4, Credit 4 (offered regularly)**

0504-327 **Honors: Writing Disciplines**
This course is an intensive analysis of the processes and practices of writing and research specific to a particular discipline or across disciplines such as film studies, photography and visual cultures, ethnography, literary studies, creative writing, or mythology. It asks how their modes and objects of inquiry—for instance, film, photography, digital media, oral history, or narrative—shape and transform the discipline and its inquiries over time. Students have the opportunity to develop a critical understanding of important conversations within a particular area of study and to write about those topics. **Class 4, Credit 4 (offered regularly)**

0504-400 **American Sign Language Literature**
Students will explore a wide range of literary works representing the various genres of ASL literature. Students will be expected to analyze works in terms of literary conventions/techniques as well as relevant cultural symbols and themes. Attention will be given to historical context, deaf cultural values, and the style/conventions used by individual literary artists. Each student will be required to complete literary analysis papers. In addition, students will be expected to create original ASL literary works and/or retell well-known ASL literary works individually or in collaboration with other students. This course is conducted in ASL and will require considerable reading and viewing of videotaped materials. Part of literary and culture studies concentration and minor and may be taken as an elective. (Fluency in ASL or approval of instructor required.) **Class 4, Credit 4 (offered annually)**

0504-425 **Great Authors**
The course provides extended study of the works of a specific canonical author (to be listed in the sub-title) as selected by the instructor for each section of the course. Students can take any single section of this course as part of the literary and cultural studies concentration and minor and may also be taken as an elective. Additional sections on different authors can be taken for elective credit. **Class 4, Credit 4 (offered annually)**

0504-435 **Global Literature**
This course will approach literature as a global phenomenon, considering what happens to literary texts as they move across national, linguistic, racial and ethnic, religious and economic borders. Students will read representative poetry, fiction, drama and non-fiction from the given nation or region and be introduced to its cultural and historical contexts. The course may also be comparative and will likely cover more than one region in the context of globalization and world movements. Students can take any single section of this course as part of the literary and cultural studies concentration and minor, and it may also be taken as an elective. Sections can also be taken for elective credit. **Class 4, Credit 4 (offered annually)**

0504-436 **The Graphic Novel**
This course charts the development of the graphic novel, examines that history in relation to other media (including literary works, comics, film, and video games), and reflects on how images and writing function in relation to one another. Primary readings will be supplemented with secondary works that address socio-historical contexts, interpretive approaches and the cultural politics of the medium, such as representations of class, race, gender and ethnicity. Part of the literary and cultural studies concentration and minor, and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0504-440 **Drama and Theatre**
This course examines drama as a genre and theater as a performing art. Intensive study of at least one major playwright or period complements a general survey of drama/theater from ancient Greece to modern Broadway. Part of the literary and cultural studies concentration and minor and the theatre arts minor. It may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered annually)**

0504-441 **The Art of Poetry**
Emphasizes the enjoyment and study of poetry with primary attention to major poetry in English. Part of the literary and cultural studies concentration and minor and the creative writing minor. It may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered annually)**

0504-442 **The Short Story**
This course uses the genre of the contemporary short story to provide material for critical commentary and cultural understanding. Part of the literary and cultural studies concentration and minor and the creative writing minor. It may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0504-443 **The Novel**
A close reading and analysis of several novels selected to show the range of narrative techniques, methods of characterization and plot construction, and styles representative of the genre. Part of the literary and cultural studies concentration and minor; the creative writing minor; and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered annually)**

0504-444 **Film Studies**
This course examines the nature of narrative in both film and literature, the various aspects of adaptation of literature into film and the relationship between social reality and storytelling in documentary film, utilizing a non-technical approach to the study of film. Part of the literary and cultural studies concentration and minor and may also be taken as an elective. Additional screening time is recommended. (0502-227 or equivalent) **Class 4, Credit 4 (offered annually)**

0504-447 **Special Topics: Literature**
This course title defines a focused, in-depth study and analysis of a selected advanced topic in literature. Specific topics vary according to faculty assigned. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0504-448 **Biographical Literature**
Students develop skills to critically read this consistently best-selling genre. The course distinguishes between biographical and autobiographical literature and asks students to examine and critique the social contexts that produce various forms of biography. Selections attempt to explore lives lived within a variety of cultures. Part of the literary and cultural studies concentration and minor and the science writing minor. It may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0504-454 **Shakespeare: Tragedy/Romance**
For almost four hundred years Shakespeare's work has stood as monument to the literary imagination. In this course, we will study Shakespeare's tragedies and romances, with a view toward exploring the influence of his work through the ages, as well as addressing questions of canonicity. Through class discussion, interactive activities, and examination of film, students will develop strategies both to investigate the literary and theatrical power of these works as well as to consider their cultural presence in both contemporary American culture and Shakespeare's England. Particular attention will be devoted to literary theory and the variety of interpretation in order to inform readings of the plays. Part of the literary and cultural studies concentration and minor; the theater arts minor; and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered annually)**

0504-455 **Shakespeare: Comedy**
In this course students will read, study, and discuss some of Shakespeare's comedies and histories in an attempt to determine the nature of his greatness. What political and institutional factors account for the reverence accorded to Shakespeare? In addition to reading a range of Shakespeare's comedies and histories, the course will develop deeper understandings of contemporary literary theory and practices that allow various interpretations of these plays. Attention will be paid to issues of gender, historicity, iconicity and textual analysis among others. Part of the literary and cultural studies concentration and minor; the theatre arts minor; and as an affiliated course in the women's and gender studies minor. It may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered annually)**

0504-460 **Modern Poetry**
From Walt Whitman's 'barbaric yawp,' to Emily Dickinson's 'letter to the world that never wrote to me,' and Baudelaire's 'breath of wind from the wings of madness,' Modern Poetry is a body of literature characterized by bold changes in voice, form, and subject matter. This course offers a close examination of poetry of the 19th and 20th centuries, with attention to such things as the role played by technological, historical, and political developments; what it means to be 'modern' and how other modern arts movements, for instance, visual arts, music, or film, have influenced poetry. Part of the literary and cultural studies concentration and minor; the creative writing minor; and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered annually)**

0504-461 **Latin American Literature**
Reading short stories, novels, poetry, and essays, as well as viewing films of modern Mexico and Central and South America reveals a literature and culture wherein the mythic functions as an integral part of the modern world view and the poetic functions as a political power. Part of the Latino/Latina/Latin American and minority relations concentrations; the Spanish language/culture concentration and minor; the literary and cultural studies concentration and minor; and may also be taken as an elective. Part of international studies Latin American track. (0502-227 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0504-462 **Literature and Technology**
Surveying the rise of computing technologies, information theories, and information economies in the last century, this course considers their impact on literature, culture and knowledge-formation. In particular, we will reflect on topics such as the relations between social and technological transformation, literary print and digital cultures and electronic literature. Part of the science, technology and society minor; the science writing minor; the literary and cultural studies concentration and minor; and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered annually)**

0504-464 **Mythology and Literature**
This course is a scholarly investigation into the cultural, historical, social, psychological, religious and spiritual, literary and performative dimensions of myth. It examines different approaches to the study of myth emerging from disciplines such as anthropology, history, literary studies, and psychology. Special attention will be paid to the effect of these narratives on literature and other kinds of cultural texts, past and present. Part of the literary and cultural studies concentration and minor and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered annually)**

0504-466 **Early Black Writers**
The seeds of African-American letters were planted in slavery and bloomed in the Harlem Renaissance of the 1920's. In this course students research and discuss the major contributors to that legacy, a list of writers that includes Phyllis Wheatley, Paul Laurence Dunbar, Ida B. Wells, William Wells Brown, Langston Hughes, and Zora Neale Hurston, Countee Cullen and Claude McKay. Part of the minority relations concentration; the literary and cultural studies concentration and minor; and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0504-467 **African-American Literature**
In this course students research and discuss major contributions to the African-American legacy of letters. From Phyllis Wheatley, Paul Laurence Dunbar, Ida B. Wells to Toni Morrison, from the Harlem Renaissance, and the Black Arts Movements of the 1960's to Hip-Hop, this course explores African-American writers who inspired a civil rights and cultural revolution. Part of the minority relations concentration; the literary and cultural studies concentration and minor; as an affiliated course in the women and gender studies minor; and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0504-468 **Literary Representations of America**
A study of the various ways this nation has been portrayed by authors since its founding. Although the emphasis will be on 19th and 20th century American literature, in all its genres, attention may also be paid to international writers' perspectives on America, as well as visual and musical portrayals. Part of the literary and cultural studies concentration and minor and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0504-469 **American Literature**
This course explores the contested literary and cultural history of the U.S. Focusing on one or more salient themes and ideas chosen by the instructor, the course examines issues of identity, migration, difference, technology, and work in American literature presented in historical context. The emphasis is on the diversity of traditions and voices including African-American, European American, Latina/o, Native, Asian American and/or new immigrant writing in the U.S. This course looks at both the struggle and the possibilities of forging a genuinely democratic literary tradition. Part of the literary and cultural studies concentration and minor and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0504-474 **Studies in British Literature**
This course examines select British texts and authors, emphasizing foundations and evolution of British literary traditions and changing national British identities, focusing on one or more of the defining periods ranging from the heroic poetry of the Anglo-Saxon period, the Restoration, the 18th century, up to World War I. Part of the literary and cultural studies concentration and minor and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered annually)**

0504-477 **Survey of Italian Literature**
This course traces Italian literature of a particular time period. Readings may include novels, short stories, poetry, plays, and essays representative of the time period, with attention to literary trends and to cultural and historical influences. All readings will be in English translation. Part of the Italian language/culture concentration and minor; the literary and cultural studies concentration and minor; and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered every other year)**

0504-480 **Women in Literature**
This course concentrates on literature by women authors, literary representations of women, and other means by which representational practices and the politics of language are engaged to critically examine gender roles, sexuality and their social consequence in various historical contexts. Part of the literary and cultural studies concentration and minor and the women and gender studies concentration and minor (0522-481). It may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered annually)**

0504-482 **Science Fiction**
This course provides a selective survey of science fiction from its antecedents to its foundational texts and through many of its developments in the 20th and even the 21st centuries. With a variety of authors who exhibit varying intentions and effects, the course approaches these texts as literary form, as cultural artifact, as philosophical speculation, and as scientific and technological imaginary. Part of writing studies concentration and minor; the literary and cultural studies minor; and the science writing minor. It may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0504-485 **Global Literature**
This course will consider some of the key historical forces that have been bringing the globe's inhabitants into contact with and awareness of one another. Under the auspices of cultural expression, we will examine a host of artistic and popular forms that link different parts of the global world system: possible primary texts include TV programs and commercials, film animation, music, visual art, literature and new media. Course 'readings' will be determined through class input. Lectures and scholarly readings will supplement our examination. Attendance and participation are heavily weighted. Students will also write two papers, a graded draft and present their work in-class. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0504-490 **Autobiography**
This course will examine a rich spectrum of life-writings, ranging from formal autobiography to 'outlaw' narratives, including selections from visual self-portraits in art, photography and film. With new studies in identity, memory and cognition, we will trace strategies for constructing identity as we redefine the boundaries of family, nation, class and gender. Part of the literary and cultural studies concentration and minor and the women and gender studies concentration and minor (0522-484). It may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0504-491 **Modern Italian Poetry**
We will study Italian poetry from the late 19th through the 20th centuries within a cultural and historical context, examining in particular the influences operating between modern Italian poetry and modern poetry in English. Students will read a variety of poems in translation and will have at least one dual language text. When possible, class discussion and lectures will be supplemented by guest lectures on topics such as Italian art, design, and history; viewing of Italian films; and attendance at Italian cultural events. Students do not need any knowledge of the Italian language in order to take this course. Part of the Italian language/culture concentration and minor; the literary and cultural studies concentration and minor; and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered every other year)**

0504-493 **Maps, Spaces, and Places**
This interdisciplinary course emphasizes visual literacy and spatial thinking through conventional and digital maps, and in diverse novels, poetry, and films. We rethink space as a dynamic context for making history, raising questions about authority and organizing social/communal life. Requirements include an oral presentation, brief online responses and a final community project, such as 'Reading Rochester/RIT as Text', orienteering, digital or picture map research, or a GIS project. Part of the literary and cultural studies concentration and minor and may also be taken as an elective. (0502-227 or equivalent). **Class 4, Credit 4 (offered occasionally)**

0504-496 **Women in Hispanic World**
This course explores the contributions to history, literature, art and politics by prominent Spanish American women. We will look at writings and paintings by these women, read critical essays about their work, and view four films inspired by them. This course is part of the Latino/Latina/Latin American concentration; the Spanish language/culture concentration and minor; the literary and cultural studies concentration and minor; and may also be taken as an elective. Cross-listed with foreign language, special topics: women in the Hispanic world. (0502-227 or equivalent) **Class 4, Credit 4 (offered annually)**

0504-500 **Italian Literature: Special Topics**
The focus of this special topics course will be determined by the instructor's interest and strength. The course might focus on a particular author, work, genre or time period in Italian literature; or rather, it might be thematically organized. Readings may include novels, short stories, poems, plays and essays representative of the time period author, or thematic focus with attention to literary trends and cultural and historical influences. All readings will be in English translation. Part of the Italian language/culture concentration and minor; the literary and cultural studies concentration and minor; and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered every other year)**

0504-545 **Deaf American Literature**
The major focus on this course is 'the image of the deaf' and 'the deaf experience' as depicted in literature. The course attempts to define 'deafness' and the cultural roles it plays in both texts by deaf authors and texts about deaf persons, as well as to examine particular literary forms related to the deaf experience. Thus, attention is also given to studying poetry that is created in American Sign Language (ASL), a language primarily used by the deaf American community. Part of the ASL language/culture concentration; the literary and cultural studies concentration and minor; the deaf studies concentration and minor, and may also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered annually)**

Fine Arts

0505-213 **Fine Arts: Visual Arts**
Students develop ability in perceiving worth in objects of art through consideration of fundamental concepts in painting, sculpture and architecture, involving analysis, interpretation and principles of aesthetics. **Class 4, Credit 4 (offered regularly)**

0505-214 **Fine Arts: Musical Arts**
An introduction to music as a fine art. Students develop skills in listening, evaluation and analysis through an examination of music's forms, constituent elements, and stylistic and historical development. **Class 4, Credit 4 (offered quarterly)**

0505-215 **Fine Arts: Film Arts**
This course will develop students' skills in viewing, analyzing, interpreting and evaluating the art of cinema through an examination of film technology, history, aesthetics and style. **Class 4, Credit 4 (offered regularly)**

0505-216 **Fine Arts: Theatre Arts**
The course will develop students' skills in viewing, evaluating, and analyzing the art of the theater through an examination of its constituent elements, aesthetics, and stylistic and historical development. **Class 4, Credit 4 (offered regularly)**

0505-319 **Arts of Expression**
This is a course in Shakespeare's drama that emphasizes the plays as potential theatre productions. While studying five or six plays representative of the different acknowledged types of Shakespearean drama (comedy, tragedy, history, problem comedy, romance), students will gain a broad understanding of the character and range of Shakespeare's poetic-dramatic art. Experimenting with performance activities such as oral interpretation, character presentation, and scene rendering, they acquire a practical appreciation of Shakespearean drama's theatrical potency, of the original staging conventions, and of how each type of play makes particular generic demands on both performer and spectator. Augmenting the reading and practical expressive activities is a term project. **Class 4, Credit 4 (offered annually)**

0505-325 **Honors Fine Arts**
This course introduces students to the idea, the practice and the evaluation of the visual, the musical and the dramatic arts (music, theater, film, painting, sculpture, and architecture). The course is organized and taught by a team of fine arts faculty, in a format that combines lecture, discussion, and practice. The topic of fine arts is treated in three integrated ways: experimental-analytic, and program-critical. Students will be expected to read, view, listen to, discuss, research, write about, and create works of art. **Class 4, Credit 4 (offered annually)**

0505-401 **RIT Singers**
RIT's primary choral group performs vocal works dating from the Middle Ages to the present. There is one major performance per quarter and several smaller events throughout the year. Contact the instructor for information about participating. Part of the music concentration and minor and may also be taken as an elective. **Class 1, Credit 1 (offered regularly)**

0505-402 **RIT Orchestra**
The RIT orchestra performs three major concerts per year of standard orchestral repertoire. In addition, students from the orchestra have the opportunity to play in a variety of chamber ensembles. Participation is by audition. Contact the instructor for information. Part of the music concentration and minor and may also be taken as an elective. **Class 1, Credit 1 (offered regularly)**

0505-403 **RIT Concert Band**
The RIT concert band is a large instrumental ensemble which performs a wide body of literature including traditional marches, wind ensemble pieces, musical medleys and orchestral transcriptions. The group rehearses once a week for two hours in the music room (A120) of the student/alumni building. Students participating in the course are eligible for one credit hour applied toward their individual concentration. The group performs at least one formal concert per quarter as well as several special events throughout the academic year. Part of the music concentration and minor and may be taken as an elective. **Class 1, Credit 1 (offered regularly)**

0505-404 **RIT World Music Ensemble**
A multi-cultural ensemble of instrumentalists, singers, and dancers organized to explore and perform a variety of music and dance from cultures around the world. The cultures to be studied will be dependent on enrollment. Participants native to the represented cultures will be enlisted to assist in the teaching of basic performance practices and concepts. Enrollment is open to all students, faculty, and staff, who are competent instrumentalists, singers and/or dancers from both Western and non-Western traditions. Auditions will be held to assess proper placement. Contact the instructor for more information. Part of the music concentration and minor and may also be taken as an elective. **Class 1, Credit 1 (offered regularly)**

0505-405 **RIT Jazz Ensemble**
This performing ensemble will provide the opportunity for students to become familiar with and perform a variety of musical styles associated with American jazz. These will include swing, blues, fusion, Dixieland, samba, bossa-nova, ballad, be-bop and ragtime. As an experiential outcome of such study, the group will prepare a significant assortment of musical compositions for public performance. Part of the music concentration and minor and may also be taken as an elective. Contact the instructor for more information. **Class 1, Credit 1 (offered regularly)**

0505-412 **RIT Chamber Orchestra**
The RIT Chamber Orchestra is a select ensemble, its membership consisting of students with a solid track record of performance in the RIT Orchestra, and invited to participate by the music director. Students are expected to be participating in RIT Orchestra concurrently. The ensemble will be active each spring term, with personnel and repertoire changing to suit specific curricular goals. Students will be exposed to more in-depth ideas and practices of orchestral playing, particularly regarding music of the 18th, early 19th and at times 20th centuries. Part of the music concentration and minor, and may be taken as an elective. (RIT Orchestra or permission/invitation of music director.) **Class 1, Credit 1 (S)**

0505-420 **Applied Music**
Students will receive private instrumental or voice lessons and participate in studio performance opportunities. Part of the music concentration and minor and may also be taken as an elective. Please Note: applied music lessons are made available to student music minors and/or active participants in the music ensembles program. **Class 1, Credit 1 (offered regularly)**

0505-421 **Introduction to Museums and Collecting**
This course examines the history, theory, ideology, and practice of collecting within the institutional context of the museum. It considers the formation of the modern museum, and focusing on the American context, it investigates various types of museums, ranging from natural history, anthropology, science and technology, history, and art. The course explores the governance and operations of museums in the areas of collections management, collections care, and gallery/museum management. The course focuses on issues of contemporary concern and examines museums and their practices. The course includes field trips to local museums and collections throughout the quarter. Part of the art history concentration and minor. **Class 4, Credit 4 (offered annually)**

0505-422 **Art Materials/Photography**
This is a lecture-studio/lab course on materials and tools, supports and techniques of works of art on paper and other organic art materials. Topics include the application, development and manufacture of artists' materials: drawings, watercolors, furniture, textiles, prints and photographs. This course includes studio reconstructions of masterworks, lectures, and library research. Part of the art history concentration and minor. May be taken as an elective. **Class 4, Credit 4 (offered annually)**

0505-423 **Art Materials/Panel Painting**
This is a lecture-studio/lab course on materials and tools, supports and techniques of inorganic art materials. Topics include the application, development and manufacture of artists' materials: glass ceramics, sculpture, gilding, pigments, patinas. This course includes studio reconstructions of masterworks, lectures, and library research. Part of the art history concentration and minor and may be taken as an elective. **Class 4, Credit (offered annually)**

0505-425 **Display and Exhibition Design**
This course examines the history and practice of display and exhibition design. It considers the history of display as found in a variety of private collections, and the history of exhibitions with the development of museum-like institutions. It investigates various types of displays and exhibitions, ranging from natural history, anthropology, science and tech., history, and art; and compares these to commercial displays at large international fairs. This course explores the development of a display and exhibition budget in light of budgetary constraints. It considers the professional parameters of display and exhibition design as well as ethical issues related to material. The course includes field trips to local institutions and collections throughout the quarter. Part of the art history concentration and minor and may be taken as an elective. **Class 4, Credit 4 (offered annually)**

0505-426 **Collections Management and Museum Administration**
This course presents an overview of the administration and management of museums and their collections. The course examines the governance structure of museums, focusing on personnel responsible for their administration, curation and education, and operations, as well as the mission statement and policies they determine. This course also details the management of collections, including the development of a collections policy, management of that policy, documentation and record keeping, acquisitions, and the creation/management of exhibitions. Finally, the course considers collections care or preventive conservation, looking at both the facility and collections. Throughout the quarter, legal and ethical issues pertaining to museums and their collections will be emphasized. Part of the art history concentration and minor. May be taken as an elective. **Class 4, Credit 4 (offered annually)**

0505-427 **Fund Raising, Grant Writing and Marketing**
This course examines the growing autonomy of collecting institutions as they are cut off from various forms of governmental sponsorship and public subsidy and their subsequent needs for raising money from outside, non-traditional sources. The course looks at issues of needs assessment, budgeting, and strategic planning. It focuses on the design and implementation of effective fundraising campaigns, as well as on the organization and writing of successful grant proposals. It also considers the importance of marketing to overall institutional success. May be taken as an elective. **Class 4, Credit 4 (offered annually)**

0505-436 **Women's Stories and Films**
This course will provide an introduction to women's films through an exploration of narrative structure in films made by women. Through film screenings and class discussion, the course will examine the themes and issues of women's narratives and how they are presented in the medium of film. The hero's journey and traditional narrative structure will be contrasted with the heroine's journey and the more personal story telling style of the feminine. The course will also examine differences between films made by women and films made by men about women. The course will introduce the work of feminist film critics and consider the relevance of those theories to women's roles in current films. It may be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-437 **Forensic Investigation Art**
This course introduces the study and examination of artistic and historic materials within a humanities-oriented forum in which students present and debate published research on several famous case studies including: the Shroud of Turin, the Getty Kouros, and the Hanvan Meegeren forgeries of Vermeer paintings. Emphasis will be placed on using resources from the inter-disciplinary fields of art history, art and materials science supported by a virtual lab in which the application of instrumental techniques to the materials is demonstrated. Part of the art history concentration and minor and may be taken as an elective. **Class 4, Credit 4 (offered annually)**

0505-438 **Conservation of Cultural Materials**
This course examines the philosophies, ethics, art conservation methods and principles of collection management. An overview of deterioration characteristics and conservation strategies for a variety of materials including: stone, glass, ceramic, wood, paper, new media, metals, textiles, oil paintings and archaeological materials will be presented. Part of the art history concentration and minor and may be taken as an elective. **Class 4, Credit 4 (offered annually)**

0505-442 **Music in the U.S.**
A survey of music in the United States from the time of European colonization to the present. Particular emphasis is placed upon the question of what makes music distinctively "American." Part of the American artistic experience; the music concentrations and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-443 **Images of American Life**
Students examine images of American life in the 19th and 20th century in the visual arts, particularly photography, to analyze and evaluate the influences of American political, social and cultural events on imagery and perception. Part of the American artistic experience concentration; the art history concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-444 **American Painting**
A survey of the style and meaning in American paintings from the colonial limners to contemporary artists. Centers on what distinguishes painting of the colonies and of the United States from its European counterpart. Part of the American artistic experience concentration; the art history concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-445 **Issues in American Art**
A comprehensive overview of American attitudes and philosophies as they have shaped and been embodied in our artistic heritage. Emphasis is placed on American art from 1850 to the present. Part of the American artistic experience concentration; the art history concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered regularly)**

0505-446 American Film in the Studio Era
This course examines the history and aesthetics of the motion picture in the U.S. during the classical Hollywood studio period. Emphasis will be placed on the analysis of both the work of major American film makers and the evolution of major American film genres. Among the filmmakers to be studied are Griffith, Chaplin, Hawks, Ford, Capra, Welles, Hitchcock, Wilder and Kubrick. Genres to be covered include the melodrama, silent comedy, screwball comedy, western, thriller, film noir, and the gangster film. The films will be studied within the context of contemporary cultural and political events, and will be discussed from several viewpoints. Part of the American artistic experience concentration; the art history concentration and minor; affiliated elective in the women and gender studies minor; the theatre arts minor; and it may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0505-447 American Musical Theatre
Survey of the development of American opera and the American musical theater, highlighting representative works, composers, librettists and performers of both the 'cultivated and vernacular traditions.' Part of the American artistic experience concentration; the music concentration and minor; and the theatre arts minor. It may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0505-448 20th Century American Music
Survey of both the cultivated and vernacular traditions of American music in the 20th century taking into account its political, social and historical frameworks. Part of the American artistic experience concentration; the music concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0505-449 Music Theory I
For the student who has basic musical literacy (ability to read music notation). In addition to the writing of melody, two-part counterpoint and four-part harmony, some attention is given to the analysis of form and style. Part of the music concentration and minor and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0505-450 Music and the Stage
A historical and cultural survey of collaboration between the arts of music and theater, focusing on a selection of significant creative products that combine music and drama. Included are works by Shakespeare, Monteverdi, Moliere, Mozart-DaPointe, John Gay, Beethoven-Goethe, Wagner, Puccini, Brecht-Weill, and Bernstein, spanning the genres of Renaissance tragedy and comedy, opera serial, opera buffa, ballad opera, incidental music romantic drama, Italian opera, music drama, epic theater, cabaret, vaudeville, and musical comedy. Part of the music concentration and minor and the theater arts concentration and minor. It may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0505-452 Special Topics: American Art
A critical examination of issues and/or artistic developments in American art. The topic may have been briefly covered in another concentration course. Provides a unique opportunity to expose the student to an in-depth analysis of one selected aspect of American art. Examples of likely topics are: American landscape painting; American portraiture; pop art of the '60s; jazz; Robert Venturi and post-modern architecture in America; criticism and theory; or other topics dealing with American painting, sculpture, architecture, music and film. Part of the American artistic experience concentration; the art history concentration and minor; and may also be taken as an elective. (Prerequisites, if any, are determined by the instructor.) **Class 4, Credit 4 (offered occasionally)**

0505-453 Theater in the U.S.
A broad survey of theater in the United States, designed to acquaint students with the main figures, companies, plays, productions and stylistic currents that have defined the American stage since the Revolution. Emphasizes the native and multi-cultural features of our theater's development, while taking due note of the influences from Europe. Also introduces students to some of the impulses, both traditional and avant garde, that have characterized the American theater since mid-century. Part of the American artistic experience, and the theatre arts concentration and minor. It may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-454 Orchestral Repertoire in History
A survey of the history and development of the orchestra and its repertoire from the Baroque to the present, focusing on works commonly performed by American orchestras. In conjunction with concert attendance requirements, special attention is given to work performed by area orchestras. In addition, various business, legal, cultural and artistic aspects of the modern American orchestra are addressed. Part of the American artistic experience concentration, the music concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-455 Survey of Jazz
This course will survey the development of American jazz music, highlighting representative composers and performers and significant works. Particular attention will be drawn to the multi-racial influences on the creation of jazz music and its relationship to American culture as a whole. Part of the American artistic experience concentration; the music concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-456 Topics in Music History
This course is a study of various aspects of music in different historical environments with emphasis on analogies between music and the other arts. Part of the music concentration and minor. May also be taken as an elective. Students may register for course only with permission of the instructor. **Class 4, Credit 4 (offered occasionally)**

0505-457 Contemporary Drama, Theater, Media
This course will examine some recent trends in American drama and theater, focusing largely on the apparent influence of television and other mass media on playwriting and performance conventions from the past two decades. Central to the course will be an examination of how traditional models of playwriting and performance rooted in casually-oriented narrative have been abandoned or at least undermined by a number of contemporary American theater artists. Part of the American artistic experience concentration and the theatre arts concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-458 Modernist European Theatre
This course will provide an overview of several major movements associated with modern European drama and theater with a survey of various plays associated with these movements. These plays will be situated within appropriate historical contexts to illuminate the significance of the works. Emphasis will be placed on how the various plays and movements, while employing similar devices and conventions, nonetheless, differ from each other in tenor and content, and in the end, toward which they were directed. Part of the theatre arts concentration and minor. May be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-459 Era of Haydn and Mozart
Many of the characteristics of art music, up to the present day, have their beginnings in the late eighteenth century. This course explores the creation and performance of music within the context of European cultural, political and artistic ideals from 1740 to 1800 with particular attention given to the works of Haydn and Mozart. Part of the music concentration and minor; the German language/culture concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-461 World Music I
A course designed to explore selected music cultures of North America, South America, and Africa through an examination of their musical, sociological, philosophical and aesthetic values. The primary goal of the course will be to expand understanding of and perceptions about music both outside and within Western cultural traditions. The methodology will involve using traditional techniques of music analysis and 'comparative musicology' along with special techniques for listening to and analyzing non-western music, in an examination of musical elements, music-making processes, instruments, the function/purposes of music in various cultures, and selected readings from allied disciplines. Students will have opportunities for experimental (hands-on) activities depending on size and make-up of the class. Part of the music concentration and minor and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0505-462 World Music II
This course will explore selected music cultures of India, Asia, East Asia, and Central/Southeastern Europe through an examination of their musical, sociological, philosophical, and aesthetic values. The primary goal of the course will be to expand understanding of and perceptions about music both outside and within Western cultural traditions. The methodology will involve using traditional techniques of music analysis and "comparative musicology" along with special techniques for listening to and analyzing non-Western music, in an examination of musical elements, music making processes, instruments, the functions/purposes of music in various cultures, and selected readings from allied disciplines. Students will have opportunities for experimental (hands-on) activities depending on size and make-up of the class. Part of the music concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-463 **Survey of African-American Music**
This course is a survey of the history of African-American music through an examination of the major forms of music-making and dance developed among African-Americans in the United States from the early 17th century to the present. A brief introduction to West African cultural characteristics, especially music and dance, as well as discussion of the African diasporas in the New World, will serve as background for this survey. Part of the American artistic experience concentration; the music concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-464 **Blues Personal and Social**
A course designed to explore the African-American folk form known as the blues. While tracing the history of this unique form frames the course, particular emphasis is placed on understanding the blues as a window into the personal lives of those who perform it, and viewing the blues as a vehicle for social commentary. Part of the American artistic experience concentration; the music concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-466 **Sounds of Protest**
This course is designed to explore the variety of ways music has served as commentary on and/or symbolic representation of social circumstances and events in America and selected world cultures historically and in the present. Students will research, listen to, analyze, and discuss music representing a variety of genres, styles, and cultures, ranging from selected non-Western music to various forms of European and American folk, popular, and concert music. Students will place this music in context through reading and discussion of writings on the arts, education, sociology, history, ethnomusicology, critical theories, and biography, writers and critical thinkers and topics that include race, gender, sexuality, economics, class, war, and politics, among others. Part of the American artistic experience concentration and music minor. It may be taken as an elective. **Class 4, Credit 4 (offered annually)**

0505-467 **American Film Since the 1960's**
This course examines the history and aesthetics of the motion picture industry in the U.S. since the late 1960's, when the classical studio period ended. Emphasis will be placed on the analysis of both the work of major American filmmakers and the evolution of major American film genres. Among the filmmakers to be studied are Altman, Coen Scorsese, Allen, Coppola, Seidelman, Lee, Tarantino, and Lynch. The course will consider the evolution of the traditional Hollywood genres, the development of new genres, the rise of the blockbuster, the rise of the independents, and the aesthetic changes that have occurred since the 1970's. Part of the American artistic experience concentration; the art history concentration and minor; and the theatre arts minor. May also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-468 **Art of India and Southeast Asia**
A survey outlining the development of art in India and Southeast Asia examining the philosophical circumstances that distinguish eastern artistic traditions. There is opportunity for each student to pursue special interest in depth. Part of the art history concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-469 **Art of China, Korea and Japan**
A survey outlining the development of art in China, Korea and Japan examining the philosophical circumstances that distinguish eastern artistic traditions. There is opportunity for each student to pursue special interest in depth. Part of the art history, Chinese language/culture and Japanese language/culture concentrations and minors; the art history concentration and minor; and may also be taken as an elective. Part of the international studies East Asian track. **Class 4, Credit 4 (offered annually)**

0505-470 **American Popular Song 1830-1950**
This course will survey the American popular song and its composers and performers taking into account the political, social and historical perspectives reflected in this commercial part of the vernacular music tradition. Part of the American artistic experience concentration; the music concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-471 **American Popular and Rock Music**
This course examines the history and elements of popular and rock music in the US from the end of the 19th century to current times. Emphasis will be placed on the music that was written and performed after World War II. Students will be introduced to various styles of this genre as well as an introduction to those musical elements necessary to define a rudimentary analysis of the music. Among the composers and performers to be studied are early minstrel performers; Louis Armstrong; Scott Joplin; George Gershwin; blues musicians; Benny Goodman; Frank Sinatra; rhythm and blues musicians; country and western; Elvis Presley; Ray Charles; folk; Jimi Hendrix; disco; punk; metal; grunge and pop. Part of the American artistic experience concentration; the music concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-480 **Women and the Visual Arts**
Examines the image of women in the visual arts and the role of women as image makers. Major topics include the variety of images of women, the evolution and change of these images over time, media images (as differentiated from fine art images) of women, images of women by women and by men, women's images and the issues of their relationship to the images made by men, the nude and pornography, history of women artists, selected women artists and their work, relation of their work to the art of the period, current issues and status of women artists. Part of the art history concentration and minor and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0505-482 **Beethoven**
Introduction to the music of Beethoven in the psychological, political and philosophical contexts that gave it shape and force. Using the classical style of Haydn and Mozart as background, the course will focus on the development of the "Dionysian" personality in Beethoven's compositions and the creation of the sublime in music. Part of the German language/ culture concentration and minor; the music concentration and minor; and may also be taken as an elective. (0505-459 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0505-483 **Bach and the Baroque**
This course provides a study of Johann Sebastian Bach, his life and times, and his music in the context of Baroque styles and aesthetics. Compositions from each of the major periods of his creative life are examined and discussed, particularly as they serve the social and religious purposes for which they were written and as they reveal the psychology of so called 'Rhineland mysticism.' Part of the German language/culture concentration and minor; the music concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-484 **Romanticism in Music**
Survey of the rise of German romanticism from Beethoven to Strauss in the context of the development of 19th century musical styles in general. Part of the German language/culture concentration and minor; the music concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-485 **Music Theory II**
This course is for the student who has completed music theory I or a comparable program of study. In addition to the continuing study of melodic construction and development, thematic development in two part counterpoint, four-part harmony, and analysis of form and style, emphasis is placed on the development of individual musical skills. Part of the music concentration and minor and may also be taken as an elective. (0505-449 or equivalent) **Class 4, Credit 4 (offered annually)**

0505-486 **German Theatre and Drama**
A broad survey of German language plays and theater styles since 1800 (all materials in English translation). Chief focus is on the dramas and theater practice of Bertolt Brecht (*Threepenny Opera*, *Mother Courage and Her Children*, *Good Person of Szechwan*, *Life of Galileo*, *The Caucasian Chalk Circle*). Emphasis is given also to developments in German theater through the period of the Berlin Wall (erected 1961, demolished 1989), and in the first decade after Germany's reunification. Class method includes practical experimenting with theatrical presentation. Part of the German language/culture concentration and minor and the theatre arts concentration and minor. It may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0505-487

Art of Islam

A survey of artistic traditions (to include architecture, decorative arts, art of the book and painting) from the seventh century onwards in countries from Asia, Africa, and Europe that were influenced by the religion of Islam. There will be an opportunity for each student to pursue special interests in depth. Part of the Arabic language/culture concentration and minor; the art history concentration and minor; and may also be taken as an elective. Part of the international studies Middle East program track. **Class 4, Credit 4 (offered occasionally)**

0505-489

Theatre Production Seminar/Workshop

Using seminar and workshop approaches, this course involves students in production dramaturgy (research applied to the staging of a play). These activities are then applied to preparing a production of that play. The specific features of both the dramaturgical and production activities will necessarily vary depending on the specific play being produced. As a general rule, dramaturgical research will consist of examining the play in question both as a particular idiosyncratic work with its own unique internal characteristics and as a work situated within larger theatrical and dramatic contexts. This research will commonly include a consideration of the social, political and cultural contexts from which the play emerged. Part of the theatre arts concentration and minor and may be taken as an elective. **Class 4, Credit 4 (offered annually)**

0505-491

Traumatic Images

This course investigates visual culture and its imagistic response to life's crises. Problems of identity and identification will be explored and confronted through works of photography, painting, mixed media, new media and film of the 19th, 20th and 21st Centuries. Beginning with the late 19th Century vogue for images of 'hysterical' women, crippled 'black-sheep' family members and dead loved ones (as corpses and as ghosts), we then move on to consider the last century's fascination with pain and suffering, disease and violence, struggle and survival and then the 21st Century's emphasis on terrorism. Specifically, we will focus on the gendering of images and imaging as disturbing pictures work to defy the formal and theoretical distinction between private and public, personal and collective experience and manage the often conflicting responsibilities to self, family, religion, race, nation and society. **Class 4, Credit 4, (offered annually)**

0505-500

African-American Art

This course provides an overview of African-American art, presented in three periods: from slavery to World War I, from the Harlem Renaissance and related movements of the 1920's to social realism of the 1930's, and from modernist abstraction following WWII to postmodern representations of Black identity. There will be a particular focus on representations of African-Americans as well as representations by African-Americans in art and film as we move through these periods. African and American/European cultural and visual sources are introduced, where appropriate, to create a comparative context for the art work studied. We will be sensitive to the development of artists' work. Part of the art history concentration and minor and the American artistic experience concentration. It may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0505-502

Shakespeare: Dramatist

This is a course in Shakespeare's drama that emphasizes the plays as potential theatre productions. While studying five or six plays representative of the different acknowledged types of Shakespearean drama (comedy, tragedy, history, problem comedy, romance), students will gain a broad understanding of the character and range of Shakespeare's poetic-dramatic art. Experimenting on selected production activities, they acquire a practical appreciation of Shakespearean drama's theatrical potency, of the original staging conventions, and how each type of play makes particular generic demands on both the reader and spectator. A term research project will focus on the history of a single play's staging interpretation. Part of the theatre arts concentration and minor and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-504

Memory, Memorials and Monuments

In this course we examine the public remembering and memorialization of historic events that lead to memorials and monuments in the fields of architecture, sculpture and film. We begin by examining the nature of memory, and specifically of collective memory, and its relationship to historical events and its subsequent transformation in the process of memorialization. We look at examples of the sculptural monument, a traditional form of memorial, and the evolution of its vocabulary in the second half of the 20th century. We also examine the memorial work undertaken by those museums whose primary function is to engage in remembering historical events, a recent phenomenon in the field of museum building. Part of the art history concentration and minor and the American artistic experience concentration. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0505-505

Art in the Age of the New Deal

This course will examine art in the age of the new deal; that is the art and context of the 1920's and the 1930's that spawned the works of the federal art projects of the 1930's. We will examine the role of the Roosevelt administration's new deal that fostered government sponsorship of the arts, including the visual arts, film, theater, literature, music and dance. We will examine the art produced through this sponsorship in the context of the evolution of 20th century modernism, mostly European, that had just begun to influence American art. We will look at the stylistic and ideological affinities of this figurative style, known as the American scene, with the Mexican muralists and other government-sponsored social realist art of the 1930's. Part of the art history concentration and minor and the American artistic experience concentration. It may be taken as an elective. **Class 4, Credit 4 (offered annually)**

History

0507-301

Modern American History

This course offers an analysis and interpretation of main themes in the history of the United States from the Civil War/Reconstruction Era (1865-1877) through contemporary America. **Class 4, Credit 4 (offered quarterly)**

0507-302

Modern European History

The course offers analysis of the political, social, economic, cultural and military events that have characterized the history of Europe from the modern period to the 20th century. Emphasis will be given to the ideas, events, movements and developments that have shaped the civilization of Europe and have contributed to the transformation, development and enrichment of other civilizations. One of the major goals of the course is not only to convey factual knowledge about the history of Europe from modern times to the 21st century, but to provide the history co-intellectual framework from which emerges the interconnection between European civilization and the rest of the world. Part of the international studies European track. **Class 4, Credit 4 (offered quarterly)**

0507-305

American History: Special Topics

Like the department's core course, 'History: Modern America,' this course will examine the political, social, cultural, and economic development of the American people in the modern period. The difference is that this course will do so by focusing on specific themes or topics to be chosen by the instructor, announced in the subtitle, and developed in the course syllabus. **Class 4, Credit 4 (offered quarterly)**

0507-306

Themes in European History

Like the department's core course, 'History: Modern Europe,' this course will examine the political, social, cultural, and economic development of the European people in the modern period. The difference is that this course will do so by focusing on a specific theme or topic, to be chosen by the instructor, announced in the subtitle, and developed in the course syllabus. **Class 4, Credit 4 (offered quarterly)**

0507-325

Honors History

Like the department's core course, "History: Modern American," this course will examine the political, social, cultural and economic development of the American people in the modern period, and study the United States in its foreign relations. The difference is that this course will do so by focusing on a specific theme or topic, to be chosen by the instructor, announced in the subtitle, and developed in the course syllabus. **Class 4, Credit 4 (offered occasionally)**

0507-401

American Women: Colonies-1848

American Women: Colonies-1848 considers the history of American women from the colonial era to the Seneca Falls convention of 1848. We will examine the experience of different races and classes of women from across the country, looking at Puritan women in Massachusetts and at planter's daughters in the Carolinas; at female slaves in the deep South and at mill workers in the urban North. We will investigate the impact of the American Revolution upon women and trace the emergence of the women's rights movement. Part of the history minor and concentration and the women's and gender studies minor. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0507-402 **American Women: 1848–Now**
American Women:1848–NOW considers the history of American women from the Seneca Falls convention to the first NOW convention. We will trace the rise of the women’s rights movement and the history of the struggle to secure the right to vote. We will also consider the role of women in other important nineteenth-century reform movements, including abolition, temperance, spiritualism, and progressivism. We will also look at the varied experience of American women in the twentieth century, including the impact of birth control on women’s lives, of access to higher education, and of second wave feminism. Part of the history minor and concentration, and the women’s and gender studies minor. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0507-410 **Terrorism, Intelligence and War**
Investigates the historical, political, moral, and legal dimensions of terrorism and intelligence. Uses a case-study approach with themes that include just war theory, terrorism in the colonial and post colonial worlds, domestic terrorism, and mechanisms of intelligence and covert operations. Part of the history concentration, and the American history and the modern world history minors. It can be taken as an elective. **Class 4, Credit 4 (offered annually)**

0507-411 **Origins of U.S. Foreign Relations**
Analyzes the roots of U.S. foreign policy, beginning with the American Revolution and continuing through the Spanish-American War. Examines the development of the US from a small eighteenth-century experiment in democracy into a late nineteenth-century imperial power. Topics include foreign policy powers in the Constitution, economic development, continental and overseas expansion, and Manifest Destiny. Part of the history concentration, and the American history and modern world history minors. It can be taken as an elective. **Class 4, Credit 4 (offered annually)**

0507-412 **Modern Japan: History, Fiction, and Film**
An introduction to modern Japanese history, highlighting social and aesthetic traditions that have formed the foundation for Japanese literature and cinema. Explores how writers and directors have drawn on this heritage to depict historical experiences. Part of the history concentration and the modern world history minor. It can be taken as an elective. **Class 4, Credit 4 (offered annually)**

0507-441 **Modern U.S. Foreign Relations**
Examines the late-19th century emergence of the United States as an imperial power and its development into a twentieth-century superpower. Topics include American politics and foreign policy, the influence of racial and cultural ideologies on policy, isolation and intervention, the Cold War, and the Iraq wars. Required course for international studies program. Part of the history and global studies concentrations; the American history minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0507-442 **Contemporary Middle East**
This course analyzes the making of the contemporary Middle East from the rise of Islam to the present with special emphasis on the patterns of political development in the 20th century. Part of the history, international relations and Arabic language/culture concentrations; the history of the modern world and international relations minors; the political science minor; and may also be taken as an elective. Part of the international studies Middle East track. **Class 4, Credit 4 (offered occasionally)**

0507-445 **Modern Latin America**
Survey of the historical development of the Hispanic and Portuguese areas of the Americas from independence through the mid-20th century. The movement towards independence, the problems that emerged during the nineteenth century of forming unified nations and the problems of modernization in the twentieth century are all covered. The histories of selected countries are used to illustrate these issues. Part of the history, Spanish language/culture, and Latino/Latina/Latin American concentrations; the Spanish language/culture and history of the modern world minors; and may also be taken as an elective. Part of the international studies Latin American track. **Class 4, Credit 4 (offered occasionally)**

0507-446 **Europe Since 1945**
The course analyzes the major changes that have affected Europe since 1945. The focus in this course will be on the political and economic process of European integration from the Organization for European Economic Cooperation to the Treaty of Maastricht; the Single Market to the single currency; the Common Market to the transatlantic cooperation between the European Union and the United States; detente and perestroika to the new relations between the European Union and the Eastern European countries; Keynesian neo-capitalism to economic globalism and the new partnership between the European Union and the countries of the Mediterranean, the Middle East, Africa, Latin America and Asia. Part of the global studies and history concentrations; the European history and history of the modern world minors; and may also be taken as an elective. Part of the international studies European track. **Class 4, Credit 4 (offered occasionally)**

0507-447 **U.S. Since 1945**
U.S. since 1945 explores the major themes of history in post-war America, such as the emergence of the middle class; the civil rights movement; the women’s rights movement; the gay rights movement; the cultural revolutions of the 1960’s; the war in Vietnam; and the rise of the right in U.S. politics. Part of the history minor and concentration. May be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0507-448 **History of Russia to 1917**
A journey into Russian history featuring explorations of the role of the Vikings in early Russia, the Kievan Era, the Mongol domination, serfdom, Ivan “the Terrible,” Peter “the Great,” Catherine “the Great,” Nicholas II and Alexandra, revolutionary personalities and movements, and the decline and fall of the Tsarist autocracy. Part of the history and Russian language/culture concentrations; the European history and history of the modern world minors; the Russian language/culture minor; and may also be taken as an elective. Part of the international studies European track. **Class 4, Credit 4 (offered occasionally)**

0507-449 **History of Russia Since 1917**
This course is an exploration to the Russian past of the late 19th, 20th, and early 21st centuries highlighted by inquiries into the Russian revolutionary leaders and their programs, the causes and courses of the revolutions of 1905 and 1917, Lenin and the formation of the Soviet Union, the Stalinist regime, the Great Fatherland War, postwar recovery, de-Stalinization under Khrushchev, Brezhnev’s regime, Gorbachev’s reforms and the implosion of the Soviet Empire, Yeltsin’s “shock therapy,” and “Managed Democracy” under Putin and Medvedev. Part of the Russian language/culture concentration; the history concentration; the European history and history of the modern world minors; and may also be taken as an elective. Part of the international studies European track. **Class 4, Credit 4 (offered occasionally)**

0507-450 **Stalin, Mussolini, Hitler**
This course is an inquiry into European affairs during the years 1918–1945 describing and analyzing the political, territorial, economic, and social consequences of World War I; the origins, nature and significance of the Community regime under Joseph Stalin in Russia; the Fascist regime under Benito Mussolini in Italy; and the Nazi regime under Adolf Hitler in Germany; the disintegration of the international order in the inter-war years; and the outbreak and course of World War II. Part of the history concentration; the history of the modern world and European history minors; and may also be taken as an elective. Part of the international studies European track. **Class 4, Credit 4 (offered occasionally)**

0507-451 **History of Rochester**
A history of the local community, the history of Rochester, with special focus on its important place in national issues like cutting edge transportation, women’s rights, abolition, and modern business. Part of the history concentration, the American history minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0507-453 **United States and Latin American History**
The emphasis is on analyzing the United States’ relations with Latin America from independence to the present. Part of the history concentration; the Spanish language/culture concentration and minor; and may also be taken as an elective. Part of the international studies Latin American track. **Class 4, Credit 4 (offered occasionally)**

0507-462 **Civil War and Reconstruction**
A course which examines the Civil War Era (1850's–1870's) from military, social and political perspectives. Students will consider the causes of the war, its development between 1861 and 1865, and some of its consequences in American society during the reconstruction era. Part of the history concentration; the American history minor, the history of the modern world minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0507-463 **American Deaf History**
This course explores the history of the deaf community in the United States. It examines the foundation of schools for the deaf, the birth of American Sign Language, and the emergence of deaf culture, all within a 19th century context. 20th century events, such as the rise of oralism, the hearing oppression of the deaf, and the fight for deaf civil rights are also considered. Part of the American Sign Language, and history concentrations; and the deaf studies concentration and minor. Part of the American history minor and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0507-464 **Environmental Disasters American History**
Students will study the ways in which environmental disaster has impacted American thought, culture and politics. The course will focus on a range of topics, such as natural disasters, man-made disasters, western expansion, the technological domination of nature, and conservation and environmental politics. Part of the history concentration; the environmental studies concentration and minor; the American history minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0507-465 **Survey of African-American History**
This course examines the history of African-Americans from the colonial era through the 20th century. Students will consider a variety of themes: the Middle Passage, the creation of slave cultures, resistance to enslavement and the rise of free black communities, emancipation, civil rights struggles in the 20th century, and several other topics. Part of the history concentration; the American history minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0507-466 **American Slavery, American Freedom**
This course examines debates over the institution of slavery and the meaning of freedom in antebellum American society. Students will study the history of enslavement in American society before the Civil War, including such topics as the creation of slave culture, slave rebellion, and relations between masters and enslaved people. In addition, students will study movements against slavery by abolitionists, politicians and free black activists. Part of the history concentration; the American history minor; the history of the modern world minor; and the legal studies minor. It may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0507-467 **Disabilities in American History**
This course will explore the meaning of disability in the nineteenth and twentieth centuries. The course provides a cultural overview of disability and seeks to explore the social construction of disability, with special attention given to the cultural, intellectual, personal, and social histories of disability. Disability in history has been many (frequently contradictory) things: acquired at birth and acquired by war; a reason to promote eugenic policies or a reason to promote civil rights legislation; a medical diagnosis or a personal identity; visible in the body (as in the case of amputations) or invisible (as in the case of deafness); a source of family shame or a source of personal pride. How has the meaning and nature of disability changed over time? How can we understand the cultural meaning of the body in history? The course seeks to explore and explain these shifting meanings of disability within the context of Western history. Specific topics to be considered include freak shows, disabled veterans, prosthetic technologies, disability as culture, the history of eugenics, and political activism. Part of the history minor; may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0507-468 **The United States and Japan**
This course examines the United States-Japanese relationship from the perspectives of diplomacy, economics, and culture. Fluctuating sharply during its 150 years, this relationship has featured gunboat diplomacy, racial conflict, war, and alliance. The course investigates United States-Japanese relations in the contexts of modernization, imperialism, World War II and the Cold War. Part of the history and Japanese language/culture concentrations; and the history of the modern world and Japanese language/culture minors; and may also be taken as an elective. Part of the international studies East Asian track. **Class 4, Credit 4 (offered annually)**

0507-469 **Special Topics in History**
Topics will vary, but the course number will remain the same. Be sure not to repeat the same topic. Part of the history concentration, and it may be taken as an elective. (0507-301 or 0507-302 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0507-473 **European Deaf History**
This course explores European deaf history, from the eighteenth to the twentieth century. The roots of the deaf educational system, including the so-called war of the methods between manualism and oralism in the Western world, will be explored. The birth of the deaf community and the transformation of physical deafness into cultural deafness across the European continent will receive special attention. The impact of the holocaust on the European deaf community will also be discussed. Specific national histories that may be considered include England, France, Germany, and Spain. This course may be taken as an elective. Part of the ASL concentration; the European history minor and deaf studies concentration and minor. **Class 4, Credit 4 (offered annually)**

0507-474 **America's National Parks**
The national parks are some of America's most treasured and spectacular landscapes, but even these wild places are the product of historical forces. In this class we will explore the history of America's national parks, and use these spaces to unpack the relationship between Americans, their land, and their history. Part of the American history concentration and minor and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0507-475 **Hands-On History**
Get hands-on experience researching, interpreting, and writing history. The class will tackle a common historical theme (announced in the sub-title), then do original historical research on a topic of your choice within the overall theme. Our themes do not just rehash old topics with little new information to uncover. Instead, we focus on relatively unexplored areas of the past, where your research can shed new light on unknown topics. You will learn about history by doing it! Part of the American history minor and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0507-476 **Diversity Deaf Community**
Students in this course will be introduced to the study of diversity in the deaf community related to race, ethnicity, sexuality and other factors. Students will learn to analyze the implications of such diversity in terms of self-perception, self-esteem, and acculturation. Students also will learn how the deaf experience transcends race, ethnicity and other factors to bond members of the deaf community and help define deaf culture Part of the ASL/deaf cultural studies minor and concentration. May be taken as an elective. **Class 4, Credit 4 (offered annually)**

0507-477 **Oppression in the Lives of Deaf People**
Students in this course will examine various forms of oppression across different cultures and communities. Students will analyze the influence of oppression on minority groups with respect to resistance and the struggle for social justice. Finally, students will examine and apply experiences of other minority groups in recent history to the deaf community. Part of the ASL/deaf cultural studies minor and concentration. May be taken as an elective. **Class 4, Credit 4 (offered annually)**

0507-478 **Histories of Globalization**
This course examines narratives of globalization as human process. We will focus on contemporary and historical issues that are routinely conceived of as affecting or pertaining to the world's population in its entirety, such as human rights, humanitarianism, environmental degradation, trade, and military power. The world and its population will feature as a unit of analysis, and an emphasis will be placed on issues that appear to be in tension with the role of the nation-state and nationality, and highlight world and global citizenship. We will explore critiques of the conceptualization of globality and worldliness as a factor in determining social, cultural, and historical change. Part of the history concentration. **Class 4, Credit 4 (offered occasionally)**

0507-479 Introduction to African and Diaspora Studies
This course is an introduction to the study of an enormous continent, Africa and its diaspora. Because of the dimensions of the geography, population and time covered, one of the main purposes of this course is to pave the way to narrower regional or thematic classes. This course will emphasize the interdisciplinarity of African and diaspora studies. We will explore contrasting and complementing disciplinary perspectives on Africa and its diaspora. We will move our way through African and diasporic cultures and histories both temporally and thematically. Lectures will introduce key themes and ideas, and you will discuss textual and visual evidence for African and diasporic communities, cultures and ideas. This course is suitable to those new to the study of Africa and its diaspora, and to those who are considering taking further classes or seminars in African and/or diasporic studies. Part of the international studies program in a related track; the sociology/anthropology concentration; and the African studies concentration. Part of the history concentration and minor. **Class 4, Credit 4 (offered occasionally)**

0507-481 Global Slavery and Human Trafficking
This course examines historical and contemporary dimensions of global slavery and human trafficking. The trans-Atlantic slave trade was the world's largest forced migration between continents, but it was only one of many slave trades that shaped societies throughout the world. In order to understand the historical significance of global slave trades, we will compare it to other systems of slavery. In examining the historical significance and legacies of the slave trade, we will link different regional histories to the growth of market-based capitalist economies into the twentieth century. The course will also examine the changing meaning of the term 'slavery' and examine some modern forms of forced labor, bondage, and slavery that persist to this day in all sectors of the global economy. We will explore the rise of human trafficking, and global anti-trafficking programs and campaigns. Part of the international studies degree program in a related track; the sociology/anthropology concentration; and the history concentration and minor. **Class 4, Credit 4 (offered occasionally)**

0507-483 Histories of Christianity
Traces the development of Christian thought and practice in the West from Christianity's origins to the present. The course opens with the Hellenistic invasion of Palestine and the formation of the early Church and its canonical scripture. It examines the major changes in Christianity, from the production of its canonical texts, to its flourishing as an established church. Readings typically include the Gospel of Matthew, decisions of Councils, Augustine, Aquinas, Erasmus, Luther, Calvin, Paley, Victorian authors, Barth, as well as background readings and a text. Part of the religious studies and history concentrations; the history of the modern world minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0507-485 Foundations of Asian Civilization
This course provides an overview of the Confucian and Buddhist worlds in East Asia, focusing on China and Japan, their origins, and cultural characteristics. Part of the history minor and concentration. Part of the international studies East Asia track. May be taken as elective. **Class 4, Credit 4 (offered annually)**

0507-486 20th Century China and Japan
This course provides an examination of social, political, cultural, and economic developments of both China and Japan in the twentieth century. Part of the history concentration and minor. Part of the international studies degree program East Asia track. May be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0507-487 Communist China
An analysis of the main characteristics of Chinese Communism, its native roots, Marxist/Leninist elements and Maoist innovations. It also examines the causes for the rise of communism in modern China, the context and process of its development, as well as contributions and problems communism brought to the Chinese people. In addition, China and the world are examined. Part of the Chinese concentration and minor; the history concentration; the history of the modern world minor; and may also be taken as an elective. Part of the international studies East Asian. (0507-301, 302 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0507-488 Modern Germany
This course provides a study of Germany during the nineteenth and twentieth centuries, beginning with the unification of Germany in 1871 and tracing the political evolution of the nation to the present. Special attention will be given to the rise of Nazism. Part of the history concentration and minor. May be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0507-489 Japan in the Modern World
An examination of social, economic, political and intellectual developments of Japan in the nineteenth and twentieth centuries with an analysis of how Japan has reached such a significant status in the contemporary world. Part of the history and Japanese language/culture concentrations; the history of the modern world and Japanese language/culture minors; and may also be taken as an elective. Part of the international studies East Asian track. (0507-301, 302 or equivalent) **Class 4, Credit 4 (offered annually)**

0507-490 History of Mexico
This course explores the historical development of Mexico, including the colonial period, independence movement, and the revolution of 1910. Twentieth century history will also be discussed. Part of the history minor and concentration. May be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0507-496 African History
This course provides an overview of African history and politics in three key phases: pre-colonial times, the colonial era, and the postcolonial period. Part of the history minor and concentration. May be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0507-498 Modern France
This course surveys the important events that formed French society, culture and politics from 1789, the outbreak of the Revolution, to the present. Topics range from the legacy of the Revolution and the cascade of short lived regimes begun in 1799, 1815, 1830, 1848, 1852, and 1870, to urban planning, colonialism, art, literature, religion, and the experience of three German invasions. This course will be valuable to students interested in French history, language, politics, or society, or any student who plans to visit France. Reading knowledge of French is not required. Part of the history and French language/culture concentrations; the history of the modern world and European history minors; and may also be taken as an elective. Part of the international studies Europe program track. **Class 4, Credit 4 (offered occasionally)**

Science, Technology, and Society

0508-211 Science, Technology and Values
This course explores the concepts and effects of science and technology in society, analyzes the relationship between science and technology, examines how each has come to play a major role today, and looks at how science and technology have affected and been affected by our values. This course also considers the environmental aspects of science and technology. Science and technology are often assumed to be value free, yet people, guided by individual and societal values, develop the science and technology. In turn, the choices people make among the opportunities provided by science and technology are guided by their individual values. This course fulfills a humanities core requirement. **Class 4, Credit 4 (offered quarterly)**

0508-212 Introduction to Environmental Studies
This course explores the human condition within an environmental context by emphasizing critical environmental problems facing humans on both a global and regional scale. The approach will be interdisciplinary. The issues, their causes, and their potential solutions will be analyzed with respect to ethical, social, historical, political, scientific, and technological factors. This course fulfills a humanities core requirement. **Class 4, Credit 4 (offered quarterly)**

0508-319 Arts of Expression
Like "science, technology and values" this course will explore value issues relating to science and technology. It will also consider the societal and environmental aspects of science and technology. The main difference is that this course will focus on a specific theme or topic that may emphasize science and values, technology and values, or the environmental aspects of science or technology. The theme or topic will be chosen by the instructor, announced in the subtitle, and developed in the course syllabus. This course fulfills a humanities core requirement. **Class 4, Credit 4 (offered occasionally)**

0508-325 Honors Science, Technology and Society
Like "science, technology and values" this course will explore value issues relating to science and technology. It will also consider the societal and environmental aspects of science and technology. The main difference is that this course will focus on a specific theme topic that may emphasize science and values, technology and values, or the environmental aspects of science or technology. The theme or topic will be chosen by the instructor, announced in the subtitle, and developed in the course syllabus. This course fulfills a humanities core requirement. **Class 4, Credit 4 (offered occasionally)**

0508-440 **History of Science**
This course is an introduction to the historical study of science, emphasizing the origins, character and development of Western science and its social, economic, cultural and religious contexts. The course features the physical sciences, with secondary coverage of the life sciences. Part of the science and technology studies concentration; the historical perspectives on science and technology minor; the science, technology and society minor; and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0508-441 **Science and Technology Policy**
This course examines how local, state, federal and international policies are developed to influence innovation, the transfer of technology and industrial productivity in the United States and other selected nations. Required course for the public policy and environmental science degree programs. Part of the science and technology studies concentration; the science, technology, and policy minor; the science, technology and society minor; the public policy concentration and minor; the sustainable product development minor; and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0508-442 **History of American Technology**
This course is an introduction to the historical study of technology in America. It examines major periods and persons, ideas and inventions, and important events in American technological history. It also examines the cultural context of American technology and its influence on American social, economic, political, and cultural institutions. Part of the science and technology studies concentration; the historical perspectives on science and technology minor; the science, technology and society minor; and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0508-443 **Face of the Land**
This course is a case study in the relationship of technology and society, involving off-campus field trips and focusing on the interaction of land, people and technology. By considering the natural landforms of the United States and other countries as appropriate, the students see how the nature of land determines its value. As technological innovations are made and introduced, old relationships with the land are altered, sometimes irreversibly. Through this study students have a concrete example of the positive and negative effects of technology on the social structure. Part of the science and technology studies concentration; the science technology and society minor; the environmental studies concentration and minor, the sustainable product development minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0508-444 **Social Consequences of Technology**
Modern society is increasingly based on technology. With each advance due to technology, unanticipated problems are also introduced. Society must define and solve these problems or the advances may be diluted or lost. In this course we study several interactions between technology and the world in which we live. We investigate how various technologies developed and compare the expected effects of the new technologies with the actual results. Part of the science and technology studies concentration; the science, technology and society minor; the science, technology, and policy minor; the sustainable product development minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0508-445 **Biomedical Issues: Science and Technology**
This course is a study of the impact of science and technology on life, our view of life and of the value issues that arise from this impact. Part of the science and technology studies concentration; the science, technology and society minor; the science, technology, and policy minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0508-446 **Makers of Modern Science**
This course approaches the history of science through studying biographies of modern scientists. Modern science is understood to be science from the scientific revolution of the sixteenth and seventeenth centuries to the present. Emphasis will be on recent scholarship devoted to analyzing science in context, i.e., the way it actually develops through the lives of individuals in particular social and political contexts. Part of the science and technology studies concentration; the historical perspectives on science and technology minor; and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0508-447 **Special Topics in Science and Technology**
This course allows for examination of a special problem or topical area in the field of science and technology studies. Topics and specific content and methods vary from year to year or term to term. Topics may vary, but the course number remains the same. Part of the science and technology studies concentration; the science, technology and society minor; the science, technology, and policy minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0508-449 **History of Women in Science & Engineering**
Using biographical and social-historical approaches, this course examines the history of women's involvement in science and engineering since the birth of modern science in the seventeenth century; the historical roots of gender bias in the Western scientific enterprise; and the influx of women into science and engineering since the mid-to-late twentieth century. Part of the science and technology studies concentration; the historical perspectives on science and technology minor; the women and gender studies concentration and minor (0522-449); and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0508-450 **History of Chemistry**
This course surveys the history of chemistry from antiquity to the present. Emphasis will be placed on developments since the Renaissance; on changing views of how matter is structured and how different substances react (or fail to react); and on the political, social and cultural contexts that influenced the rise of new chemical concepts and practices. Part of the science and technology studies concentration; the historical perspectives on science and technology minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0508-451 **Cyborg Theory: (Re)Thinking the Human Experience**
The developing cybernetic organism or 'cyborg' challenges traditional concepts of what it means to be human. Today medical science and science fiction appear to merge in ways unimagined a century ago. By exploring scientific and cultural theories, science fiction, and public experience, this class examines the history and potential of the cyborg in Western cultures. Part of the science and technology studies concentration; the science, technology and society minor; the science technology and society minor; and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0508-452 **Gender, Science and Technology**
This course explores the importance of gender within Western science and technology. It considers how masculine and feminine identities are socially and culturally shaped, how sex and gender are being significantly transformed, and how rethinking gendered practices may help make science and technology fairer and more responsive. Part of the science and technology studies concentration; the science, technology and society minor; the women and gender studies concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0508-460 **Environment and Society**
This course introduces the interdisciplinary foundations of environmental science via an analysis of sustainability. It will consist of one lecture and one lab per week. Labs will emphasize non-classroom based learning activities such as field trips. Initial course for the environmental science degree program. Required course for the public policy degree program. Part of the environmental studies concentration and minor; the science, technology, and society minor; the sustainable product development minor; the environmental modeling minor; the environmental science minor; and may also be taken as an elective. **Class 2, Lab 4, Credit 4 (offered twice annually)**

0508-463 **Great Lakes I**
The first course in a two-quarter sequence that approaches the Great Lake Ecosystem using the interrelated, inter-disciplinary principles of environmental science. The focus will be on sustainability as the foundation for environmental problem solving in the Great Lakes. The sequence will assess environmental issues involving the Great Lakes in the context of our local community, as well as in regional and global contexts. Within the matrix of scientific principles, students will consider the importance of government action, political science theory, public policy, ethics, economics, sociology, history, and engineering. The course will include a combination of classroom and field activities. Required course for the environmental science degree program. Part of the environmental studies concentration and minor; the sustainable product development minor; and may be taken as an elective. **Class 2, Lab 4, Credit 4 (offered annually)**

0508-464 **Great Lakes II**
The second course in a two-quarter sequence that approaches the Great Lake Ecosystem using the interrelated, inter-disciplinary principles of environmental science. The focus will be on sustainability as the foundation for environmental problem solving in the Great Lakes. The sequence will assess environmental issues involving the Great Lakes in the context of our local community, as well as in regional and global contexts. Within the matrix of scientific principles, students will consider the importance of government action, political science theory, public policy, ethics, economics, sociology, history, and engineering. The course will include a combination of classroom and field activities. Required course for the environmental science degree program. Part of the environmental studies concentration and minor; the sustainable product development minor; and may be taken as an elective. (0508-463) **Class 2, Lab 4, Credit 4 (offered annually)**

0508-482 **Energy and the Environment**
This course will examine contemporary energy issues, with particular emphasis placed on the environmental implications associated with energy consumption and production. Students will learn about various energy technologies and fuels (including nuclear, coal, oil, natural gas, solar, biomass, and wind) and the environmental tradeoffs associated with each of these energy systems. Part of the environmental studies concentration and minor; the science, technology, and policy minor; the sustainable product development minor; and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0508-484 **Environmental Policy**
This course introduces students to the environmental policy-making process. Students identify the consequences of major environmental legislation and regulations and examine the actions of both citizens and the corporate sector as they comply with these laws. They also focus on the economic and social implications and value of environmental regulation and enforcement and identify current developments in the area. Part of the environmental studies concentration and minor; the legal studies minor; the public policy and American politics concentrations and minors; the political science minor; the sustainable product development minor; and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0508-488 **History of Ecology and Environmentalism**
This course explores the history of ecological science, from the eighteenth century to the present, and it features the political use of ecological ideas in environmental debates, from the nineteenth century to the present. We investigate how social and political ideas have influenced ecological science, how ecological concepts have influenced Western politics and society, and how different generations of ecological researchers have viewed their role in society. Part of the environmental studies concentration and minor; the historical perspectives on science and technology minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0508-489 **History of the Environmental Sciences**
This course surveys the history of the environmental sciences from antiquity to the present. The environmental sciences include those sciences that deal with the earth's physical and organic environments, ranging from geology and biology to evolutionary theory and ecology. A prominent theme is the influence of social, religious, and political ideas on theories of how the earth and its plants and animals have evolved. Part of the environmental studies concentration and minor; the historical perspectives on science and technology minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0508-490 **Biodiversity and Society**
This course explores the problems, issues, and values stemming from the current massive loss of biodiversity. This course also explores why preserving or conserving biodiversity is considered to be important, and what mechanisms have been identified for its maintenance. Part of the environmental studies concentration and minor; the science, technology and society minor; the sustainable product development minor; and may also be taken as an elective. **Class 4, Credit 4 (offered bi-annually)**

0508-491 **Sustainable Communities**
This course uses the concept of sustainability to explore the connections between natural and human communities, between nature and culture, and among environmental, economic, and social systems. The course also encourages learning outside the classroom. In the context of neighborhoods in the city of Rochester, students will observe firsthand the contemporary issues associated with urban communities that are seeking to achieve sustainability. Part of the environmental studies concentration and minor; the urban and community studies minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0508-500 **Science, Technology and Social Classics**
STS Classics are books that involve science or technology and that also have notable social significance. In this course students will read several such books to advance their understanding of how society learns about, explores, and evaluates science and technology. The seminar format for this course will also advance students' writing, speaking, and research skills. Part of the science and technology studies concentration; the environmental studies concentration and minor; the science, technology and society minor; and may also be taken as an elective. May be taken for arts of expression credit. **Class 4, Credit 4 (offered annually)**

0508-520 **Seminar: Historical Perspectives on Science and Technology**
This course is an upper-level undergraduate seminar that explores how recent generations of historians have studied, interpreted, and debated the development and influence of science and technology. Each offering of the seminar will focus on a particular topic or historical era. Students will read pivotal texts with the goal of discussing the quality of the research and trends in historical interpretation. Part of the science and technology studies concentration; the environmental studies concentration and minor; the historical perspectives on science and technology minor; and may also be taken as an elective. (Any two of the designated history of science or technology courses) **Class 4, Credit 4 (offered occasionally)**

0508-530 **Seminar in Science, Technology and the Environment**
This course is an upper level undergraduate seminar that explores a specific, in-depth STS issue, problem, or topic from multi-disciplinary perspectives. Students will read pivotal texts appropriate to the topic with the goal of formulating feasible and appropriate responses; experiential learning activities such as field trips may also be included. This course will utilize social theory to examine how science, technology, and our understanding of the environment are socially embedded and offer students a reflexive examination in how they can shape the world around them. Part of science and technology studies concentration; the environmental studies concentration and minor; the historical perspectives on science and technology; the public policy; and the science, technology and society minors. (Any two 0508 science, technology and society courses) **Class 4, Credit 4 (offered occasionally)**

0508-582 **Seminar Science, Technology and Environment**
This course is an upper level undergraduate seminar that explores a specific, in-depth STS issue, problem, or topic from multi disciplinary perspectives. Students will read pivotal texts appropriate to the topic with the goal of formulating feasible and appropriate responses; experiential learning activities such as field trips may also be included. This course will utilize social theory to examine how science, technology, and our understanding of the environment are socially embedded and offer students a reflexive examination in how they can shape the world around them. Part of the science and technology studies concentration; the environmental studies minor; and the science, technology, and policy minor. (Any two 0508 science, technology, and society courses) **Class 4, Credit 4**

Philosophy

0509-210 **Introduction to Philosophy**
An introduction to some of the major problems, methods and insights of philosophy with readings from both classical and contemporary sources. Satisfies a liberal arts core requirement. **Class 4, Credit 4 Offered several times annually**

0509-211 **Introduction to Ethics**
This course is an introduction to central questions of ethics. Some of the questions that are examined are these: What are the grounds for moral obligations like keeping promises or obeying the law? Is there a place for moral values in a world of facts? How is human nature related to morality? How do we reason about what to do? Can reason determine how we ought to live? What are moral judgments? Is there an ultimate moral principle? Are there universal goods? What constitutes a morally worthwhile life? Can morality itself be challenged? Satisfies a liberal arts core requirement. **Class 4, Credit 4 (offered several times annually)**

0509-213 **Critical Thinking**
An introduction to philosophical analysis, especially as it may be applied in contexts other than professional philosophy. Satisfies a liberal arts core requirement. **Class 4, Credit 4 (offered several times annually)**

0509-325 **Honors Philosophy**
A critical examination of issues in some area of philosophy, but especially geared for honors students and others who wish to participate in an honors section. **Class 4, Credit 4 (offered annually)**

0509-440 **Philosophy of Religion**
This course will critically examine definitions, assumptions, and arguments central to religion. Topics may include interpreting the nature of religion, arguments for and against the existence of God, the relation between theology and philosophy, the relation between God and the world, paganism, the problem of evil, and the nature of religious language and experience. Part of the philosophy degree program, the religious studies concentration, the philosophy concentration and minor and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0509-441 **Logic**
This course is an introduction to the basic principles of logic. The main emphasis is on symbolic or formal logic, but some attention may be paid to informal logic as well. Required course for the philosophy degree program. Part of the philosophy concentration and minor and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0509-442 **Philosophy of Art and Aesthetics**
This course introduces students to thinking philosophically about the nature of art and its relation to other human experiences. Among the topics considered are the aesthetic experience, the relation between morality and art, ugliness in art and truth in art. Part of the philosophy degree program, the philosophy concentration and minor and may also be taken as an elective. (One philosophy course or consent of instructor is strongly encouraged.) **Class 4, Credit 4 (offered occasionally)**

0509-443 **Philosophy of Science**
This is an examination of the nature of the scientific enterprise; possible discussion topics include the presuppositions of science, its logic, its claims to reliability, and its relationships to society and to problems of human values. Part of the philosophy degree program; the science and technology studies concentration; the science, technology and society minor, the philosophy concentration and minor; and may also be taken as an elective. (At least one prior course in either philosophy or one of the natural sciences: physics, chemistry, biology) **Class 4, Credit 4 (offered occasionally)**

0509-444 **The Great Thinkers**
This course introduces students to the thought of some of those philosophers who have been most influential in the history of ideas. An attempt is made to cover in some depth the works of one or more of those 'Great Thinkers.' Students will begin to recognize the enduring nature of some of our most pressing problems, as well as the intellectual foundation of proposed solutions. Part of the philosophy degree program, the philosophy concentration and minor and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0509-445 **Social and Political Philosophy**
This is an examination of some of the main problems of social and political philosophy through an analysis, comparison and critical examination of various views concerning the natures of individuality and society, the relations between them and the dependence of one on the other. Part of the philosophy degree program, the global justice and peace studies concentration, the philosophy concentration and minor and may also be taken as an elective. (At least one prior course in philosophy, political science or sociology) **Class 4, Credit 4 (offered occasionally)**

0509-446 **Philosophy of Law**
This is an introduction to philosophical analysis centering on the nature, extent and justification of law, the nature of legal thought, and the problems and theories of justice. Part of the philosophy degree program, the global justice and peace studies concentration, the philosophy concentration and minor, the legal studies minor and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0509-447 **Contemporary Moral Problems**
This course examines ethical questions that arise in the course of day-to-day individual and social life. While some consideration will be given to ethical theory and its application to such questions, emphasis will be on the practical issues. Examples of typical issues to be examined are capital punishment, euthanasia, abortion, the treatment of animals, corporate responsibility, and so forth. Part of the philosophy degree program, the philosophy concentration and minor and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0509-448 **Philosophy of Peace**
This is an introduction to some of the philosophical dimensions of the search for world peace, including the elements that would constitute a just and lasting peace, nations as moral entities, justice and national self-interest, force and violence, the morality of the use of force, peace-making and peace-keeping groups. Part of the philosophy degree program, the global justice and peace studies concentration, the philosophy concentration and minor and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0509-449 **Special Topics**
This is a critical examination of issues in some area of philosophy not covered in other philosophy courses. Part of the philosophy degree program, the philosophy concentration and minor and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0509-450 **Seminar in Philosophy**
Students will examine some area of philosophy at an advanced undergraduate level. The area examined will vary from year to year. The seminar is designed especially for those whose interest in philosophy goes beyond the requirements of the liberal arts curriculum. Part of the philosophy degree program, the philosophy concentration and minor and may also be taken as an elective. (Two courses in philosophy or permission of the instructor) **Class 4, Credit 4 (offered annually)**

0509-451 **Professional Ethics**
This course critically examines ethical issues that arise in professional life. The course will examine not only the general relationship between ethics and professional life, but the particular consequences of ethical considerations within the student's own profession and the professions of others with whom the student must live and work. Part of the philosophy degree program, the philosophy concentration and minor and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0509-452 **Philosophy of Technology**
Technology is a ubiquitous and defining force in our world. The course investigates how our conceptions of technology have emerged within philosophy, as well as the role technology plays in shaping how we live and how we reflect upon questions of meaning and value in life. Technological modes of understanding, organizing and transforming the world shape our relationships with others, with ourselves and with nature at fundamental levels. We will explore how these modes have emerged and why they emerged so predominantly within a Western social and intellectual context. Part of the philosophy degree program; the public policy degree program; the philosophy concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0509-453 **Environmental Philosophy**
A variety of decision procedures may be and have been used to determine what to do regarding environmental issues. Each alternative can determine what is reasonable and moral, and assessing them presents theoretical problems. We examine each in terms of morality, examine their presuppositions and consequences, determine whether we can assess them, and if so, how. Students begin to learn to be conscious of and assess the decision procedures that are often buried in policy recommendations regarding particular environmental problems. Part of the philosophy degree program; the philosophy concentration and minor; the environmental studies concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0509-454 **Feminist Theory**
This course explores the nature and effects of categories of sex and gender upon our ways of living, thinking and doing, while also challenging how gendered assumptions might shape our conceptions of identity and inquiry more generally. Different conceptions of sex and gender will be discussed, and the course will investigate how these concepts affect our lives in both concrete and symbolic ways. Special attention will be paid to how gendered assumptions color our understanding of knowledge production, experiences and emotion, public and private activities, and the nature of ethical decision making. Part of the philosophy degree program; the philosophy and the women's and gender studies concentrations and minors; and may also be taken as an elective. (One prior course in philosophy recommended.) **Class 4, Credit 4 (offered occasionally)**

0509-455 **Theories of Knowledge**
Epistemology, or the theory of knowledge, examines how we come to know what we know. This course covers historical and contemporary approaches to the question of what knowledge is, what makes a belief true, and how beliefs are justified. Philosophical skepticism, the position that we actually know nothing at all, will also be discussed, as will possible responses. Other topics may include feminist epistemology, naturalism, the internalism/externalism debate, and the application of epistemology to other fields. Part of the philosophy degree program, the philosophy concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0509-456 **Ancient Philosophy**
This course examines the origin and development of Western philosophy in ancient Greece from Thales in the sixth century down to at least the fourth century B.C.E., concentrating on the central ideas of the pre-Socratics, the Sophists, Socrates, Plato, and Aristotle. Some attention might also be given to the Hellenistic philosophers (Epicureans, Stoics, and Sceptics). This was a period of remarkable intellectual creativity in philosophy, mathematics, medicine, rhetorical theory, aesthetics and cosmology. Questions to be considered in this course will include: What are the nature and limits of knowledge? Is knowledge even possible? What is the nature of language? How reliable is perception? What is the true nature of reality? What is the origin and nature of the material world? Is moral knowledge possible? What is the nature of happiness, and what sort of life would make people happy? Part of the philosophy degree program; the philosophy concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0509-457 **Modern Philosophy**
This course examines the history of modern philosophy, from Descartes through Kant. This period marked the beginning of modern science, with a rich ferment of ideas, and the philosophy of the period is essential to understanding modern science as well as contemporary problems about consciousness, mind/body interaction, causation and so on. Questions to be considered in this course include the following: What is the scope and what are the limits of our knowledge? What is the nature of reality? Do we have access to reality? How is causal interaction possible, if at all? Does God exist, and if so, how do we know and what relation does God have to the world? Part of the philosophy degree program; the philosophy concentration and minor; and may also be taken as an elective. Part of the international studies European track. **Class 4, Credit 4 (offered annually)**

0509-458 **Philosophy of the Mind**
The philosophy of mind is a fairly large category. It includes issues of metaphysics, epistemology, logic, psychology, aesthetics, logic, linguistics, cognitive science, artificial intelligence and biology, to name a few. Here are some typical questions which writers in the philosophy of mind often find interesting: Is there an ontological difference between minds and bodies? Could there be minds without bodies? Can I know that I have a mind? How do I come to know that? Are there other minds in the universe? Can I be conscious of my own consciousness? Can other things have the kinds of experiences which I have? Part of the philosophy degree program, the philosophy concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0509-459 **Philosophy of the Social Sciences**
This course examines the methods, foundations, assumptions and purposes of the social sciences. In particular, it will examine the ways in which 'science' and 'non-science' are distinguished, as well as the similarities and differences between the social and natural sciences. Special attention will be paid to the ways in which both Anglo-American and European philosophical traditions approach the social sciences. Other topics may include the role of values in social scientific inquiry, the process of explanation and theory confirmation in the social sciences, and various conceptions of interpretation and meaning in the social sciences. Part of the philosophy degree program; the philosophy concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0509-460 **East Asian Philosophy**
This course is an introduction to the origin and development of the philosophical traditions of China, Tibet, and Japan through a consideration of selected thinkers, schools, and classic texts of Buddhism, Daoism, Confucianism and Zen. Questions of metaphysics, epistemology, and ethics are emphasized with reference to the nature of reality and the person, social harmony and self-realization, causality, right action and enlightenment. Comparisons may also be made with western philosophers, both contemporary and classical. Part of the philosophy degree program; the religious studies concentration; the philosophy concentration and minor; and may also be taken as an elective. Part of the international studies East Asian track. **Class 4, Credit 4 (offered occasionally)**

0509-461 **American Philosophy**
This course examines the contributions of American philosophers from the colonial era to the present day. From the New England Transcendentalists of the 19th century to the Pragmatism and Neo-Pragmatism of the 20th and 21st, American philosophy has responded to the demands of a pluralistic, ever-changing society. Because American philosophy is a reflection of American culture, it has also offered a unique perspective on perennial philosophical problems in ways that have differed sharply from dominant forms of European philosophy. Authors may include Ralph Waldo Emerson, Henry David Thoreau, Frederick Douglass, Susan B. Anthony, C.S. Pierce, Jane Addams, William James, Black Elk, John Dewey and Richard Rorty. Part of the philosophy degree program, the philosophy concentration and minor and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0509-462 **Contemporary Philosophy**
This course examines developments in philosophy since 1900. During this time philosophy evolved along with science, politics, and the arts. In some cases philosophy responded to new discoveries and theories while at other times it precipitated movements that had far reaching effects. A range of philosophical approaches may be discussed, including postmodernism, positivism, critical theory, existentialism, feminist theory, neo-pragmatism, and phenomenology. The connections among different approaches will also be addressed. Part of the philosophy degree program; the philosophy concentration and minor; and may also be taken as an elective. (At least one prior course in philosophy is required.) **Class 4, Credit 4 (offered occasionally)**

0509-464 **Philosophy of Action**
This course explores the three central philosophical issues of action theory: what is an action, what is an agent, and what is metaphysical freedom. The first part of the course examines the most significant theories of action and the different ways in which they characterize intentional behavior. The second part of this course explores the nature of agency. The third part of this course focuses on the classical problem of free will. Part of the philosophy degree program; the philosophy concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0509-465 **Critical Social Theory**
Introduces students to models of cultural critique that arose in pre-war Germany and that have burgeoned since. These models combine philosophical, aesthetic, economic and psychoanalytic methods of analysis. Among the topics considered are alienation and reification, hegemony or false consciousness, trauma, fetishism, the authoritarian personality and state, advertising and modern technology, and the relative autonomy of art. Part of the philosophy degree program; the philosophy concentration and minor; and may also be taken as an elective. (One previous course in philosophy or consent of instructor is strongly encouraged.) **Class 4, Credit 4 (offered occasionally)**

0509-466 **Existentialism**
Existentialism is distinguished by its emphasis on human existence and the way its meaning is created through actions and choices. Existentialism focuses on the concept of individual freedom in an effort to respond authentically to the possibilities which life presents, emphasizing the importance of certain psychological states (e.g., anxiety, anticipation of death, fear, care, responsibility and hope) and extreme situations in bringing us to an awareness of our radical freedom. This course will consider such philosophers and writers as Dostoevsky, Kierkegaard, Nietzsche, Berdyaev, Heidegger, Jaspers, Camus, Sartre, Kafka, Beauvior, Marcel, Buber, Ortega, and Unamuno. Part of the philosophy degree program; the philosophy concentration and minor; may be taken for the religious studies concentration with permission of advisor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0509-467 **Medieval Philosophy**
This course is an introduction to the philosophical thought during the medieval period (approximately 300 C.E. to 1500 C.E.). It will consider the thought of various major figures from the Christian, Jewish, and Islamic traditions, and will take up this period's two principal areas of concern: the philosophy of religion and theology, on the one hand, and metaphysics and epistemology, on the other. Part of the philosophy degree program; the religious studies concentration; the philosophy concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0509-468 **Metaphysics**
Metaphysics is the study of the general features of existence or reality. This course focuses on the fundamental concepts of being as developed in several major philosophers from the Greeks to the present. Discussion will focus on such topics as God, time, space, substance, essence, existence, process, causality, possibility, necessity, chance, and value. Part of the philosophy degree program; the religious studies concentration with permission of the advisor; the philosophy concentration and minor; and may also be taken as an elective. (One prior course in philosophy or permission of the instructor) **Class 4, Credit 4 (offered occasionally)**

0509-469 **Nineteenth Century Philosophy**
The 19th century marks a radical shift in the history of philosophy and culture and stands in its own right as a distinct period of thought between the modern era and the contemporary era. This course will consider such philosophical positions as idealism, empiricism, existentialistic romanticism, Marxism, evolution, nihilism, positivism, pragmatism, and the role of the arts and aesthetics. Philosophers considered include Schelling, Fichte, Hegel, Schopenhauer, Mill, Marx, Darwin, Kierkegaard, Nietzsche, Comte, Bradley, Green, Peirce and James. Part of the philosophy degree program; the philosophy concentration and minor; may be taken for the religious studies concentration with permission of the advisor; and may be taken as an elective. (One prior course in philosophy or permission of the instructor.) **Class 4, Credit 4 (offered occasionally)**

0509-470 **Philosophy and Literary Theory**
Introduces students to models of literary theory from the mid-twentieth century to the present and familiarizes them with the key works of literature to be analyzed. It prepares students to practice questioning and critiquing texts using the philosophical, aesthetic, economic and psychoanalytic methods of analysis which have come to form the foundation of contemporary literary theory. Among the topics considered are culture and imperialism, performativity, the encounter of modern literature and modern technology, structuralism and semiotics, the role of psychoanalysis, the role of the academy, and the relative autonomy of art. Part of the philosophy degree program; the philosophy concentration and minor; and may also be taken as an elective. (One course in philosophy or permission of instructor.) **Class 4, Credit 4 (offered occasionally)**

0509-471 **Philosophy of Film**
This course introduces students to models of film interpretation and critique that arose in pre-war Europe and that have burgeoned since; these models combine philosophical, aesthetic, economic and psychoanalytic methods of analysis. Among the topics considered are the nature of the image, ideology and alienation, trauma, fetishism, magical realism, realism and anti-realism in film. Part of the philosophy degree program; the philosophy concentration and minor; and may also be taken as an elective. (One prior course in philosophy or consent of the instructor) **Class 4, Credit 4 (offered occasionally)**

0509-474 **Philosophy of Language**
This course examines how philosophers and others have understood the nature of language. It explores the classical philosophical contexts in metaphysics, epistemology, aesthetics and rhetoric in which concerns about the nature of language arose. In addition, the course focuses on recent debates, within both contemporary analytic and continental traditions of philosophy. Some likely areas of inquiry will be: theories of reference, description and naming; theories of meaning, metaphor and narrative; functionalist, pragmatist and naturalist accounts; structuralism, post-structuralism, and hermeneutic accounts, among others. Part of the philosophy degree program; the philosophy concentration and minor; and may also be taken as an elective. (At least one prior course in philosophy is strongly recommended) **Class 4, Credit 4 (offered occasionally)**

0509-475 **Philosophy of Vision and Imaging**
This course examines how philosophers and others have understood the nature and primacy of sight. It explores how technologies of seeing and imaging have influenced theories of sight and our most dominant and authoritative practices of seeing and representing in the humanities and the arts, as well as in the natural and social sciences. The course will focus on the impact these theories and practices of seeing and representing - both analogue and digital - have on the nature of knowing, as well as on how they shape and mediate our experiences of personal and social identity and agency more generally. Part of the philosophy degree program; the philosophy concentration and minor; the religious studies concentration; and may also be taken as an elective. (At least one prior course in philosophy is strongly recommended) **Class 4, Credit 4 (offered occasionally)**

0509-476 **Ethical Theory**
This course examines the theoretical basis of ethics and morality, namely the theoretical commitments that enter into any judgment that a particular action is right or wrong. Possible topics may include: different ways of understanding the concepts of right and wrong; the existence or non-existence of moral facts; different criteria of moral actions; different conceptions of the good life. Part of the philosophy degree program; the philosophy concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0509-499 **Philosophy Co-op**
One quarter of work experience in a professional setting related to the philosophy major. (At least third-year standing and departmental approval required.) **Class 0, Credit 0, (offered variable times)**

0509-571 **Honors Philosophy**
This course is a critical examination of issues in some area of philosophy, but specially geared for honor students and others who wish to participate in an honors section. It may be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0509-595 **Senior Thesis in Philosophy**
This is a research seminar that provides students with the opportunity to initiate and complete an original research project. The course guides students through the early decisions necessary to plan and complete the thesis; provides instruction for specific methods of research; provides a guided time line to keep work on schedule; offers instructional feedback for individual sections of the thesis and affords opportunities for peer review. Part of the philosophy degree program. Cannot be taken to fulfill liberal arts requirements. **Class 4, Credit 4 (offered quarterly in consultation with faculty advisor)**

0509-599 **Independent Study**
A program of study executed by an individual student with assistance and guidance by an instructor, outside a classroom setting. Guidelines for designing and gaining approval for an independent study are provided in the liberal arts policy. **Class variable, Credit variable (offered quarterly in consultation with faculty advisor)**

Anthropology

0510-210 **Cultural Anthropology**
This course explores how human beings across the globe live and work according to different values and beliefs. Students will develop the tools for acquiring knowledge, awareness, and appreciation of cultural differences, and in turn enhance their abilities to interact across cultures. The course accomplishes these aims by examining the relationship between individuals and their communities, and the dynamics of ritual, religious, political, and social life in different parts of the world. Fulfills a liberal arts core social science requirement. Counts as a prerequisite for the sociology/anthropology concentration and minor and the international studies and urban and community studies majors as a prerequisite for cultures in globalization. **Class 4, Credit 4 (offered quarterly)**

0510-319 **AE: Ritual and Performance**
The world's cultural diversity is most vividly and dynamically displayed through ritual and festival. Yet, ritual is anything but superfluous; rather, some of the most important "work" of culture is accomplished through the performance of ritual. Through examination of performances in different cultures, we consider the cultural power of ritual and performance. Topics include the power of ritual symbols, world transformation, rites of passage, ritual and death, ritual and gender, ritual and childhood socialization, ritual and emotion, contestation of tradition and authenticity, ritual and community, hierarchy, and hegemony. Written expression is enhanced through drafting, revision, and peer review. Counts toward the arts of expression requirement or may be taken as an elective. **Class 4, Credit 4 (offered annually)**

0510-325 **Honors Cultural Anthropology**
Cultural anthropology is the study of cultural diversity and cultural change and professional anthropologists engage in experiential, empirical, and humanistic research. Anthropologists use techniques of immersion to gain a close, insider's view of a culture. Anthropological research addresses some of the most prominent and pressing social issues of our time, including international migration, mass media, changing views of gender and sexuality, racism, tourism, religious fundamentalism, ethnic nationalism, war and genocide, hunger and famine, and the globalization of popular culture. This course introduces cultural anthropology and each year it may focus on a different topic. Fulfills a liberal arts core social science requirement. Counts as the prerequisite for the sociology/anthropology concentration and minor. **Class 4, Credit 4 (offered occasionally)**

0510-440 **Cultures in Globalization**
Change in all subsystems of human culture is the norm on the planet earth for its human inhabitants in the 21st century. In particular, the stress and strain that accompany change challenge traditional lifeways among both indigenous and peasant societies in the developing world. The change is driven by many factors including global and local population growth and by the expanding world capitalist system through which technology is transferred and the culture of consumption is spread to the most remote corners of the globe. This course explores the problems created by the processes of globalization and a variety of solutions through citizen activism and public policy. Required course for international studies majors. Part of the sociology/anthropology concentration and minor; the globalization concentration; and may be taken as an elective. (0510-210, 0515-210 or equivalent) **Class 4, Credit 4 (offered annually)**

0510-442 **Cultures and Politics in Latin America**
This course introduces cultures of Latin America and the Spanish-speaking Caribbean in the context of political and economic forces that have shaped them. We examine Spanish and Portuguese colonialism and its modern-day legacies, including ethnic inequalities, economic vulnerability, and social unrest. We look at how art, music and literature have engaged critically with the forces of fascism, revolution, socialism, dictatorship, and neo-colonialism. We consider indigenous activism, religious diversity, changing experiences of women and men, rebellion and revolution, impacts of and creative responses to globalization, and Latinos in the U.S. Part of Latino/Latina American concentration; sociology/anthropology concentration and minor; the Native American science and technology concentration; the Spanish language/culture concentration and minor; and may be taken as an elective. Part of international studies program in a related track. (0510-210, 0515-210 or equivalent) **Class 4, Credit 4 (offered annually)**

0510-443 **Immigration to the United States**
This course examines immigration to the U.S. within the context of globalization. We examine the push and pull-factors that generate immigration, and changing immigration policies and debates. We consider how changes in the American workplace have stimulated the demand for foreign workers in a wide range of occupations from software engineer to migrant farmworker and nanny. We review the cultural and emotional challenges of adapting within the American cultural landscape; transnationalism and connections with the homeland; the experiences of refugees; and how immigration has changed since 9/11. Special attention is given to immigration from Latin America, the largest sending region. Part of the sociology/anthropology concentration and minor; the urban studies concentration and minor; the globalization concentration; and the international studies program in a related track. May also be used as an elective. (0510-210, 0515-210 or equivalent) **Class 4, Credit 4 (offered annually)**

0510-444 **The Global Economy and the Grassroots**
Economic globalization has given birth to global, grassroots social movements. This course examines how global economic integration is brought about through multilateral institutions, multinational corporations, outsourcing, trade agreements, international lending, and neoliberal reforms. We consider impacts (cultural, economic, and health) of these trends on employees, farmers, small businesses, consumers, and the environment in the developed and developing worlds (with special attention paid to Latin America). We examine beliefs, alternative visions, and strategies of grassroots movements responding to these challenges. Part of the Latino/Latina/Latin American concentration; sociology/anthropology concentration and minor; Spanish language/culture concentration and minor; the globalization concentration; and may be taken as an elective. Part of the international studies program in a related track. (0510-210, 0515-210 or equivalent) **Class 4, Credit 4 (offered annually)**

0510-445 **Global Cities**
This course examines the impact of global dynamics on cities from the early twentieth century to the present. By tracing urban formations from metropolis to global city, emphasis will be placed on the making of identities, communities, and citizens in the architectural spaces, cultural places, ethnic zones, and media traces of urban life in the context of globalization. This is a required core course for urban and community studies program. Part of the sociology/anthropology concentration and minor; the urban studies concentration and minor; the globalization concentration; and the international studies program in related tracks. May also be taken as an elective. (0510-210, 0515-210 or equivalent. Restricted to students in their second-year and above.) **Class 4, Credit 4 (offered annually)**

0510-446 **Native North Americans**
This course will examine persistence and change in Native American cultures using archaeological, ethnohistorical, ethnographic, linguistic, and autobiographical sources, among others. In addition to broad regional and historical coverage, we will read about and discuss culture change, colonialism, federal law, gender, race, and places in Native American contexts. Our goal is to understand the lived experiences of Indian people and the many forces that shape Native American lives. Part of the major in international studies (indigenous studies track); the Native American science and technology concentration; and religious studies concentration. **Class 4, Credit 4 (offered annually)**

0510-447 **Media and Globalization**
This course examines the cultural importance of mass media in the context of globalization. By analyzing the global flows of media images across national borders, emphasis is given to the cultural, social, and political impact of global media culture on communities in different parts of the world. How, for example, do mass media represent and shape cultural values and beliefs in developing societies? What is the role of mass media in forging national and ethnic identities, body images, cultural constructs of sexuality and gender, and the perceptions of war and violence in different societies? Part of the sociology/anthropology concentration and minor and the globalization concentration. May also be taken as an elective. (0510-210, 0515-210 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0510-448 **Native North Americans in Film**
This course will examine the parallels of anthropological works and resulting Government policies in the late-19th and 20th centuries as they relate to the genre of Native Americans film, both popular and ethnographic works. In addition, an extensive regional and historical literature review will complement the films. Part of the major in international studies in a related track; the Native American science and technology concentration; and the sociology concentration and minor. May also be taken as an elective. (0510-210, 0515-210 or equivalent). **Class 4, Credit 4 (offered occasionally)**

0510-449 **Sustainable Development**
Sustainable development is now generally defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." The term emerged from the report of the UN World Commission on Environment and Development, Our Common Future (Oxford University Press, 1987) under the leadership of Gro Harlem Brundtland, three times Prime Minister of Norway. The Brundtland Commission grew out of concern that global human eco-economic activities were leading to adverse impacts on local and global environments in the long term. Among important outcomes of the Brundtland report have been Earth Summits in 1992, 2002 and the Rio+20 in 2012, the Kyoto Accord and worldwide Agenda 21 programs. In particular the report noted that environmental problems resulted from unsustainable consumption in the global north and widespread poverty in the global south. This course will explore aspects of unsustainable human behavior, and possible solutions, from a cross-cultural and global perspective. The earth is viewed as a single ecosystem, a living self-regulating system. Human eco-economic activities, in local, regional, and global contexts will be viewed in terms of their impacts throughout the earth system. The course explores options for sustainable use of natural, social and political capital in urban and rural community settings. The course adopts the analytical approaches of anthropology and the system dynamics of human materialism. Counts toward the international studies major (globalization core elective), and the minor and concentration in sociology and anthropology. **Class 4, Credit 4 (offered annually)**

0510-451 **Global Sexualities**
This course explores issues of gender and sexuality in a global context. Students will be introduced to anthropological perspectives on the experience of men and women, as gendered subjects, in different societies and historical contexts, such as colonialism, nationalism, and global capitalism. In turn, we will explore how cultural constructions of masculinity and femininity are configured by race, class, ethnicity, and sexual orientation. Course materials are drawn from an array of sources, reflecting various theoretical perspectives and ethnographic views from different parts of the world. Part of the international studies major in a related track; the women's and gender studies concentration and minor; the sociology/anthropology concentration and minor; and the globalization concentration. It may also be taken as an elective. (0510-210 or 0515-210 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0510-452 **Bodies and Culture**
This course examines the body in culture, society, and history. Comparative approaches to the cultural construction of bodies, and the impact of ethnic, gender, racial ideologies on body practices (i.e. surgical alteration, mutilation, beautification, surrogacy, erotica). The formation of normative discourses of the body (regarding sexuality, AIDS/illness, reproduction, fat/food) in medical science, consumer culture, and the mass media. The course will be discussion, writing, and project-oriented, encouraging students to acquire a range of analytic skills through a combination of text interpretation and research. Part of the sociology/anthropology concentration and minor; the women's and gender studies concentration and minor; and may be taken as an elective. (0510-210 or 0515-210 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0510-454 **Visual Anthropology**
We see others as we imagine them to be, in terms of our values, not as they see themselves. This course examines ways in which we can understand and represent the reality of others through visual media, across the boundaries of culture, gender, and race. It considers how and why visual media can be used to represent or to distort the world around us. Pictorial media, in particular ethnographic film and photography, are analyzed to document the ways in which indigenous and native peoples in different parts of the world have been represented and imagined by anthropologists and western popular culture. Part of the major in international studies in a related track; the sociology/anthropology concentration and minor; the globalization concentration; and may also be taken as an elective. (Restricted to second-year students and above.) **Class 4, Credit 4 (offered annually)**

0510-455 **Special Topics: Anthropology**
Topics will vary, but the course number will remain the same. Be sure not to repeat the same topic. Part of the sociology/anthropology concentration and may be taken as an elective. (0510-210 or 0515-210 or equivalent) **Class 4, Credit 4 (offered annually)**

0510-457 **Divided Europe**
As Europe strives for political and economic unity, we see a concurrent push toward inequality, exclusion, and marginalization: minorities, immigrants, refugees, Blacks, Muslims, Jews, Roma or Sinti, and women struggle against discrimination. Not only the legacy of colonialism but the revitalization of nationalism shape contemporary European cultural politics. Based on an anthropological perspective, this course examines ways in which we can understand a divided Europe through the intersections of race, ethnicity, class, gender, and religion. Part of the major in international studies program in a related track; the sociology/anthropology concentration and minor; and may be taken as an elective. **Class 4, Credit 4 (offered annually)**

0510-459 **Cultural Images of War and Terror**
This course critically examines the visual culture of war and terror in a global world from an anthropological perspective. Representations of violence are endlessly transmitted on television, on the internet, in print media, in cinema, and recreational games to become part of our everyday visual culture. Whether disseminated as news, documentary truth, or entertainment, the ubiquitous encounters with images of violence require a new form of visual literacy that not only highlights the intersection of the local and the global, but also recognizes the ways in which visual technologies, cultural politics of memory and history, media practices and national ideologies intervene in the formation of a visual culture of war and terror. Part of the major in international studies program in a related track; the sociology/anthropology concentration and minor; the global justice/peace studies concentration; the globalization concentration. **Class 4, Credit 4 (offered occasionally)**

0510-460 **Genocide/Conflict/Justice**
The destruction and survival of societies often hinges upon ideas of tribe, ethnicity, religion, nation, sovereignty and belonging. When ideas fail to incorporate people, essentialist categories of identity, historical memory, and accounts of extreme violence become interrelated, potent sources of destruction. Slavery and exclusive ownership of resources leave people starving or living in perilously polluted environments. We will take critical, anthropological approaches to studies of genocide. Students will assess the destruction and survival of societies, from the 19th century slaughter of Native Americans and Amazonian Indians to more recent genocides in Cambodia, Bosnia, Rwanda, and the Sudan. Part of the major in international studies in a related track; the sociology/anthropology concentration and minor; the African studies concentration; and may be taken as an elective. (0510-210 or 0515-210 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0510-461 **Native American Repatriation**
NAR addresses issues surrounding cultural objects, contested ownerships, repatriation, reparations, legal compliance, museum technologies and the ever-changing role of repositories. This course facilitates experiential learning including work with the Rochester Museum and Science Center. Lectures, round-table discussions, and instruction are provided by museum professionals, nationally renowned speakers, and Native American representatives. Students will comprehend the breadth of federal legislation regulating human remains and objects of culture patrimony, the complex legal and social issues facing museums and communities, and the opportunities that exist as NAGPRA enters into its third decade since ratification in 1990. Part of the Native American science, the material cultural science, and sociology concentrations. May be taken as an elective. **Class 4, Credit 4 (offered annually)**

0510-463 **Economics of Native America**
This course will analyze current and historic economic issues faced by Native Americans. It will also examine government policies enacted by and directed toward Native Americans with a focus on their economic implications. This will be done using standard economic models of the labor market, poverty, trade, development and gaming. (0511-301 or equivalent) **Class 4, Credit 4 (offered annually)**

0510-464 **Nationalism and Identity**
Nationalism is often described in terms of strong sentiments and acts of self-determination on the part of members of a nation as distinct from the state that is necessarily a territorially and politically defined entity. This course will explore leading theories related to the origins of contemporary nationalism and nationalism's importance within the context of state societies, especially in Europe. The past as an invented historical or imagined reality will be highlighted, as invented pasts contribute to claims for exclusive national culture and both exclusive and contested identities. The relationships between culture, literacy, and capitalism will be applied to understanding select historical and ethnographic cases of nationalism. Counts toward the minor and concentration in sociology and anthropology. **Class 4, Credit 4 (offered annually)**

0510-465 **Social and Cultural Theory**
This course explores classical and contemporary theories regarding society and culture influential within the field of anthropology. Students will assess the utility of different theories in addressing enduring questions regarding human behavior, the nature of culture, the relationship between the individual and society, social control and social conflict, social groups and social hierarchy, the operation of power, cultural change, colonialism and culture, and the interplay between the global and the local. Theories will be marshaled to shed light on contemporary social and cultural phenomena and problems such as violence, exploitation, modernity, and globalization. (0510-210, 0515-210 or permission of instructor.) **Class 4, Credit 4 (offered occasionally)**

0510-484 **Islamic Culture and the Middle East**
This interdisciplinary course focuses on introducing the fundamentals of the Middle East (including North Africa), with an emphasis on Islam, to students with little or no prior background in the region or the culture. The framework of Islam is used to explore the significance of how religion - with its prescriptions for and proscriptions against certain behaviors and societal and cultural norms - constructs and shapes ways of knowing and understanding material and performance culture. The four themes to be addressed include: (1) foundations of Islam; (2) Islamic law and Islamic sects; (3) material and performance culture in Islam; and (4) Islamic culture and the West. The rationale for this course is to help students recognize and interpret fundamental concepts of Islamic cultures, to encourage students' independent thinking about topical events within their historical perspective, and to inspire students to examine how their own cultures change and adapt to various students. Part of the major in international studies in a related track; the sociology/anthropology concentration and minor; and may be taken as an elective. **Class 4, Credit 4 (offered annually)**

0510-485 **Exploring Ancient Technology**
While it is commonplace to describe the present era as one dominated by technology, humans have been critically dependent on technology for as long as we have existed as a species. Some of today's key technologies such as ceramics, woodworking, textiles, glass, and metals, were invented before the dawn of recorded history. We will explore these ancient technologies—how they came to be invented, how they evolved, and how they were integrated into the social and economic life of ancient and modern peoples. Key concepts and themes will be explored in a series of hands-on labs in which students will seek to replicate and understand a variety of ancient technologies. The course concludes with either an individual project or a class project. Part of the sociology/anthropology concentration and minor; the material culture studies concentration, the archaeology concentration; and the archaeological science minor. May also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0510-487 African Popular Cultures
For most people in Africa, participating in popular cultures may be the best or only means of political expression. Yet, here in the United States, we rarely, if ever, have access to these forms, nor are they sufficiently linked in our imaginations to political processes in Africa or around the world. Rather, ideas and images about Africa come to us through the lenses of American or European cultures and media—Conrad’s *Heart of Darkness*, exotic depictions in National Geographic, or CNN images of massacres in the Sudan. These images and the discourses that frame them tend to distance us from African experiences and expressions. By contrast, students in this course will assess the links between popular cultures and politics, with special attention to anthropological theory about African colonial and postcolonial literature, music, oral and ritual expressive forms, and visual media, and the particular political contexts through which they emerge and are performed. Part of the major in international studies in a related track; the sociology/anthropology concentration and minor; the African studies concentration; and may be taken as an elective. (0510-210 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0510-488 Muslim Youth Cultures
In recent years there has been an explosion of interest in Muslim youths as a result of increased media attention to security, religious extremism, and human rights. These concerns, while important, may obscure other equally vital aspects of being young and Muslim in rapidly globalizing societies. Through in-depth studies of Muslim youth cultures in the Middle East and Africa, the course offers broad perspectives on the diversity and complexity of Muslim youth cultures and their affects on changing societies, cultures, nations and the world. Part of the international studies Middle East track; the sociology/anthropology minor and concentration; and the African studies concentration. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0510-502 Archaeology and the Human Past
Archaeology is the study of the human past, from the origin of our species through the development of modern, industrial states. In studying the past, archaeology seeks to explain how we, as modern humans, came to be. This course discusses how archaeologists study the past and explain how human society has changed over time and presents an overview of world prehistory. Specific topics will include the evolution of modern humans, the peopling of the world, the development of agriculture, the rise of states and the development of urban society. Case studies will be used throughout to demonstrate how archaeological research is conducted and how archaeologists use their research to formulate explanations of the past that have relevance for the present. Part of the sociology/anthropology concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0510-506 Great Discoveries in Archaeology
Archaeology conjures a romantic image in the minds of many people and almost everyone is at least familiar with some of the greatest discoveries made by archaeologists. Finds such as King Tut’s tomb, the ancient city of Troy, the jungle cities of the Maya, and Otzi the Ice Man, excite almost anyone who hears of them. But what is it, aside from fabulous wealth, romantic locale, or incredible preservation that makes them great? Although great discoveries are always exciting, archaeology is not only about finding things, but also about using these findings to explain the human past. This course helps us understand how and why human society has changed over time. It explores some of the great discoveries of archaeology, many of which will be familiar to students. Part of the sociology/anthropology concentration and minor; the archaeological science minor; the archaeology concentration; and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0510-507 Archaeological Science
Archaeology is one of the few social sciences that lends itself well to the application of analytical techniques from the physical sciences. This is largely due to the fact that archaeology relies primarily on physical evidence. This course examines the growing field of archaeological science. The course covers a number of archaeological questions including the age and origin of materials; how things are made; what people ate; their daily activities; their state of health; and how archaeological scientists are able to answer these questions using techniques from biology, chemistry, and physics. The course includes in-class labs in which students apply some of these techniques and a final research project in which the student picks their own archaeological question and methodology to answer it. Part of the sociology/anthropology concentration and minor; the archaeology concentration; the material cultural studies concentration. **Class 4, Credit 4 (offered annually)**

0510-508 Archaeology of Cities
This course will focus on the pre-historical trajectories of urban development, the multiple roles of cities, and their impact on the development of complex societies in different world regions. We will attempt to explain how, in its multiple forms and manifestations, the city has developed and contributed to the constitution of modern, industrial society. The course will consist of lectures, in-class discussions and activities, group presentations, and a final research paper that will be presented to the class. Part of the major in international studies program in a related track; the sociology/anthropology concentration and minor; the urban studies concentration; the archaeological science minor; the material cultural studies concentration; the archaeology concentration; and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0510-509 Survey of Metallurgy
This course introduces students to the anthropological study of metallurgy. The course begins with the survey of the earliest uses of metals and examines some of the early metallurgical treatises. Using archaeologically-derived and modern data, we will explore ancient and current mining and extraction techniques. We will also explore the meanings of metallurgical processes as presented in ethnographic accounts. Using information and data derived from scientific inquiry, archaeological excavations, and ethnographies, we will examine basic metal refining and working techniques. Students will also learn to interpret phase diagrams and study microstructures of metal samples. Part of the archaeology concentration; the sociology/anthropology concentration; the material cultural studies concentration; and the archaeological science minor. May be taken as an elective. **Class 4, Credit 4 (offered annually)**

0510-511 Field Methods in Archaeology
This course introduces students to the methods of archaeological field work. The course begins with the student’s development of a research question and design. We then explore the feasibility of this research through the examination of sampling techniques, site survey, and excavation. Field methods of recording, photography and artifact conservation will also be discussed. Students will be able to analyze the usefulness of the field techniques in light of the archaeological scientific methods for dating, and organic and inorganic analyses. Students should emerge from the course understanding the values of the techniques necessary for proper archaeological excavation towards the reconstruction of the past and the development of an understanding of our present. Part of the archaeology concentration; the archaeological science minor; the sociology/anthropology concentration; the material culture science concentration; the Native American science and technology concentration; and may be taken as an elective. **Class 4, Credit 4 (offered annually)**

0510-512 Garbage Archaeology
This course introduces students to the study of archaeological methods with a focus on garbage (also known in colloquial speaking as rubbish, waste and refuse). By studying garbage, we can study human behaviors in both the present and past. This course’s hands-on component enables students to learn about their immediate environment of Rochester through the collection, sorting, and processing of garbage in their neighborhoods. We also learn and employ the techniques of ethno-archaeology in order to understand the differences between what people do and what people say they do. Through weekly readings we will consider how such topics as migration and settlement, disease vectors, ethnicity and identity, and public policy are seen and interpreted through something that every human produces on a daily basis. Part of archaeology concentration; the sociology/anthropology concentration; and the archaeological science concentration. **Class 4, Credit 4 (offered annually)**

Economics

0511-200 Foundational Seminar in Economics
This course is designed to introduce new students in the economics program (freshmen and external and internal transfers) to the applications of economic analysis in academic, business, government and the not-for-profit sector. Students will be exposed to the research and consulting activities undertaken by academic economists as well as a discussion of the career outcomes of the alumni of the RIT economics program. **Class 1, Credit 1 (offered annually)**

0511-211 Principles of Microeconomics
Microeconomics studies the workings of individual markets. That is, it examines the interaction of the demanders of goods and services with the suppliers of those goods and services. It explores how the behavior of consumers (demanders), the behavior of producers (suppliers), and the level of market competition influence market outcomes. **Class 4, Credit 4 (offered quarterly)**

0511-325

Honors Economics

This course introduces students to some of the important questions addressed in microeconomics and the methodology used to address these questions. We will look at some of the basic models of consumer and firm behavior and study how implications are derived from these. We will also see how some of these simple models give insight into diverse questions such as: Should food stamps be given away freely to those who are poor, or should they be required to purchase them? Why are general practitioners (as opposed to specialists) disproportionately located in smaller towns? Why do firms bundle goods rather than just selling them separately? As far as the final impact is concerned, is there a difference in whether a tax is imposed on the sellers of a product or on buyers of a product? Microeconomics gives the tools to understand and evaluate implications of government as well as business policy decisions. In addition, it provides the foundation for the study of many other sub-disciplines in economics. **Class 4, Credit 4 (offered annually)**

0511-402

Principles of Macroeconomics

Macroeconomics studies aggregate economic behavior. The course begins by presenting the production possibilities model. This is followed by a discussion of basic macroeconomic concepts including inflation, unemployment and economic growth and fluctuations. The next topic is national income accounting which is the measurement of macroeconomic variables. Following this the aggregate supply-aggregate demand frame work is presented. The latter part of the course focuses on the development of one or more macroeconomic models, a discussion of the role of money in the macroeconomy, and other topics the individual instructor may choose. (0511-211 or 0511-325 or equivalent) **Class 4, Credit 4 (offered quarterly)**

0511-440

Urban Economics

Urban economics is the application of economic analysis to spatial relationships in densely populated (urban) areas. The first part of the course develops economic models that explain the location behavior of consumers and businesses in cities. The second part is issue oriented, applying the insights gained in the first part to a number of urban problems. Part of the economics concentration and minor. May also be taken as an elective. (0511-211 or 0511-325) **Class 4, Credit 4 (offered occasionally)**

0511-441

Economics of Human Resources

The microeconomic study of human resources encompasses aspects of human involvement in the production and distribution of goods and services. Potential topics are labor force participation, economics of employment discrimination, primary and secondary education, higher education, distribution of income and wealth, poverty and income maintenance, manpower planning, and microeconomic analysis of the work/leisure decision. Part of the economics concentration and minor. May also be taken as an elective. (0511-211 or 0511-325, and 0511-402) **Class 4, Credit 4 (offered occasionally)**

0511-444

Public Finance

A study of the economics of the public sector. Topics include, but are not limited to: taxation and public expenditures and their effect on the allocation of resources, distribution of income, and employment; market failure; public goods; the economics of public choice; and the application of public finance principles and normative questions to public economic issues. Part of the economics concentration and minor. May also be taken as an elective. (0511-211 or 0511-325) **Class 4, Credit 4 (offered occasionally)**

0511-445

Survey of Economic Thought

A survey of the various schools of thought that have developed in economics from the late eighteenth century up to the present. Representative economists from each of the major schools (Classical, Marxian, Neo-Classical, Keynesian, Monetarist, etc.) are studied. Part of the economics concentration and minor. May also be taken as an elective. (0511-211 or 0511-325, and 0511-402) **Class 4, Credit 4 (offered occasionally)**

0511-448

Economics of Less Developed Countries

Introduction to the economic problems of less developed countries (LDC). Students study the historical causes of underdevelopment gap between developed and underdeveloped countries and the theories and the policies aimed at accelerating the rate of growth in LDC. In addition, the role of international organizations in the economic development of LDC is discussed. Part of the global studies concentration; the economics concentration and minor; and may also be taken as an elective. (0511-211 or 0511-325, and 0511-402) **Class 4, Credit 4 (offered occasionally)**

0511-449

Comparative Economic Systems

A comparative analysis of different economic systems. The three major economic systems studied are the capitalist mode of production, the planned economy and the mixed economy. The student studies the economic decision-making process in each system, including the economic structure, operation and relative efficiency in achieving its macroeconomic goals. Upon completion of this course, the student is able to critically evaluate each economic system, recognize the advantages and disadvantages of each and propose general policy recommendations to improve each system's relative efficiency. Part of the global studies concentration and the economics concentration and the environmental studies minor. Part of the economics core course requirement for GSSI majors, and also may be taken as an elective. (0511-211 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0511-450

Benefit-Cost Analysis

Explores the use and abuse of benefit-cost and related analytical techniques commonly encountered in economic policy making. Many expenditure and regulatory programs of governmental agencies now are routinely evaluated in a benefit-cost or cost-effectiveness framework, and debate about policy decisions increasingly draws upon benefit-cost findings. Yet, application of benefit-cost analysis often attracts much controversy, in part because of disagreements about how to conduct such analysis and about the role that economic efficiency should play in societal decisions. The mechanics, power and limitations of this form of analysis form the primary elements of the course. Required course for economics majors; part of the economics concentration and minor; and may also be taken as an elective. (0511-211 or 0511-325) **Class 4, Credit 4 (offered annually)**

0511-452

Monetary Analysis and Policy

The study of monetary behavior and the role of monetary institutions in the modern economy. Includes consideration of monetary theory, the development and current characteristics of monetary institutions in the American economy and the use of the tools of monetary analysis to evaluate alternative monetary policies. Concludes with an evaluation of the neo-Keynesian and Monetarist positions. Required course for economics majors; part of the economics concentration and minor; and may also be taken as an elective. (0511-211 or 0511-325 and 0511-402) **Class 4, Credit 4 (offered annually)**

0511-453

Intermediate Microeconomic Theory

Helps develop the tools of analysis utilized in contemporary economics to study the process of price formulation in a capitalist society. Topics covered include the theories of consumer behavior, cost and production, alternative market structures and the pricing of factors of production. Required course for economics majors; part of the economics concentration and minor; and may also be taken as an elective. (0511-211 or 0511-325) **Class 4, Credit 4 (offered annually)**

0511-454

International Trade and Finance

Introduces the students to the theory and practical issues of the export/import markets, the international flow of capital and international investment decisions. In addition, students study the foreign-exchange and the Euro-dollar markets and the investment opportunities in them. The role of multi-national corporations in international trade and finance also is discussed. Required course for economics and international studies majors; part of the economics concentration and minor. Part of the economics core course requirement for GSSI majors, and may also be taken as an elective. (0511-211 or 0511-325 is required, and 0511-402 is recommended) **Class 4, Credit 4 (offered annually)**

0511-455

Intermediate Macroeconomic Theory

The central question of macroeconomics is the determination of output, employment and prices. This course develops models that incorporate behavioral assumptions concerning consumption, investment and the role of money and their relationship to macroeconomic variables. Required course for economics majors; part of the economics concentration and minor; and may also be taken as an elective. (0511-211 or 0511-325, and 0511-402) **Class 4, Credit 4 (offered annually)**

0511-456

Industrial Organization

The study of the structure, conduct and performance of contemporary American industry. Involves the application of the tools of microeconomic analysis and empirical evidence to aid in understanding the behavior of modern industry. In addition, the course considers the historical determinants of contemporary market structure and the public policy measures designed to preserve a competitive market structure. Required course for economics majors; part of the economics concentration and minor; and may also be taken as an elective. (0511-211 or 0511-325) **Class 4, Credit 4 (offered annually)**

0511-457 Applied Econometrics
Provides students in the economics program with an opportunity to develop their skills in applied regression analysis. Covers the various regression models, estimation techniques, data preparation and transformation, and the interpretation of regression results. Particular emphasis on the dangers of misuse of regression techniques. Required course for economics majors. Part of the economics concentration and minor. May also be taken as an elective. (0511-211 or 0511-325, 1016-226 or equivalent, and 1016-319) **Class 4, Credit 4 (offered occasionally)**

0511-458 Economic Forecasting
Introduction to one of the major functions contemporary economists perform economic forecasting. Students are exposed to alternative theories and the manner in which economists in both the private and public sectors use these frameworks of analysis, data and quantitative methods to generate economic forecasts. Required course for economics majors. Part of the economics concentration and minor. May also be taken as an elective. (0511-211 or 0511-325, and 0511-402, 1016-319 and 1016-226 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0511-459 Managerial Economics
A further elaboration of the elementary principles of economic analysis in microeconomics and macroeconomics. Particular emphasis is on the application of these principles to the decision-making process of the firm. Required course for economics majors; part of the economics concentration and minor; and may also be taken as an elective. (0511-211 or 0511-325) **Class 4, Credit 4 (offered annually)**

0511-460 Mathematical Methods: Economics
This course provides students with an introduction to quantitative techniques used in economics such as matrix algebra, one-and multi-variable differential calculus, and unconstrained and constrained optimization. The emphasis of the instruction is on the application of these techniques to fortify and broaden a student's understanding of traditional economic topics like utility maximization, cost minimization, duality in consumer theory, expected utility, and profit maximization. Required course for economics majors. Part of the economics concentration and minor and may also be taken as an elective. (0511-211 or 0533-325, and 1016-226 or equivalent) **Class 4, Credit 4 (offered regularly)**

0511-462 Honors Independent Research
This course is designed to allow economics students who are in the Honors Program to conduct independent research under the guidance of a faculty mentor. Prior to enrollment in this course the student must submit a research proposal and the name of the proposed faculty mentor to the economics department for approval. Once approved the faculty mentor in consultation with the student will determine the number of credit hours (1-3) which will be assigned to the course. The completed research project will be presented at the annual economics/public policy undergraduate research conference. **Class varies, Credit varies (offered occasionally)**

0511-463 Directed Research in Economics
This course is designed to allow economics students to pursue research under the direction of an economics faculty member. Prior to enrollment in this course, the student must submit a research proposal to the proposed faculty sponsor and the economics department for approval. Once approved the faculty sponsor in consultation with the student will determine the number of credit hours (1-4) which will be assigned for the course. The completed research project will be presented at the annual liberal arts undergraduate research conference. **Class 4, Credit 4 (offered occasionally)**

0511-464 Game Theory With Economic Applications
Game theory uses a mathematical approach to study situations with two or more players in which each player's decision influences payoffs of other players. We will start with a short introduction on single person decision theory, and then study how to formulate multi-person decisions problems as game theoretic models; how to predict behavior (through the use of various equilibrium concepts - Nash equilibrium, sub-game perfect equilibrium, etc.) of the parties involved and/or identify guide lines for appropriate behavior. Game theoretic methodology is widely used in economics, and hence the skills learned in this course will be very useful to both those who want to study further and those who plan to look for consulting jobs. Part of the economics concentration and minor. May also be taken as an elective. (0511-211 or 0511-325) **Class 4, Credit 4 (offered annually)**

0511-465 Honors Seminar in Economics
This course begins by introducing students to economics research methodologies and their constituent elements. Such elements include reviewing peer-reviewed research literature, developing economic models, posing economics research questions, deriving testable hypotheses, cultivating empirical evidence appropriate for testing the hypotheses, and writing the argument and results within the economics research paradigm. Students will present their research-in progress during the seminar and will conclude the course by submitting a final paper. The course is restricted to Honor students with Economics minors or concentrations and selected Economics majors. (0511-211) **Class 4, Credit 4 (offered annually)**

0511-466 Health Care Economics
This course examines the economics of health care, the organization of its delivery and financing, and analyzes access to care issues, the role of insurance, the regulation of hospitals, physicians, and the drug industry, the role of technology, and limits on health care spending. Part of the economics concentration and minor. May be used as an elective. (0511-211 or 0511-325) **Class 4, Credit 4 (offered annually)**

0511-467 Economics of Native America
This course will explore current and historic issues faced by Native Americans. It will also examine policies enacted by and directed toward Native America with a focus on their economic implications. This will be done via the use of standard economic models of the labor market, poverty, trade, development, and gambling. Part of the economics concentration and minor; and may also be taken as an elective. (0511-211 or 0511-325) **Class 4, Credit 4 (offered annually)**

0511-480 Economic Role of Women
Analyzes the economic role of women in today's society. Includes the economic role of women in the labor force, as owners of other factors of production and in business decision-making process. The impact of the changing role of women on GNP, labor market and other economic variables is elaborated. Through the analysis of some economic models and their application to real world situations, it is shown that the social, political and individual equality of women depends, to a great extent, on their economic role in family and society. (Part of the economics concentration and minor; the women's and gender studies concentration, and may be taken as an elective. 0511-211 or 0511-325) **Class 4, Credit 4 (offered occasionally)**

0511-481 Environmental Economics
Examines the relationship and apparent conflict between economic growth and environmental quality, the economics of environmental issues and policy, the environment as a resource and a public good, and the ability and lack of ability of free markets and the government to deal adequately with pollution and other environmental problems. Part of the environmental studies concentration and minor; the economics concentration and minor; and may also be taken as an elective. (0511-211 or 0511-325) **Class 4, Credit 4 (offered occasionally)**

0511-484 Natural Resource Economics
This course develops an economic perspective on one of the most important and challenging issues facing global society--the allocation, use and preservation of natural resources. The course presents and discusses the methodology economists use to inform natural resource managers and policy makers. Economic thought and analysis are used to evaluate a variety of issues in this area. The course concludes with a brief discussion of the inter-disciplinary aspects of natural resource management. Part of the economics concentration and minor; the environmental studies minor; and may also be taken as an elective. (0511-211 or 0511-325) **Class 4, Credit 4 (offered occasionally)**

0511-499 Economics Coop

0511-599 Independent Study

Political Science

0513-211 American Politics
This course examines the basic principles, themes and institutions of American politics. We will approach the study of American politics from four interrelated topics: 1) American political values and constitutional foundations; 2) mass politics and political socialization; 3) political institutions; and 4) public policy. Current events will be discussed throughout the course in an effort to promote responsible citizenship. In addition to providing a basic overview of American politics, this course seeks to develop critical thinking, group dynamic and communication skills that are transferrable outside the classroom. **Class 4, Credit 4 (offered quarterly)**

0513-214 Introduction to International Relations
The purpose of this course is to provide basic knowledge of the field of international relations. Among the topics to be addressed are key theoretical concepts, themes and controversies in the field such as: important state and non-state actors in international politics, security, economic relations between states, levels of analysis, and schools of thought. Required course for international studies degree program. **Class 4, Credit 4 (offered quarterly)**

0513-215 Political Ideologies
This course explores how political ideas and theories have shaped political practice, for good or bad. In particular, the course will concentrate on the most influential political ideologies that have shaped and influenced world politics. Topics to be considered include: democracy and modern liberalism, American liberalism, socialism and communism, fascism, liberation, ideologies and the politics of identity, Islamism and Zionism. **Class 4, Credit 4 (offered occasionally)**

0513-319 Arts of Expression: Politics Through Film
This course explores the enduring issues facing the American and global political order through the lens of film. Particular attention will be paid to the principles of sound political deliberation, the limitations of political leadership and the theory and practice of American political principles both at home and abroad. This course emphasizes the practice of writing. Part of the American politics and international minors and concentrators. May be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0513-325 Honors Political Science
This course explores the founding principles of the American political order and their contemporary relevance. In addition, the course will examine the extent to which the three political institutions of American government (legislature, executive, and judiciary) have either adhered to or departed from the founding principles. Emphasis will be placed upon reading and analyzing primary sources from the founding era and some of the more influential perspectives on American government drawn from the Civil War period to the 20th century. **Class 4, Credit 4 (offered occasionally)**

0513-401 National Security Forces I
This course will examine the American national security policy by analysis of the evolution of the American defense strategy and policy. Topics include methods for managing conflict, international terrorism, alliances and regional security, an analysis of arms control and the threat of war, and the formulation of American defense policy and strategy, air force doctrine, and civilian control of the military. (Requires approval of the Aerospace Studies Department-Air Force ROTC) Strictly for ROTC students. **Class 4, Credit 4 (offered annually)**

0513-402 National Security Forces II
This course will examine the sociology aspects of officership and the military criminal justice system. Topics of interest focus on the military as a profession, officership, air force core values, and a comparison of the military/civilian justice system. (Requires approval of the Aerospace Studies Department-Air Force ROTC) Strictly for ROTC students. **Class 4, Credit 4 (offered annually)**

0513-425 Politics and the Life Sciences
This course examines the intersection between politics and the life sciences. The course will examine the biological approach to human behavior, paying special attention to the implications of biological explanations of behavior for political systems. Topics to be covered may include the biological approach to morality, law, and international conflict, as well as the political and policy implications of new research in the biological sciences including biotechnology. Part of the political science degree program; the political science minor; the American politics concentration; and may be taken as an elective. (0513-211 or equivalent) **Class 4, Credit 4 (offered annually)**

0513-426 Cyberpolitics
Innovations in digital communication technologies have the potential to affect many aspects of politics and government. Beyond specific elements such as elections and delivery of government services, these developments have the potential to expand and redefine the nature of political participation and civic engagement, and to alter the structure of political power. This course examines the potential and promise of digital democracy, and attempts to separate hype from a realistic examination of actual impacts. Part of the political science degree program; the political science minor; and may be taken as an elective. (0513-211, 0513-214 or equivalent) **Class 4, Credit 4 (offered annually)**

0513-427 Evolutionary International Relations
This course examines the biological explanations of international conflict. Topics will include the evolutionary approach to human behavior, international conflict, and the relevance for evolutionary explanations as an alternative or supplement to current paradigms of international relations like realism and rational choice. Finally, the course will look at what an evolutionary understanding of politics means for peacekeeping missions, global governance and the stability of international cooperation. Part of the political science degree program and the political science minor. May be taken as an elective. (0513-211, 214, or equivalent) **Class 4, Credit 4 (offered occasionally)**

0513-428 Evolution and the Law
This course examines the evolutionary approach to law. The course will consider the relevance of evolutionary theory to the analysis of law, the roots of rule of law, the relationship between natural law and common law, as well as the strengths and limitations of the evolutionary approach to specific themes within law, such as property law and family law. Part of the political science degree program and the political science minor. May be taken as an elective. (0513-211, 214 or equivalent) **Class 4, Credit 4 (offered annually)**

0513-429 Primate Politics
This course examines the biological approach to the study of political order. Students will learn about the basic political structures of the great apes, how they differ, and how an understanding of these primate social structures can help us understand human political behavior. Specific topics might include the biological explanations of patriarchy and matriarchy, the biology of dominance structures, and the biology of leadership choice. Part of the political science degree program and the political science minor. May be taken as an elective. (0513-211, 214 or equivalent) **Class 4, Credit 4 (offered annually)**

0513-440 International Relations
A critical analysis of the structure and principles of the international system with emphasis on the tensions between the imperatives of power politics and the requirements of law and justice. Part of the international relations, global studies and peace studies concentrations; the international relations minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0513-442 Government and Politics of Russia
An analysis of the politics and governmental systems in Russia. Emphasis is on the dynamics of political, economic and social change, as well as political leadership and contemporary issues. Part of the international relations concentration and minor; part of the Russian foreign language concentration; and may be used as an elective. (0513-211, 215 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0513-445 Comparative Politics
Provides a mode of analysis for the study of political systems. Basic concepts of political science are utilized to present a descriptive and analytical examination of various political systems that can be classified as western democracies, communist or third world. Particular attention is paid to the governmental structure, current leadership and major issues of public policy of those selected political systems under review. Part of the international relations, American politics and global studies concentrations; the international relations minor; and also may be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0513-446 Politics in Developing Countries
This course uses comparative theoretical perspectives to explore the ways in which the historical, cultural, economic and political context of the societies of Africa, Asia and Latin America determines the patterns of their political processes. Focus is directed to such factors as history, religion, economic underdevelopment, and culture and their impact on the efforts to promote the values of liberalization and democratization, economic and social modernization and political and social stability. Part of the international relations concentration and minor and the political science minor. It may also be taken as an elective. Part of the international studies East Asian and Latin American tracks. (0513-211, 214 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0513-447 **Human Rights and Global Perspectives**
This course explores the theoretical meaning, both domestically and internationally, and the institutional and political aspects of human rights. Issues covered include the definition of human rights; the relationship between civil and political rights and economic, social and cultural rights; the meaning and impact of humanitarian and international human rights law; the impact of cultural relativism in the definition and assessment of the promotion and protection of human rights; the significance of different religious perspectives; the question of the legitimacy of humanitarian interventions and the effects of globalization on human rights perceptions and practices. Part of the international relations concentration and minor; the political science minor; and may also be taken as an elective. (0513-211, 214 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0513-449 **Special Topics in Political Science**
Special topics will examine a political theme, issue or problem at an advanced undergraduate level. The subject matter examined will vary from year to year according to the availability of faculty and the interests of students. The course is designed especially for those whose interest in politics goes beyond the requirements of the liberal arts curriculum. The course may be taken as part of the American politics or international relations concentrations and minors, the political science minor, and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0513-450 **State and Local Politics**
This course is a study of politics and government on the state and local levels, and the relationships between these levels and the federal government. The course's major objective is to give the student a sophisticated understanding of these aspects of the political process. The first focus is on the federal system of government, including the interdependence of the three levels. The course continues by examining the state level followed by a focus on local government. A final topic is policy-making, including revenues and expenditures, which again illustrate the interrelationship of the three levels. Part of the American politics concentration and minor; the political science minor; and may also be taken as an elective (0513-211, 214 or equivalent) **Class 4, Credit 4 (offered annually)**

0513-451 **The Congress**
Examines the role of the legislature in the U.S. political process. The primary emphasis is the study of the U.S. Congress, but some attention also is directed to state legislatures. Topics studied include elections, party organization, committees, interest-group activities and executive-legislative relations. Part of the American politics concentration and minor; the political science minor; and may also be taken as an elective. (0513-211, 214 or equivalent) **Class 4, Credit 4 (offered annually)**

0513-452 **The American Presidency**
A study of the role of the presidency in the American political system. Among the topics considered are the nomination and election process, evolution, expansion and limitation of presidential powers, factors in decision-making and the various leadership functions performed by the American presidency. Part of the American politics concentration and minor; the political science minor; and may also be taken as an elective. (0513-211, 214 or equivalent) **Class 4, Credit 4 (offered annually)**

0513-453 **American Foreign Policy**
A study of the formulation and execution of American foreign policy, including the examination of the instruments, procedures and philosophies shaping the development and implementation of foreign policy. Part of the international relations, American politics, global studies, and global justice and peace studies concentrations; the international relations, political science, American politics, American history and European history minors; and may also be taken as an elective. (0513-211, 214 or equivalent) **Class 4, Credit 4 (offered annually)**

0513-454 **Political Parties and Voting**
Political parties, and their candidates, present voters with choices of elected officials and policies. Elections give citizens a means to express their preferences, and to hold government officials accountable for their performance. Communication is the key to this process, both through older style media, and, increasingly, newer styles involving the Internet and other digital means. This course studies parties, candidates, and citizens, and the communication interplay that binds them. Part of the American politics concentration and minor; the political science minor; and may also be taken as an elective (0513-211, 214 or equivalent) **Class 4, Credit 4 (offered annually)**

0513-455 **Politics and Public Policy**
A study of the politics of the policy process covering these basic questions: How do public problems get to the agenda of government? How does government formulate policy alternatives? How does government legitimate public policy? How does government implement public policy? How does government evaluate public policy? Part of the American politics and public policy concentrations and minors; the political science minor; and may also be taken as an elective. (0513-211, 214 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0513-457 **Constitutional Law**
This course provides an introduction to Constitutional Law by examining the Supreme Court's attempt to resolve constitutional disputes between the federal government and the states (federalism); and between the different branches of government (the separation of powers). The course will study carefully the text of the Constitution, the intention of the founders, and the interpretation of the court in landmark cases that have defined American constitutional law. These cases will be studied both chronologically and thematically. Students will learn how to prepare a Langdellian brief in order to analyze the court's legal reasoning. Part of the American politics concentration and minor; the legal studies minor; the political science minor; and may also be taken as an elective. (0513-211, 214 or equivalent) **Class 4, Credit (offered annually)**

0513-458 **American Political Thought**
Provides a general overview of the political ideas, concepts, issues and principles which taken together compose the stream of American political thought. Examines major controversies, which have marked the developing body of the literature by examining the contributions of major political thinkers. Required course for the public policy degree program. Part of the American politics concentration and minor; the political science minor; and may also be taken as an elective. (0513-211, 214 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0513-460 **Constitutional Rights and Liberties**
This course provides an introduction to the Supreme Court's legal and political reasoning on civil rights and liberties that is, the fundamental individual rights of a free society contained in the Bill of Rights. Particular emphasis will be placed on the First Amendment as the cornerstone of a free society guaranteeing religious liberty and the right to free speech. The course will also examine how the court has balanced constitutional rights and liberties in the first, fourth, fifth and sixth amendments against the need for enhanced national security. Part of the American politics concentration and minor; the legal studies minor; the political science minor; and may also be taken as an elective. (0513-211, 214 or equivalent) **Class 4, Credit 4 (offered annually)**

0513-461 **Comparative Politics**
The course provides a mode of analysis for the study of political systems. Basic concepts of political science are utilized to present a descriptive and analytical examination of various political systems that can be classified as liberal democracies, post-communist, newly industrializing countries (NIC's), and Third World. Particular attention is paid to the governmental structure, current leadership and major issues of public policy of those selected political systems under review. Part of the global studies concentration and the political science minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0513-464 **Law and Society**
This course provides students with a fundamental literacy about law as an immensely and ubiquitous presence in society. It focuses on the relationships between law and other social institutions, and examines the values and interests that are expressed in law and shaped by legal structures and processes. Consensus and conflict perspectives on the law are compared and contrasted, and applied to understanding the law's impact on everyday life. This course takes an explicit interdisciplinary approach to understanding law. This course is offered for those interested in critical inquiry of law within a framework of a broad liberal arts education. Part of the legal studies minor; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0513-465 **Modern Constitutionalism, Liberty and Equality**
This course examines the founding principles of modern constitutionalism and the modern state. Special attention will be paid to the theory and practice of the principles of equality, liberty, consent and popular sovereignty. A major effort throughout the course will be made to consider the assessments and prescriptions for modern constitutionalism offered by American and continental political thinkers. Part of the American politics concentration and minor; the legal studies minor; the political science minor; and may also be used as an elective. **Class 4, Credit 4 (offered annually)**

0513-466 Political Leadership
The most fundamental proposition of this course is that political leadership makes a crucial difference in the life of a nation. It will examine such leadership that may serve as either a constructive or destructive force in the pursuit of some shared, national goal or purpose. The course will consider a diverse range of leaders and their respective style and type of leadership, and their common traits. The course may include five archetypes of political leadership and respective figures that embody these types. As a representative of a particular kind of political leadership, each leader will be studied in terms of his or her historical context, the principles for which he or she stood, and the means and ends each employed in the pursuit of political goals. Part of the American politics concentration and minor; the political science minor; and may be used as an elective. **Class 4, Credit 4 (offered occasionally)**

0513-467 Modern Korea
This course examines the political background of Korean politics, its institutional foundation, political leadership, political processes, government structures, and foreign and security politics of both South and North Korea, the balance of power in East Asia, and the relationship between the United States and Korea. Part of the political science minor; the international relations minor and concentration; and may be taken as an elective in the international studies degree program. The course may be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0513-481 Women in Politics
A study of feminist thought as it applies to the political, economic and social status of women and how it has been expressed through the women's political movement. Students study a number of public policies as they apply to and affect women and examine the opportunities for women to participate in the political process. Part of the American politics concentration and minor; the political science minor; the women's and gender studies concentration and minor (0522-484) and may also be taken as an elective. (0513-211, 214 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0513-484 Government and Politics of Africa
The course examines the influence of historical, cultural, economic and social factors on the pattern of politics in Sub-Saharan Africa. Focus is directed to the challenges of economic modernization and development; national integration; the promotion of a vibrant and liberal civil society; democratization and stability. Part of the international relations concentration and minor; the political science minor, and may also be taken as an elective. Part of the international studies Middle East track. **Class 4, Credit 4 (offered occasionally)**

0513-485 Politics Through Fiction
This course explores contemporary issues facing the American and global political order through the lens of fiction. Particular attention will be paid to the grounds of sound political deliberation, the limitations of prudence and the theory and practice of American political principles both home and abroad. Part of the American politics concentration and minor; the political science minor; and may also be taken as an elective. (0511-213, 214 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0513-487 International Law and Organization
The study of international law and organizations is the study of international cooperation and governance. We cover a variety of theoretical and substantive topics including the theories of international law and organizations, the historical development of international organizations, how these organizations work in practice, and whether they are effective. We concentrate on the United Nations and the role and usefulness of nongovernmental organizations. Several of the substantive issues discussed are interstate violence and attempts to address humanitarian concerns, globalization, and the environment. Part of the international relations concentration and minor; the legal studies minor; the political science minor; and may also be taken as an elective. (0513-211, 214 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0513-488 War and the State
Explores the enduring reality of war through an analysis of regional and global conflicts since the establishment of the modern international system. Key concepts include deterrence, appeasement, offensive-defensive military strategies, and international balances of power. These will be applied to several historical cases to explain why wars occur and how they might be avoided. Part of the international relations concentration and minor, the political science minor, and global justice and peace studies concentration. It may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0513-489 Terrorism and Political Violence
This course examines the causes, methods, and responses of non-state groups attempting to establish new political orders. The combined use of violence with the tactic of terror distinguishes these groups from others seeking political change. Special attention will be given to national and international efforts attempting to resolve such conflicts. Part of the international relations concentration and minor, the political science minor and may also be taken as an elective. (0513-211, 214 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0513-494 Comparative Public Policy
As modernization theorists predict, industrial and post-industrial societies tend to face similar public policy issues in such areas as public education, health care, public transportation, public housing and the protection and preservation of the environment. However, the political responses to these challenges have varied in significant ways in different states. Many states have developed extensive welfare state systems while some have put more emphasis on market-based solutions. The course seeks to explore and analyze the factors that explain these differences and assess the extent to which the different approaches succeed in meeting these policy challenges. Part of the international relations concentration and minor; the political science minor; and may also be taken as an elective. (0513-211, 214 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0513-495 Revolutions and Political Change
Revolutions aim to effect and often result in fundamental changes in a society's basic social, economic and political structures. They are also accompanied by violence, in some cases, civil war. Thus, they raise complex normative questions. The course provides students with a theoretical and historical understanding of three types of 20th century revolutions: classical, social and ideological (Russian, Chinese, Cuban, Iranian, Nicaraguan); anti-colonial (Vietnam, Algeria, Angola and Mozambique) and anti-communist (the Soviet Union and Eastern Europe). The course also involves assessments of the achievements and failures of revolutions in terms of their own goals as well as other normative values. Part of the international relations concentration and minor; the political science minor; and may also be taken as an elective. (0513-211, 214 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0513-496 Government and Politics in East Asia
This course examines the East Asian countries using the following comparative criteria as the organizing guidelines: modern political history of the country, political economy and development, governance and policy-making, representation and participation, major domestic and foreign policy issues. Prospect of the countries in the 21st century are analyzed and discussed. Part of the Chinese language/ culture concentration and minor; the Japanese language/culture concentration and minor; the international relations concentration and minors; the political science minor; and may also be taken as an elective. Part of the international studies East Asian track. (0513-211, 214 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0513-499 Experiential Learning: Political Science
The purpose of the Experiential Learning: Political Science option is to give students a first-hand experience in an appropriate organization or study abroad program that meets the needs of the student's career objectives. Students are closely supervised at the host organization, developing their pre-professional skills while learning the organization's programs, agenda and methods. Restricted to political science degree program only. (Students must have junior status.) **Credit 0 (offered as needed)**

0513-500 Political Science Capstone
This seminar provides an opportunity to examine in depth any theme, problem or work within the discipline of political science, for example: the foundations of self-government, foreign policy, international law and organizations, and the fundamental problems of international relations. Course content will be determined in consultation with the instructor. Teams of students will write a substantial paper on a topic related to the general themes of the seminar. Students will also present their findings electronically by way of a web site or wiki. Restricted to political science degree program only. (Students must have senior status.) **Class 4, Credit 4 (offered annually)**

0513-514 Political Theory
This course will examine the human quest for personal and political order. It will provide a critical introduction to some of the most influential and epic political thinkers who have shaped our world, and whose profound legacy continues to do so today. The continuity and divergence between these political philosophers and their respective traditions will be examined throughout the course. Each political philosopher will be examined in terms of the enduring questions of cosmology, human nature, justice, the good society, politics, the state, democracy and legacy. In each case, students will be asked to consider what standard each thinker offers to guide and judge political life. Part of the American politics concentration and minor, the legal studies and political science minor, and may also be taken as an elective. (0513-211, 214 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0513-599 Independent Study
A student may register for an independent study project subject to the approval of the faculty sponsor, student's department, the academic committee of the college of liberal arts and the dean of the college of liberal arts and providing that she or he has a minimum GPA of 2.7 at time of application. An independent study project is not a substitute for a course. It enables the interested student and his or her faculty sponsor to coordinate their efforts on subjects and topics that range beyond the normal sequence of course selection. **Class variable, Credit variable (offered occasionally)**

Psychology

0514-210 Introduction to Psychology
This course is an introduction to the scope of topics and methodology of psychology. Topics include aims, methods, neuroscience, sensation, perception, learning, memory, intelligence, motivation, normal and abnormal personality, and social psychology. Required course for psychology majors. **Class 4, Credit 4 (offered quarterly)**

0514-315 Scientific Writing
This is a course on how to write scientific articles. Basic grammar and style; structure of an empirical, theoretical, or review article; and citation format will all be covered. Students will learn by writing papers, by critiquing the papers of their peers, and by taking exams. Required course for psychology majors. Cannot be taken for liberal arts credit. (0514-210 or equivalent) **Class 4, Credit 4 (offered regularly)**

0514-325 Honors Psychology
Honors psychology is a state-of-the-art survey of major subfields in psychology, the scientific study of behavior and mental processes. Topics include the biological basis of behavior, perception, learning, memory, intelligence, emotions, social relations, personality and psychopathology. Besides textbook reading, students will read and discuss current publications on each topic we explore. **Class 4, Credit 4 (offered regularly)**

0514-350 Psychological Statistics
This course will cover descriptive and inferential statistics. Special attention will be given to psychological applications, conceptualization, and interpretation of statistics, computer-assisted data analysis and reporting of results. This course must be taken prior to higher-level psychology courses, especially experimental psychology and track courses. Required course for psychology majors. (0514-210 or equivalent) **Class 4, Credit 4 (offered regularly)**

0514-400 Experimental Psychology
An introduction to the logic of experimental research and application of the scientific methods to the study of behavior. Emphasis on stating empirically testable hypotheses, designing and conducting experiments, and writing research papers in APA style. Required course for psychology majors. (0514-210, 315, 350) **Class 4, Credit 4 (offered regularly)**

0514-402 Research Methods
An introduction to the logic of various research methods and the application of scientific methods to the study of behavior. Emphasis will be on a wide range of research designs and techniques including surveys, correlational designs, quasi-experimental designs, as well as true experimental designs. Students will learn to write research papers in APA style. Required course for the psychology majors. (0514-210 or equivalent) **Class 4, Credit 4 (offered regularly)**

0514-440 Childhood and Adolescence
This course explores human development from conception through adolescence. The developmental approach provides the opportunity to integrate many areas of psychological research such as cognition, personality, perception, social interaction and moral development as they apply to human development. Required course for psychology majors. Part of the psychology concentration and minor and may also be taken as an elective. (0514-210 or equivalent) **Class 4, Credit 4 (offered regularly)**

0514-441 Humanistic Psychology
This course examines the major assumptions, theories and implications of "growth" or humanistic psychology. Students study human beings as dynamic, complex creatures who shape themselves and their world through the choices they make each day and whose best hope for realizing their individual and collective potential is an accurate understanding of what human persons need to grow psychologically and what societal conditions seem to foster such growth. Institute elective for psychology majors. Part of the psychology concentration and minor and may also be taken as an elective. (0514-210 or equivalent) **Class 4, Credit 4 (offered regularly)**

0514-442 Adulthood and Aging
This course encompasses the psychology of the span of life from young adulthood through the middle years. The developmental approach, presented in an interdisciplinary framework, provides a systematic orientation to the study of the individual during early adulthood. Institute elective for psychology majors. Part of the psychology concentration and minor and may also be taken as an elective. (0514-210 or equivalent) **Class 4, Credit 4 (offered regularly)**

0514-443 Cognitive Psychology
This course examines how people perceive, learn, represent, remember and use information. Contemporary theory and research are surveyed in such areas as attention, pattern and object recognition, memory, knowledge representation, language acquisition and use, reasoning, decision-making, problem solving, creativity, and intelligence. Applications in artificial intelligence and human/technology interaction may also be treated. Required course for psychology majors. Part of the psychology concentration and minor and may also be taken as an elective. (0514-210 or equivalent) **Class 4, Credit 4 (offered regularly)**

0514-444 Social Psychology
This course gives a general overview of those areas of social psychology currently under the most intensive investigation and likely to be of most interest to the student, including nonverbal communication, attraction aggression and group effects. Required course for psychology majors. Part of the psychology concentration and minor and may also be taken as an elective. (0514-210 or equivalent) **Class 4, Credit 4 (offered regularly)**

0514-445 Psychology of Perception
This course covers topics of all sense modalities with emphasis on visual perception. It traces what happens to the physical stimulus as our sensory systems analyze it to produce complicated perceptions of the world around us. Many complex perceptual phenomena draw upon explanations at the physiological, psychological and cognitive levels. Required course for psychology majors in the visual perception track. Part of the psychology concentration and minor and may also be taken as an elective. (0514-210 or equivalent) **Class 4, Credit 4 (offered regularly)**

0514-446 Psychology of Personality
This course examines the strengths and weaknesses of the major psychological theories of personality. Methods of assessing personality, research and applications of theory to real-life situations are included in the evaluation of each theory. Required course for psychology majors. Part of the psychology concentration and minor and may also be taken as an elective. (0514-210 or equivalent) **Class 4, Credit 4 (offered regularly)**

0514-447 Abnormal Psychology
This course examines the major categories of mental disorder not only from the descriptive point of view, but also in terms of the major theoretical explanations of the causes of disorder. The major treatment modalities also are covered. Required course for psychology majors. Part of the psychology concentration and minor and may also be taken as an elective. (0514-210 or equivalent) **Class 4, Credit 4 (offered regularly)**

0514-448 Industrial and Organizational Psychology
Industrial and organizational psychology provides consideration of principles as well as application of current research in industrial psychology, with particular reference to personnel selection, training, motivation, morale, performance appraisal, leadership and communication. Required course for psychology majors. Part of the psychology concentration and minor and may also be taken as an elective. (0514-210 or equivalent) **Class 4, Credit 4 (offered regularly)**

0514-449 Behavior Modification
Students learn the skills of changing their behavior by controlling their environment and the consequences of their behavior. Elective for psychology majors. Part of the psychology concentration and minor and may also be taken as an elective. (0514-210 or equivalent) **Class 4, Credit 4 (offered regularly)**

0514-453 Death and Dying
This course will view death from a social-psychological perspective. After dealing with topics such as the leading causes of death, attitudes toward death, suicide, and American funeral practices, it will focus on such questions as how people can better cope with their own mortality and that of loved ones, and how people can help others face death, and help themselves and others during periods of bereavement. Elective for psychology majors. Part of the psychology concentration and may also be taken as an elective. (0514-210 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0514-480 Psychology of Women
Examines the relevance and applicability of present psychological theory and research to the understanding of the development and behavior of women. Major topics include psychological and biological sex differences, psychological theories of women's development, the relationship between female personality development and various sociocultural factors, women's place in society, women and their bodies, and women and mental health. May be taken as an elective. Cross-listed with women's and gender studies. (0514-210 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0514-483 Social Psychology of Religion
This course examines religions as cultures that, like other "ways of life," face the task of attracting or creating new members, maintaining their loyalty, providing them with a coherent worldview and satisfying their basic needs. Suggests how psychological processes such as identity information, attribution, self-actualization, brainwashing, conflict, denial, projection and repression may be applied and misapplied in efforts to understand religious belief and behavior. Elective for psychology majors. Part of the religious studies concentration, the psychology concentration and minor, and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0514-499 Psychology Co-op
The program requires that students complete a cooperative education experience for two quarters between the sophomore and senior years of course work. The co-op experience is in a psychology-related field and does not carry academic credit. **Class 0, Credit 0 (offered regularly)**

0514-526 Current Topics in Psych
This course presents different topics in psychology, focusing on current research areas. It is taught in a seminar format, and uses original articles and classroom discussion to cover material related to the topic. The topics covered vary from year to year, but include evolutionary psychology, positive psychology, drugs and behavior, rumor psychology, intelligence, sexuality, morality, health psychology or other topics of interest to faculty and students not covered in other courses. This course can count once towards any of the psychology tracks. Students may take this course for liberal arts or institute elective credit. (0514-210, 315, 350, 400) **Class 4, Credit 4 (offered annually)**

0514-530 Attention and Spatial Vision
This is a course examining two specialized topics in psychology. We will cover various topics under the grand heading of spatial vision, including linear systems analysis (visually based), visual physiology, receptive field structure and responses, and perception of static patterns. We will also examine current psychological, physiological and neuropsychological research on attention. We will learn about a variety of topics related to current thinking about attention, our capacity for information processing, and how these relate to brain function. Research based on psychophysical studies, experimental psychology techniques, and advance brain imaging methods will be covered. Required course for psychology majors in the visual perception and information processing tracks. Students may take this course for liberal arts or institute elective credit. (0514-210, 315, 350, 400) **Class 4, Credit 4 (offered regularly)**

0514-531 Language and Problem Solving
Perhaps the most significant cognitive capacity of human beings is their use and understanding of language. This course examines the structure of language and its relationship to thought, and surveys contemporary theory and research on the comprehension and production of spoken and written language. Applications such as artificial speech recognition are discussed. The course also surveys the psychological literature on reasoning and problem solving and examines attempts in artificial intelligence to simulate human performance in these areas. Required information processing track course for psychology majors. Students may take this course for liberal arts or institute elective credit. (0514-210, 315, 350, 400, 443) **Class 4, Credit 4 (offered occasionally)**

0514-532 Judgment and Decision-Making
Explores judgment and decision-making processes and focuses on the social and cognitive aspects of complex information processing. Topics include selective perception, memory and hindsight biases, framing effects, heuristics and biases, social influences, group processes and common errors. Required course for psychology majors in the visual perception and information processing track. Students may take this course for liberal arts or institute elective credit. (0514-210, 315, 350, 400, 443) **Class 4, Credit 4 (offered regularly)**

0514-533 Learning and Memory
This course reviews current memory research within a larger historical perspective. It presents the multi-store or modal model of memory with an in-depth examination of the evidence used to support the model. It also includes topics such as memory structures, levels of processing, implicit and explicit memory, schemas, signal detection theory and global memory models. Theories of learning are clearly meaningful for the study of memory. With the new developments in connectionist models of learning, theories of learning again assume importance in scientific study. Required information processing track course for psychology majors. Students may take this course for liberal arts or institute elective credit. (0514-210, 315, 350, 400, 443) **Class 4, Credit 4 (offered regularly)**

0514-540 Visual System
As the basis to study visual perception, this course introduces electromagnetic waves as visual stimuli, structure of the eye, and visual pathways in humans, vertebrates, and some non-vertebrates. The materials cover span basic optics, biology, physiology, and psycho- physics. The functional and behavioral consequences of the visual system, such as uneven distribution of photoreceptors in the retina, receptive field of cells, and neural plasticity are also considered. Required for psychology majors in the visual perception track. Students may take this course for liberal arts or institute elective credit. (0514-210, 315, 350, 400) **Class 4, Credit 4 (offered occasionally)**

0514-541 Color Perception
This course explores human color perception from the psychophysical perspective with coverage of relevant optics, neurophysiology, and vision science. Among the topics covered are theories of color vision, congenital and acquired color vision deficiencies, and evolution of color vision. Required for psychology majors in the visual perception track. Students may take this course for liberal arts or institute elective credit. (0514-210, 350, 400, 445) **Class 4, Credit 4 (offered regularly)**

0514-542 Spatial Vision and Pattern Perception
Traditional psychological views of organization of spatial vision such as Gestalt psychology and optical array are elaborated and connected to recent development of studies in spatial vision and pattern recognition. Techniques include electrophysiology, psychophysics, and brain imaging. Required for psychology majors in the visual perception track. Students may take this course for liberal arts or institute elective credit. (0514-210, 315, 350, 400, 445) **Class 4, Credit 4 (offered occasionally)**

0514-544 History and Systems
The course provides background to the development of current psychological perspectives. It examines beliefs, practices, achievements and limitations of various systems of psychology from Greek times to the late 20th century. Part of the psychology concentration and minor. Students may take this course as liberal arts or institute elective credit. (0514-210 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0514-545 **Brain and Behavior**
This course is an introduction to the neurobiological basis of cognition and behavior. Topics include hemispheric specialization, localization of function, brain injury, neuropsychological testing, and functional neuroimaging. Emphasis is on higher brain functions such as language, memory, and visuo-spatial processing, with an evolutionary perspective. Laboratory work focuses on EEG correlates of attention and cognition. Part of the biopsychology track for the psychology majors. This course is open to qualified non-majors as a liberal arts or institute elective. (0514-210, 315, 350, 400) **Class 4, Credit 4 (offered occasionally)**

0514-548 **Biological Bases of Mental Disorders**
A comprehensive introduction to the biological foundations of schizophrenia, depression, autism, bipolar disorder, Tourette's syndrome, and other mental disorders. Topics include neuropsychological testing, etiology, and structural and functional neuroimaging. Part of the biopsychology and clinical psychology tracks for psychology majors. This course is open to qualified non-majors as a liberal arts or institute elective. (0514-210, 315, 350, 400, 447) **Class 4, Credit 4 (offered regularly)**

0514-549 **Introduction to Clinical Psychology**
The purpose of this course is to provide an overview of the field of clinical psychology. The course is designed for upper-level undergraduate students interested in learning more about this specific field. Students will learn about the primary tasks of a clinical psychologist, including fundamentals of assessment, clinical research, conceptualizing problems, and psychotherapy. In addition, students will learn about the educational and professional behavior, and controversial issues within the field. Part of the clinical psychology track for psychology majors. This course is open to qualified non-majors as a liberal arts or institute elective. (0514-210, 315, 350, 400, 447) **Class 4, Credit 4 (offered regularly)**

0514-550 **Psychological Testing**
This course will explore the theories, methods, and applications of psychological testing. The advantages and drawbacks of psychological testing in general, and selected tests in particular, will be emphasized. The use of tests in clinical and other applied areas of psychology is based on several assumptions. First, assessment is apt to be more useful if based upon reliable and valid information. Second, improving one's knowledge of tests will help students gather meaningful information about people and environments. Third, it is desirable to design intervention plans based on accurate assessment data, and to use data to evaluate intervention outcomes. Required course in the clinical psychology track for psychology majors. This course is open to qualified non-majors as a liberal arts or institute elective. (0514-210, 315, 350, 400, 447) **Class 4, Credit 4 (offered regularly)**

0514-551 **Research in Clinical Psychology**
This course will explore the theory and methods used to evaluate interventions in the field of clinical psychology and related human services. Topics to be covered will include within subjects/single experiments, between-subjects experiments/clinical trials, and general program evaluation. Two primary objectives are to help students develop an appreciation for the importance of scientific evaluations of psychotherapy and other interventions and to develop skills for evaluating the efficacy of clinical interventions. Required course in the clinical psychology track for psychology majors. This course is open to qualified non-majors as a liberal arts or institute elective. (0514-210, 315, 350, 400, 447) **Class 4, Credit 4 (offered occasionally)**

0514-553 **Psychopharmacology**
A comprehensive introduction to psychoactive drugs. Topics include pharmacokinetics, pharmacodynamics, synaptic transmission, drugs of abuse and drugs used in the treatment of mental disorders. Required course in the biopsychology and clinical psychology tracks for psychology majors. (0514-210, 315, 350, 400, 447) **Class 4, Credit 4 (offered regularly)**

0514-554 **Psychophysiology**
This course provides a comprehensive introduction to psychophysiology. Students will learn about various psychophysiological measures and their use in the study of topics such as attention and emotion. Topics may include mind-body interaction, somatic and autonomic nervous system function, central and peripheral physiological measures (e.g. EKG, EMG, cardiac reactivity, skin conductance responses), psychophysiological research methods, and applied psychophysiology. Required course in the biopsychology track for psychology majors. (0514-210, 315, 350, 400) **Class 4, Credit 4 (offered regularly)**

0514-571 **Honors Special Topic**
This course focuses on contemporary issues and topics that are not covered in-depth in other psychology courses. It concentrates on student discussion of primary source readings on topics such as persuasion, stereotypes, evolutionary psychology, forensic psychology, cognition, perception, clinical techniques, the neuron, drugs and behavior, rumor psychology, intelligence, sexuality, morality, or health psychology. May be taken as an elective. (0514 210 or 0514-325) **Class 4, Credit 4 (offered regularly)**

0514-596 **Senior Project in Psychology I**
This course is intended for students in the psychology major to demonstrate independent, experimental research expertise. Students are guided by faculty advisors in conducting experimental research on an issue of their choice. This course will culminate in an approved APA style introduction and methods sections for the student's senior project. Students will be supervised by the instructor as they conduct their senior project literature review, write the introduction, develop the research question or hypothesis, develop the study methodology and materials, construct all necessary IRB materials, and write a methods section. Restricted to psychology majors only. (0514-210, 315, 350, 400) **Class 4, Credit 4 (offered regularly)**

0514-597 **Senior Project in Psychology II**
This course is intended for students in the psychology major to demonstrate independent, experimental research expertise. Students design the method, run subjects, and analyze the results of their study. Students write up the project in APA format. Passing this write-up qualifies the students for the writing requirement in psychology. Because senior project is the culmination of a student's scientific research learning experience in the psychology major, it is expected that the project will be somewhat novel and will extend the theoretical understanding of their previous work. Each student will be supervised by the instructor as they collect data, analyze those data, write the results, discussion, and abstract sections of their project and present the study. Grades will be based upon entire manuscript (including introduction and methods section). Restricted to psychology majors only. (0514-596) **Class 4, Credit 4 (offered regularly)**

0514-599 **Independent Study**
A student may register for a graduate independent study project subject to the approval of the director of the student's graduate program, the faculty sponsor, and the dean of the college of liberal arts. Because of the length of the approval process, students who desire to take independent study should make arrangements several weeks before the quarter begins. An independent study project enables the interested student and his or her faculty sponsor to coordinate their efforts on subjects and topics that range beyond the normal sequence of the graduate course selection. **Credit variable (offered as needed)**

Sociology

0515-210 **Foundations of Sociology**
Sociology is the study of the social world and socialization processes. Sociologists study the broader picture of how societies are structured and organized through a macro-sociological analysis as well as how individuals create their own social reality symbolically through their interactions with others in a micro-sociological analysis. Students in this course will learn the fundamentals of each approach and come away with a sociological framework which they can critically apply to their own lives. This course fulfills a liberal arts social science core requirement and is a prerequisite for the sociology/anthropology concentration and minor; **Class 4, Credit 4 (offered regularly)**

0515-325 **Honors Sociology**
This course explores how sociological concepts, theories and research account for such social phenomena as socialization, deviance, social structure, stratification, political and religious affiliation and social change. It will also explore how social factors account for political and economic behavior and the speed and spread of technological change. Fulfills a liberal arts core social science requirement. Counts as a prerequisite for the sociology/anthropology concentration and minor. **Class 4, Credit 4, Class 4 (offered annually)**

0515-406 **Qualitative Methods**
Learning about social and cultural groups is a complex and ethnically sensitive process. In this course, we explore common qualitative research methods for social and cultural research. We evaluate the utility of such methods for different purposes and contexts, including cross-cultural contexts. We consider common ethical dilemmas in research with human subjects, the ethical responsibilities of researchers, and common techniques for minimizing risks to subjects. Required for the international studies and urban and community studies majors, part of the sociology and anthropology concentration and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0515-413 **Urban Planning and Policy**
This course will examine the sociological and political implications of policies and planning decisions that have impacted the growth patterns of American cities and suburbs in the post-World War II era. Particular emphasis will be given to land use decisions that have favored suburbs over cities, the loss of tax base which impacted these cities' ability to perform basic functions for their citizens, and the adverse impact of federal and state government policies and programs on the functionality of urban areas and the efficiency of local governments. Students will examine case studies on urban development, and conduct field research on governmental structures and policies that will enable them to develop alternative strategies and policies. **Class 4, Credit 4 (offered occasionally)**

0515-441 **The Changing Family**
This course examines the essential concepts and theories fundamental to the social science of family studies. It analyzes family systems with reference to gender role, participation in the workplace, marital relationships and communication between parents and children. The course also focuses on ways in which changes in the economy and technology have influenced the form of the family, and men's and women's work. Part of the sociology/anthropology concentration and minor. May also be taken as an elective. (0510-210, 0515-210 or equivalent) **Class 4, Credit 4 (offered annually)**

0515-442 **The Urban Experience**
Cities have an important effect on social interaction. Through their design, they bring together diverse groups of people in unique spatial settings which can create and maintain opportunities for either interaction or segregation. This course examines theories explaining urban life, the development and growth of cities, their role in shaping human interaction, and the problems that emerge within and surrounding them. Topics covered include education, immigration, residential segregation, poverty, homelessness, crime, sprawl, sustainable development and urban planning. Part of the sociology/anthropology concentration and minor; the urban studies concentration and minor; and may also be taken as an elective. (0510-210 or 0515-210 or equivalent) **Class 4, Credit 4 (offered annually)**

0515-443 **Sociology of Work**
This course analyzes and assesses social relations of paid labor. Sociology's major ideas about the ways we work will be examined and applied to numerous important topics such as: workplace organization, unions, labor legislation, health and safety, workplace culture, interplays between work and family, experiences of work as satisfying or alienating, inequalities at work, and social mobility. Part of the sociology/anthropology concentration and minor. May also be taken as an elective. (0510-210, 0515-210 or equivalent) **Class 4, Credit 4 (offered annually)**

0515-444 **Social Change**
This course describes and applies competing explanations for major transitions in a variety of institutions, including the economy, work, politics, family and education. These transitions are seen within historical and global contexts, but the interplay of these changing social structures with individual experience is explored as well. Topics include economic, racial and gender stratification, culture, labor-management relations, and the source and consequences of technological change. As future professionals in technical fields, students will learn to understand, assess, and manage social change rather than to simply react to it. Part of the sociology/anthropology concentration and minor; and may also be taken as an elective. (0510-210, 0515-210 or equivalent) **Class 4, Credit 4 (offered annually)**

0515-447 **Women, Work and Culture**
Broad sociological issues affecting women, work and culture are a result of the emerging global economy and technological revolution. The course will consider how the process of gender socialization is complicated by the way in which gender intersects with racial, class, ethnic, sexual, and other identities. This course will present the major theoretical perspectives employed in sociology and women's studies and consider how they relate to the study of women, work and culture. Part of the sociology/anthropology concentration and minor. May also be taken as an elective. (0515-210, 0510-210 or equivalent) **Class 4, Credit 4 (offered annually)**

0515-448 **Minority Group Relations**
The course will provide a context in which to examine the multiple and contradictory social relations of domination, subordination, resistance, and empowerment. The kinds of questions we will explore focus on how power, knowledge, meaning, and cultural representation are organized. We will analyze a variety of political and ideological themes which bear upon the formation of minority group relations, their identity and how these themes complicate the processes by which people construct their understanding of the nation, world, of others, and themselves. Through reflection on theoretical texts and fictional works, as well as film and other popular media, we will consider for ourselves how culture is differently represented and signified, and how the politics of understanding and misunderstanding minority relations work through practices within and outside cultural institutions. Part of the sociology/anthropology concentration and minor; the minority group relations concentration; and may also be taken as an elective. (0510-210, 0515-210 or equivalent) **Class 4, Credit 4 (offered annually)**

0515-449 **Population and Society**
This course examines systemic theories of population dynamics, and considers demographic changes as causes and consequences of social processes. Students will participate in group projects that synthesize related material, complete written responses to reading assignments, and participate in class discussions. Part of the sociology/anthropology concentration and minor; the environmental studies minor; and may also be taken as an elective. (0510-210, 0515-210 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0515-452 **Special Topics in Sociology**
This course focuses on issues and topics not otherwise covered in established sociology courses. Part of the sociology and anthropology concentration and may be taken as an elective. (0510-210 or 0515-210 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0515-453 **Global Exiles of War and Terror**
Daily we watch, seemingly helplessly, as people are displaced from their communities, homelands, and countries and subsequently seek asylum around the world, sometimes within our own local communities. Causes of displacement include war, violence, persecution, and modes of terror that increasingly affect the lives of women and children. In addition to the loss of human life and potential, the ensuing consequences of violent displacement include poverty, disease, physical and psychological trauma, hopelessness, and vulnerability to human rights abuse. We will explore how the rights and dignity of refugees can be protected; examine resettlement processes; and how trauma of displacement can be minimized. Part of the urban and community studies major; the international studies program as a related track; and the sociology/anthropology concentration and minor. May also be taken as an elective. (0510-210 or 0515-210 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0515-454 **U.S. Housing Policy**
Housing is a critical component in assuring basic survival. The US housing policy shapes the lives of residents of the United States through the design, sale, and development of living places. This course examines the United States' housing policy in its relationship with other social issues, including racial segregation, endemic poverty, educational and economic inequality, sprawl, and environmental degradation. Special emphasis will be paid to how current housing policy both creates and eliminates housing options and their related social issues. (0515-210, 0510-210 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0515-455 **Urban Poverty**
Urban poverty has been recognized as a persistent problem in the US since the middle of the last century. In many cities living in poverty is associated with high levels of teenage pregnancy, low levels of employment, limited educational attainment, chronic, community-based health problems, and high levels of crime. People living in poor neighborhoods also face tremendous problems with crime which pose a continual challenge for most cities. This course examines the causes and consequences of urban poverty in the US. (0515-210, 0510-210 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0515-482 **African-American Culture**
This course will describe the historical and contemporary conditions that have given rise to the distinctive cultural orientation of African-Americans in the United States. Students will be provided with an explication of African-American culture as it is perceived by the majority of African-Americans. Furthermore, the course will outline an operational articulation of the African-American experience, and analyze the characterological responses that result from it. Part of the international studies program in a related track; the sociology/anthropology concentration; the minority relations concentration; and the African studies concentration. May also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0515-485

Diversity in the City

This course examines the city as an amalgamation of diverse communities with people engaged in interpreting and responding to urban life. It examines changes in the structure of urban neighborhoods, and how these neighborhoods are impacted by social, economic, spatial and political conditions. Issues such as ethnic enclaves, urban poverty, homelessness, unemployment, public and park space and ethnic/racial segregation will be investigated. Required course for the urban and community studies program. Part of the sociology/anthropology concentration and minor, and the urban studies concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0515-506

Social Inequality

This course examines various forms of social inequality, including economic, political, health, higher education, race and sex inequality. It uses a variety of sociology's ideas to explain why these kinds of inequality exist, how they persist and what can be done about them. Part of the sociology/anthropology concentration and minor, and may also be taken as an elective. (0510-210, 0515-210 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0515-529

Deaf Culture in America

An introductory survey of culture among various groups of deaf people in the United States. Students study the scholarly literature dealing with these groups and have contact with members of this community. Familiarizes students with the characteristics of deaf culture as well as general perceptions of deafness and the deaf community within the dominant hearing society. Students should come to recognize and appreciate this segment of American cultural diversity. Part of the sociology/anthropology and ASL language/culture concentrations; the deaf studies concentration and minor. May also be taken as an elective. (0502-227, 0510-210, 0515-210 or equivalent) **Class 4, Credit 4 (offered annually)**

Interdisciplinary—Aerospace

0519-201

History of Airpower I

This course is the first in a three course sequence that examines air and space power through a historical perspective. The course traces the evolution of air and space power from the first balloons and dirigibles to the space age global positioning systems used in recent conflicts. The first course covers early flight, World War I, interwar years, and World War II. It examines the impact of air and space power on military and non-military operations in support of U.S. foreign and domestic policy and its role in future warfare. Required for second year ROTC students. **Class 1, Credit 1 (offered annually)**

0519-202

History of Airpower II

The second of a three course sequence that examines air and space power through a historical perspective. The second course covers the formation of an independent U.S. Air Force, the Berlin Airlift, Cold War deterrent policy, and the Vietnam conflict. It examines the impact of air and space power on military and non-military operations in support of U.S. foreign and domestic policy and its role in 20th century warfare. Required for second year ROTC students. **Class 2, Credit 2 (offered annually)**

0519-203

History of Airpower III

The third of a three course sequence that examines air and space power through a historical perspective. The final course covers the post Vietnam reorganization, the Persian Gulf Wars, Kosovo, war on terror, and the future of air and space power. It examines the impact of air and space power on military and non-military operations in support of U.S. foreign and domestic policy and its role in future warfare. Required for second year ROTC students. **Class 1, Credit 1 (offered annually)**

Interdisciplinary Liberal Arts

0520-201

Career Exploration Seminar

This seminar is designed to introduce students to the process by which they can make informed decisions in selecting career options and identifying an educational program which will lead to that goal. Students begin by assessing their interests, values, skills and personal traits in a small group setting with the assistance of facilitators familiar with careers and RIT programs. Students will be introduced to online and print resources used for researching occupational information and will participate in class discussion about their discoveries and goals. Students will research academic programs that lead to the careers they have identified. This includes interviewing faculty and administrators in campus programs as well as professionals working in the fields. This seminar is required for students in the university studies and liberal arts exploration programs. **Class 1, Credit 1 (offered quarterly)**

Public Policy

0521-210

Contemporary Issues in Public Policy

This course provides students with an introduction to the interdisciplinary field of public policy. The course will introduce students to the fundamental theories, concepts, and models of public policymaking, with an emphasis on policy formation, adoption, implementation and evaluation. Policy issues will be discussed in a range of contexts, including: health policy, environmental policy, defense policy, energy policy, and technology policy, among others. May be taken as an additional general education course. **Class 4, Credit 4 (offered annually)**

0521-400

Foundations of Public Policy

This interdisciplinary course will introduce the student to the concept of public policy, the policymaking process, the role of stakeholders and interest groups, and the basic dimensions of quantitative and qualitative policy analysis. A range of public policy issues, such as environmental policy, science and technology policy, and information and communications policy will be explored. Required course for the undergraduate public policy curriculum. Part of the public policy concentration and minor; the science, technology and policy minor; and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0521-401

Values and Public Policy

This course focuses on the connections and interplay between personal and social values and public policy. It explores how values and norms influence public policies and how the resulting expressions of values within public policy impact the implementation and effectiveness of policy choices. The course also considers how new developments in science and technology influence the interplay between values and policy. In addition, this course explores how to formulate values-based explanations of certain public policy preferences. A required course in the public policy undergraduate curriculum; part of the public policy concentration and minor; and may also be taken as an elective. (0521-400) **Class 4, Credit 4 (offered biannually)**

0521-402

Policy Analysis I

This course is the first in a three-course sequence (Policy Analysis I - III) that normally will be taken in the third year of the public policy degree program. The purpose of the three-course sequence is to introduce the student to both qualitative and quantitative policy analyses and to progressively integrate qualitative and quantitative dimensions of analysis into a systematic whole. Students will learn to apply a suite of analytical tools to better understand and evaluate public policy. Part of the public policy concentration and minor and may also be taken as an elective. (0521-400, 0521-406, 0511-401 and 1016-319 or equivalent; 0511-450 or departmental approval) **Class 4, Credit 4 (offered annually)**

0521-403

Policy Analysis II

This course is the second in a three-course sequence (Policy Analysis I - III) that normally will be taken in the third year of the public policy degree program. This course will assist the student in integrating both quantitative and qualitative analysis in the context of their areas of developing specialization emerging from track courses. In this course, students continue to acquire new tools and techniques to analyze public policies. Part of the public policy concentration and minor and may also be taken as an elective. (0521-402, 0511-457 or 1016-320 or equivalent) **Class 4, Credit 4 (offered annually)**

0521-404

Policy Analysis III

This course is the third in a three-course sequence (Policy Analysis I-III) that normally will be taken in the third year of the public policy degree program. This course will provide students an opportunity to develop an analysis and proposal of a particular policy issue. The course continues to build upon the tools of Policy Analysis I and II using a case study and project-based approach. Part of the public policy concentration and minor; and may also be taken as an elective. (0521-403) **Class 4, Credit 4 (offered annually)**

0521-405

Senior Project I

This is the culminating educational experience for public policy students. The principal focus is an independent study project, centered on a major policy issue drawn from the student's chosen specialization. In Senior Project I, students conduct research and produce their project report under the guidance of a faculty advisor on their senior project. An approved project proposal and permission of the department is required to register for this course. (0521-404) **Class 4, Credit 4 (offered annually)**

0521-406 Introduction to Qualitative Policy Analysis
This is a course in the practical aspects of doing theoretically informed qualitative social research. Special attention will be given to the processes by which research problems are formulated, research designs selected, data gathered and interpreted, and inferences and conclusions drawn. Through example, illustration, and application, specific research skills will be simulated using case studies. Required course for the public policy undergraduate curriculum. Part of the public policy concentration and minor; and may also be taken as an elective. (0521-400) **Class 4, Credit 4 (offered annually)**

0521-407 Senior Project II
This is the culminating educational experience for public policy students. The principal focus is an independent study project centered on a major policy issue drawn from the student's chosen specialization. In Senior Project II students conduct research and produce their project report under the guidance of a faculty advisor on their senior project. Permission of department is required to register for this course. (0521-404) **Class 4, Credit 4 (offered annually)**

0521-408 Technological Innovation and Public Policy
Technological innovation, the incremental and revolutionary improvements in technology, has been a major causal factor for economic growth and social and political change. This course will introduce generic models of innovation that span multiple sectors including: energy, environment, bio- and information technologies. The course will then analyze how governments choose policies to spur innovation. Required course for public policy undergraduate curriculum. Part of the public policy concentration and minor; the science, technology, and policy minor; and may also be taken as an elective. (0521-400 or permission of the department) **Class 4, Credit 4 (offered annually)**

0521-410 Information and Communications Policy
This course examines how federal and international policies are developed to influence innovation of information and computer technology. In particular, the course will examine such topics as privacy, freedom of speech, intellectual property rights, access to information technology, and regulation of the Internet. Part of the public policy concentration and minor; the science, technology, and policy minor; and may also be taken as an elective. (0521-400) **Class 4, Credit 4 (offered annually)**

0521-449 Special Topics in Public Policy
This course will examine current topics in public policy and may be used with consent of advisor as a policy core elective or track elective for the public policy BS degree. Part of the public policy concentration and minor and the science, technology, and policy minor. May also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0521-451 Energy Policy
This course provides an overview of energy resources, technologies, and policies designed to ensure clean, stable supplies of energy for the future. The course evaluates the impacts of fossil fuel, renewable energy, and hydrogen technologies on society and how public policies can be used to influence their development. The development of U.S. energy policy is of particular concern, although a global perspective will be integrated throughout the course. Part of the public policy concentration and minor; the environmental studies concentration and minor; the science and technology studies concentration; the science, technology and society minor; the science technology and policy minor; and the sustainable product development minor. **Class 4, Credit 4 (offered biannually)**

Women's and Gender Studies

0522-400 Foundations of Women and Gender Studies
This course will use an interdisciplinary perspective to provide an introduction to women's studies. The course will focus on the rise of feminist consciousness in the western world from the middle ages to the late 20th century. It will consider the concept of patriarchy, its dominance for the past four millennia, and the multitude of efforts by women and men to conceptualize an alternative world view. The course will consider key historical patriarchal and feminist texts, study the rise of feminist thought, and consider the history of women's activism and the women's rights movement from the late 18th century through the second half of the 20th century. The course will also consider feminist theory and the rise of feminism. Part of the women and gender studies concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0522-401 American Women: Colonies to 1848
This course considers the history of American women from the colonial era to Seneca Falls Convention. We will examine the experiences of women of different races and classes across the country, looking at Puritans in Massachusetts and at planters' daughters in the Carolinas; at female slaves in the deep South and at mill workers in the urban North. We will investigate the impact of the American Revolution movement, culminating in the convention at Seneca Falls. Part of the women and gender studies concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0522-402 American Women: 1848 to Now
This course considers the history of American women from the Seneca Falls Convention to the present. We will trace the impact of the first women's rights convention and follow the story of the struggle for the vote. We will also consider the role of women in other important nineteenth century reform movements, including abolition, temperance, spiritualism, and progressivism. We will also look at the varied experience of women in the twentieth century from birth control to second wave feminism to co-education. Part of the women and gender studies concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0522-405 Women and Science
This interdisciplinary women's studies course links science, feminist theory, history, and biography in recognizing the importance of gender to the study and practice of science. The course focuses on four critical concerns: recognition of women pioneers in the sciences, analysis of the barriers women scientists have faced historically and presently, awareness of the historical roots and exclusions of women in science, and examination of how the practice of science particularly affects women. This course is relevant to non science majors as well as those majoring in the field. Part of the women and gender studies concentration and minor and the science writing minor. May also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0522-406 Feminist Theory
This course will introduce students to the foundations of feminism in political theory, and it will critically explore how feminist concepts can be expanded to take account of class, race, and sexuality. We will examine the differences between the categories of sex and gender and the ways in which feminist understandings of human experience have modified traditional philosophical accounts of reality, knowledge, morality, and justice. Part of the women and gender studies concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0522-407 Seminar on Sexual Violence
The course is intended to familiarize students with sexual crimes and violence as they interface with each phase of the criminal justice system including enforcement, adjudication, treatment and prevention. Discussion will include laws related to sex offenses, types of sex crime, child sexual abuse, the psychology and treatment of sex offenders, prevention and victim aftercare. Part of the women and gender studies concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0522-408 American Film in the Studio Era
This course examines the history and aesthetics of the motion picture in the U.S. during the classical Hollywood studio period. Emphasis will be placed on the analysis of both the work of major American film makers and the evolution of major American film genres. Among the filmmakers to be studied are Griffith, Chaplin, Hawks, Ford, Capra, Welles, Hitchcock, Wilder and Kubrick. Genres to be covered include the melodrama, silent comedy, screwball comedy, western, thriller, film noir, and the gangster film. The films will be studied within the context of contemporary cultural and political events, and will be discussed from several viewpoints, including aesthetic, technical, social and economic. Part of the women and gender studies minor only as an affiliated course. May also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0522-410 Introduction to GLBT Studies
This introductory course examines a broad range of gay, lesbian, bisexual and transgender issues within the historical, psychological, racial, theological, cultural and legal contexts in which we live. Students will learn the historical and theoretical foundations of GLBT studies as well as the contemporary implications for family, work, religion and law for GLBT people and the mainstream society. Students will have the opportunity to compare the regulation of sexual orientation across different gender, race and socioeconomic communities. Part of the women and gender studies concentration and minor. May be taken as an elective. **Class 4, Credit 4 (offered annually)**

0522-415 Domestic Violence
The course will cover the history of domestic violence as a social problem, its dynamics, prevalence, outcomes, theories, research issues, and contemporary domestic violence policy. Special emphasis will be placed upon the cycle of violence, the effects of children's exposure to family violence, and the intersectionality of race, gender, class and sexuality. It will include readings from the social sciences as well as literary texts. Part of the women and gender studies concentration and minor and may be taken as an elective. **Class 4, Credit 4 (offered annually)**

0522-436 Women's Stories, Women's Films
This course will provide an introduction to women's films through an exploration of narrative structure in films made by women. Through film screenings and class discussion, the course will examine the themes and issues of women's narratives and how they are presented in the medium of film. The hero's journey and traditional narrative structure will be contrasted with the heroine's journey and the more personal story telling style of the feminine. The course will also examine differences between films made by women and films made by men about women. The course will introduce the work of feminist film critics and consider the relevance of those theories to women's roles in current films. The course will view women's storytelling in a context of feminine mythology and psychology. Part of the women and gender studies concentration and minor. **Class 4, Credit 4 (offered annually)**

0522-446 Women and Crime
Deals with women as criminal offenders and as victims of crime, focusing upon theories about women in crime, types of crimes committed patterns of criminality and the treatment of women offenders. Also examines the role of women as law enforcement officers, judges, lawyers and correctional officers in the criminal justice system. Part of the women and gender studies concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0522-447 Women, Work and Culture
Broad sociological issues affecting women, work and culture are a result of the emerging global economy and technological revolution. The course will consider how the process of gender socialization is complicated by the way in which gender intersects with racial, class ethnic, sexual, and other identities. This course will present the major theoretical perspectives employed in sociology and women's studies and consider how they relate to the study of women, work and culture. Part of the women and gender studies concentration and minor. May also be taken as an elective. (0510-210, 0515-210 or equivalent) **Class 4, Credit 4 (offered annually)**

0522-448 Cyborg Theory
As we enter a new millennium human biomedical experiences and expectations are changing. Biomedical research organizations continue to grow, developing advanced technologies that offer new ways of living. With these advancements traditional boundaries separating the organic and inorganic are quickly dissipating and an emerging hybrid of human and non-human stands at a cultural threshold in the 21st century. As organic bodies merge with biomedical technologies we reshape our bodies and notions of who we are. The developing cybernetic creature or 'cyborg' challenges traditional concepts of what it means to be human. Robotic prostheses, miniature pacemakers, and genetic engineering are but a few examples of developing technologies and cultural changes. Part of the women's studies concentration and minor. May be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0522-449 History of Women in Science and Engineering
This course will explore the gendered nature of Western science and technology. We will focus on three areas: the history of women's participation in science and engineering since the birth of modern science in the seventeenth century; the historical roots of gender bias in the scientific enterprise; and current debates over whether women have changed science and engineering since the 1970's. Special attention will be paid to the experience of women in engineering, one of the most male-dominated professions. The course will focus on minority and non-minority women in Western Europe and the United States and will occasionally employ cross-cultural contexts. Part of the women and gender studies concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0522-450 Gender, Science and Technology
This course explores feminist critiques of Western science and technology by investigating the ways in which gender, power and politics shape the content and context of science and technology. Particular attention is placed upon social and cultural dimensions of scientific and technological practices including the development of theory, method and application. Part of the women and gender studies concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0522-451 Global Sexualities
This course explores issues of gender and sexuality in a global context. Students will be introduced to anthropological perspectives on the experience of men and women, as gendered subjects, in different societies and historical contexts such as colonialism, nationalism, and global capitalism. In turn, we will explore how cultural constructions of masculinity and femininity are configured by race, class, ethnicity, and sexual orientation. Course materials are drawn from an array of sources, reflecting various theoretical perspectives and ethnographic views from different parts of the world. Part of the women and gender studies concentration and minor. May be taken as an elective. (0510-210 or 0515-210) **Class 4, Credit 4**

0522-452 Bodies and Culture
The body in culture, society, and history. Comparative approaches to the cultural construction of bodies, and the impact of ethnic, gender, racial differences on body practices (i.e. surgical alteration, mutilation, beautification, surrogacy, erotica). The formation of normative discourses of the body (regarding sexuality, AIDS/illness, reproduction, fat/food) in medical science, consumer culture, and the mass media. The course will be discussion and project-oriented, encouraging students to acquire a range of analytic skills through a combination of text interpretation and research. Part of the women and gender studies concentration and minor and may be taken as an elective. (0510-210 or 0515-210) **Class 4, Credit 4 (offered annually)**

0522-453 Economic Role of Women
This course applies economic theory to explain choices faced and selected by women concerning marriage, fertility and labor market participation, alongside government policies targeting those decisions. Empirical research will be presented that describes the changing demographic profile of families, poverty and the labor force. Students in this course will gain experience evaluating how economic theory and practice fits into the larger social sciences goal of describing human behavior by focusing on the changing economic role of women. Part of the women and gender studies concentration and minor. May be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0522-454 Women in Hispanic World
This course explores the contributions to history, literature, art, and politics by a number of prominent Hispanic women. We will look at writings and visual art by these women, read critical essays about their work, and view films inspired by their lives. The critical approach that will inform this course is feminist thought. Part of the women and gender studies concentration and minor and may be taken as an elective. **Class 4, Credit 4 (F)**

0522-459 Toni Morrison
Through reading and discussion of Toni Morrison's novels and feminist and African-American critical theory, this course will allow students to follow the development of Morrison's art and to approach her work from alternative critical perspectives. Particular attention will be paid to the role of narrative in African-American culture and to Morrison's understanding of its literary, historical, and political functions. Part of the women and gender studies concentration and minor. May also be taken as an elective. (0502-227 or equivalent). **Class 4, Credit 4 (offered occasionally)**

0522-461

Queer Looks

In this course we examine representations of queer sexuality in art, film and popular culture beginning in the repressive 1950's, followed by the Stonewall Riots of 1969. We situate the birth of gay liberation in the U.S. in the context of the civil rights struggles, feminism and the anti-war movement. We turn to the work of Andy Warhol that looms over the post-war period, challenged subsequently by the onset of AIDS and the work of General Idea and Act-Up, on the one hand, and the more graphically provocative work of Robert Mapplethorpe, on the other. We examine the diversification of the queer community as transgendered identity asserts itself and the opening of popular culture to issues of diverse sexual identities. We explore expressions of queer sensibility outside of North America and Europe. We turn finally to the issue of gay marriage, both in the U.S. and abroad. Part of the museum studies program, the art history concentration and minor; the American artistic experience concentration and the women's and gender studies concentration and minor. May be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0522-480

Women and the Visual Arts

Examines the image of women in the visual arts and the role of women image makers. Major topics include the variety of images of women, the evolution and change of these images over time, media images (as differentiated from fine art images) of women, images of women by women and by men, women's images and the issues of their relationship to the images made by men, the nude and pornography, history of women artists, selected women artists and their work, relation of their work to the art of the period, current issues and status of women artists. Part of the women and gender studies concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0522-481

Women's Studies in Language and Literature

Concentrates on literature by women, about women, primarily from the early 19th century to the present. Considers the aspirations, frustrations and achievements of women as documented by themselves, as well as the perceptions and representations of women in literature by male writers. Works are examined for their literary value as well as their documentation of broader feminist issues. Part of the women and gender studies concentration and minor. May also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0522-482

Women in Politics

A study of feminist thought as it applies to the political, economic and social status of women and how it has been expressed through the women's political movement. Students study a number of public policies as they apply to and affect women and examine the opportunities for women to participate in the political process. Part of the women and gender studies concentration and minor. May also be taken as an elective. (0513-211, 214 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0522-483

Psychology of Gender

Examines the relevance and applicability of present psychological theory and research to the understanding of the development and behavior of women. Major topics covered include psychological and biological sex differences, psychological theories of women's development, the relationship between female personality development and various sociocultural factors, women's place in society, women and their bodies, and women and mental health. Part of the women and gender studies concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0522-484

Auto/Biography

According to poet James Merrill, we live in the age of 'me-moir,' at least in American culture. But what happens to the quarrel between truth and fiction, to the almighty autonomous 'I,' as we move outside of England and America? What 'outlaw' forms of language and representation do a street fighter from Morocco, a Soweto social worker or an AIDS diarist use to write the self? How do international sex workers, a New Zealand filmmaker, and the author of 'The English Patient' negotiate the charged relationships of family, nation, class, and gender? Expect to encounter visual and biographies from art, photography and film, as well as projects in the classroom and out in the community in this course. Part of the women and gender studies concentration and minor. May also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0522-491

Traumatic Images

This course investigates visual culture and its imagistic responses to life's crises. Problems of identity and identification will be explored and confronted through works of photography, painting, mixed media, new media and film of the 19th, 20th and 21st Centuries. Beginning with the late 19th Century vogue for images of 'hysterical' women, crippled 'black-sheet' family members and dead loved ones (as corpses and as ghosts), we then move on to consider the last century's fascination with pain and suffering, disease and violence, struggle and survival and then the 21st Century's emphasis on terrorism. Specifically, we will focus on the gendering of images and imaging as disturbing pictures work to defy the formal and theoretical distinction between private and public, personal and collective experience and manage the often conflicting responsibilities to self, family, religion, race, nation and society. Part of the art history concentration and minor; the American artistic experience concentration and the women's and gender studies concentration and minor. May be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0522-492

Native American Women's Experience

This course examines the unique status of Native American women in tribal and Euro-American societies. Given the gender complementary construction of many tribal communities, Native women long enjoyed a status and power not found in Europe, but this equality has been altered in many tribes as a result of colonialism. We will study how Native women have responded to assaults on the 'feminine principle,' as Paula Gunn Allen terms it, and how they have sought to rebuild tribal communities along the lines of traditional values. We will examine the following themes in native women's lives: tribal gender roles, nation, community, family, class, work, race, sexuality, disability, culture-bearing, environment, land, health and representation. Part of the women and gender studies concentration and minor. May also be taken as an elective. (0502-227 or equivalent) **Class 4, Credit 4 (annually)**

International Studies

0524-210

Global Studies

Within the past three decades, planetary computerization, burgeoning media industries, and other global processes have significantly altered the ways in which we experience our local and global worlds. Global reconfigurations of time and space change our consciousness, sense of self and others, and the material realities in which we live and work. This course provides the conceptual tools to assess emerging global processes, interactions and flows of people, ideas and things that challenge historical patterns of international studies and relations. The course will introduce you to international and global processes in areas such as global cultural economies, global cities, new forms of democracy and civil society, global religions, sexualities, health, and environments, increased competition for resources, political conflict, war and terrorism. Beyond understanding the causes and consequences of global change, this course will introduce you to ethical dilemmas in global justice movements, and in transferring ideas and technologies in new global contexts. Required for the international studies major. **Class 4, Credit 4 (offered annually)**

0524-420

Introduction to African and Diaspora Studies

This course is an introduction to the study of an enormous continent, Africa and its diaspora. Because of the dimensions of the geography, population and time covered, one of the main purposes of this course is to pave the way to narrower regional or thematic classes. This course will emphasize the interdisciplinarity of African and diaspora studies. We will explore contrasting and complementing disciplinary perspectives on Africa and its diaspora. We will move our way through African and diasporic cultures and histories both temporally and thematically. Lectures will introduce key themes and ideas, and you will discuss textual and visual evidence for African and diasporic communities, cultures and ideas. This course is suitable to those new to the study of Africa and its diaspora, and to those who are considering taking further classes or seminars in African and/or diasporic studies. Part of the international studies program in a related track; the sociology/anthropology concentration; and the African studies concentration. **Class 4, Credit 4 (offered annually)**

Modern Languages and Cultures

0524-421 Global Slavery and Human Trafficking
This course examines historical and contemporary dimensions of global slavery and human trafficking. The trans-Atlantic slave trade was the world's largest forced migration between continents, but it was only one of many slave trades that shaped societies throughout the world. In order to understand the historical significance of global slave trades, we will compare it to other systems of slavery. In examining the historical significance and legacies of the slave trade, we will link different regional histories to the growth of market-based capitalist economies into the twentieth century. The course will also examine the changing meaning of the term 'slavery' and examine some modern forms of forced labor, bondage, and slavery that persist to this day in all sectors of the global economy. We will explore the rise of human trafficking, and global anti-trafficking programs and campaigns. Part of the international studies degree program in a related track; the sociology/anthropology concentration; and the African studies concentration. **Class 4, Credit 4 (offered annually)**

0524-422 Histories of Globalization
This course examines narratives of globalization as human process. We will focus on contemporary and historical issues that are routinely conceived of as affecting or pertaining to the world's population in its entirety, such as human rights, humanitarianism, environmental degradation, trade, and military power. The world and its population will feature as a unit of analysis, and an emphasis will be placed on issues that appear to be in tension with the role of the nation-state and nationality, and highlight world and global citizenship. We will explore critiques of the conceptualization of globality and worldliness as a factor in determining social, cultural, and historical change. Part of the sociology/anthropology concentration; the globalization concentration; and may be taken as an elective. **Class 4, Credit 4 (offered annually)**

0524-425 Economics of Native America
This course will analyze current and historic economic issues faced by Native Americans. It will also examine government policies enacted and directed toward Native Americans with a focus on their economic implications. This will be done using standard economic models of the labor market, poverty, trade, development and gaming. (0511-301 or equivalent) **Class 4, Credit 4 (offered annually)**

0524-449 Special Topics in International Studies
A critical examination of issues in some area of international studies not covered in other international studies courses. Part of the international studies degree program in a related track; the sociology/anthropology concentration; and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0524-499 International Studies Coop

0524-501 Capstone Seminar in International Studies
This upper division seminar constitutes the final core requirement in the international studies degree program. Students will enroll in this course in their final year of study. The capstone seminar will further develop and sharpen the student's understanding of globalization and international processes. The course uses a problem-solving focus to provide a detailed analysis of one or more contemporary issues in the field of international and global studies, culminating in a written senior thesis and project presentation. (0524-210, fourth year status, and permission of instructor.) **Class 4, Credit 4 (offered regularly)**

0524-502 Advanced Research in Global Studies
This upper division course is designed as an elective continuation of the capstone seminar for majors in international and global studies. Upon successful completion of the capstone seminar, qualified students may engage in enhanced research in a specific area or dimension of their capstone project with a faculty expert. May be taken as an elective by majors in international studies. (0524-501, GPA of 3.0 or higher) **Class 4, Credit 4 (offered annually)**

0524-597 GSSI Study Abroad

0524-598 GSSI Internship

0525-385 Linguistics of American Sign Language
Students in this course will be introduced to the study of American Sign Language in terms of its linguistic structure and use. In particular, students will learn to analyze the basic features of ASL phonology, morphology, syntax, semantics, and discourse/pragmatics. In addition, topics related to variation in ASL and acquisition of ASL will also be reviewed. Part of the ASL concentration; the deaf cultural studies concentration and minor; and may be taken as an elective. Instruction is in ASL (an interpreter will not be provided). Students must be fluent in ASL, have completed ASL III, or have approval of the instructor. **Class 4, Credit 4 (S)**

0525-386 American Sign Language Literature
Students will explore a wide range of literary works representing the various genres of ASL literature. Students will be expected to analyze works in terms of literary conventions/techniques as well as relevant cultural symbols and themes. Attention will be given to historical context, deaf cultural values, and the style/conventions used by individual literary artists. Each student will be required to complete literary analysis papers. In addition, students will be expected to complete literary analysis papers. In addition, students will be expected to create original ASL literary works and/or retell well-known ASL literary works as individuals or in collaboration with other students. Part of the ASL concentration; the deaf cultural studies concentration and minor; and may be taken as an elective. Instruction is in ASL (an interpreter will not be provided). Students must be fluent in ASL, have completed ASL III, or have approval of the instructor. **Class 4, Credit 4 (W)**

0525-390 Beginning American Sign Language I
This is the first in a three-course sequence at the beginning level. The sequence provides students without prior knowledge of the language with a sound basis for learning ASL as it is used today among deaf people in North America. The goal of the sequence is beginning proficiency in communication skill with an emphasis on comprehension of the visual language. Students become acquainted with linguistic structure of the language. (Students must take the placement test if you have prior study of the language. ALL NTID students are required to take the course placement interview. Please email casnss@rit.edu to schedule an appointment.) Liberal Arts' ASL courses are NOT open to NTID students who are in AOS programs. Please email rxmns@rit.edu if you are an NTID student interested in registering for an ASL course in the 0886 discipline. **Class 4, Credit 4 (offered regularly)**

0525-391 Beginning American Sign Language II
This is the second in a three-course sequence at the beginning level. This course continues with the introduction of ASL as it is used today among deaf people in North America with the goal of developing beginning expressive and comprehensive proficiency. Students become further acquainted with contemporary culture and life of the deaf community in the United States. Students also continue to study the linguistic structure of the language. Part of the ASL/deaf studies concentration and minor; and may also be taken as an elective. (0525-390 or equivalent; Students must take the placement test if you have not taken COLA ASL I previously. ALL NTID students are required to take the course placement interview. Please email casnss@rit.edu to make an appointment.) Liberal Arts' ASL courses are NOT open to NTID students who are in AOS programs. Please email rxmns@rit.edu if you are interested in registering for an ASL course in the 0886 discipline. **Class 4, Credit 4 (offered regularly)**

0525-392 Beginning American Sign Language III
This is the third in a three-course sequence at the beginning level. This course continues with the study of ASL as it is used today among deaf people in North America with the goal of developing further expressive and comprehensive proficiency. Students become further acquainted with contemporary culture and life of the deaf community in the United States. Students also continue to study the linguistic structure of the language. ALL NTID students are required to take the course placement interview. Please email rxmns@rit.edu to make an appointment.) Liberal Arts' ASL courses are NOT open to NTID students who are in AOS programs. Please email rxmns@rit.edu if you are an NTID student interested in registering for an ASL course in the 0886 discipline. **Class 4, Credit 4 (offered regularly)**

0525-400**Beginning Arabic I**

Beginning Arabic I introduces students with no prior knowledge of the language to modern standard Arabic. Beginning Arabic I builds the foundation skills in speaking, listening, reading, writing, and culture, including with the emphasis on conversation and intensive work on learning the writing system. Topics include the alphabet, greetings, dialects, forms of address, coffee, numbers, handwriting styles, calligraphy, masculine and feminine, definite article, Nisba adjective, questions, names, pronouns, plural and non-verbal sentences. This course is a prerequisite for the Arabic language/culture concentration and minor or may be taken as an elective. Part of the international studies program in a related track. (Students must take the placement test if they have prior study of the language.) **Class 4, Credit 4 (F)**

0525-401**Beginning Arabic II**

Beginning Arabic II focuses on the development of functional competence in speaking, listening, reading, writing, and culture. Topics include possessive pronouns, present tense, questions, adverbs, noun-adjective phrases, why, prepositions and pronouns, fronted predicate, past tense, negation of past tense, roots and patterns, dictionary, reading and culture. This course may be taken as part of the Arabic language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-400 or equivalent; students must take the placement test if this is their first RIT Arabic class.) **Class 4, Credit 4 (W)**

0525-402**Beginning Arabic III**

Beginning Arabic III works on further development of functional skills in speaking, listening, reading, writing, and culture. Topics include non-human plural agreement, telling time, object pronouns, verb chart review, quantifiers, superlative, future, future negation, subject verb agreement, definite and indefinite, reading and culture. This course may be taken as part of the Arabic language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-401 or equivalent; students must take the placement test if this is their first RIT Arabic class.) **Class 4, Credit 4 (S)**

0525-403**Intermediate Arabic I**

Intermediate Arabic I continues at the intermediate level the development of functional skills in speaking, listening, reading, writing, and culture. Topics include the comparative, case markings, colors, reading dates, grammar, reading, writing, listening, culture. This course may be taken as part of the Arabic language/culture concentration and minor or as an elective. Part of the International studies program in a related track. (0525-402 or equivalent; students must see instructor and take the placement test if this is their first RIT Arabic class.) **Class 4, Credit 4 (F)**

0525-404**Intermediate Arabic II**

Intermediate Arabic II continues more intermediate level work in all skills, including conversation, with increased work in reading and writing. Topics include Ibn-Batota: The longest trip in history, history of Islam, verbs, time, festivals and celebrations, Ramadan, verbal nouns, Christian holidays, Arab journalism, modern Arab history, actions with unknown subjects. This course may be taken as part of the Arabic language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-403 or equivalent; students must take the placement test if this is their first RIT Arabic class.) **Class 4, Credit 4 (W)**

0525-405**Intermediate Arabic III**

Intermediate Arabic III does advanced-intermediate work in all skills, including conversation, with increased work in reading and writing. Topics include university tasks, Arabic literature and philosophy, place names, words that don't conjugate, broken plurals, history of the Arab Peninsula, literature, artificial addition, superlatives, patron of Falla, discrimination, language of "dhad", Arabic women's movements, political and social images, sign names, relative plural, religion and citizenship, non-complete noun, famous people. This course may be taken as part of the Arabic language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-404 or equivalent; students must take the placement test if this is their first RIT Arabic class.) **Class 4, Credit 4 (S)**

0525-406**Advanced Arabic I**

This course is the first of the advanced (third year) work in all skills (speaking, listening, reading, writing, culture) including conversation, with increased work in reading and writing. Topics include grammar, vocabulary, readings in political, social, religious, and literary themes, and study of the continuity of the language throughout its history. Part of the SILP/WORLD languages program. This course may be taken as part of the Arabic language/culture concentration and minor or as an elective. Part of the international studies program in a related track. Part of the SILP/WORLD languages program. (0525-405 or equivalent; students must take the placement test if this is their first RIT Arabic class.) **Class 4, Credit 4 (offered regularly)**

0525-407**Advanced Arabic II**

This is the second course of the advanced (third year) sequence. It continues study in the advanced year textbook and does advanced work in all skills (speaking, listening, reading, writing, culture) including conversation, with increased work in reading and writing. Topics include grammar and readings in political, social, religious, and literary themes. This course may be taken as part of the Arabic language/culture concentration and minor or as an elective. Part of the SILP/WORLD languages program. Part of the international studies program in a related track. (0525-406 or equivalent; students must take the placement test if this is their first RIT Arabic class.) **Class 4, Credit 4 (offered regularly)**

0525-408**Advanced Arabic III**

This is the final course of the advanced (third year) sequence. It continues study of the advanced year textbooks and does advanced work in all skills (speaking, listening, reading, writing, culture), including conversation, with increased work in reading and writing. Topics include grammar and readings in political, social, religious, and literary themes. This course may be taken as part of the Arabic language/culture concentration and minor or as an elective. Part of the SLIP/WORLD languages program. Part of the international studies program in a related track. (0525-407 or equivalent; students must take the placement test if this is their first RIT Arabic class.) **Class 4, Credit 4 (offered regularly)**

0525-420**Beginning Chinese I**

This is the first course of a three-course sequence at the beginning level. This course is designed for beginners, with no prior study of Chinese. The course introduces students to the sounds, the writing system, and the essential grammatical structures of Mandarin Chinese. Pinyin, the Romanization (phonetic transliteration) of Mandarin Chinese, is taught and required throughout the course. Students also learn to read and write Chinese characters. Emphasis is on developing listening, speaking, reading and writing skills, as well as building a vocabulary based on the Chinese characters. This course is a prerequisite for the Chinese language/culture concentration and minor and may be taken as an elective. Part of the international studies program in a related track. (Students must take the placement test if they have prior study of Mandarin Chinese or already know Hanzi.) **Class 4, Credit 4 (offered regularly)**

0525-421**Beginning Chinese II**

This course follows Beginning Chinese I. Knowledge of Pinyin is required for the purpose of pronunciation. This course continues to focus on the developing communication skills with an emphasis on reading and writing in characters and expanding vocabulary. By the end of this course, students will have studied approximately 350 vocabulary items. This course may be taken as part of the Chinese language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-420 or equivalent; students must take the placement test if this is their first RIT Chinese class.) **Class 4, Credit 4 (offered regularly)**

0525-422**Beginning Chinese III**

This course completes the beginning level Chinese. Knowledge of Pinyin is required for the purpose of pronunciation. This course continues to focus on the developing communication skills with an emphasis on reading and writing characters and expanding vocabulary. By the end of the beginning level of coursework, students will have studied approximately 525 vocabulary items. This course may be taken as part of the Chinese language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-421 or equivalent; students must take the placement test if this is their first RIT Chinese class.) **Class 4, Credit 4 (offered regularly)**

0525-423 Intermediate Chinese I
This is the first course of a three-course sequence at the intermediate level. Knowledge of the Pinyin system is required for the purpose of pronunciation. This course continues to focus on developing communication skills with an emphasis on reading and writing in characters and expanding vocabulary. By the end of this course, students will have studied approximately 700 vocabulary items. This course may be taken as part of the Chinese language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-422 or equivalent; students must take the placement test if this is their first RIT Chinese class.) **Class 4, Credit 4 (offered annually)**

0525-424 Intermediate Chinese II
This course follows intermediate Chinese I. Communication skills are the focus. Special emphasis will be given to expanding vocabulary, and reading/writing characters at some length. Knowledge of Pinyin is required. Grammatical structures learned in the previous courses will be reviewed with the introduction of more complex ones. Aspects of Chinese culture will also be included. Approximately 175 vocabulary items will be introduced to the students in this course. This course may be taken as part of the Chinese language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-423 or equivalent; students must take the placement test if this is their first RIT Chinese class.) **Class 4, Credit 4 (offered annually)**

0525-425 Intermediate Chinese III
This course completes the intermediate level Chinese. This course continues the focus on communication skills, expansion of vocabulary, and more lengthy reading and writing of characters. Knowledge of Pinyin is required. Grammatical structures learned in the previous courses will be reviewed with the introduction of more complex ones. Aspects of Chinese culture will also be included. By the end of the intermediate level of coursework, students will have studied 1,050 vocabulary items. This course may be taken as part of the Chinese language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-424 or equivalent; students must take the placement test if this is their first RIT Chinese class.) **Class 4, Credit 4 (offered annually)**

0525-426 Advanced Chinese I
This is the first course of a three-course sequence at the advanced level. This sequence is designed to further develop competence in the four language skills of listening, speaking, reading, and writing. Focuses will be on important linguistic structures to build and refine students' understanding of Chinese grammar. This course will gradually introduce more formal speech and written-style language. Approximately 200 vocabulary items will be introduced to the students in this course. Pinyin is required. This course may be taken as part of the Chinese language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-425 or equivalent) **Class 4, Credit 4 (offered annually)**

0525-427 Advanced Chinese II
This course follows advanced Chinese I. Students continue to develop competence in the four language skills of listening, speaking, reading and writing. Focuses continue to be on important linguistic structures to build and refine students' understanding of Chinese grammar, to study more formal speech and written-style language. Pinyin is required. By the end of this course, students will have studied approximately 1,450 vocabulary items. This course may be taken as part of the Chinese language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-426 or equivalent) **Class 4, Credit 4 (offered annually)**

0525-428 Advanced Chinese III
This is the third course of a three-course sequence at the advanced level. This course sequence is designed to further develop competence in the four language skills of listening, speaking, reading, and writing. More complex language forms and functions required for communication in a variety of settings are introduced through text, video, and authentic materials. These materials also form the basis for the study of Chinese culture and society. Classroom discussion and writing practice are important parts of the course. Students will use both the traditional and/or simplified forms of Chinese characters in reading and writing, with Pinyin as an aid. This course may be taken as part of the Chinese language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-427 or equivalent) **Class 4, Credit 4 (offered annually)**

0525-439 Special Topics: Chinese Foreign Language
Study of a topic or area in one of the foreign languages or cultures not normally offered in any other concentration or minor course. May be part of the Chinese foreign language/culture concentration or minors; and may be taken as an elective. (0525-408 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0525-440 Beginning French I
Beginning French I is the first course in a three-course sequence. The sequence provides students without prior knowledge of the language with a sound basis for learning French as it is used today in its spoken and written forms. The goal of the sequence is proficiency in communication skills, with an emphasis on oral proficiency. The sequence also acquaints students with contemporary culture and life in French-speaking countries. This course may be taken as the prerequisite for the French language/culture concentration and minor; and may also be taken as an elective. Part of the international studies program in a related track. (Students must take the placement test if this is their first RIT French class and they have some prior study of French.) **Class 4, Credit 4 (offered regularly)**

0525-441 Beginning French II
Beginning French II is the second course in a three-course sequence. The sequence provides students without prior knowledge of the language with a sound basis for learning French as it is used today in its spoken and written forms. The goal of the sequence is proficiency in communication skills with an emphasis on oral proficiency. Students study contemporary culture and life in French speaking countries. This course may be taken as part of the French language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-440 or equivalent; Students must take the placement test if this is their first RIT French class.) **Class 4, Credit 4 (offered regularly)**

0525-442 Beginning French III
Beginning French III is the third course in a three-course sequence. The sequence provides students without prior knowledge of the language with a sound basis for learning French as it is used today in its spoken and written forms. The goal of the sequence is proficiency in communication skills with an emphasis on oral proficiency. Students also study contemporary life and culture in French-speaking countries. This course may be taken as part of the French language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-441 or equivalent; students must take the placement test if this is their first RIT French class.) **Class 4, Credit 4 (offered regularly)**

0525-443 Intermediate French I
Intermediate French I is the first course of a three-course sequence at the intermediate level. This sequence provides students with the tools necessary to increase their ability to function in French. Communicative activities, contemporary texts, vocabulary study, and grammar are used to expand all communication skills, especially oral proficiency. This course may be taken as part of the French language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-442 or equivalent; students must take the placement test if this is their first RIT French class.) **Class 4, Credit 4 (offered annually)**

0525-444 Intermediate French II
Intermediate French II is the second course of a three-course sequence at the intermediate level. This sequence provides students with the tools necessary to increase their ability to function in French. Communicative activities, contemporary texts, vocabulary study, and grammar are used to expand all communication skills, especially oral proficiency. Part of the French language/culture concentration and minor; and may also be taken as an elective. Part of the international studies program in a related track. (0525-443 or equivalent; students must take the placement test if this is their first RIT French class.) **Class 4, Credit 4 (offered annually)**

0525-445 Intermediate French III
Intermediate French III is the final course of a three-course sequence at the intermediate level. This sequence provides students with the tools necessary to increase their ability to function in French. Communicative activities, contemporary texts, vocabulary study, and grammar are used to expand all communication skills, especially oral proficiency. This course may be taken as part of the French language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-444 or equivalent; students must take the placement test if this is their first RIT French class.) **Class 4, Credit 4 (offered annually)**

0525-446 **Advanced French I**
This is the first course of a three-course sequence at the advanced level. This course emphasizes active spoken language use. Other skills will also be used, such as reading, writing, and listening but primarily as helps for developing conversational ability. Attention will also be given to grammatical accuracy in conversation. By the end of this course, with consistent effort and attendance, the student should be able to communicate about topics routinely encountered in Francophone cultures. This course may be taken as part of the French language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-445 or equivalent; students must take the placement test if this is their first RIT French class.) **Class 4, Credit 4 (offered annually)**

0525-447 **Advanced French II**
This is the second course of a three-course sequence at the advanced level. This course emphasizes active spoken language used. Other skills will also be used, such as reading, writing and listening, but primarily as an aid for developing conversational ability. Attention will also be given to grammatical accuracy in conversation. By the end of this course, with consistent effort and attendance, the student should be able to communicate about topics routinely encountered in Francophone cultures. This course may be taken as part of the French language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-446 or equivalent; students must take the placement test if this is their first RIT French class.) **Class 4, Credit 4 (offered annually)**

0525-448 **Advanced French III**
Intermediate French III is the final course of a three-course sequence at the intermediate level. This sequence provides students with the tools necessary to increase their ability to function in French. Communicative activities, contemporary texts, vocabulary study, and grammar are used to expand all communication skills, especially oral proficiency. This course may be taken as part of the French language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-444 or equivalent; students must take the placement test if this is their first RIT French class.) **Class 4, Credit 4 (offered annually)**

0525-458 **French Films and Hollywood**
A comparative study of French films and their American remakes from the 1930's to the 21st century to determine what these films reveal about the cultural and cinematic contexts from which they emerge. Devotes particular attention to the (re)construction of race, space, gender, and national histories. Conducted in English. Part of the French concentration and minor and may also be taken as an elective. Part of the international studies European track. **Class 4, Credit 4 (offered occasionally)**

0525-459 **Special Topics: French Foreign Language**
Study of a topic or area in one of the foreign languages or cultures not normally offered in any other concentration or minor course. May be part of a French foreign language/culture concentration and minor; and may be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0525-460 **Beginning German I**
Beginning German I is the first course in a three-course sequence at the beginning level. The sequence provides students without prior exposure to the language with a sound basis for learning German as it is used today in its spoken and written forms. The goal of the sequence is proficiency in communication skills, with an emphasis on oral proficiency. The sequence also acquaints students with contemporary culture and life in the German-speaking countries. This course may be taken as the prerequisite for the German language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (Students must take the placement test if this is your first RIT German class and have some prior study of German.) **Class 4, Credit 4 (offered regularly)**

0525-461 **Beginning German II**
Beginning German II is the second course in a three-course sequence at the beginning level. The sequence provides students without prior exposure to the language with a sound basis for learning German as it is used today in its spoken and written forms. The goal of the sequence is proficiency in communication skills with an emphasis on oral proficiency. The sequence also acquaints students with contemporary culture and life in the German-speaking countries. This course may be taken as part of the German language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-460 or equivalent; students must take the placement test if this is their first RIT German class.) **Class 4, Credit 4 (offered regularly)**

0525-462 **Beginning German III**
Beginning German III is the third course in a three-course sequence at the beginning level. The sequence provides students without prior exposure to the language with a sound basis for learning German as it is used today in its spoken and written forms. The goal of the sequence is proficiency in communication skills with an emphasis on oral proficiency. The sequence also acquaints students with contemporary culture and life in the German-speaking countries. This course may be taken as part of the German language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-461 or equivalent; students must take the placement test if this is their first RIT German class.) **Class 4, Credit 4 (offered regularly)**

0525-463 **Intermediate German I**
Intermediate German I is the first course of a three-course sequence at the intermediate level. This sequence provides students with the tools necessary to increase their ability to function in German. Communicative activities, contemporary texts, vocabulary study, and grammar are used to expand all communication skills, especially oral proficiency. A study of contemporary German life and culture is part of the course. This course may be taken as part of the German language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-462 or equivalent; students must take the placement test if this is their first RIT German class.) **Class 4, Credit 4 (offered annually)**

0525-464 **Intermediate German II**
Intermediate German II is the second course of a three-course sequence at the intermediate level. This sequence provides students with the tools necessary to increase their ability to function in German. Communicative activities, contemporary texts, vocabulary study, and grammar are used to expand all communication skills, especially oral proficiency. A study of contemporary German life and culture is part of the course. This course may be taken as part of the German language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-463 or equivalent; students must take the placement test if this is their first RIT German class.) **Class 4, Credit 4 (offered annually)**

0525-465 **Intermediate German III**
Intermediate German III is the third course in a three-course sequence at the intermediate level. This sequence provides students with the tools necessary to increase their ability to function in German. Communicative activities, contemporary texts, vocabulary study, and grammar are used to expand all communication skills, especially oral proficiency. A study of contemporary German life and culture is part of the course. This course may be taken as part of the German language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-464 or equivalent; students must take the placement test if this is their first RIT German class.) **Class 4, Credit 4 (offered annually)**

0525-466 **Advanced German I**
This course is the first course of the three-course sequence at the advanced level. It provides advanced students of German with the tools necessary to refine their speaking, writing, reading and listening skills. The course includes a study of advanced grammar. Literary and non-literary texts will be read and analyzed. This course may be taken as part of the German language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-465 or equivalent; students must take the placement test if this is their first RIT German class.) **Class 4, Credit 4 (offered annually)**

0525-467 **Advanced German II**
This course is the second course of the three-course sequence at the advanced level. It provides advanced students of German with the tools necessary to refine their speaking, writing, reading and listening skills. The course includes a study of advanced grammar. Literary and non-literary texts will be read and analyzed. This course may be taken as part of the German language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-466 or equivalent; students must take the placement test if this is their first RIT German class.) **Class 4, Credit 4 (offered annually)**

0525-468 **Advanced German III**
This course is the last course of the three-course sequence at the advanced level. It provides students of German with the tools necessary to refine their speaking, listening, reading and writing skills. The course includes a study of advanced grammar. Literary and non-literary texts will be read and discussed. A study of the contemporary German speaking world is included. This course may be taken as part of the German language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525 467 or equivalent; students must take the placement test if this is their first RIT German class.) **Class 4, Credit 4 (offered annually)**

0525-479 **Special Topics: German Foreign Language**
Study of a topic or area in one of the foreign languages or cultures not normally offered in any other concentration or minor course. May be part of a German foreign language/culture concentration and minor; and may be taken as an elective. **Class 4, Credit 4 (offered annually)**

0525-480 **Beginning Japanese I**
This is the first course in the first-year sequence designed for students with no prior exposure to Japanese. It provides a sound introduction to the language as it is spoken and written today. A strong emphasis is placed on oral proficiency and the appropriate use of language in the Japanese society. Hiragana and Katakana syllabaries are also taught for written communication. This course is a prerequisite for the Japanese language/culture concentration and minor or as an elective. Part of the international studies program in a related track. It is also a prerequisite for the KIT/RIT summer program in Kanazawa, Japan. See instructor for placement. (Students must take the placement test if you have prior study of Japanese.) **Class 4, Credit 4 (offered regularly)**

0525-481 **Beginning Japanese II**
This is the second course in the first-year sequence. It provides a sound introduction to the language as it is spoken and written today. A strong emphasis is placed on proficiency and the appropriate use of language in the Japanese society. Students continue to learn how to use language in real-life situations for different communication purposes. Approximately 50 Kanji characters are also introduced for written communication. The course is a prerequisite for the KIT/RIT summer program in Kanazawa, Japan. Part of the Japanese language/culture concentration and minors; and maybe taken as an elective. Students must have a good command of Hiragana and Katakana to take this course. Part of the international studies program, East Asian track. (0525-480 or equivalent; students must take the placement test if this is your first RIT Japanese class.) See instructor for placement. **Class 4, Credit 4 (offered regularly)**

0525-482 **Beginning Japanese III**
This is the third course in the first-year sequence. It provides a sound introduction to the language as it is spoken and written today. A strong emphasis is placed on proficiency and the appropriate use of language in the Japanese society. Students continue to learn how to use language in real life situations for different communication purposes. Students learn approximately 60 Kanji in this course. Students must have a good command of Hiragana and Katakana and some basic Kanji to take this course. The course is a prerequisite for the KIT/RIT summer program in Kanazawa, Japan. This course may be taken as part of the Japanese language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525 481 or equivalent; Students must take the placement test if this is your first RIT Japanese class.) See instructor for placement. **Class 4, Credit 4 (offered regularly)**

0525-483 **Intermediate Japanese I**
This is the first course in the second-year sequence designed to give students more advanced instruction and practice in the skills of speaking, reading, writing, and comprehending contemporary Japanese. A strong emphasis is placed on proficiency through reading, writing, and speaking activities. Students learn cultural information and practice using the language in real life situations in Japanese society. Approximately 60 new Kanji are introduced. The course is a prerequisite for the KIT/RIT summer program in Kanazawa, Japan. This course may be taken as part of the Japanese language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-482 or equivalent; students must take the placement test if this is your first RIT Japanese class.) See instructor for placement. **Class 4, Credit 4 (offered twice annually)**

0525-484 **Intermediate Japanese II**
This is the second course in the second-year sequence designed to give students more advanced instruction and practice in the skills of speaking, reading, writing, and comprehending contemporary Japanese. A strong emphasis is placed on proficiency through reading, writing, and speaking activities. Students learn cultural information and practice using the language in real life situations in Japanese society. Approximately 90 new Kanji are introduced. This course may be taken as part of the Japanese language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-483 or equivalent; students must take the placement test if this is your first RIT Japanese class.) See instructor for placement. **Class 4, Credit 4 (offered twice annually)**

0525-485 **Intermediate Japanese III**
This is the third course in the second-year sequence designed to give students more advanced instruction and practice in the skills of speaking, reading, writing, and comprehending contemporary Japanese. A strong emphasis is placed on proficiency through reading, writing and speaking activities. Students learn cultural information and practice using the language in real-life situations in Japanese society. Approximately 90 new Kanji are introduced. This course may be taken as part of the Japanese language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-484 or equivalent; students must take the placement test if this is your first RIT Japanese class.) See instructor for placement. **Class 4, Credit 4 (offered twice annually)**

0525-486 **Advanced Japanese I**
This course provides advanced students of Japanese with training in all four language skills. Students will practice oral communication with a high degree of proficiency in various social settings. They will improve communicative skills with discussions and debates. They also receive training in reading semi-authentic materials with the help of a dictionary and in writing for a specific purpose, such as news reports and critical essays. This course may be taken as part of the Japanese language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-485 or equivalent; students must take the placement test if this is your first RIT Japanese class.) **Class 4, Credit 4 (offered annually)**

0525-487 **Advanced Japanese II**
This course provides advanced students of Japanese with training in all four language skills. Continuing Advanced Japanese I students will practice oral communication with a high degree of proficiency in various social settings. They will improve communicative skills with discussions and debates. Students will also receive training in reading semi-authentic materials with the help of a dictionary and in writing for a specific purpose, such as news reports and critical essays. This course may be taken as part of the Japanese language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-485 or equivalent; students must take the placement exam if this is your first RIT Japanese class.) **Class 4, Credit 4 (offered annually)**

0525-488 **Advanced Japanese III**
This course provides advanced students of Japanese with training in all four language skills. Students will practice oral communication with a high degree of proficiency in various social settings. They will improve communicative skills with discussions and debate. They will also receive training in reading semi-authentic and authentic materials with the help of a dictionary, as well as training in writing for a specific purpose, such as news reports and critical essays. This course may be taken as part of the Japanese language/culture concentration and minor or as an elective. Part of the international studies program in a related track. See instructor for placement. (0525-476, 0525-487 or equivalent; students must take the placement test if this is your first RIT Japanese class.) **Class 4, Credit 4 (offered annually)**

0525-494 **Japanese Culture in Print**
Through selected readings of essays, novels, biographies of historical figures, and contemporary manga (Japanese comics), this course gives students the opportunity to learn about Japanese culture, society and history in the Japanese language. Also, through discussing and writing as well as reading, this course refines students' language skills with the aim of expressing their thoughts. Furthermore, through individual readings selected by the student and based on their area of interest and ability, this course provides the opportunity to develop expressive skills in Japanese. This course may be taken as part of the Japanese language/culture concentration and minor or as an elective. (0525-485 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0525-495 **Professional Japanese**
This course is designed to improve the four skills (i.e., speaking, listening, reading and writing) developed in the elementary/intermediate sequence to master formal interactions in Japanese. The students will learn the formal expressions through conversations as well as selected reading materials. The students will have an opportunity to deepen their knowledge of the structure of Japanese society as well as to practice conversation in Japanese, especially in professional and formal contexts used in business settings. The course will be useful for students who are planning to seek employment in Japanese companies or in companies doing business in Japan. Part of the Japanese language/culture concentration and minor and may also be taken as an elective. (0525-485 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0525-496 **Structure Japanese Language**
This course aims to increase the students' understanding of basic characteristics of the Japanese language, which will help their learning of the Japanese language. The topics include the genetic affiliation of the Japanese language, sound system, word formation, syntactic structures, sociocultural factors in language use, and historical development of the writing system. Students will become acquainted with the language from a linguistics perspective and develop analytical skills by solving linguistic problems pertinent to Japanese language. Part of the Japanese language/culture concentration and minor; and may also be taken as an elective. (0525-495 or equivalent) **Class 4, Credit 4 (offered annually)**

0525-497 **Language Japanese Society**
This course aims to introduce students to modern Japanese society, its rich cultural heritage, and the use of Japanese language that reflects the societal norms. It provides students with a fundamental, yet diverse knowledge of Japanese culture and Japanese language use. The course work will include lectures, readings, discussions, and working with multi-media resources. Knowledge of Japanese is helpful but not necessary. Part of the Japanese language/culture concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0525-498 **Special Topics: Japanese Foreign Language**
Study of a topic or area in one of the Japanese foreign languages or cultures not normally offered in any other concentration or minor course. May be part of a foreign language/culture concentration and minors; and may be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0525-500 **Beginning Italian I**
Beginning Italian I is the first course in a three-course sequence. The sequence provides students without prior knowledge of the language with a sound basis for learning Italian as it is used today in its spoken and written forms. The goal of the sequence is proficiency in communication skills with an emphasis on oral proficiency. The sequence also acquaints students with contemporary culture and life in Italy. This course is a prerequisite for the Italian language/culture concentration and minor and may be taken as an elective. Part of the international studies program in a related track. (Students must take the placement test if you have prior study of the language.) **Class 4, Credit 4 (offered twice annually)**

0525-501 **Beginning Italian II**
Beginning Italian II is the second course in a three-course sequence. The sequence provides students without prior knowledge of the language with a sound basis for learning Italian as it is used today in its spoken and written forms. The goal of the sequence is proficiency in communication skills with an emphasis on oral proficiency. Students study contemporary culture and life in Italy. This course may be taken as part of the Italian language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-500 or equivalent; students must take the placement test if this is their first RIT Italian class.) **Class 4, Credit 4 (offered twice annually)**

0525-502 **Beginning Italian III**
Beginning Italian III is the third course in a three-course sequence. The sequence provides students without prior knowledge of the language with a sound basis for learning Italian as it is used today in its spoken and written forms. The goal of the sequence is proficiency in communication skills with an emphasis on oral proficiency. Students also study contemporary life and culture in Italy. This course may be taken as part of the Italian language/culture concentration and minor or as an elective. Part of the international studies program in a related track (0525-501 or equivalent, students must take the placement test if this is their first RIT Italian class.) **Class 4, Credit 4 (offered twice annually)**

0525-503 **Intermediate Italian I**
Intermediate Italian I is the first course of a three-course sequence at the Intermediate level. This sequence provides students with the tools necessary to increase their ability to function in Italian. Communication activities, contemporary texts, vocabulary study and grammar use are used to expand all communication skills, especially oral proficiency. Part of the Italian language/culture concentration and minors; and may also be taken as an elective. Part of the international studies program, European track. (0525-502 or equivalent; Students must take the placement test if this is your first RIT Italian class.) **Class 4, Credit 4 (offered annually)**

0525-504 **Intermediate Italian II**
Intermediate Italian II is the second course of a three-course sequence at the intermediate level. This sequence provides students with the tools necessary to increase their ability to function in Italian. Communication activities, contemporary texts, vocabulary study and grammar are used to expand all communication skills, especially oral proficiency. This course may be taken as part of the Italian language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-503 or equivalent; Students must take the placement test if this is your first RIT Italian class.) **Class 4, Credit 4 (offered annually)**

0525-505 **Intermediate Italian III**
Intermediate Italian III is the final course of a three-course sequence at the intermediate level. This sequence provides students with the tools necessary to increase their ability to function in Italian. Communication activities, contemporary texts, vocabulary study and grammar are used to expand all communication skills, especially oral proficiency. This course may be taken as part of the Italian language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-504 or equivalent; students must take the placement test if this is your first RIT Italian class.) **Class 4, Credit 4 (offered annually)**

0525-506 **Advanced Italian I**
This is the first course of a three-course sequence at the advanced level. This sequence is designed to further develop proficiency in the four language skills of listening, speaking, reading, and writing. This sequence develops the ability to understand and communicate more freely by expansion of vocabulary and grammar, and by exposure to authentic cultural materials. The course seeks to analyze contemporary Italian culture, politics and economics through its representation in films and the press. Students are required to analyze, form opinions and participate in discussions. Students will pursue a topic of research of their choice and submit a portfolio at the end. This course may be taken as part of the Italian language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-505 or equivalent) **Class 4, Credit 4 (offered annually)**

0525-507 **Advanced Italian II**
This is the second course of a three-course sequence at the advanced level. This sequence is designed to further develop proficiency in the four language skills of listening, speaking, reading, and writing. This sequence develops the ability to understand and communicate more freely by expansion of vocabulary and grammar, and by exposure to authentic cultural materials. The course seeks to analyze contemporary Italian culture, politics and economics through films and the press. Major trends examined include youth, education, immigration, women, and the political system. Students will pursue a topic of research of their choice and submit a portfolio at the end. Part of the Italian language/culture concentration and minor; and may also be taken as an elective. Part of the international studies program, European track. (0525-506 or equivalent) **Class 4, Credit 4 (offered annually)**

0525-508 **Advanced Italian III**
This is the third sequence designed to further develop proficiency in the four language skills of listening, speaking, reading, and writing. This sequence develops the ability to understand and communicate more freely by expansion of vocabulary and grammar, and by exposure to authentic cultural materials. The course seeks to analyze contemporary Italian culture, politics and economics through films and the press. Major trends examined include youth, education, immigration, women, and the political system. Students will pursue a topic of research of their choice and submit a portfolio at the end. This course may be taken as part of the Italian language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-507 or equivalent; students must take the placement test if this is their first RIT Italian class.) **Class 4, Credit 4 (offered annually)**

0525-519 **Special Topics: Italian Foreign Language**
Study of a topic or area in one of the Italian foreign languages or cultures not normally offered in any other concentration or minor course. May be part of a foreign language/culture concentration and minors; and may be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0525-520 **Beginning Portuguese I**
Beginning Portuguese I builds the foundation skills in speaking, listening, reading, writing, and culture. For students with no prior experience in the language. Topics include greetings, courtesy, numbers, location, dates, time, classroom expressions, questions, expressing needs and likes, daily activities, description, nationality, possession, restaurant, arts and entertainment, future, family, routine, preferences, present tense. This course may be taken as the prerequisite for the Portuguese minor, the Latino/Latina/Latin American studies concentration or as an elective. Part of the international studies program in a related track. (Permission of instructor and GPA of 2.85 are required for registration.) **Class 4, Credit 4 (offered regularly)**

0525-521 **Beginning Portuguese II**
Beginning Portuguese II is the second course in the beginning year of Portuguese. This course continues presentation of work in the basic skills of speaking, listening, reading, writing and culture, including work on past tenses and some subjunctive. Topics include past tenses, progressives, object pronouns, comparisons, reflexives, housing, household items, domestic chores, schedules, physical and emotional states, familiarity and skills, clothing, shopping, affirmation and negation, opinions, leisure activities, sports, past events, holidays. This course may be taken as part of the Latino/Latina/Latin American studies concentration or as an elective. Part of the Portuguese minor, the international studies program in a related track. (0525-520 or equivalent; students must take the placement test if this is their first RIT Portuguese class.) **Class 4, Credit 4 (offered regularly)**

0525-522 **Beginning Portuguese III**
Beginning Portuguese III is the third course in the beginning year of Portuguese. This course advances work in the basic skills of speaking, listening, reading, writing and culture, including work on the subjunctive mood. Topics include past tenses, subjunctive, commands, future, impersonal subject, relative pronouns, passive voice, diminutives and augmentatives, work place and professions, orders and instructions, the body, health, medicine, emotions and opinions, goals, travel, directions, denial and uncertainty, states and conditions, environment. This course may be taken as part of the Portuguese minor or the Latino/Latina/Latin American studies concentration or as an elective. Part of the international studies program in a related track. (0525-521 or equivalent; students must take the placement test if this is their first RIT Portuguese class.) **Class 4, Credit 4 (offered regularly)**

0525-523 **Intermediate Portuguese I**
Intermediate Portuguese I is the first course in the second year, intermediate-level Portuguese. This course includes intensive grammar review along with increasing work in situation dialogues, conversation, composition and culture. This course may be taken as part of the Portuguese minor or the Latino/Latina/Latin American studies concentration or as an elective. Part of the international studies program in a related track. (0525-522 or equivalent; students must take the placement test if this is their first RIT Portuguese class.) **Class 4, Credit 4 (offered regularly)**

0525-524 **Intermediate Portuguese II**
Intermediate Portuguese II is the second course in second-year, intermediate-level Portuguese. This course continues intensive grammar review along with conversation, composition and culture, including work on business letters and professional vocabulary, and continuing situation dialogues. This course may be taken as part of the Portuguese minor or the Latino/Latina/Latin American studies concentration or as an elective. Part of the international studies program in a related track. (0525-523 or equivalent; students must take the placement test if this is their first RIT Portuguese class.) **Class 4, Credit 4 (offered regularly)**

0525-525 **Intermediate Portuguese III**
Intermediate Portuguese III is the third course in second-year, intermediate-level Portuguese. This course will continue intensive work in conversation, composition, and culture, including authentic materials, longer readings, study films, and continuing situation dialogues. This course may be taken as part of the Portuguese minor or the Latino/Latina/Latin American studies concentration or as an elective. Part of the international studies program in a related track. (0525-524 or equivalent; students must take the placement test if this is their first RIT Portuguese class.) **Class 4, Credit 4 (offered regularly)**

0525-526 **Advanced Portuguese I**
This is the first in a three-course sequence at the advanced level in Portuguese. Students will increase their ability to communicate and to understand the language and culture of Portuguese-speaking countries through intensive study of grammar and vocabulary, conversation, composition, discussion of the culture, and intensive study of films on the themes of O Sertao and urban violence. This course may be taken as part of the Portuguese minor, the Latino/Latina/Latin American studies concentration or as an elective. Part of the international studies program in a related track. (0525-525 or equivalent; students must take the placement test if this is their first RIT Portuguese class.) **Class 4, Credit 4 (offered regularly)**

0525-527 **Advanced Portuguese II**
This is the second course at the advanced level in Portuguese. Students will increase their ability to communicate and to understand the language and culture of Portuguese speaking countries through intensive study of grammar and vocabulary, conversation, composition, discussion of culture, and intensive study of films on the theme of political transitions. This course may be taken as part of the Portuguese minor, the Latino/Latina/Latin American studies concentration or as an elective. Part of the international studies program in a related track. (0525-526 or equivalent; students must take the placement test if this is their first RIT Portuguese class.) **Class 4, Credit 4 (offered regularly)**

0525-528 **Advanced Portuguese III**
This is the third course at the advanced level in Portuguese. Students will increase their ability to communicate and to understand the language and culture of Portuguese speaking countries through intensive study of grammar and vocabulary, conversation, composition, discussion of culture, and intensive study of films on the themes of women and adaptations of the myth of Orpheus. This course may be taken as part of the Portuguese minor or the Latino/Latina/Latin American studies concentration or as an elective. Part of the international studies program in a related track. (0525-527 or equivalent; students must take the placement test if this is their first RIT Portuguese class.) **Class 4, Credit 4 (offered regularly)**

0525-540 **Beginning Russian I**
Beginning Russian I builds the foundation skills in speaking, listening, reading, writing and culture, with emphasis on conversation. For students with no prior experience in the language. Topics include the Russian alphabet and sound system, pronunciation print, italic and cursive writing, greetings, introductions, autobiographical information, questions, airport, ads, ethnic and national backgrounds, geography, numbers, names. This course is a prerequisite for the Russian language/culture concentration and minor ; it may be taken as an elective. Part of the international studies program in a related track. (Permission of instructor and GPA of 2.85 are required for registration. Students must take the placement test if they have prior study of the language.) **Class 4, Credit 4 (offered regularly)**

0525-541 **Beginning Russian II**
Beginning Russian II focuses on the development of functional competence in speaking, listening, reading, writing, and culture. Topics include autobiographical information, what people study, academic schedules, diplomas and transcripts, spelling rules, location, cases, various grammar points, pronunciation, numbers, daily activities, telling time, invitations, telephone calls, letters, days of week, directions, home and furnishings, want ads, colors, family, age. This course may be taken as part of the Russian language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-540 or equivalent; students must take the placement test if this is their first RIT Russian course.) **Class 4, Credit 4 (offered regularly)**

0525-542 **Beginning Russian III**
Beginning Russian III works on further development of functional skills in speaking, listening, reading, writing, and culture. Topics include purchases, birthday greetings, past tense, cases, age, object pronouns, prepositions, necessity, pronunciation, restaurant, menus, cooking, food stores, future, numbers, family, location, biographies, school, time. This course may be taken as part of the Russian language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-541 or equivalent; students must take the placement test if this is their first RIT Russian class.) **Class 4, Credit 4 (offered regularly)**

0525-543 **Intermediate Russian I**
Intermediate Russian I continues with intermediate-level development of functional skills in speaking, listening, reading, writing, and culture. Topics include letters, email, handwriting, autobiography, weather, travel, seasons, telephone, messages, feelings, several grammar points, cities, directions, transportation, commands, hotel, travel, dates, plural, numbers, pronunciation. This course may be taken as part of the Russian language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-542 or equivalent; students must take the placement test if this is their first RIT Russian class.) **Class 4, Credit 4 (offered regularly)**

0525-544 **Intermediate Russian II**
Intermediate Russian II continues with more intermediate-level work in all skills, including conversation, with increased work in reading and writing. Topics include movies, television, likes, dislikes, agree, disagree, comparisons, reflexives, books and authors, genres of literary works, poems, free time, invitations, music games, sports, hobbies, passive, various grammar points. This course may be taken as part of the Russian language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-543 or equivalent; students must take the placement test if this is their first RIT Russian class.) **Class 4, Credit 4 (offered regularly)**

0525-545 **Intermediate Russian III**
Intermediate Russian III does advanced-intermediate level work in all skills, including conversation with increased work in reading and writing. Topics include post office, Internet, Internet cafe, personal ads, generalities, illness, parts of the body, past tense, holidays, hosts and guests, time, directions, location, hypothesis, parties, various grammar points. This course may be taken as part of the Russian language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-544 or equivalent; students must take the placement test if this is their first RIT Russian class.) **Class 4, Credit 4 (offered regularly)**

0525-546 **Advanced Russian I**
This is the first advanced level course in Russian. The course will help to further develop proficiency at the advanced level in all skills of the language (speaking, listening, reading, writing, culture). Students will increase their ability to communicate and to understand the language and culture of Russian-speaking countries through intensive study of grammar and vocabulary, introduction to literature, and discussion of culture. Topics include contemporary Russian life, literature, paintings, newspapers, journals, social customs, business customs, cross-cultural communication. This course may be taken as part of the Russian language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-545 or equivalent; students must take the placement test if this is their first RIT Russian class.) **Class 4, Credit 4 (offered regularly)**

0525-547 **Advanced Russian II**
The second advanced level course in Russian will help to further develop proficiency at the advanced level in all skills of the language. Students will increase their ability to communicate and to understand the language and culture of Russian speaking countries through intensive study of grammar and vocabulary, reading selected literature and nonfiction prose, and discussion of culture. Topics include contemporary Russian life, literature, art, newspapers, journals, social customs. This course may be taken as part of the Russian language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-546 or equivalent; students must take the placement test if this is their first RIT Russian class.) Part of the Russian language/culture concentration and minors; and may be taken as an elective. Part of the international studies program European track. **Class 4, Credit 4 (offered regularly)**

0525-548 **Advanced Russian III**
The third advanced level course in Russian will help to further develop proficiency at the advance level in all skills of the language. Students will increase their ability to communicate and to understand the language and culture of Russian speaking countries through intensive study of grammar and vocabulary, reading of literature and nonfiction prose, and discussion of culture. Topics include contemporary Russian life, literature, art, newspapers, journals, social customs, business customs, cross-cultural communication, grammar. This course may be taken as part of the Russian language/culture concentration and minor or as an elective. Part of the international studies program in a related track. (0525-547 or equivalent; students must take the placement test if this is their first RIT Russian class.) **Class 4, Credit 4 (offered regularly)**

0525-560 **Beginning Spanish I**
Beginning Spanish I is the first course in a three-course sequence. This sequence of courses provides students with a basic foundation in all skills in Spanish through intensive practice in a variety of media. Course I is for true beginners, and it (or an equivalent proficiency) is a prerequisite for courses II and III. Topics include autobiographical information, greetings, introductions, social expression, description, family and friends, classroom objects and expressions, numbers, colors, telling time, weather, calendar, ownership, nationality. This course may be taken as a prerequisite for the Spanish language/culture and minor; the Latino/Latina/Latin American studies concentration or as an elective. Part of the international studies program in a related track. (Students must take the placement test if they have prior study of the language.) **Class 4, Credit 4 (offered regularly)**

0525-561 **Beginning Spanish II**
This is the second course in the Beginning Spanish sequence continuing through the basic language structures, vocabulary, situations, and emphasis on past tenses. Topics include food, meals, restaurant, market, clothing, shopping, comparisons, holidays, vacation, travel, hotel, directions, parties, celebrations, relationships, object pronouns, commands, requests, information about various countries. This course may be taken as part of the Spanish language/culture concentration and minor; the Latino/Latina/Latin American studies concentration or as an elective. Part of the international studies program in a related track. (0525-560 or equivalent; students must take the placement test if this is their first RIT Spanish class.) **Class 4, Credit 4 (offered regularly)**

0525-562 **Beginning Spanish III**
This is the third course in the Beginning Spanish sequence continuing through the basic structures, vocabulary and situations, and expanding practice in all skills. Emphasis on the subjunctive mood. Topics include subjunctive, future, conditional, if-clauses, work related situations, rural vs. urban, environment, information on various countries. This course may be taken as part of the Spanish language/culture concentration and minor or the Latino/Latina/Latin American studies concentration or as an elective. Part of the international studies program in a related track. (0525-561 or equivalent; students must take the placement test if this is their first RIT Spanish class.) **Class 4, Credit 4 (offered regularly)**

0525-563 **Intermediate Spanish I**
This is the first course in the intermediate Spanish sequence. Emphasis is on grammar review, survival situation dialogues, introduction to conversation, and culture, expanding practice in all skills including information on various countries. This course may be taken as part of the Spanish language/culture concentration and minor or the Latino/Latina/Latin American studies concentration or as an elective. Part of the international studies program in a related track. (0525-562 or equivalent; students must take the placement test if this is their first RIT Spanish class.) **Class 4, Credit 4 (offered regularly)**

0525-564 **Intermediate Spanish II**
This is the second course in the intermediate Spanish sequence. Intermediate II emphasizes professional vocabulary in the student's major field of study, business correspondence (letters and job interview), grammar review and culture of various countries with work in all skills. This course may be taken as part of the Spanish language/culture concentration and minor or the Latino/Latina/Latin American studies concentration or as an elective. Part of the international studies program in a related track. (0525-563 or equivalent; students must take the placement test if this is their first RIT Spanish class.) **Class 4, Credit 4 (offered regularly)**

0525-565 **Intermediate Spanish III**
This is the second course in the intermediate Spanish sequence. Intermediate II emphasizes professional vocabulary in the student's major field of study, business correspondence (letters and job interview), grammar review and culture of various countries with work in all skills. This course may be taken as part of the Spanish language/culture concentration and minor or the Latino/Latina/Latin American studies concentration or as an elective. Part of the international studies program in a related track. (0525-563 or equivalent; students must take the placement test if this is their first RIT Spanish class.) **Class 4, Credit 4 (offered regularly)**

0525-566 **Advanced Spanish I**
This advanced Spanish course develops and refines students' listening, reading, speaking, and writing skills within a distinctive Hispanic cultural framework, which will include literary texts and visual materials. This course may be taken as part of the Spanish language/culture concentration and minor or the Latino/Latina/Latin American studies concentration or as an elective. Part of the international studies program in a related track. (0525-565 or equivalent; students must take the placement test if this is their first RIT Spanish class.) **Class 4, Credit 4 (offered annually)**

0525-567 **Advanced Spanish II**
This advanced Spanish course develops and refines students' listening, reading, speaking, and writing skills within a distinctive Hispanic cultural framework which will include literary texts and visual materials. This course may be taken as part of the Spanish language/culture concentration and minor or the Latino/Latina/Latin American studies concentration or as an elective. Part of the international studies program in a related track. Advanced Spanish I, II, III may be taken in any order. (0525-566 or equivalent; students must take the placement test if this is their first RIT Spanish class) **Class 4, Credit 4 (offered annually)**

0525-568 **Advanced Spanish III**
This advanced Spanish course develops, and refines students' listening, reading, speaking, and writing skills within a distinctive Hispanic cultural framework which will include literary texts and visual materials. This course may be taken as part of the Spanish language/culture concentration and minor or the Latino/Latina/Latin American studies concentration or as an elective. Part of the international studies program in a related track. (0525-567 or equivalent; students must take the placement test if this is their first RIT Spanish class.) **Class 4, Credit 4 (offered annually)**

0525-576 **Trauma and Survival in First Person Narrative**
This course introduces students to first-person narratives about trauma and survival from Latin America, the Hispanic Caribbean, U.S. Latina/o communities, and Spain. Students will learn about Hispanic literature, culture, and history while exploring themes of memory, community, and survival in autobiography, testimonial, chronicle, memoir, epistolary narrative, essay, interview, and the historical novel. Through in-class discussion, presentations, reading, and writing exercises, this course refines students' skills in oral expression, reading, writing, and critical thinking. Students will also develop research skills as they complete a project on a topic chosen in consultation with the instructor. This course may be taken as part of the Spanish language/culture concentration and minor; the Latino/Latina/Latin American studies concentration; and may be as an elective. **Class 4, Credit 4 (offered regularly)**

0525-577 **Screening the Hispanic Caribbean**
This course provides an introduction to Hispanic Caribbean culture through film. We will study the role of film in Hispanic Caribbean societies as well as the unique artistic and technical achievements and obstacles of Hispanic Caribbean filmmakers through class discussion of films, critical essays, lectures, written activities, presentations, quizzes, and a final project. Weekly screenings of required films will be held outside of class hours. This course will take a cultural studies approach to the study of film as a social practice. All films have English subtitles. Part of the international studies program, the Spanish language/culture concentration and minor; the Latino/Latina/Latin American studies concentration; and may also be taken as an elective. **Class 4, Credit 4 (S)**

0525-578 **Women in the Hispanic World**
This course introduces students to the historical, political, and cultural contributions of women in Latin America, Spain, and U. S. Latina/o communities. This course refines students' skills through discussions, presentations, and writing exercises on readings, lectures, and film screenings. Students will also develop research skills as they complete a project on a topic chosen in consultation with the instructor. The critical approach that will inform this course is feminist thought. Part of the Latino/Latina/Latin American concentration; the Spanish language/culture concentration and minor; and may be taken as an elective. Part of the international studies program in a related track. **Class 4, Credit 4 (F)**

0525-579 **Special Topics: Spanish Foreign Language**
Study of a topic or cultures not normally offered in any other concentration or minor course. May be part of Spanish language/culture concentration and minors; the Latino/Latin America concentration; and may be taken as an elective (0525-565 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0525-580 **Spanish for Technology**
This course is intended for students with an intermediate level of Spanish who want to develop a specialized knowledge of technical language. The contents of the course include areas such as computing, video and photography, automotive, construction, and energy production. The technical areas will be complemented by cultural content about technical universities, licensing/accreditation systems, technology-related professions, current trends in technology development, and important technological infrastructure in Spanish speaking countries. Interaction with the reading material and interaction between class participants will be done both in face-to-face and computer-mediated formats. Part of the Spanish language/culture concentration and minor and may also be taken as an elective. (0525-565 or equivalent) **Class 4, Credit 4 (offered occasionally)**

0525-595 **American Sign Language Literature**
In this course, students will explore a wide range of literary works representing the various genres of ASL literature. Students will be expected to analyze works in terms of literary conventions/techniques as well as relevant cultural symbols and themes. Attention will be given to historical context, deaf cultural values, and the style/conventions used by individual literary artists. Each student will be required to complete literary analysis papers. In addition, students will be expected to create original ASL literary works and/or retell well-known ASL literary works as individuals or in collaboration with other students. This course is conducted in ASL and will require considerable reading and viewing of videotaped materials. This course is part of the ASL concentration; the deaf studies concentration and minor. (fluency in ASL or approval of instructor) **Class 4, Credit 4 (offered annually)**

0525-596 **Special Topics: Deaf Cultural Studies**
Part of the deaf cultural studies concentration and minor and may be taken as an elective. **Class 4, Credit 4 (offered annually)**

0525-597 **Special Topics: Foreign Languages**

Urban and Community Studies

0526-440 **Quantitative Methods**
The research conducted by sociologists and anthropologists generates large, complex data sets that are difficult to interpret subjectively. Multivariate quantitative methods are an important tool for understanding these data. This course presents a variety of quantitative methods for the analysis of large population data set in the context of sociological and anthropological reach. Topics include: research design, collecting and coding data, data screening, data display, non-metric data, comparing groups, exploratory data analysis, and classification and grouping. The course features laboratory exercises in which the methodologies are applied to actual data sets and an individual final project in which the student selects a research problem and data set which they analyze and present to the class. (Data Analysis I and II) **Class 4, Credit 4 (offered annually)**

0526-443 **Community Economic Development: Rochester**
The City of Rochester will serve as a dynamic laboratory for applying perspectives and insights in community planning, with a particular focus on community economic development. The course requires students to conduct extensive field studies so as to gain first-hand knowledge of such urban forms as neighborhoods and commercial centers, to examine and assess policies formed to address the city's past and present challenges, and to formulate alternative policies. The city's industrial transformation, especially since 1945—from an economic and industrial powerhouse to a community of secondary importance—will be examined and will provide context for the field studies and stakeholder meetings. Comparative research on cities experiencing similar changes may be included. Part of the urban and community studies major; the urban studies concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0526-445 **Urban Planning and Policy**
This course will examine the sociological and political implications of policies and planning decisions that have impacted the growth patterns of American cities and suburbs in the post-World War II era. Particular emphasis will be given to land use decisions that have favored suburbs over cities, the loss of tax base which impacted these cities' ability to perform basic functions for their citizens, and the adverse impact of federal and state government policies and programs on the functionality of urban areas and the efficiency of local governments. Students will examine case studies on urban development, and conduct field research on governmental structures and policies that will enable them to develop alternative strategies and policies. Required for the urban and community studies major, and counts toward the concentration in sociology and anthropology and the minor and concentration in urban studies. **Class 4, Credit 4 (offered annually)**

0526-475 **Senior Thesis in Urban and Community Studies**
The senior thesis is the final requirement in the urban and community studies degree program. Students will conduct and present research on a selected major issue in the field of urban and community studies. The course will provide students the opportunity to develop skills of expressing their research in written and oral forms. (0515-442, 0515-406 and 0526-440) **Class 4, Credit 4 (offered annually)**

Museum Studies

0533-370 Introduction to Museums and Collecting

This course examines the history, theory, ideology, and practice of collecting within the institutional context of the museum. It considers the formation of the modern museum, and focusing on the American context, it investigates various types of museums, ranging from natural history, anthropology, science and technology, history, and art. The course explores the governance and operations of museums in the areas of collections management, collections care, and gallery/museum management. The course also focuses on issues of contemporary concern and examines museums and their practices. The course includes field trips to local museums and collections throughout the quarter. Part of the art history concentration and minor and is a required course for the cultural resource studies program. Cross-listed with fine arts, 0505-421. **Class 4, Credit 4 (offered annually)**

0533-422 Art Materials/Photography

This is a lecture-studio/lab course on materials and tools, supports and techniques of works of art on paper and other organic art materials. Topics include the application, development and manufacture of artists' materials: drawings, water-colors, furniture, textiles, prints and photographs. This course includes studio reconstructions of masterworks, lectures, and library research. Required course for the museum studies degree program. **Class 4, Credit 4 (offered annually)**

0533-423 Art Materials/Panel Painting

This is a lecture-studio/lab course on materials and tools, supports and techniques of inorganic art materials. Topics include the application, development and manufacture of artists' materials: glass, ceramics, sculpture, gilding, pigments, patinas. This course includes studio reconstructions of masterworks, lectures, and library research. Required course for the museum studies degree program. **Class 4, Credit 4 (offered annually)**

0533-424 Legal and Ethical Issues

This course presents an overview of the legal and ethical issues that govern the institutions and personnel involved in collecting cultural resources. Collecting institutions are governed by national, state, and local laws that define how facilities and collections are used and this course will consider them, as well as the larger social and historical context out of which they developed. The course will consider the evolution of the museum as a public institution and how the legal system increasingly defined minimum standards for maintaining collections, the facilities in which they are housed, and guaranteeing public access; in addition legal standards for the collection will be studied, including definitions of ownership, what this means in terms of intellectual property rights, copyright, reproduction (traditional and electronic), and deaccessioning/disposal. These will be studied within the context of the society within which the institution functions. The course will also study the development of national and international ethical standards and will examine the codes of behavior that govern the personal and professional conduct of museum professionals and the practices that comprise conflicts of interest. Ethical standards for collecting institutions will also be considered, particularly those that address the responsibilities to a collection, the ethics of acquisition, the question of illicit or stolen material, the issues of human remains and objects of sacred significance, and repatriation. Attention will be paid to the changes in society that made these issues critical for collecting institutions. Required course for the museum studies degree program (0505-213 or 2039-225, 226, 227 or equivalent) **Class 4, Credit 4 (offered annually)**

0533-425 Display and Exhibition Design

This course examines the history and practice of display and exhibition design. It considers the history of display as found in a variety of private collections and the history of exhibitions with the development of museum-like institutions. It investigates various types of displays and exhibitions, ranging from natural history, anthropology, science and technology, history, and art; and compares these to commercial displays at large international fairs. The course explores the development of a display and exhibition budget in light of budgetary constraints. It considers the professional parameters of display and exhibition design as well as ethical issues related to material. The course includes field trips to local institutions and collections throughout the quarter. Required course for the museum studies degree program. **Class 4, Credit 4 (offered annually)**

0533-426 Collections Management and Museum Administration

This course presents an overview of the administration and management of museums and their collections. The course examines the governance structure of museums, focusing on personnel responsible for their administration, curation and education, and operations, as well as on the mission statement and policies they determine. The course also details the management of collections, including the development of a collections policy, management of that policy, documentation and record keeping, acquisitions, and the creation/management of exhibitions. Finally, the course considers collections care or preventive conservation, looking at both the facility and collections. Throughout the quarter, legal and ethical issues pertaining to museums and their collections will be emphasized. Required course for the museum studies degree program. **Class 4, Credit 4 (offered annually)**

0533-427 Fund Raising, Grant Writing and Marketing

This course examines the growing autonomy of collecting institutions as they are cut off from various forms of governmental sponsorship and public subsidy and their subsequent needs for raising money from outside, non-traditional sources. The course looks at issues of needs assessment, budgeting, and strategic planning. It focuses on the design and implementation of effective fundraising campaigns, as well as on the organization and writing of successful grant proposals. It also considers the importance of marketing to overall institutional success. Required course for the museum studies degree program. **Class 4, Credit 4 (offered annually)**

0533-437 The Forensic Investigation of Art

This course introduces the study and examination of artistic and historic materials within a humanities oriented forum in which students present and debate published research on several famous case studies including: the Shroud of Turin, the Getty Kouros, and the Han van Meegeren forgeries of Vermeer paintings. Emphasis will be placed on using resources from the interdisciplinary fields of art history, art and materials science supported by a virtual lab in which the application of instrumental techniques to the materials is demonstrated. Required course for the museum studies degree program. **Class 4, Credit 4 (offered annually)**

0533-438 Conservation of Cultural Materials

This course examines the philosophies, ethics, art conservation methods and principles of collection management. An overview of deterioration characteristics and conservation strategies for a variety of materials including: stone, glass, ceramic, wood, paper, new media, metals, textiles, oil paintings and archaeological materials will be presented. Required course for the museum studies degree program. **Class 4, Credit 4 (offered annually)**

0533-511 Senior Thesis in Museum Studies I

The senior thesis in museum studies I is the first course in the final sequence required for completion of the degree program. In this section, students will work with their thesis advisors to define their senior thesis project, engage in preliminary research, write an abstract containing the thesis statement/research question, construct their formal thesis proposal, and develop a plan of work for senior thesis in museum studies II. (0505-213 or 2039-225, 226, 227 or equivalent; 0533-424, 437, 438 and internship) **Class 4, Credit 1**

0533-512 Senior Thesis in Museum Studies II

The senior thesis in museum studies II is the second course in the final sequence required for completion of the degree program. In this section, under the guidance of their thesis advisors, students will do their research and write their literature review. They will also revise their content outline based on this research. Finally, they will develop a new plan of work for the completion of their thesis in senior thesis in museum studies III. (0533-511; 0505-213 or 2039-225, 226, 227 or equivalent; 0533-424, 437, 438 and internship) **Class 4, Credit 1 (offered as needed)**

0533-513 Senior Thesis in Museum Studies III

The senior thesis in museum studies III is the final requirement in the degree program. In this section, under the guidance of their thesis advisors, student will write a completed first draft of their thesis, to be followed by a second and/or final draft that is a clean and completed thesis. Students will participate in the college of liberal arts senior thesis poster session by presenting posters of their research and being present to talk about their research to attendees. (0533-212; 0505-213 or 2039-225, 226, 227 or equivalent; 0533-424, 437, 438 and internship) **Class 4, Credit 2 (offered as needed)**

Communication

0535-200 Foundations of Communication
Introduces students to the history of human communication from speech to computers. Spoken, written and visual communication in a variety of contexts is surveyed. Required course for professional and technical communication majors and advertising and public relations majors. **Class 4, Credit 4 (F)**

0535-201 Introduction to Journalism
The course covers the impact/effect of journalism on American society, with an introduction to the history, freedom, technologies, ethics and functions of the news media. Students will learn how to assess news value, develop news judgment and analyze news stories. Required course for journalism majors. Part of the journalism minor; elective for professional and technical communication majors and advertising and public relations majors. **Class 4, Credit 4 (F)**

0535-311 Rhetorical Theory
Students develop an understanding of public communication as a humanistic study concerned with the formation of judgment and moral-ethical choice. Rhetorical Theory focuses on the systematic relationships among the various ways and means human beings use communication to influence action and describe objects and events in the world. The class centers on verbal and nonverbal human symbolic action. Required course for professional and technical communication majors; a professional elective for advertising and public relations majors. **Class 4, Credit 4 (offered annually)**

0535-315 Quantitative Research Methods
An introduction to the methods and ethics of scientific, scholarly communication research, including methods of locating, analyzing and critiquing communication research literature. This course focuses on social scientific empirical research methods and culminates in the development of a research project proposal suitable for implementation as the senior thesis in communication. Required course for professional and technical communication majors and advertising and public relations majors, and a professional elective for journalism majors. Cannot be taken to fulfill liberal arts requirements. (0535-445 or equivalent) **Class 4, Credit 4 (offered twice annually)**

0535-316 Qualitative Research Methods
Introduction to the methods and ethics of qualitative research, including participant observation, naturalistic study, and focus group interviewing. Qualitative research methods rely on the researcher's observational, analytic and critical skills, and seek to understand the behaviors, beliefs, values, attitudes, assumptions, rituals and symbol systems that characterize relationships between the source, message, media and audience of specific communication acts. Students develop a research proposal suitable for implementation as the senior thesis in communication. Required course for advertising and public relations majors and a professional elective for professional and technical communication majors and journalism majors. Cannot be taken to fulfill liberal arts requirements. (0535-445 or equivalent) **Class 4, Credit 4 (offered annually)**

0535-317 Critical Research Methods
The course develops a disciplined ability for the critical appraisal of public discourse. Students learn methods enabling them to systematically investigate and explain human symbolic action and artifacts. In addition to the specialized form of critical thinking it teaches, the course promotes criticism as a means for understanding the processes of rhetorical action. Required course for professional and technical communication majors and a professional elective for advertising and public relations majors and journalism majors. (0535-445 or equivalent) **Class 4, Credit 4 (offered annually)**

0535-351 Professional Communication for Software Engineers
An introduction to professional communication contexts and processes emphasizing both conceptual and practical dimensions. Participants engage in public speaking, small group problem solving and leadership, and professional writing exercises while acquiring theoretical background appropriate to understanding these skills. Restricted to software engineer majors only. Cannot be taken as a liberal arts elective. **Class 4, Credit 4 (offered quarterly)**

0535-352 Professional Communication for Business
An introduction to professional communication contexts and processes emphasizing both conceptual and practical dimensions. Participants engage in public speaking, small group problem solving and leadership, and professional writing exercises while acquiring theoretical background appropriate to understanding these skills. Restricted to the college of business programs. Cannot be taken as a liberal arts elective. **Class 4, Credit 4 (offered quarterly)**

0535-403 Effective Technical Communication
This course provides knowledge and practice of written and oral communication skills generally required in technical professions. Focus is on individual and group writing and speaking tasks. Required course for various programs. Cannot be taken to fulfill liberal arts requirements. **Class 4, Credit 4 (offered quarterly)**

0535-405 Information Gathering
This course is about introduction to information gathering techniques and search strategies for journalistic purposes, with emphasis on identifying, locating, evaluating and using information and sources. Required course for Journalism majors in their second year. Part of the journalism minor and an elective for professional and technical communication majors and advertising and public relations majors. Can be taken concurrently with Newswriting II. **Class 4, Credit 4 (offered annually, F)**

0535-410 Computer-Mediated Communication
Readings, discussions, and observations of online behavior introduce students to computer-mediated communication (CMC) terms and theories to further develop their skills. CMC was originally defined as a form of electronic written communication. As networking tools advanced, CMC expanded to include new software developments, such as instant messenger and the internet. Today, the term computer-mediated communication is used to refer to a wide range of technologies that facilitate both human communication and the interactive sharing of information through computer networks. Professional elective for professional and technical communications majors, advertising and public relations majors and journalism majors. Part of the communication minor and may be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0535-411 Health Communication
An introduction to the subject of communication in health care delivery and in public health campaigns, with an emphasis on interpersonal, organizational, and mass communication approaches. Professional elective for professional and technical communication majors, advertising and public relations majors and journalism majors. **Class 4, Credit 4 (offered twice annually)**

0535-412 Communication Law and Ethics
An examination of the major principles and trends in communication law. The course analyzes a broad range of issues related to the First Amendment, intellectual property, and media regulation. Special attention is paid to new communications technologies and to discussing the major ethical perspectives and issues surrounding contemporary communication behavior. Required course for professional and technical communication majors and a professional elective for advertising and public relations majors. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0535-414 Interpersonal Communication
Analysis and situational applications of the major theories of interpersonal communication. The course allows the student to look into, out of and at relationships in regard to communication. The focus is on perception of self and others, language use, nonverbal communication and symbolic interaction in face-to-face situations. Professional elective for professional and technical communication majors and advertising and public relations majors. Part of the communication concentration and minor and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0535-415 Organizational Communication
Offers the seasoned communication student a comprehensive overview of the organizational communication field. This overview is focused on the conceptualization of organizations, communication theories as applied to organizations, significant research from the past and present, and speculations about the future. Professional elective for professional and technical communication majors, advertising and public relations majors and journalism majors. Part of the communication minor and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0535-416 Newswriting
Practicum in basic techniques of news writing and gathering for the daily press. Emphasis is primarily on writing for the print media. Emphasis on frequent writing against a deadline. Required course for journalism majors. Professional elective for professional and technical communication majors and advertising and public relations majors. Part of the journalism and communication minors. May also be taken as an elective. **Credit 4, Class 4 (offered twice annually)**

0535-417 **Newswriting II**
Practicum in advanced techniques of news gathering, reporting and writing, with an emphasis on reportorial principles and practices. This class expands upon the principles and practices of gathering, evaluating, investigating and presenting information to news media audiences, all of which are introduced in newswriting. Required course for journalism majors. Part of the journalism minor, and an elective for the professional and technical communication majors and advertising and public relations majors. Can be taken concurrently with information gathering. (0535-416 or equivalent) **Class 4, Credit 4 (F)**

0535-421 **Public Relations**
An introduction to the study of public relations. Topics include history, research areas, laws, ethics and social responsibilities as they relate to the theory and practice of public relations. Required course for advertising and public relations majors and a professional elective course for professional and technical communication majors and journalism majors. Part of the communication minor and may also be taken as an elective. **Class 4, Credit 4 (offered twice annually)**

0535-422 **Ethics in Technical Communication**
Ethics is the study of morals, of what is right and good, especially regarding specific moral choices. In a given situation, a system of ethics helps us answer the question: what should I do? Ethics in Technical Communication explores the ways in which ethical conduct is important in the communication of technical information, particularly among professional technical communicators; establishes principles, based on the history of ethical studies, for making ethical choices as technical communicators; and provides opportunities to apply ethical principles to case studies, in order to better understand the often problematical nature of ethical choices in technical—or any—communication. Professional elective for professional and technical communication majors, advertising and public relations majors and journalism majors. Part of the communication minor and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0535-445 **Theories of Communication**
An introduction to communication theories, including the history of the major stages in the development of modern humanities and social sciences theories of communication. Required course for professional and technical communication majors, advertising and public relations majors and journalism majors. Cannot be taken to fulfill a liberal arts requirement. **Class 4, Credit 4 (offered twice annually)**

0535-446 **Writing the Technical Manual**
Continuing from technical writing (0502-444), this course develops skills necessary for researching, planning, designing, writing and editing full-length technical documents such as manuals. Students apply techniques learned in technical writing, for instance physical and process description writing, to put together a complete and detailed piece of technical documentation. Required course for professional and technical communication majors and a professional elective for advertising and public relations majors. Part of the communication minor and may also be taken as an elective. (0502-444 or equivalent) **Class 4, Credit 4 (offered annually)**

0535-450 **Visual Communication**
An introduction to the study of visual communication through the use of resources and first-hand experience. Differences between verbal and visual modes of communication are explored. Iconic and symbolic demonstrations of visual images used in a variety of media are stressed. The course includes a number of class and individual visits to museums, galleries and exhibits. The goal of the course is to examine visual messages as intentional communication that seeks to inform, persuade and/or propagandize specific target audiences. Required course for professional and technical communication majors and advertising and public relations majors. Part of the communication minor and may also be taken as an elective. **Class 4, Credit 4 (offered twice annually)**

0535-460 **Copywriting and Visualization**
Students learn the verbal and visual thinking skills utilized in the creation of advertising messages. To create an effective strategy for an advertising campaign, the advertising copywriter/art director team needs to combine linguistic and visual metaphors into a persuasive message. Students develop creative advertising messages by researching and writing a creative brief and then implementing the plan by transforming concepts into actual advertising messages and campaigns. Required course for advertising and public relations majors and a professional elective for professional and technical communication majors and journalism majors. Part of the communication minor and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0535-461 **Principles of Advertising**
An introduction to the advertising communication process showing how advertising is integrated into the larger discipline of marketing communications. Marketing communications is the integration of internal and external communication systems. It involves coordinating the various promotional mix elements (advertising, sales promotion, publicity and public relations) along with other marketing activities to more effectively communicate with a company's customers. Required course for advertising and public relations majors and a professional elective for professional and technical communication majors and journalism majors. Part of the communication minor, and may also be taken as an elective. **Class 4, Credit 4 (offered twice annually)**

0535-462 **Digital Design in Communication**
An introduction to essential software applications for communication majors, including desktop publishing, image manipulation, presentation graphics and statistical applications. Required course for professional and technical communication majors, advertising and public relations majors and journalism majors. **Class 4, Credit 4 (offered twice annually)**

0535-463 **Campaign Management and Planning**
An introduction to managing and planning advertising and public relations campaigns. The course takes a team project approach thereby helping students learn how to work together in class as well as in a competitive agency. Service-learning is used to expose students to community causes. Required course for advertising and public relations majors and a professional elective for professional technical communication majors and journalism majors. Part of the communication minor and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0535-464 **Public Relations Writing**
An overview of a variety of forms of writing for public relations, including news releases, newsletters, backgrounders, public service announcements, magazine queries, interviews, coverage memos, media alerts, features, trade press releases, and public presentations. Students write for a variety of media including print, broadcast, and the Web. Required course for advertising and public relations majors and journalism majors, and a professional elective for professional and technical communication majors. Part of the communication minor and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0535-465 **Rhetoric of Political Campaigns**
An overview of the rhetorical dimensions, history and the functions of political communication. Students read communication and rhetorical theory that relates to the ways in which the form, content, and context campaign rhetoric invite citizens to conceive of themselves, the candidates, the nation, the government and the political process. Professional elective for professional and technical communication majors, advertising and public relations majors and journalism majors. Part of the communication minor and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0535-467 **Media Planning**
An introduction to developing, executing and managing media plans for advertising and public relations. This course covers the characteristics and uses of advertising media; media terms and calculations, media strategies and tactics, and media plan development and implementation. Required course for advertising and public relations majors. Professional elective for professional and technical communication majors and journalism majors. (0535-461 or equivalent) **Class 4, Credit 4 (offered annually)**

0535-470 **Law and Ethics of the Press**
An introduction to the American legal system and its relationship to journalists and other communication practitioners. The ethical boundaries and applications of law are explored to help students better understand how they influence journalism as an industry and profession. Students will strengthen their understanding of basic legal principles by applying them to existing and emerging issues in mass communication. Required course for journalism majors. Professional elective for professional and technical communication majors and advertising and public relations majors. Part of the communication minor and the journalism minor, and part of the photojournalism major. **Class 4, Credit 4 (offered twice annually)**

0535-471 **History of Journalism**
The history of American journalism from colonial times to the present, including the advance of press freedom under the First Amendment and how it has affected the development of American media. Journalism's relationship to politics, institutions and culture are investigated. Newspaper, magazine and broadcast industries are examined for ideas that have changed American journalism. Required course for journalism majors. Professional elective for professional and technical communication majors and advertising and public relations majors. Part of the communication and the journalism minors. **Class 4, Credit 4 (offered annually)**

0535-472 **News Editing**
An introduction to the principles and practices of editing hard news and feature articles, including news judgment, story selection, headline writing, copy editing, and picture editing. The course emphasizes reader interest, readability, clarity, verification and style, as well as legality, ethics and propriety. Required course for journalism majors. Professional elective for professional and technical communication majors and advertising and public relations majors. Part of the journalism minor and may also be taken as an elective. **Class 4, Credit 4 (offered twice annually)**

0535-474 **Reporting in Specialized Fields**
An in-depth study, analysis and practicum of a selected advanced and focused subject in professional journalism. Specific subject matter of the course varies according to faculty assigned and is published when the course is offered; students may enroll in this class no more than twice as long as the specific subject matter is different. Examples include education journalism, health journalism, business journalism, reporting public affairs, sports journalism, reporting for alternative media. Required course for journalism majors. Professional elective for professional and technical communication majors and advertising and public relations majors. Part of the journalism minor. **Class 4, Credit 4 (offered annually)**

0535-475 **eJournalism**
An introduction to the principles and practices of online news reporting, including writing for mainstream news sites, journalistic blogs (Web logs), share and discussion sites, and other, evolving online news outlets. The course familiarizes students with the tools of the online reporter and explores the cultural and ethical terrain unique to the digital environment. Required course for journalism majors. Part of the journalism minor and a professional elective for professional and technical communication majors and advertising and public relations majors. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0535-476 **eJournalism II**
Further development of skills learned in eJournalism, with an emphasis on writing and design skills for rich (online) media and an overview of new trends. Course will cover writing, designing and packaging content to attract and inform online news consumers. Required course for journalism majors. Part of the journalism minor and a professional elective for professional and technical communication majors and advertising and public relations majors. (0535-475 or equivalent) **Class 4, Credit 4 (offered annually)**

0535-480 **Human Communication**
An overview of the field of communication, including the contexts of interpersonal, group, mass and public communication. Part of the communication concentration and minor. May also be taken as an elective. Closed to communication majors. **Class 4, Credit 4 (offered twice annually)**

0535-481 **Persuasion**
A study of the theories, practices and effects of persuasion. Persuasion is human communication designed to influence another's attitudes, beliefs, values and actions. Objectives of this course include developing an understanding of how contemporary persuasion continually shapes our society, while seeking to heighten our abilities to detect and analyze persuasive appeals. The course is specifically designed to investigate the prevalence of persuasive communication in various facets of our culture. Required course for professional and technical communication majors and advertising and public relations majors. Part of the communication concentration and minor and may also be taken as an elective. **Class 4, Credit 4 (offered quarterly)**

0535-482 **Mass Communications**
An introductory analysis of newspapers, television, radio, magazines and other mass media in the United States. The course focuses on the history, development, economics and law and regulation of the mass media in the U.S., and explores theoretical consideration of contemporary mass communication issues. Required course for professional and technical communication majors, advertising and public relations majors and journalism majors. Part of the communication concentration and minor and may also be taken as an elective. **Class 4, Credit 4 (offered quarterly)**

0535-483 **Small Group Communication**
Focuses on the importance of cooperation and understanding as essential prerequisites to effective communication and to becoming adept in the analysis and evaluation of communication in small groups. This class is highly experiential in nature; you should expect to engage in a variety of activities that explore the concepts and topics being studied. Professional elective for professional and technical communication majors and advertising and public relations majors. Part of the communication concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered twice annually)**

0535-484 **Rhetoric of Race Relations**
Examines the history of the struggle for freedom and equality for Blacks in American society. This course traces the history and rhetoric of key spokespersons from the pre-Civil War period to the 20th century as evidenced in texts of selected public speeches and reactions to them. Professional elective for professional and technical communication majors and advertising and public relations majors. Part of the communication concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0535-497 **Communication Portfolio**
All communication majors create a portfolio comprised of projects, papers and related professional materials compiled during their college career. Each quarter the department hosts a portfolio review day when the communication seniors present their portfolio work in a public space for review and comment by faculty, staff and peers. All communication students must register once in their final year for the communication portfolio. The course requirement is fulfilled by presenting the portfolio at review day. Restricted to undergraduate communication degree programs in fourth-year status. **Class 0, Credit 0 (offered quarterly)**

0535-499 **PTA, PTC, PTJ Co-op**

0535-501 **Public Speaking**
Public speaking equips students with knowledge of the theories and principles of formal public speaking. Informative and persuasive speeches are the focus, with emphasis on organization, evidence, language use, audience analysis, situational demands, strategy, delivery and effective use of media technology. Required course for professional and technical communication majors and advertising and public relation majors. Part of the communication concentration and minor. May also be taken as an elective and for arts of expression credit. **Class 4, Credit 4 (offered quarterly)**

0535-502 **Speech Writing**
An advanced course for those who wish to increase their abilities to write professional public speeches for themselves or others. This course focuses on acquiring the skills necessary for contemporary professional speechwriting. Professional elective for professional and technical communication majors and advertising and public relations majors. Part of the communication minor and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0535-503 **Advanced Public Speaking**
Further development of knowledge and skills learned in public speaking (0535-501). This course emphasizes language, delivery, and speech organization, requiring students to develop and deliver speeches for various occasions, using a variety of delivery methods. Students will present out-of-the-classroom speeches as well as practice ghostwriting. Part of the communication minor; a professional elective for the advertising and public relations majors and professional and technical communication majors; and may also be used as an institute elective. (0535-501). **Class 4, Credit 4 (S)**

0535-520 **Intercultural Communication**
An examination of the role of culture in face-to-face interpersonal and small group interaction. Professional elective for professional and technical communication majors, advertising and public relations majors and journalism majors. Part of the Arabic and French language/culture concentrations; the communication concentration and minor; and may also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0535-525

Special Topics in Communication

A focused, in-depth study and analysis of a selected advanced topic in communication and associated issues. Specific topic varies according to faculty assigned and is published when the course is offered. Topics may include semiotics, communication technologies, gender differences in communication, legal communication, rhetoric of race relations, group dynamics, and censorship and propaganda. Professional elective for professional and technical communication majors and advertising and public relations majors, and may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0535-532

Professional Writing

Students develop writing, research, and interviewing skills necessary for the composition of articles for magazines, newsletters, and other similar publications. In addition students learn how to investigate the market for and 'sell' their writing, and how to write query letters. Much of the course is conducted as a workshop, during which students appraise each other's work and make suggestions for revision. Required course for professional and technical communication majors and a professional elective for advertising and public relations majors and journalism majors. Part of the communication and journalism minors. **Class 4, Credit 4 (offered annually)**

0535-590

Senior Project in Journalism

Senior capstone course culminating in the production of a long-form piece of journalism, a Web site and a digital portfolio of select works. The course brings together each participant's work in journalism and the professional core. Required course for journalism majors. (0535-416, 462, 475, 476 or equivalent) **Class 4, Credit 4 (S)**

0535-595

Senior Thesis in Communication

A research seminar that provides students with the opportunity to initiate and complete an original research project. The course guides students through the early decisions necessary to plan and complete the thesis; provides instruction for specific methods of research; provides a guided time line to keep work on schedule; offers instructional feedback for individual sections of your thesis and affords opportunities for peer review. The course culminates in a public presentation of the completed senior thesis. Required course for professional and technical communication majors and advertising and public relations majors only. Cannot be taken to fulfill liberal arts requirements. (0535-315, 445 or equivalent) **Class 4, Credit 4 (offered twice annually)**

0535-599

Independent Study

A combined student/faculty-member effort on a chosen topic beyond the normal sequence of course selections. It provides the qualified, self-motivated student with a creative orientation the opportunity to develop an autonomous and personal sense of academic growth and achievement. **Class variable, Credit variable (offered as needed)**

Center for Multidisciplinary Studies

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Course numbering: RIT courses are generally referred to by their seven-digit registration number. The first two digits refer to the college offering the course. The third and fourth digits identify the discipline within the college. The final three digits are unique to each course and identify whether the course is noncredit (less than 099); lower division (100–399); upper division (400–699); or graduate level (700 and above).

Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's schedule of courses, published by the Office of the Registrar. Prerequisites/corequisites are noted in parentheses near the end of the course description.

Accounting and Business Systems

3080-201 **Financial Accounting**
Emphasis is placed on analyzing and recording business transactions and understanding the results of these transactions. Preparation of basic financial statements required by any business are included. **Credit 4**

3080-203 **Managerial Accounting**
The functions and uses of accounting information are presented. Emphasis is placed on the preparation and operation of dynamic budgets and the use of accounting data for control and profit planning. (3080-201) **Credit 4**

3080-224 **Personal Financial Management**
Manage your personal finances more effectively; personal budgeting, protection of personal assets, consumer credit, investments and estate planning are presented. **Credit 4**

3080-341 **Information Resources/ Network Tool**
An overview of the evolution and structure of the computing environment and information networks. Topics include the evolution of the computer; personal computers, workstations and local area networks; tools for managing information; systems design and analysis tools; electronic mail; and using the Internet. Labs explore information resources and data communication tools available on the RIT computer network and the Internet. **Credit 4**

Business Administration Management

3081-200 **Management Process**
A comprehensive three-quarter course in effective supervision and management for supervisors and potential supervisors. Approximately 50 topics of current importance to supervisors are presented, as well as essential management principles, business communication and practical supervision techniques. Specific supervisory problems of course participants are discussed in informal sessions and through projects conducted outside the classroom. Instruction is usually guided by a team of management specialists. Lecture discussion, panel presentations, audiovisual presentation, simulation exercises and case studies. (Course sequence extends over three consecutive quarters and should be taken in sequence when possible.) A management certificate is awarded for successful completion of the three course sequence. **Credit 4 (12 credit total)**

3081-201 **Management Process II**
A comprehensive three-quarter course in effective supervision and management for supervisors and potential supervisors. Approximately 50 topics of current importance to supervisors are presented, as well as essential management principles, business communication and practical supervision techniques. Specific supervisory problems of course participants are discussed in informal sessions and through projects conducted outside the classroom. Instruction is usually guided by a team of management specialists. Lecture discussion, panel presentations, audiovisual presentation, simulation exercises and case studies. (Course extends over three consecutive quarters and should be taken in sequence.) A management certificate is awarded for successful completion of the courses. **Credit 4 (12 credits total)**

3081-202 **Management Process III**
A comprehensive three-quarter course in effective supervision and management for supervisors and potential supervisors. Approximately 50 topics of current importance to supervisors are presented, as well as essential management principles, business communication and practical supervision techniques. Specific supervisory problems of course participants are discussed in informal sessions and through projects conducted outside the classroom. Instruction is usually guided by a team of management specialists. Lecture discussion, panel presentations, audiovisual presentation, simulation exercises and case studies. (Course extends over three consecutive quarters and should be taken in sequence.) A management certificate is awarded for successful completion of the course. **Credit 4 (12 credits total)**

3081-205 **Organization and Management**
A general introduction to the major management functions and the organization of business. Topics include business and personal planning, organizing, staffing, implementing, directing, control, time management, appraisal, compensation, organization theories, decision making, problem solving, influences on managerial decision making, communication, management styles and motivation. Extensive use is made of learning groups in which students work together to discuss and apply concepts. Some out-of-class time is required to prepare for a learning group presentation. **Credit 4**

3081-221 **New Venture Development**
Course presents factors to be considered by those interested in the ownership and management of small business enterprises. Includes who should be an entrepreneur, guidelines for starting a new business, basic legal consideration, and approaches for obtaining capital and credit. **Credit 4**

3081-222 **Small Business Management**
The functions required to successfully manage and finance a small business are presented. A variety of topics include staffing a small business, purchasing and supplier relations, consumer credit policies, and the financial and administrative controls necessary to minimize business risk. **Credit 4**

3081-223 **Small Business Marketing and Planning**
Presents various successful planning and marketing approaches (including market determination, distribution and pricing strategies). The regulatory environment facing small business is included along with techniques for planning growth. **Credit 4**

3081-264 **Advertising Evaluation and Techniques**
Course presents basic approaches used in planning, preparation and evaluation of advertising and sales promotional materials. A number of projects involving writing/layout/production for print, broadcast and specialized media advertising are incorporated. **Credit 4**

3081-361 **Marketing**
An introductory course in marketing that provides a better awareness of the function of marketing and how marketing relates to other areas of business. Topics include the marketing concept, developing a product strategy, behavioral aspects of consumer marketing, the marketing mix, segmentation and current marketing issues. **Credit 4**

3081-398 **Special Topics**
Special topics are experimental courses offered quarterly. Watch for titles in the course listing each quarter. **Credit variable**

3081-410 **Project Management**
Upper-level course addresses the qualitative and quantitative facets of project management, as well as techniques required to manage projects. Major topics include project selection, planning, work breakdown structure, conflict resolution and negotiation, budgeting, network scheduling, resource allocation, critical path method, PERT, Earned Value Analysis, and Risk Management. Several software applications are used in the course. Students will complete weekly assignments and a term project. 3081-410 may not be substituted for 3081-710 in a CMS graduate concentration or advanced certificate. (Introductory course(s) in management; Microsoft Office applications; fundamentals of accounting, finance, statistics, and probability; or permission of instructor.) **Credit 4**

3081-411 **Advanced Project Management**
Course covers the Advanced Project Management topics necessary for implementation of and excellence in project management. It deals with turning the principles and theory of project management into practice. Addresses the best practices for project management in the world; project portfolio management; the project office; project risk management; multinational cultures and cultural failures; integrated project teams; and virtual project teams. Incorporates aspects of the Project Management Body of Knowledge (PMBOK). (Introduction to Project Management 3081-410 or equivalent experience or by permission of the instructor) **Credit 4**

3081-412 **International Project Management**
With the increasing frequency of globalization, mergers, and acquisitions, international projects are becoming more prevalent and approaching the norm for many organizations. This course addresses a wide range of international projects-based in different industries and multiple countries. It deals with cultural and social differences within firms; cultural and social differences among countries and within countries; languages and dialect variations; different management practices and structures; religious practices; legal, regulatory, and reporting requirements; technology differences in different areas; and time zone differences. Incorporates aspects of the Project Management Body of Knowledge (PMBOK). (Introduction to Project Management 3081-410, and Advanced Project Management 3081-411 or equivalent experience or permission of the instructor.) **Credit 4**

3081-415 **Introduction to Logistics & Transportation**
Review of the logistics and transportation industry as part of the growing emphasis on distribution technologies. Introduces basic understandings of the function areas of logistics management and their inter relationships and how transportation and distribution plays a significant role in the success of a business. **Class 4, Credit 4**

3081-525 **Strategic Logistics Management**
Introduces the role of the government in the transportation industry. The evolution of past and current regulatory and promotional policies is explored. The determination and utilization of freight rates are examined. Various methods to forecast and control transportation costs also are discussed. **Credit 4**

3081-526 **Logistic Law and Economics**
Introduces the basic skills required to move materials in support of the logistics function internationally. Includes discussions of duties, customs regulations and the various instruments used to facilitate international trade. **Class 4, Credit 4**

Quality Management

3084-310 **Introduction to Quality**
An introduction to the fundamental concepts of total quality management. Includes an overview of the competitive environment, the cost of non-quality, and the history of quality; a systematic examination of the leading definitions of quality and models of quality management; and an exploration of the implication of quality management concepts for organizational structure and roles, decision making and interpersonal relations. **Class 4, Credit 4**

3084-340 **Quality Data Analysis**
An introductory course in statistics and probability that provides students with techniques to analyze and interpret quality control data. Topics include problem solving techniques such as the fishbone and flowcharting, descriptive statistics (statistical tables and graphs, measures of central tendency and dispersion), a brief overview of the normal distribution, and one-way ANOVA. (3084-310, Introduction to Quality) Offered online only. **Credit 4**

3084-410 **Introduction to Lean Six Sigma**
Six Sigma techniques, introduced to industry in the late 1980's, use data-driven decisions to reduce defects, drive down costs and increase efficiency. This methodology focuses on minimizing process variation, thereby enabling the process to operate more smoothly and efficiently. Lean is a process that focuses on eliminating waste and streamlining operations. Lean Six Sigma, a more recent technique, combines the two processes. Data-driven decisions are still present, but the emphasis on speed for the process improvement is key. Combining these two methods into Lean Six Sigma provides a powerful tool to make improvements in any process or business. In this course, students learn the history, context, and tools of Lean/Six Sigma through lectures and case studies, and begin to apply the process in a course project. (3084-310, Introduction to Quality; 3084-340, Quality Data Analysis) Offered online only. **Credit 4**

3084-420 **Statistical Quality Tools**
An introductory course in Statistical Quality Control techniques used in determining operating quality levels and recognizing degrees of process control and capability in a service industry or a manufacturing process. Topics include tools for diagnosing sources of variation, construction and interpretation of charts for variables and attributes, and process capability. This course adds topics in acceptance sampling and ANOVA. Tolerances, specifications, product quality, and product reliability are covered through a short overview of design of experiments (DOE) concepts and Taguchi methods. Offered online only. (Permission of the instructor. Students may not receive credit for both 3084-320 and 3084-420.) **Credit 4**

3084-430 **Management for Quality**
Successful companies integrate quality techniques and concepts throughout their operations. This course addresses issues in developing and managing an effective organization, including defining a quality philosophy, delighting the customer, the role of strategic planning, enhancing employee involvement, and sustaining quality initiatives. Additional topics include understanding quality standards and systems, benchmarking, and vendor and supplier assurance. (3084-310, Introduction to Quality; 3084-340, Quality Data Analysis) Offered online only. **Credit 4**

3084-480 **Introduction to Asset Management**
Unscheduled downtime costs businesses millions of dollars each year, but asset management and maintenance is often the last area to attract the attention of managers trying to lower costs. Usually thought of as non-value-added, maintenance and asset management policies can have significant impact on a company's profit. This course introduces the student to the wide range of policies and practices, including capital budget issues related to asset acquisition, cost of ownership, and depreciation; inventory/procurement; maintenance policies such as run-to-failure, preventive maintenance, and reliability centered maintenance; training issues; and developing performance indicators for management programs. Co-listed with 3084-780. Note: Students may not receive credit for both 3084-480 and 3084-780. This is an online course. **Credit 4**

3084-501 **Warehouse and Inventory Management**
In the world of ever-evolving supply chain technologies, inventory control is now a term of the past. Distribution managers and buyers now need skilled individuals who possess a thorough knowledge of the product supply chain; with an in depth understanding of inventory practices, storage techniques, emerging technology and inventory management strategies. Co-listed with 3084-701. Note that students may not receive credit for both 3084-501 and 3084-701. Online course. **Credit 4**

Technical Communication

3088-322 **Interpersonal Communication for Customer Service**
The course helps participants define interpersonal communication for customer service and show professionalism in customer service. Participants will learn how to listen effectively, apply assertiveness appropriately, and apply telephone skills, conflict resolution skills, and problem solving methods. Participants will learn how to educate the customer on new or changed products and services, and contribute to building customer satisfaction and loyalty through quality customer service. **Credit 4**

3088-325 **Communicating in Business**
Focuses on the development of those communication skills essential to functioning effectively in the business world. Students learn the process of analyzing communication situations and responding to them appropriately. Topics include reports, memos, letters, oral presentations and interpersonal skills. (3088-220 or equivalent) **Class 4, Credit 4**

3088-327 **Environmental Communication**
Communication of environmental information and issues is critical for awareness, information, and action. Students develop skill in reporting and conveying environmental and scientific information as well as an understanding of the role of the media and public relations in the environmental communication process. Writing and speaking skills are sharpened for successful business and media communication. (0502-227 or equivalent) **Class 4, Credit 4**

3088-330 **Technical Report Writing**
Students learn to prepare reports of the sort required by practicing engineers and managers in industry and business. Focus is on developing the ability to analyze audiences and purposes, state problems, design reports, and write and edit them. Assigned reports are discussed and critiqued by peers and instructor. (3088-220 or equivalent) **Credit 4**

- 3088-331** **Report Writing**
Principles of organizing information into clear, concise reports. Techniques for oral reports, formal reports, and informal letter and memo reports. Also includes proposals, project status and progress reports. **Credit 2**
- 3088-333** **Technical Writing and Editing**
Focuses on the writing skills required for preparing technical documents. Adapting material and language for audience and purpose and conventions of technical writing style are emphasized. Strategies for evaluating technical discourse are studied and applied. Prior to enrolling in this course, students must demonstrate command of standard written English prose. (For students in Basic Technical Communication program. Others contact program chair.) **Credit 4**
- 3088-347** **Promotional Writing**
Focuses on practical guidelines for preparing marketing materials including brochures, data sheets, trade press articles, press kits and advertising copy. (0502-227 or equivalent) **Credit 2**
- 3088-348** **Managing the Project**
Principles of project management are studied and applied in cases and examples taken from the fields of technical and public relations communication. Major topics include planning, organizing, scheduling, budgeting, controlling, monitoring and reporting. Conflict resolution, team building and motivation are also covered. Use of project management software is introduced. **Credit 2**
- 3088-350** **Introduction to Public Relations**
An overview of the public relations function, covering tasks, responsibilities and roles of the PR practitioner as researcher, image-developer, designer, editor, coordinator, marketer and advertiser; as adviser to management; and as spokesperson, media manager and services purchaser and provider. **Credit 2**
- 3088-352** **Writing for the Organization**
Introduction to public relations writing at the corporate level, including planning, writing and producing documents and publications intended to interpret the organization both internally and externally. Provides practice in writing a variety of news and feature copy, including crisis communication, covering meetings, adapting interviews for print and statements for various media. **Credit 2**
- 3088-354** **Speechwriting**
Introduces principles of speechwriting, a highly specialized form of professional communications. Speechwriting covers techniques for preparing a speech in the "voice" of another. Writing for the "ear" and adapting the message, wording, body language and tone to the speaker are included. Techniques for enhancing message retention are studied. (3088-220 or equivalent) **Credit 2**
- 3088-356** **Strategic Communications**
This is a survey of strategic reactions to organizational communication problems. Case studies are used to analyze how communications research, planning, implementation, and evaluation are used to contribute to organizational goals and respond to needs and crises. Students study real cases where organizations have developed strategies for communication with consumers, employees, investors, government bodies, communities, and other publics. **Credit 2**
- 3088-361** **Research Techniques**
This course offers exposure to and experience with electronic and traditional resources for information generation. Student assignments simulate workplace fact-finding assignments and culminate in an extended feasibility project of the student's choice. Students work in teams and use problem-solving strategies, assess project requirements, collect data, report periodically on their progress, and formally present their results. A variety of research methodologies are introduced, including interviewing skills, developing and using questionnaires, testing procedures, review and use of literature, and blueprint and specification reading. **Credit 4**
- 3088-363** **Technical Document Design**
This course presents an overview of the principles and contemporary techniques involved in document design and provides the student with an opportunity to exercise them in the preparation of a technical manual. Topics include the basic principles of graphic design and visual communication, use of computer graphics and page layout programs, typography and its role in document design and reproduction and distribution methods. Students will plan, research, design, write, format, edit and produce a finished technical manual. **Class 4, Credit 4**
- 3088-381** **Photo Imaging with Computer I**
An introduction to the computer as a photographic tool for people just beginning to apply their photography or photo-design skills to a computer. Adobe Photoshop is presented in a hands-on, two-quarter lab sequence. In the first quarter lab, students explore traditional photographic techniques using a computer with an electronic camera; second quarter, photographic manipulation using a computer with a flatbed scanner. **Credit 3**
- 3088-382** **Photo Imaging with Computer II**
Adobe Photoshop is presented in a hands-on, two quarter lab sequence. In the second-quarter lab, students explore photographic manipulation using a computer with a flat-bed scanner. **Credit 3**
- 3088-412** **Advanced Photoshop Techniques**
This course will offer a strategic view of the Photoshop/digital imaging work environment. It will focus on broader techniques with an emphasis on preparing high-quality images for print publication. Topics such as masking, color models, image correction and file formats will be discussed in detail. This course has a graduate section that is co-listed with 3088-712. Students taking 3088-412 may not receive credit for 3088-712. (3088-382) **Credit 3**
- 3088-475** **Writing Software User Documentation**
Defines and provides examples of end-user documentation for software products; defines the conventional audience, content, structure and language of software user manuals; identifies typical problems in user manuals; explores types of online user information; and defines usability testing. Practice in writing step-by-step procedures, defining system and software concepts, and describing functional processes. **Credit 2**
- 3088-476** **Instructional Design Principles**
This course presents an overview of the process of designing instructional packages from need and task analysis through identifying goals and objectives, media selection, program development and validation testing. **Class 4, Credit 4**
- 3088-477** **Managing Media Presentations**
An introduction to design principles and software applications for creating and organizing media presentations on technical topics. Includes principles of Web page design, the development of computer based illustrations and electronic presentations. Covers the use of Power Point and other software applications. Project management skills are introduced. **Credit 4**
- 3088-500** **Communications Elective**
This course covers special communication topics and subject areas and is offered on demand. **Credit variable**
- 3088-510** **Technical Information Design**
Intensive practice in the creation of content for online and multimedia documents with emphasis on the presentation of technical and scientific concepts, products and processes. A survey of graphic methods for the display of complex technical relationships and processes. Students will also be introduced to contemporary topics and applications in technical information design. **Credit 4**
- 3088-511** **Documentation Usability**
This class presents concepts, tools, and techniques used to increase the usability of printed and online documentations, including multimedia interfaces, through usability evaluation and usability testing. It discusses ways to incorporate usability testing into the design process, saving time and money by eliminating design and functionality problems early in the design process. (3088-333 or equivalent) **Credit 4**
- 3088-512** **Writing Procedures and Online Help**
The development of task-oriented procedural documentation. Procedures for complex physical and mental tasks including time-constrained activities, emergencies, diagnostics and troubleshooting, and multiple-path processes. Formats for print, electronic, and multimedia instructions. An introduction to applications used for the creation of online help, including we-delivered and HTML help. The course will also cover the principles of designing and writing online help, regardless of the help authoring tool used to create it. Practice will be given in writing procedures of various formats, as well as writing online delivery, particularly via online help. **Credit 4**

3088-514 **Technical Proposals**
The elements of proposal writing, including responsiveness, establishing credibility, and technical clarity. The proposal process as practiced in government and industry, including an understanding of RFPs, RFIs, and the decision process. Specialized proposals including NDAs, on-line and multimedia proposals and technical marketing presentations. **Credit 4**

3088-544 **Writing for the Sciences**
Course introduces students to the writing requirements for describing scientific and technological subject matter for presentation to general audiences. Students will learn to write and edit material for professional, in-house, trade, and popular publications that cover developments in the scientific and technical areas. The editing of scientific writing is also introduced. **Credit 4**

Math and Science

3092-101 **Math Thought and Processes**
An examination of mathematical thought and processes through a study of elementary mathematical concepts. This course will acquaint the student with the "mathematical way of thinking". Topics include sets, numeration systems, number theory, real numbers and finite systems. **Credit 4**

3092-102 **Modern Math Methods**
A continuation of 3092-201 with an examination of selected modern mathematical methods used in today's society. This examination includes a study of equations, inequalities, problem solving, graphs and functions, probability, statistics and the usefulness of these methods in today's society. **Credit 4**

3092-211 **College Math for Business**
An introduction to mathematical concepts and quantitative methods required in business management. Included are sets and real number system; linear, nonlinear and exponential functions; and system of equations and inequalities. Differential and integrated calculus is introduced, as well as some special topics in quantitative analysis such as linear programming and simulation. **Credit 4**

3092-212 **College Math for Business II**
An introduction to mathematical concepts and quantitative methods required in business management. Included are sets and real number; linear, nonlinear and exponential functions; and system of equations and inequalities. Differential and integrated calculus is introduced, as well as some special topics in quantitative analysis such as linear programming and simulation. (3092-211 or department approval) **Credit 4**

3092-221 **Technical Math**
A two-quarter sequence introducing college algebra and trigonometry, covering basic algebraic concepts and operations, algebraic and transcendental (trigonometric, logarithmic and exponential) functions. (Three years high school math or equivalent; requires pretest) **Credit 4**

3092-222 **Technical Math II**
A two-quarter sequence introducing college algebra and trigonometry, covering basic algebraic concepts and operations, algebraic and transcendental (trigonometric, logarithmic and exponential) functions. (Three years high school math or equivalent; requires pretest) **Credit 4**

3092-231 **Contemporary Science-Biology**
An introduction to the fundamental principles of biology for non science majors and the application of these concepts to areas of interest in our contemporary technological society. Topics discussed include the cell as a biological unit, the biogenesis-abiogenesis controversy, genetic coding and introduction to plant and animal biology. The course is presented in a lecture-demonstration format. (3092-221 or 3092-201 or 3092-211 or equivalent) **Credit 4**

3092-232 **Contemporary Science-Chemistry**
An introduction to the fundamental principles of chemistry for non-science majors and the application of those concepts to areas of interest and concern in our contemporary technological society. Topics discussed include the atomic theory, chemical compounds, chemical reactions, organic chemistry, biological chemistry and macromolecular chemistry. The course is presented in lecture demonstration format. (3092-221 or 3092-201 or 3092-211 or equivalent) **Credit 4**

3092-233 **Contemporary Science-Physics**
An introduction to the fundamental principles of physics for non-science majors, and the application of these concepts to areas of interest and concern in our contemporary technological society. The conceptual basis for the phenomena of heat, light, sound, mechanics, electricity and magnetism is discussed and related to such topics as astronomy, space exploration, lasers and environmental concerns. The course is presented in a lecture-demonstration format. (3092-221 or 3092-201 or 3092-211 or equivalent) **Credit 4**

3092-234 **Oceanus**
An introduction to the fundamental principles of oceanography for non-science majors, and the application of those concepts to areas of interest and concern in our contemporary technological society. The marine environment is investigated in terms of basic scientific concepts, and topics discussed include plate tectonics and earthquake prediction, the impact of ocean pollutants, climate fluctuations, cetacean intelligence and resources from the sea. (Distance learning offering) (High school algebra) **Credit 4**

3092-250 **Introduction Computer Program**
Basic concepts and overview of computer science. The topics include historical development, algorithms, flowcharting and programming in BASIC. Exposure to hardware concepts, software concepts, binary and hex numbers and logic. Application of the computer to various disciplines. Not for Computer Science majors. This is a distance learning offering. (High school intermediate algebra) **Credit 4**

3092-310 **The History and Manufacture Siege Weapons**
In this course, students will learn the history of the development of siege weapons throughout the ages, from early Sumeria to the mid-1900s. Students will then use this historical knowledge to construct prototypes and design their own siege weapons. **Credit 2**

3092-311 **Statistics**
An introduction to the basic tools of statistical analysis used in business, including charts, frequency distribution, averages, dispersion, probability theory, sampling. Logical procedures for making business decisions under conditions of uncertainty are emphasized. Hypothesis testing including one, two and k-sample test means, proportions, regression and correlation analysis are also included. (3092-212) **Credit 4**

3092-312 **Statistics II**
An introduction to the basic tools of statistical analysis used in business, including charts, frequency distribution, averages, dispersion, probability theory, sampling. Logical procedures for making business decisions under conditions of uncertainty are emphasized. Hypothesis testing including one, two and k-sample test means, proportions, regression and correlation analysis are also included. (3092-212) **Credit 4**

3092-599 **Independent Study**
This course number should be used by students who plan to study a math topic on an independent study basis. The student must obtain permission of the appropriate faculty member before registering for the course.

Multidisciplinary Studies

3097-211 **Exploring Innovation**
This course, which helps students develop an innovative mind set, discusses the nature of innovation, including what innovation is, the goals and objectives of innovation, how innovation happens, and reasons that innovations succeed or fail. Case studies in a variety of situations are explored to further understanding and expertise in innovation. A description of the resources available through RIT Center for Student Innovation is included. **Credit 4**

3097-240 **Methods of Learning**
Provides students with analytical thinking skills and strategies that are effective across academic disciplines. The process of "learning to learn" considers an individual's natural learning skills and how to apply them to academic work. The importance of questioning in the active learning process is established through guided instruction. The application of skills to current academic course work is reinforced through small group sessions and carefully monitored independent student self-assessment. **Credit 4**

3097-300 **The Leader in You**
This course introduces students to the concept of personal leadership. Students will identify and evaluate frameworks for successful leadership and learn critical skills and strategies that will enable them to achieve success in their personal and professional lives no matter what their discipline. Focus areas include: personal goal setting through the creation of mission and vision statements, self analysis of values and decision making, emotional intelligence, and interpersonal communication techniques. Coursework will include readings enhanced by experiential activities, cases studies, written reports and reflections. This course is suitable for all students desiring to develop and learn about their leadership potential or by permission of instructor. **Credit 2**

3097-301 **Leading Others**
In this course, students will learn the most effective strategies and skills needed to be successful at leading others and projects. Through a variety of experiential exercises, field work and an in depth look at a variety of leadership styles and theories, students will evaluate their strengths and weaknesses as a leader and develop a plan of action to improve skills. Areas of focus include: leadership theories and styles, teamwork and group dynamics, cultural communication and influence, and ethical decision making. This course is suitable for students with previous leadership experience or by permission of instructor and can be used to meet one of the free elective requirements in the new curriculum. **Credit 2**

3097-305 **Experiential Leadership**
This is an independent study online course designed for students interested in applying critical leadership concepts to a current leadership experience. By integrating course concepts of leadership styles and theories with a leadership field experience, students will be able to assess their skills as a leader and create a plan for growth and development for future success. Note: this is an online independent study for students serving in a leadership role or working on a leadership or community service project. (3097-302, The Leader in You, or by permission of the instructor.) **Credit 2**

3097-411 **The Innovation Process I**
Innovation translates new ideas or inventions into practical use in the form of products, markets or services, concepts or systems. This course and The Innovation Process II (3097-412) are a two-course sequence that comprehensively explores innovation. The practice of innovation requires understanding different innovation paradigms; the role of creativity, discovery and invention; entrepreneurialism as an implementation strategy; intellectual property issues; team building and collaboration; and experience. Selected case studies and exemplary problems are explored to illustrate the principles and to acquire the skills of innovation. **Credit 4**

3097-412 **The Innovation Process II**
This course continues the study of the entire process of innovation from problems identification to final solution and implementation. It builds on the topics in The Innovation Process I (3097-411), and prepares students for a capstone experience in 3097-511 and 3097-512. (3097-411 or equivalent) **Credit 4**

3097-430 **Survey of Organizational Change**
This course will facilitate a student's understanding of factors that impact and influence behavior in contemporary organizations. In addition, students will develop skills that can be used to effectively function in the workplace. The course focuses on individual behavior, teams, motivation, decision-making, and creativity. Leadership, power, and politics in organizations are also addressed. Other topics include culture and change including the need for continuous learning and attention to the learning organization, ethics and values, organizational structure and conflict. The importance of effective communication is stressed throughout the course. **Credit 4**

3097-431 **Understanding Corporate Culture**
An introduction to the concepts of organizational/corporate culture and the methods of analyzing it. Focuses on the development of skills required to assess corporate culture in terms of such constitute parts as ritual, symbol, structure, language and identity. Also included are a history of the study of corporate culture, an analysis of leadership styles and communication patterns in the workplace, an overview of strategies for managing corporate and organizational change and an orientation to leadership styles appropriate to the successful manipulation of cultural elements. Emphasis is both on individual and interactive learning processes. (0510-210 and either 0514-210 or 0515-210) **Credit 4**

3097-432 **Managing Organizational Change**
At a time when America is learning that change-and not stability-is at the heart of business and organizational vitality, this course offers students insight into theories of organizational dynamics and change as well as an introduction to skills for managing change and negotiating. The strategies covered include, but are not limited to, community building, managing corporate and individual change, and identifying resistance conflict. **Credit 4**

3097-433 **Teams and Team Development**
Meets the increasing need to understand and participate in teams in the workplace. Students establish a strong framework of group theory through topics that include current group and team theory research, individual functions in a team and team leadership, mission and global development, evaluating team effectiveness, negotiating persuasion and conflict resolution. This course is highly interactive, with projects that require the student to use the theory in constructing and observing cross functional work teams, self directed teams and integrated work teams. Learning takes place through lectures, case studies, simulations and group projects that develop strong team skills and reinforce team theory. **Credit 4**

3097-434 **Change and Leadership Project**
This course integrates the knowledge gained in the courses that make up the Organizational Change and Leadership Certificate and, therefore, cannot be taken until all the courses in the certificate have been completed. Students will be expected to identify an area within their studies of change and leadership that is of most interest to them. Once they have identified their area of interest, they will discuss this with the faculty member assigned to the course and begin the process of developing a proposal of the work to be accomplished. Well planned and fully thought-out proposals lead to the best projects and the ones that are most easily executed and completed. Upon acceptance of the proposal, the student will complete the project and write a paper reflecting their area of choice, integrating the knowledge gained from the courses in the certificate. **Credit 4**

3097-435 **Global Forces and Trends**
Dealing with unpredictable futures is an on-going challenge for every leader, manager, and individual. Whether you are making personal or organizational decisions, your success depends on your ability to envision the future with a proactive, strategic approach. The ability to analyze, adjust to, and take advantage of emerging opportunities, trends, and forces, and to integrate and connect information patterns, determines the success or failure of your decisions. In this course, methodologies and approaches such as scenario-based strategy, visual thinking, mind-mapping, mental models, strategic thinking theory, and challenging prevailing ideas are introduced and used to examine the technical, social, economic and demographic trends and forces affecting people, organizations, and the choices they need to make. **Credit 4**

3097-441 **Creative Critical Thinking and Problem Solving**
An interdisciplinary approach to the generation and evaluation of ideas and solutions. Includes analysis of the conditions limiting creativity and the development of a "toolkit" of strategies and techniques for discovering, inventing and assessing new, unique and useful ideas, applications and solutions. Applicable to a range of life and work situations, from complex environmental concerns to competitive business challenges to family disputes. **Credit 4**

3097-442 **Learning Organization**
This interdisciplinary course combines management thought, control theory psychology and systems thinking. It focuses on theory and techniques for building and sustaining an efficient, creative organization that promotes problem solving and collaborative learning. Learning organization principles of systems thinking, personal mastery, mental models, shared vision, team learning. Provides an introduction to control theory psychology with applications for improved personal interaction and a non-coercive approach for lead managing. Includes analysis of the conditions limiting an organization's capacity to learn and remediation of organizational "learning disabilities." **Credit 4**

3097-452 **Special Topics**
This course provides an overview of urban issues and how to develop action plans that address some of a city's most critical challenges. Student teams will address issues of economic development, education, public safety, the quality of life and metropolitan solutions. **Credit 4**

3097-462 **Empowered Leadership**
This multidisciplinary course has a three-tier structure: a fundamental look at the theories and practices of leadership; a study of leadership styles and their impact on the work environment; and a reflection and self-analysis by the students of their leadership styles. Course work will include extensive readings, case studies, written reports and reflections. Much of the course will operate in a team manner. **Credit 4**

3097-510**Multidisciplinary Life**

This is a required undergraduate capstone course for the applied arts and science bachelors program. Students should consult their advisor before registering. **Credit 4**

3097-511**Innovation Capstone I**

This course prepares the student to be a member of an interdisciplinary team exploring a simple problem for which an innovation in science, technology, design, business, finance, artistic expression, etc., could be key in working toward an ultimate resolution of the problem. Problems may be proposed by students or by faculty mentors, or derived from external sources. After selecting a problem, each interdisciplinary student project team works throughout the quarter, culminating in a formal written report and oral presentation at the conclusion of the project. (3097-412 or equivalent) **Credit 4**

3097-512**Innovation Capstone II**

This course builds on the skills and knowledge gained in Innovation Capstone I, 3097-511. In this course, the student is engaged as a member of an interdisciplinary project team exploring a complex, non trivial problem, which requires an innovative solution. Problems may be proposed by students or by faculty mentors, or derived from external sources. Each student team selects a non-trivial problem, which is investigated and solved in the quarter, culminating in a formal written report and oral presentation at the conclusion of the project. (3097-511) **Credit 4**

National Technical Institute for the Deaf

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Course numbering: RIT courses are generally referred to by their seven-digit registration number. The first two digits refer to the college offering the course. The third and fourth digits identify the discipline within the college. The final three digits are unique to each course and identify whether the course is noncredit (less than 099); lower division (100–399); upper division (400–699); or graduate level (700 and above).

Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's schedule of courses, published by the Office of the Registrar. Prerequisites and/or corequisites are noted in parentheses near the end of the course description.

Interdisciplinary Courses

0806-101

Job Search Process

Course goals are to prepare students to secure a cooperative or professional work experience in the student's major and to assist the student in acquiring the skills for accessing information, networking, developing résumés and letters, completing various employment-related forms, interviewing, and using various communication techniques in preparing students for the job search process. **Class 2, Credit 2 (F, W)**

0806-201

Employment Seminar

Provides the student with an opportunity to synthesize a work experience with knowledge gained in technical and liberal arts courses in order to prepare for permanent employment. Experiences will include résumé revisions, further research into potential permanent employment, including accessing professional journals, electronic networks and interviewing for permanent employment. Discussions relating to financial considerations to be used in evaluating employment opportunities and individual roles with the organization will also be included. **Class 1, Credit 1 (F, W, S)**

0887-100

Wide World of Technology

This survey course introduces undecided students to technology, its evolution, future, and influence on all aspects of life. It examines current technologies and their impact on individuals and society. It explores the symbiotic relationship between technology and values. **Class 2, Credit 2 (F)**

0887-200

Freshman Seminar

Provides entering NTID students with opportunities to enhance personal, social, intellectual, academic and ethical decision making in order to maximize their college experience. Students have opportunities to explore and negotiate the college environment, confront questions of identity and social roles, deal with ethical issues with faculty members and peer mentors, expand critical thinking skills, and learn and use academic skills. Course emphasizes student self-assessment of current strengths and areas of needed improvement along with development of plans for ongoing growth, rather than attainment of skill mastery within a quarter-length course. **Class 2, Credit 2 (F, W, S)**

0887-210

Career Decision Making

This course provides students with information and experience regarding career choices and selecting a major using a career decision-making model. Students develop a career plan after completing career and self-assessments and gathering information from career and direct exposure to academic disciplines. Includes program sampling. (0887-200 or permission of CES department) **Class 2, Lab 1, Credit 2 (F, W, S)**

0887-398

Special Topics: Interdisciplinary

Credit variable (F, W, S)

0887-399

Independent Study: Interdisciplinary

Credit variable (F, W, S)

ASL-English Interpretation

0875-201

American Sign Language I

ASL I includes linguistic features, cultural protocols and core vocabulary for students to function in basic ASL conversations that include ASL grammar for asking and answering questions while introducing oneself, exchanging personal information, talking about family, friends and surroundings, and discussing activities. This course is designed for students who have no knowledge of American Sign Language. To progress to the next course in the series (0875-202) students must complete the course with a grade of C or better. **Class 3, Lab 2, Credit 4 (F, W)**

0875-202

American Sign Language II

This course expands the basic principles presented in ASL I. ASL II teaches students to use linguistics features, cultural protocols and core vocabulary to function in basic ASL conversations that include ASL grammar for giving directions, describing, making requests, talking about family, occupations and routines, and attributing qualities to others. To progress to the next course in the series (0875-203), students must complete the course with a grade of C or better. (0875-201 with grade of C or better) **Class 3, Lab 2, Credit 4 (F, W)**

0875-203

American Sign Language III

This course expands on principles presented in ASL I and II courses. The ASL III course focuses on ASL features related to time, subject/object, classifiers, non-manual behaviors, and fingerspelling (including number and loan signs). In addition, ASL semantics and syntax (including conversational regulators) are introduced. To progress to the next course in the series (0875-301), students must complete the course with a grade of C or better. (0875-202 with grade of C or better) **Class 3, Lab 2, Credit 4 (W, S, Su)**

0875-212

Deaf Culture and Community

This course is designed to introduce students to aspects of Deaf culture and the deaf community. The distinction between these two groups will be reviewed and characteristics of both will be identified. Students will learn about the language, norms of behavior, values, traditions and possessions (materials) of D/deaf people. The evolution of a pathological view of D/deaf people to a cultural one will be analyzed from a historical and sociological perspective. Intercultural issues relating to the role of hearing people within the Deaf community will also be covered. (0875-302) **Class 4, Credit 4 (S)**

0875-213

Introduction to the Field of Interpreting

This course provides students with information regarding the role and function of an interpreter. Information about the history of interpreting, terminology, employment options with regard to various settings, and the function of assessing as part of the interpreting process is presented. Additional topics include values and characteristics of a profession and cumulative trauma disorders (CTDs). **Class 4, Credit 4 (F)**

0875-301

American Sign Language IV

This course builds upon information taught in ASL I-III and introduces new grammatical features of ASL and specialized vocabulary, while continuing to increase fingerspelling and numbers receptive and expressive skills. In addition, some features of ASL discourse are taught in organizing and explaining contextual information. To progress to the next course in the series (0875-302), students must complete the course with a grade of C or better. (0875-203 with grade of C or better) **Class 4, Credit 4 (F)**

0875-302

American Sign Language V

This course builds upon information taught in ASL I-IV. Various structures of ASL discourse are the focus of this class. Students continue learning and using ASL vocabulary, fingerspelling, numbers, and grammatical features of ASL. To progress to the next course in the series (0875-303), students must complete course with a grade of C or better. (0875-301 with grade of C or better) **Class 4, Credit 4 (W)**

0875-303 American Sign Language VI
This course builds upon information taught in ASL I–V. Students continue learning and using ASL vocabulary, grammatical principles and discourse features related to narratives in ASL. Students analyze multiple meaning English words and English Idioms for expressing concepts in ASL. Issues related to Deaf culture continue to be introduced based on unit topics. To progress to courses English to ASL Interpreting I and ASL to English Interpreting I (0875-315 & 0875-316), students must complete the course with a grade of C or better. (0875-302 with grade of C or better) **Class 4, Credit 4 (S)**

0875-305 Deaf Expressions
Students will explore historical, philosophical, linguistic, social, cultural, educational, medical and artistic past, present, and future of deaf/Deaf/hard-of-hearing people. This course uses an on-line format to discuss concepts and perspectives found in the assigned book(s) and visual media (film, tv, etc). Each time the course is offered the book and visual media will be different so students may take this course multiple times. Books/media will be chosen from areas with relevance to Deaf Culture and community, such as D/deaf literature & the Arts, D/deaf history, D/deaf issues, significant D/deaf people, and ASL. For students unfamiliar with ideatools software, an optional face-to-face orientation meeting with the instructor is offered in the first week of class. **Class 1, Credit 1 (F, W, S)**

0875-311 Processing Skills Development
This course is an introduction to the mental processing skills (pre-interpreting skills) of consecutive and simultaneous interpretation. This course includes an overview of the theoretical models of interpretation, provides skill development activities for isolated interpreting sub-tasks and practice activities for the integration of these tasks in translation and consecutive interpreting activities. Course content includes interpreting theory, visualization, listening and comprehension, shadowing, paraphrasing, abstracting, dual task training, text analysis (including identification of main point, summarizing and structuring), cloze skills and translation. (0875-302) **Class 4, Credit 4 (S)**

0875-315 English to ASL Interpreting I
This is the first course in a three-course sequence in which students develop the ability to produce an equivalent ASL message from a spoken English source message. The focus of this course is text analysis and consecutive production of an equivalent message in the target language. Content also includes interpreting management strategies for spoken English to ASL interpreting. Students will interpret both rehearsed and unrehearsed monologues and dialogues. Warm-up exercises will be performed as part of the self-care regimen recommended for sign language interpreters. To progress to course English to ASL Interpreting II (0875-325), students must complete course with a grade of C or better. (0875-303 with a grade of C or better, 0875-311) **Class 4, Credit 4 (F)**

0875-316 ASL to English Interpreting I
This is the first course in a three-course sequence in which students develop the ability to produce an equivalent spoken English message from an ASL source message. The focus of this course is text analysis and consecutive production of an equivalent message in the target language. Content also includes interpreting management strategies for ASL to spoken English interpreting. Students will interpret both rehearsed and unrehearsed monologues and dialogues. Warm-up exercises will be performed as part of the self-care regimen recommended for sign language interpreters. To progress to course ASL to English Interpreting II (0875-326), students must complete course with a grade of C or better. (0875-303 with a grade of C or better, 0875-311) **Class 4, Credit 4 (F)**

0875-320 Practical and Ethical Applications
Students examine the underlying principles of the code of professional conduct and discuss application of the various situations and settings in which sign language interpreters work. Students will explore how professional interpreters apply these principles in their daily work and how deaf consumers perceive the ethical role and function of interpreters. In addition to ethical considerations, etiquette and protocol for each setting will be discussed. Settings include K–12, post-secondary, religious, medical, mental health, deaf-blind, performing arts, business and industry, and vocational rehabilitation. To progress to Practicum and Seminar I (0875-350), students must complete course with a grade of C or better. (0875-213, 315, 316) **Class 4, Credit 4 (W)**

0875-325 English to ASL Interpreting II
This is the second in a three-course sequence in which students develop the ability to produce an equivalent ASL message from a spoken English source message. Specific discipline areas will be addressed. Students will develop the ability to apply text analysis skills to the simultaneous English-to-ASL interpreting task. Additionally, students will develop the ability to apply the principles of diagnostic feedback. One special area of emphasis will include affect equivalency between source and target languages. Warm-up exercises will be performed as part of the self-care regimen recommended for sign language interpreters. To progress to Practicum and Seminar I (0875-350), students must complete course with a grade of C or better. (0875-315 with a grade of C or better) **Class 4, Credit 4 (W)**

0875-326 ASL to English Interpreting II
This is the second in a three-course sequence in which students develop the ability to produce an equivalent English message from an ASL source message using simultaneous interpreting strategies. Specific discipline areas will be addressed. Students will develop the ability to apply text analysis skills to the simultaneous ASL-to-English interpreting task. Additionally, students will develop the ability to apply the principles of diagnostic feedback. One special area of emphasis will include affect equivalency between source and target languages. Warm-up exercises will be performed as part of the self-care regimen recommended for sign language interpreters. To progress to Practicum and Seminar I (0875-350), students must complete course with a grade of C or better. (0875-316 with a grade of C or better) **Class 4, Credit 4 (W)**

0875-350 Practicum and Seminar I
The student experiences a practicum placement under the immediate supervision of a professional interpreter who functions as the student's mentor, and the seminar instructor (supervision instructor). The practicum will involve such activities as observing the mentor and a variety of other interpreters at work; preparing videotapes for mentor critique; interpreting under the supervision of the mentor; and meeting weekly with the mentor to discuss the practicum experience. Additionally, practicum students will meet together weekly to share observations and experiences gained from the practicum placement. Class discussions focus on linguistic issues in interpretation, ethical dilemmas, situational concerns and problem solving. Students must complete this course with a grade of C or better. (Permission of instructor, cumulative GPA 2.5; 0875-320, 325, 326 with grades of C or better; and in good standing) Field experience a minimum of 100 hours. **Class 2, Credit 4 (F, W, S, Su)**

0875-398 Special Topics: ASL-English Interpretation
Credit variable (F, W, S)

0875-399 Independent Study: ASL-English Interpretation
Credit variable (F, W, S)

0875-400 Interactive Interpreting
In this course students advance their skills in interpreting alone and with team interpreters for interactive assignments within small group and one-to-one settings. Students will expand their understanding and use of ASL and English vocabularies related to content areas that are of current interest to Deaf and hard-of-hearing individuals locally and nationally. Students will also advance their interpreting analysis skills. (0875-325, 326) **Class 2, Lab 4, Credit 4 (S)**

0875-411 Interpreting Frozen and Literary Texts
This course will focus on skills and techniques for the interpretation of frozen texts in English and ASL. Work includes translation, transliteration and interpretation (between English and ASL) of source texts, including prayers, music, poetry, drama, etc. **Class 4, Credit 4 (offered annually)**

0875-430 Introduction to K–12 Interpreting
This course includes an overview of the history and current status of educational interpreting throughout the United States. Content includes the role, practices and skills of educational interpreters in K–12 settings; communication systems; pertinent laws and regulations; resources, information and strategies for consumer awareness and education; administrative practices and personnel structure of school systems; assessment and management of educational interpreters; and topics that concern educational interpreters. (0875-400) **Class 4, Credit 4 (S)**

0875-431 Introduction to Cued Speech Transliterating
This course is an introduction to the Cued Speech system of representing spoken English, its history, and application. Students will increase their awareness of spoken English and the pronunciation of words in conversation. They will also understand and describe the purpose of Cued Speech, why parents choose this system for their child who is deaf as well as identify other populations and uses for Cued Speech. Students will understand the language learning benefits of Cued Speech. Upon completion of the course students will be able to accurately cue spoken English. (Third-year status in the program) **Class 4, Credit 4 (W)**

0875-501 English to ASL Interpreting III
In this course students advance their skills in simultaneously producing equivalent ASL messages from spoken English source messages. Single-speaker texts on specific topic areas for large group settings will be the focus of this course. Students will continue to develop their English vocabulary, ASL vocabulary and interpreting analysis skills, and strengthen their team interpreting skills. Warm-up exercises will be performed as part of the self-care regimen recommended for sign language interpreters. To progress to Practicum and Seminar II (0875-510), students must complete course with a grade of C or better. (0875-400) **Class 4, Credit 4 (F)**

0875-502 ASL to English Interpreting III
In this course students advance their skills in simultaneously producing equivalent spoken English messages from ASL or contact language source messages. Single-speaker texts on specific topical areas for large group settings will be the focus of this course. Students will continue to develop their English vocabulary, ASL vocabulary, interpreting analysis skills, and strategies for team interpreting. To progress to Practicum and Seminar II (0875-510), students must complete course with a grade of C or better. (0875-400) **Class 4, Credit 4 (F)**

0875-510 Practicum and Seminar II
This course provides the student with experiential education under the supervision of a professional interpreter who functions as the student's mentor. The 10-week practicum consists of a minimum of 100 hours and will focus on gaining experience interpreting. The student may select a practicum placement in the post-secondary, K-12 or community setting. Additionally, students will meet two hours weekly in seminar, with other practicum students, to share observations and experiences gained from the practicum placement. Seminar discussions will focus on linguistic issues in interpretation, application of professional and business ethics, situational concerns and problem solving. The seminar instructor will be the practicum student's supervising instructor. Students must complete this course with a grade of C or better. (Permission of instructor, cumulative GPA of 2.5 or better; 0875-501, 502 with grades of C or better; and in good standing) Field experience a minimum of 100 hours. **Class 2, Credit 4 (F, W, S, Su)**

0875-520 Issues in Interpreting
This course offers students an opportunity to integrate all curricular content areas through the examination and discussion of issues in the field of interpreting. While the course content and focus will vary depending on current issues and student interest/experiences, the course will provide an advanced experience of problem solving and value clarification. Students will develop and demonstrate their ability to define a research topic or problem, gather and evaluate scholarly evidence, and present their findings in a paper and presentation. (0875-501, 502) **Class 4, Credit 4 (W, S)**

0875-531 Educational Interpreting: Elementary Settings
This course is designed to prepare students to interpret in elementary school settings. Content will include an orientation to activities, discipline content and sign vocabulary, language development, psycho-social development and interpreting issues that are pertinent to elementary students. The course addresses strategies for interpreting classroom discourse and various content areas. Vocabulary for various elementary content areas will be introduced. Students will do English-to-ASL and ASL-to-English interpreting for elementary-level texts. (0875-430) **Class 4, Credit 4 (W, S)**

0875-532 Educational Interpreting: Middle/Secondary Settings
This course is designed to prepare students to interpret in middle and secondary school settings. Content will include an orientation to activities, discipline content and vocabulary, language development, psycho-social development and interpreting issues that are pertinent to middle and secondary school students. The course addresses strategies for interpreting classroom discourse and content areas. Students will learn how to prepare the middle/secondary students to request and work with interpreters in community and post-secondary settings. Students will learn about interpreting for foreign language courses. Students will do English-to-ASL and ASL-to-English interpreting for middle- and secondary-school-level texts. (0875-430) **Class 4, Credit 4 (W, S)**

0875-533 Educational Interpreting: Post-Secondary Settings
This course prepares students to interpret in the post-secondary setting. Students will learn preparation strategies for English-to-ASL and ASL-to-English interpreting for the following topics: computer science, advanced science and mathematics, selected liberal arts, physical education, and foreign language instruction. In addition, students will become familiar with current issues facing interpreters in post-secondary settings. As part of this course, students will observe interpreters working in several types of college classrooms (e.g., lectures, seminars, labs and studios). (0875-400) **Class 4, Credit 4 (W)**

0875-560 Healthcare Interpreting
This course is designed to introduce students to sign language interpreting in healthcare settings through the analytical construct of Demand-Control Schema for interpreting work. The course content includes medical terminology in English and ASL. Students will learn tools and techniques to utilize while interpreting in healthcare environments with an emphasis on interactive learning including direct exposure to healthcare settings, deaf and hard-of-hearing healthcare professionals and professional healthcare interpreters. (Third-year status in the program) **Class 4, Credit 4, (F)**

0875-561 Mental Health Interpreting
This course is designed to introduce students to the field of mental health interpreting. Students will become familiar with the DSM-IV and common types of mental illness as well as psychiatric terminology in both English and ASL. Students will examine the role, function, ethics, and challenges of interpreting in mental health settings through the analytical construct of Demand-Control Schema for interpreting work. Students will also learn tools and techniques to utilize while interpreting in psychiatric environments and will have opportunities to interact with mental health professionals. (Third-year status in the program) **Class 4, Credit 4**

0875-565 Introduction to Legal Interpreting
This course will introduce students to the field of legal interpreting. Students will learn about the legal and judicial systems while examining the role, function, ethics, safeguards and challenges of interpreting in legal and courtroom settings. Students will employ a multidisciplinary approach to learning about legal interpreting through legal research and writing, observation, guest lecturers and interpreting practice. (Third-year status in the program) **Class 4, Credit 4 (S)**

0875-598 Special Topics: ASL-English Interpretation
Credit variable (F, W, S)

0875-599 Independent Study: ASL-English Interpretation
Credit variable (F, W, S)

Accounting Technology

0801-201 Accounting I
Introduction to accounting for both accounting and nonaccounting students. Topics covered include the analyzing and recording of business transactions using the double-entry accounting system, end-of-period adjustments, the worksheet, financial statements, closing entries, the post-closing trial balance and the management of cash funds. Students complete a comprehensive "accounting cycle" project. Computerized spreadsheet applications are emphasized. **Class 6, Credit 4 (W, S)**

0801-202 Accounting II
A continuation of Accounting I for both accounting and nonaccounting students. Topics covered include the payroll system and accounting for a merchandising business using special journals. Course work includes a practice set that applies accounting concepts in a simulated business situation. Computerized spreadsheet applications are emphasized. (0801-201) **Class 6, Credit 4 (F, S)**

0801-203 Accounting III
This course is a continuation of Accounting I and II. Topics covered include the accounting principles and procedures related to notes payable and receivable, the valuation of receivables, inventories, fixed assets and partnerships. Computerized spreadsheet applications are emphasized. (0801-202) **Class 4, Credit 4 (F, W)**

0801-204 Accounting IV
This course emphasizes corporate accounting concepts and principles. Topics covered include capital stock, retained earnings, taxes, dividends, bonds, the statement of cash flow, and the analysis of financial statements. A comprehensive "annual report" team project is completed. Computerized spreadsheet applications are emphasized. (0801-203) **Class 4, Credit 4 (W, S)**

0801-211 **Financial Accounting I**
This course is the first in a series of two financial accounting courses for students in the associate of science in business degree program. Students develop problem solving, critical thinking and decision-making skills related to financial accounting concepts. Students gain an understanding of the mechanics and processes of the complete accounting cycle with an emphasis on the corporate form of business. Students learn generally accepted accounting principles and their impact on the preparation of financial statements. Skills in reading, understanding and analyzing published financial statements will be emphasized. **Class 4, Credit 4 (W)**

0801-212 **Financial Accounting II**
This course is the second in a series of two financial accounting courses for students in the associate of science in business degree program. Students develop problem-solving, critical-thinking and decision-making skills related to financial accounting concepts with an emphasis on the corporate form of business. Students gain an understanding of the accounting procedures related to current assets, inventories, long-term assets, current liabilities, long-term liabilities and the components of stockholder's equity. Students learn the procedures for preparing and the methods of analyzing the corporate income statement, statement of stockholder's equity, balance sheet and statement of cash flows. (0801-211) **Class 4, Credit 4 (S)**

0801-211 **Managerial Accounting I**
This course is the first in a series of two managerial accounting courses for students in the associate of science in business degree transfer program. Students develop problem-solving, critical-thinking and decision-making skills related to managerial accounting concepts. Students gain an understanding of the mechanics and processes of the complete accounting cycle with an emphasis on the manufacturing environment. Students learn generally accepted accounting principles and their impact on the preparation of financial statements. Skills in reading, understanding and analyzing financial reports will be emphasized. (0801-212) **Class 4, Credit 4 (F)**

0801-222 **Managerial Accounting II**
This course is the second in a series of two managerial accounting courses for students in the associate of science in business degree transfer program. Students continue to develop problem-solving, critical-thinking and decision-making skills related to managerial accounting concepts. Students gain an understanding of the mechanics and processes of the complete accounting cycle with an emphasis on the manufacturing environment. Students continue to learn generally accepted accounting principles and their impact on the preparation of financial statements. Skills in reading, understanding and analyzing financial reports will be emphasized. (0801-221) **Class 4, Credit 4 (W)**

0801-252 **Cost Accounting I**
This course introduces students to cost accounting with an emphasis on job order costing. Topics covered include manufacturing statements; cost theory; and integration of materials, labor and overhead to the computerized job cost situation. Students complete a comprehensive practice set. Computerized spreadsheet applications are emphasized. (0801-203) **Class 6, Credit 4 (W)**

0801-253 **Cost Accounting II**
This course is a continuation of cost accounting, with particular concentration on process and managerial aspects. Topics covered include average and FIFO process costing methods, equivalent units, multiple products, changes in units, budgeting, cost classification and computerized applications. Students complete a comprehensive practice set. Computerized spreadsheet applications are emphasized. (0801-252) **Class 6, Credit 4 (S)**

0801-260 **Applied Accounting Techniques**
This course gives students an opportunity to reinforce and apply accounting topics and skills previously studied. Students work in a simulated accounting office as accounting clerks and perform a variety of general and process costing duties. Computerized spreadsheet applications are emphasized. (0801-252) **Lab 6, Credit 2 (F, S)**

0801-299 **Co-op: Accounting Technology**
Designed to give the student an opportunity to gain experience on the job, to apply what has been learned and to self-evaluate personal and communication skills. A job relating to the student's field of study could be taken near the student's hometown. Placement assistance is provided to help the student find a work experience job. One work experience session is required. **Credit 0 (W, S, Su)**

0801-398 **Special Topics: Accounting**
Credit variable (W)

0801-399 **Independent Study: Accounting**
This course is offered on a quarterly basis to students who have special requirements not met in other accounting courses. This course is arranged on an individual basis and is flexible in design to meet individual needs. **Credit variable (F, W, S)**

Administrative Support Technology/ Business Technology

0804-101 **Orientation to Business**
A broad overview of the form and structure of American business. It provides students with a basic knowledge of the history, organization and operation of business and its particular vocabulary. **Class 4, Credit 3 (F, S)**

0804-110 **Business English**
This course provides proofreading and editing skills as they relate to computer-generated business communications. Course content includes rules for word division, capitalization, numbers, abbreviation style, spelling, and business letter writing. Designed specifically for students enrolled in courses in the business studies department. **Class 3, Credit 3 (F, S)**

0804-111 **Keyboarding**
This course is for students with limited keyboarding experience and for those who keyboard below 25 net words per minute. Keyboarding focuses on skill development, introduction to the computer and basic formatting. Keyboarding students are expected to exit this course with a proficiency of 20 net words per minute for five minutes. **Class 1, Lab 3, Credit 2 (F, S)**

0804-112 **OAS Formatting**
This course is for students with little or no knowledge of word processing software, limited keyboarding experience, and a minimum of 20 net words per minute. Emphasis is on keyboarding skill development, introduction to the computer and basic word processing formatting skills. Students key and format business correspondence, reports and tables. The expectation is to exit this course with a proficiency of 25 net words per minute for five minutes. (0804-111) **Class 1, Lab 4, Credit 3 (F, W)**

0804-113 **OAS Document Production I**
This course focuses on enhancements to business correspondence, reports and tables produced on a microcomputer using word processing software. Skill development continues with an expected exit speed to 30 net words per minute for five minutes. **Class 3, Lab 2, Credit 4 (F, W, S)**

0804-211 **Records Management and Business Calculation**
This course develops basic skills in current business procedures related to general office functions. Skills include current records management applications, introductory database techniques and business calculation methods. Students develop skills applicable to a variety of office settings. **Class 5, Credit 3 (W, S)**

0804-212 **Payroll/Spreadsheet Applications**
This course develops basic skills in current business procedures related to general office functions. Students learn basic database and spreadsheet techniques. Students complete payroll records using both manual and computerized systems. Students develop skills applicable to a variety of office settings. **Class 5, Credit 3 (F, W)**

0804-221 **OAS Document Production II**
Emphasis on the improvement of basic skills and their application to a variety of realistic office projects. Students type correspondence, reports and tables on a microcomputer using current software. Students are expected to exit with a net speed of 40 words per minute for five minutes. (0804-113) **Class 3, Lab 2, Credit 4 (F, W, S)**

0804-230 **Administrative Support Technology Seminar**
This course provides students with an opportunity to prepare for employment through team presentation, mentoring and guest lectures. Topics for discussion are identified by students enrolled in the seminar. Topics covered may include time management, career development and personal/social development skills necessary for job success. Students are expected to participate in planning class sessions. **Class 4, Credit 3 (S)**

0804-284 **Fundamentals of Management**
Focuses on theory and practice basic to the management process. Students use case studies, lectures and simulations to study planning, organizing, directing, staffing and controlling functions. Also introduces students to motivation and leadership theory as it relates to the role of a manager. (0804-101) **Class 4, Credit 3 (F, W)**

0804-286 Fundamentals of Marketing I
Introduction to the field of marketing and its strategies. Topics include consumer behavior and its effect in the marketplace, product research and planning, pricing, distribution channels, marketing institutions, advertising and promotion and organization. (0804-101) **Class 4, Credit 3 (W, S)**

0804-290 Small Business Organization
This is an elective course designed for the business student but available to a student from another technical major who has completed the prerequisites and who has a desire to learn entrepreneurial skills to allow starting a business. Each student will develop a business plan. **Class 4, Credit 3 (S)**

0804-291 Applied Business Techniques
Gives students an opportunity to review skill-oriented course work on a microcomputer prior to graduation and job entry. Skill review includes production and speed typing, payroll procedures, records management techniques, word processing and database applications using current software packages. (0804-302) **Class 4, Credit 2 (F, W, S)**

**0804-299 Co-op: Administrative Support Technology/
Business Technology**
Designed to give the student an opportunity to gain experience on the job, to apply what has been learned and to self-evaluate personal and communication skills. A job relating to the student's field of study could be taken near the student's hometown. Placement assistance is provided to help the student find a work experience job. One work experience session is required. **Credit 0 (Su)**

0804-302 Advanced Applications for Word Processing
This course provides an introduction to advanced document formatting and applications using various types of word processing, spreadsheets, databases, slide presentations and electronic office procedures. Students learn new skills using current software on a PC. (0804-221) **Class 4, Credit 4 (F, W, S)**

0804-303 Business Graphics
This self-paced course provides a continuation of the word processing concepts and applications presented in the previous course. Students use current software on a PC to create basic business and data-driven graphics that are prepared in the office environment. An introduction to desktop publishing basics also is included. (0804-302) **Class 4, Credit 4 (W, S)**

0804-304 Database Applications for Business
This course contains the concepts and applications for creating, maintaining, retrieving and printing files. Using current database software on PC equipment, students use files to create various forms and reports. (0804-302) **Class 4, Credit 4 (F, W, S)**

0804-305 Business Ethics
This course introduces ethical issues facing the business community. It will focus on issues and perspectives of right and wrong in American companies. Students will learn about common work-related ethical issues, and evaluate problems concerning professional conduct and moral conflict. Students will also learn about ethical behavior, how to recognize ethical behavior, and how to model ethical behavior in the workplace. Individual, organizational and societal needs will be taken into consideration during the students' decision-making process. **Class 3, Credit 3 (F, W, S)**

0804-310 Desktop Publishing for Business
This course for students in the administrative support technology program provides further study in the field of desktop publishing, utilizing word processing and microcomputer equipment. Students create documents that contain business graphics, clip art and self-created graphics. Current software programs are used and provide a working knowledge of microcomputer-based desktop publishing. In addition to required projects, students select and design documents of their choice. (0804-303) **Class 4, Credit 3 (F, S)**

0804-312 International Dimensions of Business
This course will increase students' awareness about international developments impacting the American work force and market conditions and the impact of the global marketplace relating to their future employment in an American or foreign owned business. **Class 4, Credit 3 (S)**

0804-315 Preparation for Microsoft Word Certification
This course is intended to prepare students to take a certification exam for Microsoft Word. The exam tests proficiency through hands-on assessment in simulated Microsoft Office Word applications. Skill sets include creating and customizing documents, formatting content, working with visual content, organizing content, reviewing documents, sharing and securing content. (0804-221) **Class 2, Credit 1 (F, W, S)**

0804-316 Preparation for Microsoft PowerPoint Certification
This course is intended to prepare students to take a certification exam for Microsoft PowerPoint. The exam tests proficiency through hands-on assessment in simulated Microsoft Office PowerPoint applications. Skill sets include: Creating and formatting presentations, creating and formatting slide content, working with visual content, collaborating on and delivering presentations. (0804-303) **Class 2, Credit 1 (F, W, S)**

0804-317 Preparation for Microsoft Excel Certification
This course is intended to prepare students for Microsoft Excel certification. The exam tests proficiency through hands-on assessment in simulated Microsoft Office Excel applications. Skill sets include: creating and manipulating data, formatting data and content, creating and modifying formulas, presenting data visually, collaborating and securing data. (0804-212) **Class 2, Credit 1 (F, W, S)**

0804-318 Preparation for Microsoft Access Certification
This course is intended to prepare students to take a certification exam for Microsoft Access. The exam tests proficiency through hands-on assessment in simulated Microsoft Office Access applications. Skill sets include: structuring a database, creating and formatting database elements, entering and modifying data, creating and modifying queries, presenting and sharing data, managing and maintaining databases. (0804-304) **Class 2, Credit 1 (F, W, S)**

**0804-398 Special Topics: Administrative Support Technology/
Business Technology**
Credit variable

**0804-399 Independent Study: Administrative Support Technology/
Business Technology**
Credit variable

American Sign Language

These courses are for deaf and hard-of-hearing NTID students (only) and satisfy the NTID humanities distribution requirement. C-level courses satisfy the AOS requirement. These courses may also satisfy the deaf cultural studies/American Sign Language requirement as noted.

Fundamental (Level B)

0886-199 American Sign Language I*
Designed for deaf and hard-of-hearing NTID students who have no previous knowledge of American Sign Language. ASL I includes the linguistic features, cultural protocols and core vocabulary for students to function in basic ASL conversations that include ASL grammar for asking and answering questions while introducing oneself; exchanging personal information; talking about family, friends and surroundings; and discussing activities. Classroom and lab activities include practicing conversations and videotaping. (SIPI/LCBQ:1; NTID supported students or permission of instructor) **Class 4, Credit 4 (F, W)**

Intermediate (Level C)

0886-200 American Sign Language II*†
Designed for deaf and hard-of-hearing NTID students. This course expands the basic principles presented in ASL I. The course teaches students to use linguistic features, cultural protocols and core vocabulary to function in additional basic ASL conversations, including ASL grammar for giving directions; describing others; making requests; talking about family, occupations and routines; and attributing qualities to others. Classroom and lab activities include practicing conversations and videotaping. (0886-199 or equivalent; NTID supported students or permission of instructor) **Class 4, Credit 4 (F, W, S)**

*This course satisfies the Deaf Cultural Studies/American Sign Language requirement.

†This course satisfies the humanities requirement.

0886-201 American Sign Language III*†
Designed for deaf and hard-of-hearing NTID students. This course is a continuation of ASL II expanding the emphasis on ASL grammar, syntax, spatial referencing and vocabulary development. ASL III teaches further communicative competencies in ASL conversations beyond the basic level that include telling life events, describing events in time, asking for clarification, correcting, conforming, elaborating on information, agreeing and disagreeing, resolving conflicts and giving directions. Classroom and lab activities include practicing dialogues, short stories, narratives and short conversations. (0886-200 or equivalent) **Class 4, Credit 4 (W, S)**

0886-249 Structure of American Sign Language*†
Provides students with basic knowledge about the linguistic structure of American Sign Language (ASL). Through an introduction to language components, students examine the phonology, morphology and syntax of ASL. Information regarding historical and cultural aspects of ASL is also introduced and discussed. This course is taught in ASL. **Class 3, Credit 3 (W, S)**

Bridging (Level D)

0886-250 Introduction to ASL Teaching*†
Provides overview of how second languages have traditionally been taught, what the current methods and theories are, and their applications to the teaching of sign language. Students are provided opportunities to practice basic teaching techniques, select appropriate materials, learn basic curriculum design and evaluation techniques, including how to teach cultural and grammatical features in lessons. Students learn about resources to support their efforts to teach sign language. **Class 3, Credit 3 (S)**

0886-398 Special Topics: American Sign Language
Credit variable

0886-399 Independent Study: American Sign Language
Credit variable

Applied Computer Technology

0805-201 Applications Software
This course is an introduction to computers and problem solving using general-purpose application software. Students solve a variety of problems by using application software tools such as a word processor, a spreadsheet, a presentation package and a database program. **Class 3, Credit 3 (F, W, S)**

0805-211 Web Development for Business
This course will provide students with the tools to design and develop Web sites containing multiple linked Web pages using a current Web development application. Topics will include inserting and formatting text and images, creating links and navigation bars, and creating Web page layouts and tables. **Class 2, Lab 2, Credit 3 (S)**

0805-215 PC Operating Systems
This course is designed to acquaint students with the structure and function of Windows and DOS operating systems and to provide the skills required to install, configure and maintain them. Topics include system concepts, system-level commands and commands relating to program, file and applications management. Students perform a variety of functions, including OS installation and configuration, application program installation and management, creation and management of directories and file structures, partitioning and preparation of storage media. (0805-216) **Class 2, Lab 2, Credit 3 (F, S)**

0805-216 PC Hardware I
This course introduces the fundamental hardware concepts of personal computer (PC) systems, including their structure and components. The skills required to install, upgrade and maintain PCs are presented. Hands-on topics include the identification and handling of basic computer hardware, input/output devices and data communications. Various methods of upgrading computers are presented. **Class 2, Lab 2, Credit 3 (F, W)**

0805-217 PC Hardware II
This course provides students with methodologies and hands-on activities related to the configuration, diagnosis, repairing, and preventive maintenance of personal computers (PCs). Topics include familiarization with the basic functions and use of test equipment, logical troubleshooting of internal system conflicts and faulty peripherals, electrical safety, and methods of maintaining computer equipment. (0805-216) **Class 2, Lab 2, Credit 3 (W, S)**

0805-220 Introduction to UNIX
This course is designed to address the basics of the UNIX computer operating system. Salient features of mainstreamed operating systems covered in PC operating systems and other systems are reviewed in this course and compared with similar UNIX functions to illustrate efficiencies of various operating systems. Topics include language commands; mail; network communications; directory and file structure; the editor; shell, pipe and filter concepts. (0805-201) **Class 3, Lab 1, Credit 3 (F, W, S)**

0805-224 Introduction to Networking and Security
This first course focuses on stand-alone local area networks (LANs) of microcomputers. Students study network configurations, cabling, physical layer protocols, and network operating systems. Students add computer equipment to a LAN, install software and identify and correct hardware and software incompatibility problems. **Class 2, Lab 2, Credit 3 (F, W)**

0805-225 Networking Essentials
This second course in networking builds on concepts learned in Introduction to Networking and Security. Topics focus on connecting local area networks (LANs) of personal computers with other LANs, wide area networks (WANs) and minicomputer/mainframe computers. (0805-224) **Class 2, Lab 3, Credit 3 (W, S)**

0805-226 Client/Server Networks
This third course is designed to provide students with skills in implementing and maintaining the network infrastructure required to support intranets/internet. Topics include implementing and administering internet/intranet services of the appropriate server platform, applications, WAN technologies, security, reliability and coordination with content providers. There is heavy emphasis on hands-on problem solving. (0805-225) **Class 2, Lab 3, Credit 3 (F, S)**

0805-230 Introduction to Programming
A first course in programming that introduces students to general programming concepts and enables them to design simple Windows-based business applications. Course focus is on problem-solving methods, design and writing of simple Windows-based applications with an emphasis on logic skill development. The course serves as a foundation for future programming courses. Programming projects are required. (0805-251) **Class 3, Lab 1, Credit 3 (F, W)**

0805-251 Introduction to Web Development
This course addresses Internet-related topics, including Web browsers, multimedia for the Web, and creating basic Web pages using valid coding techniques. (0805-201) **Class 3, Lab 1, Credit 3 (W, S)**

0805-252 Web Applications
This course continues Introduction to Web Development by addressing intermediate topics for the World Wide Web, including more advanced coding techniques to enhance Web pages, and advanced multimedia techniques. (0805-251) **Class 3, Lab 1, Credit 3 (F, S)**

0805-298 General Work Experience
This course serves as an introduction to work experience. Students are expected to seek supervised employment to apply skills that promote desirable work habits, effective communication, awareness of employer expectations and the ability to make cooperative and productive interpersonal choices. This work experience need not be related to the student's technical educational goals. **Credit 0 (F, W, S, Su)**

0805-299 Co-op: Applied Computer Technology
Credit 0 (F, W, S, Su)

0805-310 Microcomputer Database Software
Creating, inquiring, reporting and other functions of databases. A leading database software product for microcomputers is studied. Students design a database, establish criteria for data to be accepted and coded, and prepare views of the database contents. Database utilization in the business environment and application to the student's expected work environment is presented. (0805-201) **Class 3, Lab 1, Credit 3 (F, W)**

0805-320 Client-Side Scripting
The course is an introduction to client-side programming for the Internet using a common scripting language. Students will be introduced to the syntax of the scripting language and then learn to build practical and interactive client-side applications. (0805-231, 252) **Class 2, Lab 2, Credit 3 (W)**

*This course satisfies the Deaf Cultural Studies/American Sign Language requirement.

†This course satisfies the humanities requirement.

0805-321 Database Integration
This course is an introduction to integrating relational databases with the World Wide Web. Students will learn to form basic database queries and then create interactive Web pages that combine queries with current server technologies to create dynamic, data-driven Web sites. (0805-252, 310) **Class 2, Lab 2, Credit 3 (W)**

0805-322 Web Server Technologies
This course is an introduction to server-side technologies for the Web. Students will be introduced to the principles and details of how a Web server works as well as issues related to Web server installation, performance and security. The role of server-side scripts and CGI's will also be studied, and students will get experience modifying scripts to solve user specifications. (0805-226, 320) **Class 2, Lab 2, Credit 3 (S)**

0805-323 Advanced Web Development
This is a capstone course bringing together the skills learned in all previous Web development courses to create a single large-scale Web project. Students will first be introduced to the newest trends in Web technology, currently XML, so that they are on the cutting edge of the technology they will encounter in the workplace. Skills in Web programming and scripting, database applications, Web development tools and Web graphics will then be brought together to solve a Web-based problem by creating a large-scale Web project. (0805-320, 321; corequisite 0805-322) **Class 2, Lab 3, Credit 3 (S)**

0805-335 LAN/WAN Design
This course is designed to provide a hands-on introduction to multi-protocol routers and multi-switched networks. The class will include basic router operations, architecture, and configuration; switched Ethernet networks; virtual LAN technology; configuration of switching devices; and troubleshooting. Students will set up, wire, and configure expansion technologies in an internet work environment. (0805-226) **Class 2, Lab 3, Credit 3 (W)**

0805-336 Network Security
This course will provide students with a deeper understanding of computer and data network security. Students will examine an infrastructure design process for securing computer systems and data networks, as well as methodologies and best practices for implementing security, security policies, security testing, and incident response. The underlying principles used to secure networks including security technologies, intrusion detection, authentication, and cryptography basics will be discussed. This course will also introduce students to network security planning, technology, and organization, and the legal and ethical issues associated with network security. (0805-226) **Class 2, Lab 3, Credit 3 (W)**

0805-337 Server Management and Security
The course is an introduction to server management. Students taking the course will learn to implement and administer network servers by managing server devices, file system, users and groups, and application software. Students will also learn how to monitor and fine-tune server security and performance and to implement backup and fault tolerance. (0805-226) **Class 2, Lab 3, Credit 3 (S)**

0805-338 Firewalls and IDS
This course will provide students with a deeper understanding of the various methodologies used by firewalls and IDS for defending a network from security attacks. Students will be introduced to the concepts, principles, types and topologies of firewalls to include packet filtering, proxy firewalls, application gateways, circuit gateways and stateful inspection. Various defense methodologies associated with Virtual Private Networks (VPN), Host Intrusion Detection Systems (HIDS) and Network Intrusion Detection Systems (NIDS) will also be covered. Students will learn best practices associated with properly securing business-critical network systems using VPNs with counter-measurement tools and techniques. (0805-335, 336) **Class 2, Lab 3, Credit 3 (S)**

0805-350 Digital Technology Integration
This course provides a basis for understanding the technologies that are often integrated as part of larger automated systems. Some of these technologies include but are not limited to the control and management of audio and video systems, security and surveillance systems, lighting control systems, access control systems, communication systems, assistive technologies, and other automated business features. This course will introduce some of these integratable technologies and provide a basis for connecting, testing, controlling, monitoring and maintaining these systems. (0805-217, 225, 230) **Class 2, Lab 3, Credit 3 (S)**

0805-351 Introduction to the Macintosh
This course is designed to equip students with general competency and familiarity with the Macintosh platform. Designed primarily for PC/Windows users, previous and current Mac operating systems will be thoroughly reviewed. Macintosh applications, hardware, networking and troubleshooting will also be covered. (0805-215, 226) **Class 2, Lab 2, Credit 3 (W)**

0805-352 Help Desk Support
This course is designed to acquaint students with the computer desktop support environment. The course covers the technical skills needed to successfully troubleshoot a variety of computer platforms and the soft skills needed to support end-users and provide satisfactory customer service. Policies and customer issues related to the technology needs within large and small businesses and government entities are discussed. Emphasis is given to problem solving and troubleshooting techniques, team dynamics, and interpersonal communication skills. (0805-215, 226) **Class 2, Lab 2, Credit 3 (W)**

0805-353 Introduction to Computer Forensics
This course will introduce students to the field of computer forensics. Using current forensics tools and procedures, students will learn how to find and preserve digital data resulting from criminal or illicit activities. Hands-on lab activities will be used to reinforce concepts and to provide real-life situations that give students experience in handling suspected digital evidence. (0805-215, 226) **Class 2, Lab 3, Credit 3 (W, S)**

0805-370 Fiber Optic Cable: Uses and Maintenance
This course introduces fiber optics and parallels the objectives of the National Association of Communication Contractors fiber optic cable installer training. Students will learn the basic fiber systems, which consist of a light-emitting diode or laser transmitter, fiber optic cable, connectors and a receiver. The course is primarily oriented to connectorization of cable ends and their evaluation using the optical time domain reflectometer (OTDR). (0805-224) **Class 2, Lab 2, Credit 3 (W, S)**

0805-375 Telecommunication Concepts
This course introduces concepts in both analog (voice) and digital (data) telecommunications. Topics covered include plain old telephone service (POTS), in-home wiring service, telephone operation, number coding, routing, transmission media and other appropriate telephony topics. Private branch exchanges (PBX) and Centrex also will be discussed. (0805-225) **Class 2, Lab 2, Credit 3 (S)**

0805-380 A+ Core Hardware Certification Preparation
The course will prepare students to take and pass the first part of the CompTIA's A+ Core Hardware certification exam. Students will review material from previous courses and complete practice exams and troubleshooting exercises in preparation for the exam. In addition to textbook(s), students will be required to purchase a certification exam voucher for this course. Students must pass the certification exam to pass the course. (0805-215, 226) **Class 1, Lab 2, Credit 2 (W)**

0805-381 A+ OS Technologies Certification Preparation
The course will prepare students to take and pass the second part of the CompTIA's A+ Operating Systems Technologies certification exam. Students will review material from previous courses and complete practice exams and troubleshooting exercises in preparation for the exam. In addition to textbook(s), students will be required to purchase a certification exam voucher for this course. Students must pass the certification exam to pass the course. (0805-215) **Class 1, Lab 2, Credit 2 (S)**

0805-382 Network+ Certification Preparation
The course will prepare students to take and pass the CompTIA's Network+ certification exam. Students will review material from previous courses and complete practice exams and troubleshooting exercises in preparation for the exam. In addition to textbook(s), students will be required to purchase a certification exam voucher for this course. Students must pass the certification exam to pass the course. (0805-335) **Class 1, Lab 2, Credit 2 (S)**

0805-383 Security+ Certification Preparation
The course will prepare students to take and pass the CompTIA's Security+ certification exam. Students will review material from previous courses and complete practice exams and troubleshooting exercises in preparation for the exam. In addition to textbook(s), students will be required to purchase a certification exam voucher for this course. Students must pass the certification exam to pass the course. (0805-336) **Class 1, Lab 2, Credit 2 (S)**

0805-390 **Programming Fundamentals**
This pre-programming course is for students pursuing a major in the Golisano College of Computing and Information Sciences (GCCIS) and is designed to help them develop the programming, logic and problem-solving skills needed for success in the GCCIS majors. This course will provide students with a study of the fundamental concepts, logical structures and algorithms inherent to computer programming. Students will learn how to write basic object-oriented programs in a contemporary programming language. (0502-111, 1016-204 or 0884-275) **Class 3, Lab 2, Credit 4 (F, S)**

0805-395 **ACT Technical Capstone**
This course provides an opportunity for students to work on technical projects that integrate the skills they have developed in earlier Applied Computer Technology courses. Students will work both independently and in teams to solve real-life computer support problems in a professional manner. (Completion of all ACT Technical course requirements.) **Class 1, Lab 4, Credit 3 (F)**

0805-398 **Special Topics: Applied Computer Technology**
Credit variable (F, W, S)

0805-399 **Independent Study: Applied Computer Technology**
Credit variable (F)

Arts and Imaging Studies

0855-251 **Bitmap Graphics I**
This course introduces students to the skills needed for the successful production and manipulation of raster images using image manipulation software. Students will master the application of painting and editing tools and techniques offered by the software program such as selection techniques, basic layer controls, digital masking, image correction and enhancement. Additional topics will include the relevance of image size, resolution and file format specifications when working with raster images. Comprehension and correct usage of terminology and concepts are emphasized. **Class 2, Lab 3, Credit 3 (F, W)**

0855-252 **Vector Graphics**
This course introduces student to using vector graphic applications to generate professional looking vector based layouts. Emphasis is placed on mastering vector-based tools as preparation for intermediate and advanced digital imaging and publishing skills development. Page layout, type specification, and graphics integration are covered. **Class 2, Lab 3, Credit 3 (F, W)**

0855-253 **Typography I**
Typography is an integral element of all good design, affecting both aesthetics and functionality. In this course, students learn the fundamentals and principles of typography, including type measurement/point sizes, type classification/type families, identification of typefaces, effective use of letterspacing, wordspacing, linespacing, line length and type arrangements. Students will learn type terminology, font selection guidelines, font management, and strategies/methods to ensure optimal readability and legibility. Students will develop typographic design skills that can be applied in a wide variety of graphic applications. **Class 2, Lab 3, Credit 3 (F, W)**

0855-254 **Applied Color Theory**
This course includes the study of color for design, printing, Web, and photographic imaging systems and procedures. Students will use and apply correct technical vocabulary, various concepts, and procedures regarding the perception, recognition, selection, specification, application, and evaluation and correction of color in various graphic arts workflows and application. Students will use and apply the artist's color wheel, various color models, and specification systems. **Class 2, Lab 3, Credit 3 (W, S)**

0855-255 **Principles of Design**
Students will be introduced to the basic elements of two-dimensional monochromatic design, compositional principles, and approaches to analysis of design problems, techniques for gathering resources to work toward possible design solutions and visualization of design concepts through the use of idea sketches to final comprehensive layouts. Students will also utilize basic design vocabulary to participate in critiques for the purpose of analyzing their own and other students' work. This course provides students in non-creative technical majors as well as those pursuing more creative endeavors within the graphic arts field with a fundamental overview and understanding of the design process to expand critical awareness of the importance of good design. **Class 2, Lab 3, Credit 3 (W, S)**

0855-256 **Publishing Fundamentals**
This course provides an overview of page layout and publishing procedures and related career opportunities in the graphic communications. This course will enable students to develop an understanding of types of publications and publishing strategies as well as the roles of designer, publisher, production personnel. Students will use and apply appropriate page layout software used in design and production of printed pages for single and multiple-page documents. Students will use authoring software used in the design and production of web pages and media presentations. This course will prepare students for further study in graphic design, desktop publishing, and Web page development. **Class 2, Lab 3, Credit 3 (as needed)**

0855-299 **Co-op: Arts & Imaging Studies**
This course provides a ten-week (350 hours) work experience in the field. (45 AIS technical program credits.) **Credit 0 (F, W, S, Su)**

0855-310 **Visual Idea Development**
This course gives students the opportunity to see themselves, their experiences and their environment as sources of creativity, through a variety of activities which include classroom discussions, field trips, guest lecturers and keeping written journals and sketchbooks. Students learn strategies for developing concepts and organization of thought processes as well as systems to formulate solutions to design problems. The library is used for development of research skills. **Class 2, Lab 3, Credit 3 (F, W)**

0855-311 **Basic Drawing**
This course is an introduction to freehand drawing of basic forms, with an emphasis on perspective, including one-point and multi-point techniques and figure drawing. Perspective concepts will also be applied to more complex objects and environments, including tonal values. Figure drawing will be focused on the study of line, gesture, contour, construction, and tonal values. **Class 2, Lab 3, Credit 3 (F, W)**

0855-312 **Intermediate Drawing**
This course continues the principles and skills developed in Basic Drawing, with special emphasis on the human form, including proportion, shading, lighting, head/facial features, sustained study, and the use of the figure within compositions, including still life. Students will also be exposed to a range of media and materials. (0855-311) **Class 2, Lab 3, Credit 3 (W, S)**

0855-313 **Advanced Drawing**
This course extends the various skills and concepts learned in the previous drawing courses and applies them to still life, architecture, various environments, and the human form within various environments. The use of sketchbooks will be emphasized for development of composition skills; students will use the library and other resources and will further explore various kinds of media. (0855-312) **Class 2, Lab 3, Credit 3 (F, S)**

0855-314 **Color in Design**
In this course, color theory is emphasized and concepts learned in Basic Design are applied, using color media and materials to solve basic design problems. Technical quality in presentation of design concepts is emphasized. **Class 2, Lab 3, Credit 3 (W, S)**

0855-315 **History of Graphic Design**
This course includes the study of a survey of art and design movements, designers, and typographers who have made significant contributions to the field of Graphic Design. **Class 3, Credit 3 (W, S)**

0855-316 **Art History I**
Survey of major historical developments in the visual arts, specifically examining art from prehistoric times to the Renaissance. **Class 3, Credit 3 (F, W)**

0855-317 **Art History II**
Survey of major historical developments in the visual arts, specifically examining western art from the Baroque period of the 17th century to current movements in the fine arts. (0855-316) **Class 3, Credit 3 (W, S)**

0855-318 **Typography II**
In this course, students focus on selection of appropriate type to best communicate a message, use of type as an integral part of a design, including how to choose letterspacing, wordspacing, linespacing, line length and type arrangement to best work in a design. There is also emphasis on working with type and grids, legibility and readability, proofreaders' marks and proofreading and copy specification. (0855-252, 253, 255) **Class 2, Lab 3, Credit 3 (F, S)**

0855-319 **Graphic Design**
Students will learn how to develop design solutions by creating clear, well-executed idea sketches and final comprehensive layouts for a variety of design problems using appropriate design techniques, color and typography. Emphasis will be placed on identifying clients' needs, target audiences and successful communication of clients' messages. In addition, students will be introduced to graphic design business practices and ethics as well as an overview of printing paper selection and finishing/binding methods. Focus will also be on verbal presentation of layout ideas, group production meeting times, and group critiques. (0855-251, 252, 253, 255) **Class 2, Lab 3, Credit 3 (F, W)**

0855-321 **Image Acquisition**
The student will build on the skills previously learned in Bitmap Graphics course. Topics include: determining and applying resolution and magnification settings appropriate to the characteristics of the specified output goal; setting highlight and shadow points, removing color cast, sharpening, and tone-adjustment of acquired images; use desk-top scanners hardware/software; use appropriate color settings/modes and file formats. (0855-251, 254) **Class 2, Lab 3, Credit 3 (F, S)**

0855-322 **Bitmap Graphics II**
The students will build on the skills previously learned in Bitmap Graphics. Topics include applying production planning techniques to image manipulation, production quality standards, advanced methods and quality criteria for image manipulation, legal and ethical issues. This is a production-oriented course with the emphasis on producing photographic quality (raster) digital images. (0855-251, 254) **Class 2, Lab 3, Credit 3 (F, S)**

0855-323 **Digital Photography I**
This course gives students an introduction to the tools, techniques and terminology of electronic imaging through a series of hands-on activities that will permit each student to investigate the applications of digital photography. Students will be expected to capture images using digital cameras, process digital images using the appropriate software, create quality picture files and participate in project-related critiques. **Class 2, Lab 3, Credit 3 (F, S)**

0855-324 **Wide Format Graphics**
Wide format ink jet printing is one of the fastest growing market segments. Products include large display signage and decals, vehicle wraps, packaging mock-ups, point-of-purchase display elements, vinyl appliqué, magnetic and tie-back signage, and large-scale presentation displays, and other large-scale signage. This course provide students with a unique set of knowledge and skills required for the preparation, production, finishing, material handling, mounting and displaying of wide format products. (0855-251, 252, 253, 254) **Class 2, Lab 3, Credit 3 (F, W)**

0855-331 **Desktop Publishing I**
The students will use page layout (desktop publishing) applications to design pages and documents and to produce pages and documents to given specifications; importing and placing text and graphic files; the application of style sheets, templates, snippets, libraries, and color specifications. The application of design and typographic principles, industry terminology and measurement systems, font management, and file management are emphasized. **Class 2, Lab 3, Credit 3 (F, S)**

0855-332 **PDF Production and Workflow**
The students will study the Portable Document Format (PDF) file format including defining and applying specifications for color management, file optimization and file security; recognizing and editing PDF documents; and using PDF files in a variety of print and non-print media production workflows. **Class 2, Lab 3, Credit 3 (F, S)**

0855-333 **Publication Production I**
The students will study the use of page layout applications to produce book, magazine, and long format publications. Topics include techniques for defining and applying publication templates; font management and selection; page formats; page and section numbering; headers and footers; text editing; graphics creation, preparation, and placement; color specification and usage; automating a table of contents; using a colophon and other features typical for book and long document publishing formats. Students are introduced to the repurposing of documents for interactive digital media and XML-based document production. (0855-331) **Class 2, Lab 3, Credit 3 (F, W)**

0855-334 **Database Publishing**
The students will study the principles and techniques of database construction, manipulation, and reporting. This course provides the opportunity to develop expertise in creating graphically attractive and informationally useful reports both within the layout capabilities of a database application, and through importation into a page layout program, and conversion into a form compatible with a Web server. Topics include database formation, document tagging, template generation, style sheets, HTML coding, and database publishing techniques and procedures. (0855-331) **Class 2, Lab 3, Credit 3 (F, S)**

0855-341 **Graphics for the Web**
This course provides an overview of creating graphics for the web, including an introduction to Internet graphics and how they are related to the World Wide Web. Students gain in-depth knowledge of graphics preparation and optimizing graphics for use on the Internet. Course content includes exploring the Internet, using various programs to create and optimize images for use on the Internet, and the use of basic HTML programming. There will also be a focus on the vocabulary of the Internet, various graphic file formats, compression schemes, and concepts of effective graphic communication on the Internet. (0855-251, 252, 254) **Class 2, Lab 3, Credit 3 (F, S)**

0855-342 **Web Design I**
This course introduces students to the fundamental skills needed to create designs that work on the World Wide Web. Students are introduced to the Internet, learn basic HTML programming for graphics, and legal issues of the Internet. Text based technology is used to separate design from content using templates and cascading style sheets (CSS). CGI and Javascript are used to add basic interactivity to the site, such as forms and counters. Issues concerning what works most successfully relating to typography, color, composition, format, and audience understanding are discussed. Students are expected to create web pages that demonstrate their understanding and use of basic design principles. (0855-253, 255) **Class 2, Lab 3, Credit 3 (F, S)**

0855-343 **Computer Animation**
In this course, students will learn how to create illustrations, create web animations, develop web-based and stand-alone interactive media, and develop design elements that are used to enhance web design. Course content includes understanding staging, timelines, frame rates, keyframes, transitions, and object attributes. Both vector and raster animation applications are taught and used in the course. Throughout the quarter, students will learn the vocabulary and skills necessary to create basic to intermediate skill level computer animation projects. (0855-251, 252) **Class 2, Lab 3, Credit 3 (F, S)**

0855-344 **Videography**
This course provides an overview of Videography for the web. This is a basic digital video course that will introduce the participants to the process and procedures involved in digital video production from start to finish. Students will be introduced to Videography production techniques, cameras, digital non-linear editing, and lighting for video. Emphasis is on proper operation of video and computer equipment for productions and post-production of digital non-linear edited sequences and their adaptation to different presentation formats for online delivery. **Class 2, Lab 3, Credit 3 (F, W)**

0855-351 **Production Workshop**
This course reinforces the students' skills learned in core courses. Students are introduced to procedures that are used in an actual graphic communications production environment, understanding the cost of doing business, estimating procedures and quality control requirements. This course enables the student to develop and apply team-building and problem-solving skills as they complete integrated activities from creation to final product in both print and non-print media workflows. (45 AIS program credits) **Class 2, Lab 3, Credit 3 (F, W)**

0855-352 **Color Management**
The students will study color management system (CMS) software and color measurement devices as they are used to control color quality in the digital imaging and publishing disciplines. CMS concepts are introduced and applied to imaging equipment (input, display, and output), systems, and documents. (0855-251, 252, 254) **Class 2, Lab 3, Credit 3 (F, W)**

0855-353 **Portfolio Presentation**
This course will give students in the Arts and Imaging Studies Department an opportunity to prepare and submit a portfolio of their work in preparation for a job search or for application to a baccalaureate degree program. The course will emphasize professional procedures for making a traditional, PDF-based, and Web-based portfolio. (0855-299) **Class 2, Lab 3, Credit 3 (F, S)**

- 0855-354** **Applied Production I**
This elective two-course sequence provides an environment where students and customers interact in order to produce completed graphics projects and finished print jobs. Students work in a simulated design and production environment where they can develop their technical skills, work habits, and customer relations. (0855-351) **Class 2, Lab 3, Credit 3 (S)**
- 0855-355** **Applied Production II**
This elective two-course sequence provides an environment where students and customers interact in order to produce completed graphics projects and finished print jobs. Students work in a simulated design and production environment where they can develop their technical skills, work habits, and customer relations. (0855-354) **Class 2, Lab 3, Credit 3 (F)**
- 0855-361** **Grid Systems**
This course will provide students with the knowledge needed to understand and utilize grids to organize graphic design elements for readability and consistency in various media. Students will be first asked to use pre-designed grid systems for layout and design, and as they become proficient in the understanding and use of these systems will develop their own grid systems to solve graphic design problems. Assignments will be completed using page layout software that is consistent with industry standards. (0855-319) **Class 2, Lab 3, Credit 3 (W, S)**
- 0855-362** **Publication Design**
In this course, focus will be placed on layout and design of multi-paged printed graphics including brochures, booklets, catalogs, calendars, and magazine spreads and the use of grids and other organizational systems. Issues such as page sequencing and pagination, design flow and consistency through the layout/design and successful communication of the client's needs will be addressed. Assignments will be completed using page layout software consistent with industry standards. (0855-361) **Class 2, Lab 3, Credit 3 (F, S)**
- 0855-363** **Identity Systems Design**
In this course, students will learn about various classifications and areas of identity design and will develop identity symbols and systems of identification and branding for businesses and organizations as well as individuals, including components such as business cards, letterheads, envelopes and invoices. Focus will be on identifying client need, budget and target audience in order to develop appropriate identity design solutions with components that are compatible, consistent, and practical to use. Students are expected to find a real client for at least one of the assignments for this course. In addition, students will be familiarized with current top identification system designers and current design trends in identity design. (0855-319) **Class 2, Lab 3, Credit 3 (W, S)**
- 0855-364** **Digital Illustration**
This course will provide students with skills and techniques used in areas of digital illustration, including comparison, techniques and functions of vector and bitmap software programs to create professional-quality renderings. Various kinds of illustration will be introduced, including editorial, book, and information illustration such as illustrated charts and graphs. Students will have the opportunity to create professional quality illustrations for various audiences and media. (0855-251, 252, 311) **Class 2, Lab 3, Credit 3 (F, W, S)**
- 0855-371** **Dynamic Image Preparation**
This course will address various technologies for the capturing and converting of multiple static images into more dynamic presentations of environments, and objects. Topics will include panoramic stitching, creating virtual tours, creating 360 degree views of 3D objects, and creating dynamic slideshows. (0855-251, 252, 323) **Class 2, Lab 3, Credit 3 (F, W, S)**
- 0855-372** **Composite Imaging**
This course includes specialized image manipulation techniques applied to produce images that blend images together into a single composite image. Emphasis is given to developing efficient production techniques for this advanced image manipulation concept. (0855-322) **Class 2, Lab 3, Credit 3 (F, S)**
- 0855-373** **Digital Photography II**
This course is a continuation of Digital Photography I. Students will continue to use and apply correct technical vocabulary, various concepts, and procedures regarding the technical understanding and use of digital photography equipment and software. Aesthetic/composition considerations will be emphasized as well. Various genres and markets will be discussed such as photojournalism, portraiture, fine art, advertising and marketing, and sports. (0855-323) **Class 2, Lab 3, Credit 3 (W)**
- 0855-374** **Image Retouch and Restore**
This course includes specialized image manipulation techniques used to reconstruct, restore, and enhance images. Emphasis is given to developing skills for image evaluation and for production work plan strategies. (0855-322) **Class 2, Lab 3, Credit 3 (W, S)**
- 0855-381** **Desktop Publishing II**
This course builds on topics presented in Desktop Publishing I. Students will define and apply techniques and procedures for optimizing document design and production efficiency. Topics include defining Paragraph, Character, and Object styles; making and using templates; saving and accessing object snippets and libraries; recognizing and applying proofreaders marks and notations; defining and applying advanced typographic techniques, advanced page layout procedures, object transparency and other image effects; building and editing tables; and, defining and applying color specifications and effects. Students will continue to develop knowledge and skills in the industry leading page layout software applications. (0855-331) **Class 2, Lab 3, Credit 3 (W, S)**
- 0855-382** **Interactive PDF Publishing**
Interactive digital document files in the Portable Document Format (PDF) have become an effective and widely-used strategy for presentations, training materials, and information collection and distribution. In this course students will use Adobe Acrobat for making and using interactive PDF files. Topics include adding interactive features including bookmarks, action button, hyperlinks to internal anchors, hyperlinks to other documents and Web content. Emphasis is given to file optimization for interactive display size formats, color, and resolution. (0885-332) **Class 2, Lab 3, Credit 3 (W, S)**
- 0855-383** **Publication Production II**
In this course, students will build on the concepts and skills learned in Publication Production I. Students will understand and apply techniques and procedures specific to the layout and production of multi-section/multi-chapter publications for on-demand, mass market, and PDF digital document output and distribution (0855-333) **Class 2, Lab 3, Credit 3 (F, S)**
- 0855-384** **Digital Printing Systems**
This course will focus on the operating features of the black & white and color digital production printing systems. Students will learn the job and market capability of the various systems, xerography concepts in monochrome printing, image and paper quality considerations, creation of electronic files and file transfer, and operating procedures. Additional topics include the digital workflow for on-demand book printing and small-format binding. **Class 2, Lab 3, Credit 3 (W)**
- 0855-391** **Web Design II**
This is a required course that provides an understanding of basic web site creation. This course introduces students to the fundamental skills needed to create content and layouts that work on the World Wide Web. Graphics based technology is used to create interactive pages. Topics include rollover buttons, using image slices to maximize delivery speeds, using image maps, graphic behaviors, GIF animations, design and development of navigation systems. Usability issues will be introduced and studied, especially focusing on the ADA accessibility laws. Students are expected to create web pages that demonstrate their understanding and use of basic publishing and coding principles. (0855-342) **Class 2, Lab 3, Credit 3 (W, S)**
- 0855-392** **Web Design III**
This course provides an overview of designing multi-page web sites. In this course, students will continue to learn how to use design elements successfully to create a multi-page web site. Students will continue the study and application of concepts of Web site design, site navigation theories, and the management of a multi-page web site. In this course, students will develop a web site combining the advantages of text based production techniques for content management with graphics based design for appeal and animation. Audience interactivity will be incorporated throughout. Effective use of color, typography, and design will be applied. (0855-391) **Class 2, Lab 3, Credit 3 (F, S)**
- 0855-394** **Interactive Digital Media**
This is a required course that provides an overview of designing interactive digital media. In this course, students will continue to learn how to use design elements successfully to create a multi-page web site. Students will be introduced to the concepts of designing and developing interactive digital media, user interface theories, and the management and development of an interactive digital media file. Students will also create and prepare digital elements for network use. Issues of file size, quality, format, client/server interaction are covered. 2D/3D vector and raster graphics will be used along with animation, video and presentation applications. (0855-342, 343) **Class 2, Lab 3, Credit 3 (W, S)**

0855-398 **Special Topics: Arts and Imaging Studies**
Credit Variable (F, W, S)

0855-399 **Independent Study: Arts and Imaging Studies**
Credit Variable (F, W, S)

Automation Technologies

0891-210 **Pneumatics and Hydraulic Systems**
The basics of fluid power is the course focus. Areas of study include pressure, viscosity, turbulence, flow, thermal properties and displacement. Hydraulic/pneumatic components such as pumps, actuators, valves, accumulators, lines, directional controls, sealing devices and servomechanisms are introduced, as are the tools and procedures used to install and maintain hydraulic/pneumatic systems. (0885-201) **Class 1, Lab 6, Credit 3 (S)**

0891-212 **Industrial Electronics**
This course will introduce students to basic electrical concepts, circuits and devices used in automated systems. Students will study different forms of electrical power and the laws associated with them. Various electrical/electronic devices used in controlling, filtering and displaying power states will be studied. Safely and correctly connecting and installing devices and cables using schematic diagrams and electrical instrumentation will be included. (0813-222, 0890-214) **Class 2, Lab 6, Credit 4 (S)**

0891-214 **Electromechanical Devices**
This course introduces various devices used in the manufacturing environment for automation control. The most commonly used AC and DC motors, stepper motors, motor controllers and servomotor drives are used in laboratory set-ups along with sensors and transducers used in monitoring or controlling the manufacturing process. Relays, contactors, starters, symbols, ladder diagrams, motor connections, overload protection and interlocking schemes are studied. In addition, control loops, feedback, rate response, proportional control, process instruments and sensor interfaces as they apply to automatic control systems are studied in detail. (0805-240; corequisite: 0805-245) **Class 2, Lab 6, Credit 4 (F)**

0891-216 **Programming Concepts**
This course introduces problem-solving processes and programming concepts as they can be used to guide automation control systems and other automated system subsystems. Programming structure and flowcharting are studied. Students are exposed to programming applications with automated control systems and are expected to write simple programs. (0813-222, 0890-214) **Class 3, Lab 3, Credit 4 (S)**

0891-220 **Automated Systems I**
This course reinforces previously learned subsystem-level skills while introducing additional concepts and skills at a system level. System assembly, wiring, programming, networking, monitoring (data collection and analysis) and troubleshooting are addressed. Basic robotic technology is introduced as part of an automated system. (0891-210, 214, 216) **Class 2, Lab 6, Credit 4 (W)**

0891-230 **Automated Systems Troubleshooting I**
This course introduces skills associated with performing basic system maintenance and troubleshooting. Maintenance sheets, along with the appropriate equipment manuals, procedures, tools and instrumentation to safely and correctly perform the maintenance functions, are considered. Data from system performance charts are interpreted and used to make necessary process or equipment adjustments. Skills needed to diagnose and repair a system fault in a safe and logical manner are introduced and performed according to manufacturer specifications. (0891-220) **Class 2, Lab 6, Credit 4 (S)**

0891-299 **Co-op: Automation Technologies (0891-230)**
Credit 0 (F, W, S)

0891-314 **Programmable Logic Controllers (PLC) Programming**
Students begin to learn about the use of programmable logic controllers (PLCs). Content includes the concepts of PLC programming and interfacing and the development of PLC applications. Students use PLC program development software, test PLC applications and modify PLC programs to effect process changes as indicated. (0891-212) **Class 2, Lab 6, Credit 4 (F)**

0891-316 **Mechanical Devices and Systems**
This course builds on course work introduced in prior physics and automated system courses. Students learn about mechanical components found in transmission pathways of automated systems, including drive mechanisms, pallet changers, shifters, conveyers, gears and linkages. Students analyze factors contributing to mechanical failure such as load and torque. Effects of changes in pressure, direction, force, speed and other physical parameters are also studied. Students work with simulated modules and automated systems with mechanical components. (0885-201; corequisite: 0891-220) **Class 1, Lab 6, Credit 3 (W)**

0891-318 **Applied Robotics**
Students use, maintain, develop and debug robotic programs. Course content requires that students learn the concepts related to robotic programming and interfacing as well as the applications that use robotics. Using lab experiments and robotics program development software, students learn to set up, install, download, diagnose, write, manipulate and test programs in automated manufacturing environments. (0891-220) **Class 2, Lab 6, Credit 4 (S)**

0891-320 **Automated Systems II**
This course builds on the system-level skills developed in Automated Systems I and Automated Systems Troubleshooting I. Students encounter advanced robotic operations, process and equipment control using programmable logic controllers and material transport systems as they learn to work with product changeovers relative to upgrading or retooling a flexible manufacturing cell. Human machine interfaces (HMI) and electronic operator interfaces (EOI) are used for machine user interfacing. (0891-220, 314) **Class 2, Lab 6, Credit 4 (S)**

0891-330 **Automated Systems Troubleshooting II**
This advanced troubleshooting course not only incorporates all the maintenance and troubleshooting skills developed in Automated Systems Troubleshooting I for basic system maintenance, diagnosis and repair but also introduces maintenance and troubleshooting of the more difficult and advanced system areas such as networked controllers, vision systems, advanced robotics, programmable logic controllers, and other system and subsystem components where hardware and software are heavily integrated for system operation. (0891-320) **Class 2, Lab 6, Credit 4 (F)**

0891-398 **Special Topics: Automation Technologies**
Credit variable (F, W, S)

0891-399 **Independent Study: Automation Technologies**
Credit variable (F, W, S)

Communication Studies

Communication studies courses may satisfy the social sciences, humanities or, in some cases, deaf cultural studies/ASL graduation requirements. The 200-level courses satisfy the AOS requirement for general education. Interpersonal Relationships, Group Dynamics and Effective Teams, and Organizational Communication and the Deaf Employee satisfy the AOS communication requirement.

0880-101 **Foundations of Critical Thinking**
This course sharpens students' ability to think clearly, logically, and creatively and to communicate knowledge effectively in an academic setting. Critical thinking strategies are learned for examining issues and solving problems. Course topics include problem solving using a five-step model; analyzing and giving directions; classifying and sequencing information; identifying multiple perspectives on an issue; analyzing arguments used to support a position; and creating visual representations of problems and solutions. The importance of thinking critically for effective communication regardless of modality (writing, reading, signing, speaking, listening) is stressed. (ACT reading score 1-11 or permission of instructor; corequisite: NTID English levels A or B, 0883-100 through -199) **Class 3, Credit 3 (F, W, S)**

0880-201 **Interpersonal Relationships†‡**
This course examines the role of communication as it relates to establishing, maintaining and ending relationships. Topics include: relationship development; self-concept; perceptions and first impressions; stereotyping, prejudice and discrimination; conflict resolution; active and passive listening; personal and social values; self-disclosure, gender-related communication, and communication among Deaf and hearing people. (Qualified to enter an AOS degree program or permission of instructor) **Class 3, Credit 3 (F, W, S)**

†This course satisfies the humanities requirement.

‡This course satisfies the social sciences requirement.

0880-202 Intercultural Communication†‡
This course is intended to provide students with an introduction to the concepts of culture, communication and intercultural communication as they relate to face-to-face communication. The students will learn about the relationship between culture and communication and how to reduce potential conflict. Skills learned in this course apply to communication in everyday situations as well as the work setting. (ACT reading score 14–16 or permission of instructor) **Class 3, Credit 3 (W, S)**

0880-206 Group Dynamics and Effective Teams†‡
This course focuses on the information and skills needed to be a knowledgeable, effective participant in small groups. Topics related to group dynamics and team building are addressed at the practical and theoretical levels. These topics include characteristics of effective teams, stages of group development, techniques for group self-analysis, how groups operate for different outcomes, group vs. personal goals, the role of diversity, and group decision-making and problem-solving techniques. (Qualified to enter an AOS degree program or permission of instructor) **Class 3, Credit 3 (F, W, S)**

0880-207 Organizational Communication and the Deaf Employee*†‡
This course examines interpersonal and small group communications in organizational settings in today's corporate climate, with emphasis on important aspects of communication for deaf individuals entering a professional career. Students become familiar with the business environments of large and small companies and the implication of company size regarding personnel decisions. Case studies from selected corporations provide insights into elements of communication processes such as networks (electronic and non-electronic), organizational structures, managerial decision making, interviewing, organizational development and conflict resolution. Companies' perspectives on hiring culturally and ethnically diverse individuals and deaf individuals are discussed. Laws, such as ADA, related to the hiring and support of disabled workers are addressed. (Qualified to enter an AOS degree program or permission of instructor) **Class 3, Credit 3 (F, W, S)**

0880-398 Special Topics: Communication Studies
Credit variable (F, W, S)

Computer Aided Drafting Technology

0890-208 A/E/C Measurement Systems
This course provides students with hands-on experience with basic measuring instruments used in the architectural/engineering/construction (A/E/C) industry. Students practice measurement skills in lab and field settings and use computer simulations. Care and handling of the instruments, data collection, management, analysis and other calculations are developed. Students learn standard procedures to report and display measurement information. (0890-214) **Class 1, Lab 3, Credit 2 (S)**

0890-210 Construction CAD I
In this course students learn computer aided drafting (CAD) skills to produce contract documents, manage files and organize graphic content for construction projects. Students will produce working drawings for a variety of architectural/engineering construction types. (0890-212) **Lab 12, Credit 4 (S)**

0890-212 Computing Tools for Engineering Technology
This course provides a foundation of computer skills common to classroom and work environments in engineering-related fields. These include skills with using operating systems, networks, the Internet, common office productivity tools and graphics tools. Most assignments will include engineering communication and problem-solving components. **Class 2, Lab 4, Credit 4 (F)**

0890-214 CAD Applications in Engineering Technology
Students continue developing engineering skills in engineering graphics and solid modeling. Students will primarily use computer aided drafting (CAD) as a tool to generate 2D graphics and 3D solid models. The course is laboratory oriented and provides the student with basic skills in spatial visualization, freehand sketching, parametric solid modeling, and creation of engineering drawings that meet industrial drafting standards. (0813-220, 0890-212; corequisite: 0813-222) **Class 2, Lab 4, Credit 4 (W)**

0890-216 Design, Dimensioning and Tolerancing
Students continue developing basic engineering skills through project-based problem-solving and design exercises. Geometric dimensioning and tolerancing (GD&T) skills are the focus of this course. Course work requires students to evaluate the functional requirements of parts and assemblies, use GD&T to specify those requirements, and relate process capabilities to design specifications. (0890-214; corequisite: 0813-224) **Class 2, Lab 4, Credit 4 (S)**

0890-220 Construction CAD II
Students learn to apply 3D CAD techniques to a bi-level construction project situated on a site with modest topographic features. Concepts associated with the structural system are integrated into the construction of the 3D model. Students will extract a series of orthographic and pictorial views from the model, producing a comprehensive set of working drawings. (0890-210) **Lab 12, Credit 4 (F)**

0890-230 Construction CAD III
Students learn to apply 3D CAD techniques to a multi-level construction project situated on a site with significant topographic features. Students will function as a team to create a total project model. Concepts of structural systems will be integrated into the construction of the building models. Students will extract and refine a series of orthographic views from the site and building models such that a comprehensive set of working drawings is produced. (0890-220) **Lab 12, Credit 4 (W)**

0890-255 Construction Materials and Methods I
Students begin to learn about the common structural materials used in construction. Content includes vocabulary, identification, characteristics, origins, sources, standard sizes and shapes, units of measure, and methods for testing and acceptance. Students use standard references and classification systems for materials and products. (0890-208) **Class 2, Lab 3, Credit 3 (F)**

0890-265 Construction Materials and Methods II
This course is a continuation of the Construction Materials and Methods I course. Students learn standard classification systems and use reference sources to investigate materials and products. Students select construction materials and products and integrate their selections into design solutions. This course focuses on non-structural materials and products associated with the construction industry. (0890-255) **Class 2, Lab 3, Credit 3 (W)**

0890-275 Principles of Structural Systems
Students learn the basic concepts of loads and stresses and how the structural members of a construction project support loads. This overview includes the practical aspects of how structural elements are assembled and incorporated into construction projects. (0890-255) **Class 3, Credit 3 (W)**

0890-280 GIS Fundamentals
Students develop basic skills in applications of geographic information systems (GIS). Through hands-on projects, students will learn how to use GIS software, plan a project, create a database, conduct spatial analysis and create presentation graphics. No official prerequisites are required, but students should have basic computer literacy skills. **Class 2, Lab 3, Credit 3 (F)**

0890-299 Co-op: Computer Aided Drafting Technology
Designed to give the student an opportunity to gain experience on the job, to apply what has been learned and to self-evaluate personal and communication skills. Placement assistance is provided to help the student find a relevant work experience. **Credit 0 (F, W, S, Su)**

0890-310 Advanced Construction CAD
Students develop the CAD drafting skills gained in previous courses by adding skills in design development. The project, a building of two or more stories, requires the synthesis of information and principles both from previous courses and from reference sources. The use of these reference sources is an important part of the instruction. (0890-230, 265, 275) **Lab 12, Credit 4 (S)**

0890-320 Presentation Graphics
Students gain specialized skills and knowledge in production of presentation graphics using CAD. Using their general CAD skills as a starting point, they learn to produce various types of 3D views, fly-throughs, virtual reality, and Web graphics for presentation of construction projects to clients, agencies, boards and the public. Students will also gain basic skills and knowledge in geographic information systems using GIS software. (0890-310) **Lab 12, Credit 4 (F)**

*This course satisfies the Deaf Cultural Studies/American Sign Language requirement

†This course satisfies the humanities requirement.

‡This course satisfies the social sciences requirement.

0890-355 **Site Utilities, Mechanical and Electrical Systems for A/E/C**
Students learn to identify the basic equipment, requirements and operation of site utilities and mechanical and electrical systems for construction projects. The systems include water supply, sanitary sewers and treatment, storm drainage, solid waste handling, gas, power, telephone, cable services, fire protection, heating, ventilating, air conditioning, lighting, communication systems and conveying systems. Students become acquainted with the graphic representations of this equipment and these systems on construction documents. (0890-220, 265) **Class 3, Credit 3 (F)**

0890-375 **Construction Regulations**
Students gain a general knowledge of laws, codes, ordinances, regulations, approval processes and approving agencies or bodies that affect construction projects. Students gain a basic understanding of how these regulations and processes are applied to the work they will perform. (0890-255, 265, 275) **Class 3, Credit 3 (S)**

0890-398 **Special Topics: Computer Aided Drafting Technology**
Credit variable (F, W, S)

0890-399 **Independent Study: Computer Aided Drafting Technology**
Credit variable (W)

Computer Integrated Machining Technology

0813-220 **Engineering Fundamentals**
Students develop basic engineering skills through project-based problem-solving and design exercises. Data collection, analysis and technical communication skills are emphasized. Course work requires students to apply knowledge and skills related to mathematics, science and English courses. (Corequisite: 0890-212) **Class 2, Lab 4, Credit 4 (F)**

0813-222 **Manufacturing Processes**
This course focuses on understanding and applying basic manufacturing processes. Students will learn how typical industrial piece parts and assemblies are manufactured. Topics emphasize safety and focus on processes and related theory for material removal, sheet metal forming, joining, casting and molding in a project-based format. (0813-220, 0890-212; corequisite: 0890-214) **Class 2, Lab 4, Credit 4 (W)**

0813-224 **Industrial Processes**
This course will focus on the understanding and application of non-traditional manufacturing processes such as electrical discharge machining (EDM), electrochemical machining (ECM), photochemical machining (PCM), ultrasonic machining, laser cutting, plasma cutting, rapid prototyping, etc. This is a project-based course; the student will, alone or in a team, investigate one of the processes in depth and give a presentation on how it is applied to a specific part. (0813-222, 0890-214; corequisite: 0890-216) **Class 2, Lab 4, Credit 4 (S)**

0813-231 **CIMT 1**
Students develop basic skills for operating computer-controlled machine tools. Laboratory instruction simulates introductory-level work in an industrial environment; student work is held to ISO-referenced standards for dimensional and geometric accuracy. Safety work habits are cultivated, and industrial safety rules are highly stressed during this course. (0813-220, 222, 0890-212, 214; corequisite: 0813-239, 255) **Class 1, Lab 5, Credit 3 (S)**

0813-232 **CIMT 2**
Students deepen basic skills in operating and programming computer-controlled machine tools. Laboratory instruction simulates intermediate-level work in an industrial environment. The student's work is held to ISO-referenced standards for dimensional and geometric accuracy. Safety in the operation and programming of automated machines is an integral part of the course. (0813-205, 231; corequisite: 0813-252) **Class 1, Lab 8, Credit 4 (F)**

0813-233 **CIMT 3**
Students develop advanced skills in programming computer-controlled machine tools. A progressively more difficult series of projects sets the pace of the course. Laboratory instruction continues to simulate an industrial environment; student work is held to ISO-referenced standards for dimensional and geometric accuracy. Safety in the operation and programming of automated machines is an integral part of the course. (0813-232, 252; corequisite: 0813-254) **Class 1, Lab 8, Credit 4 (W)**

0813-234 **CIMT 4**
Students continue to develop advanced skills in programming computer-controlled machine tools. The most challenging projects of the CIMT series are presented in this course. Laboratory instruction simulates the atmosphere of the demanding industrial environment. Student work is rigorously held to ISO-referenced standards for dimensional and geometric accuracy. Safety work habits for programming, set-up and operation of automated machines are an integral part of the course. (0813-233, 254; corequisite: 0813-242 or 0813-257) **Class 1, Lab 8, Credit 4 (S)**

0813-239 **Blueprint Reading**
Students develop the skills necessary to read and interpret engineering drawings of details and assemblies. (0884-180) **Class 1, Lab 3, Credit 2 (S)**

0813-241 **Advanced Blueprint Reading**
Students develop the skills necessary to read and interpret prints of engineering drawings of details and assemblies. (0813-239) **Class 1, Lab 3, Credit 2 (W)**

0813-242 **Optical Testing**
In this course, students learn techniques used for testing spherical surfaces, flats, and prisms. Topics include measurement of surface quality, focal length, power, irregularity, angle of deviation, basic interferometry, fringe analysis, and lens aberrations. Specific measuring techniques and instruments include auto collimation, distance object, laser two-beam, spherometers, micrometers, Ronchi testers, and test plating. (0813-255, corequisite: 0813-234) **Lab 6, Credit 3 (S)**

0813-244 **Precision Optics Manufacturing I**
In this course students learn and apply basic optical principles used in conventional manufacturing of precision optical flat elements. Procedures and techniques include blocking, rough bench grinding, double-sided lapping/grinding, polishing, deblocking, and centering. Students practice and apply appropriate handling and visual inspection techniques. (0813-239, 255) **Lab 6, Credit 2 (S)**

0813-245 **Precision Optics Manufacturing II**
This course is the second in a sequence of courses in which students learn to apply basic principles of conventional and CNC manufacturing of optical elements. The emphasis in this course will be on the production of simple convex and concave spherical elements. Procedures and techniques include curve generating, blocking, rough and fine grinding, stick polishing, deblocking, and centering. Students practice and apply appropriate handling and visual inspection techniques. (0813-244) **Lab 12, Credit 6 (F)**

0813-250 **Introduction to Computer Numerical Control**
Students develop basic knowledge in principles, concepts and terminology of computer numerical controlled machining (CNC). Students review CNC history, development and applications and learn basic programming formats and techniques. (0813-222) **Class 1, Lab 2, Credit 2 (S)**

0813-251 **Industrial Materials**
Introduction to the many materials used in industry and the reasons why the final cost of producing a part is influenced by material selection. Metals, plastics and ceramics are covered from the perspectives of physical, mechanical and dimensional properties. (0813-231) **Class 3, Credit 3 (F)**

0813-252 **CNC Graphics**
Students develop basic skills in programming CNC machine tools. Laboratory instruction simulates an industrial environment; student work is held to ISO-referenced standards for dimensional and geometric accuracy. Safety in the operation of automated machines is an integral part of the course. (0813-231, 250; corequisite: 0813-232) **Lab 6, Credit 3 (F)**

0813-254 **CNC Solids**
Students develop skills in using solid modeling techniques to program CNC machine tools. Laboratory instruction simulates an industrial environment; student work is held to ISO-referenced standards for dimensional and geometric accuracy. Safety in the operation of automated machines is an integral part of the course. (0813-232, 252; corequisite: 0813-233) **Lab 6, Credit 3 (W)**

0813-255 **Precision Measurement**
Students develop the skills necessary to measure to the highest tolerances commonly used in industry. They measure parts or groups of parts using industrial methods and equipment. Analysis of measurements and problem solving are stressed. **Class 1, Lab 3, Credit 2 (S)**

0813-257 **CNC Toolpaths**
Students develop skills in creating, editing and verifying toolpaths; copying and pasting parameters, toolpaths and tool associative geometry; and modifying geometry and machining parameters to update toolpaths. Laboratory instruction simulates an industrial environment; student work is held to ISO referenced standards for dimensional and geometric accuracy. Safety in the operation of automated machines is an integral part of the course. (0813-233, 254; corequisite: 0813-234) **Lab 6, Credit 3 (S)**

0813-258 **Automated Machining**
Students continue to develop advanced skills in programming computer-controlled machine tools. Projects involve the production of fixtures and planning for short- and long-run production. Laboratory instruction simulates an industrial environment; student work is held to ISO-referenced standards for dimensional and geometric accuracy. Safety in the operation of automated machines is an integral part of the course. (0813-234, 257, 299) **Lab 12, Credit 6 (F)**

0813-299 **Co-op: Computer Integrated Machining Technology**
Credit 0 (Su)

0813-398 **Special Topics:**
Computer Integrated Machining Technology
Credit variable (W)

0813-399 **Independent Study:**
Computer Integrated Machining Technology
Credit variable (W)

Deaf Cultural Studies

Deaf cultural studies/American Sign Language courses also satisfy social sciences and humanities requirements as noted. C-level courses or above satisfy the AOS requirement.

Fundamental (Level B)

0880-190 **Introduction to Deaf Cultural Studies and ASL**
Introduces students to major concepts and issues in the field of Deaf Cultural Studies. The course integrates the fields of history, anthropology, linguistics, creative arts and literature as they apply to Deaf culture and the Deaf community. The course is designed to foster students' active participation as a means of developing strong leadership and advocacy skills among NTID students. After completing this course, students will be able to pursue specific areas of interest within the deaf cultural studies/ASL program. (ACT arts/literature reading score 1-4 or permission of instructor) **Class 3, Credit 3 (F, W)**

0881-166 **Sign Mime and Creative Movement**
Focuses on the dominant historical form of expression used by theaters of the Deaf. Topics include principles for effective use of space, creative movement strategies and expression of original ideas in sign-mime. This course satisfies the deaf cultural studies/ASL requirement. (ACT arts/literature reading score 1-4 or permission of instructor) **Class 3, Credit 3 (F, W)**

0886-199 **American Sign Language I***
Designed for deaf and hard-of-hearing NTID students who have no previous knowledge of American Sign Language. ASL I includes the linguistic features, cultural protocols and core vocabulary for students to function in basic ASL conversations: ASL grammar for asking and answering questions while introducing oneself; exchanging personal information; talking about family, friends and surroundings; and discussing activities. Classroom and lab activities include practicing conversations and videotaping. (SIPI/LCBQ:1; NTID supported students or permission of instructor) **Class 4, Credit 4 (F, W)**

Intermediate (Level C)

0880-207 **Organizational Communication and the Deaf Employee*†‡**
Examines interpersonal and small group communications in organizational settings in today's corporate climate, with emphasis on important aspects of communication for deaf individuals entering a professional career. Students become familiar with the business environments of large and small companies and the implication of company size regarding personnel decisions. Case studies from selected corporations provide insights into elements of communication processes such as networks (electronic and non-electronic), organizational structures, managerial decision making, interviewing, organizational development and conflict resolution. Companies' perspectives on hiring culturally and ethnically diverse individuals and deaf individuals are discussed. Laws, such as ADA, related to the hiring and support of disabled workers are addressed. (Qualified to enter an AOS program or permission of instructor) **Class 3, Credit 3 (F, W, S)**

*This course satisfies the Deaf Cultural Studies/American Sign Language requirement.

†This course satisfies the humanities requirement.

‡This course satisfies the social sciences requirement.

0880-247 **Deaf Art/Deaf Artists*†**
Examines art works and artists' statements, goals and intentions. The artwork and the statements of artists are examined to determine if the artists focus on being deaf as the subject of their art or if the focus of their art is related to Deaf issues or other subjects. By examining these connections and influences and comparing the varieties of choices artists have made, a definition of Deaf Art is developed. From the readings and reviews, students develop a list of issues that lead to identification of a person as a Deaf artist or an artist who is deaf. The question of what is culture and what is art is examined, and comparisons to cultural groups are made. An in-depth analysis of Deaf View/Image Art (De'VIA) will be conducted, and parallels will be drawn to other disenfranchised groups' artwork. Furthermore, students will create their own self-portrait using De'VIA themes and/or motifs. **Class 3, Credit 3 (F, S)**

0881-204 **Deaf Theater History*†**
Examines the Deaf experience in theater and the roles that deaf people have played in theater history. Particular attention is given to the documented achievements of individuals and companies in the 19th and 20th centuries. This course satisfies the deaf cultural studies/ASL requirement. (ACT arts/literature reading score 5-7 or permission of instructor; 0881-202 or 0882-221) **Class 3, Credit 3 (W)**

0882-221 **Deaf Heritage*‡**
The course will examine the lives of deaf people throughout history, particularly during critical events such as revolutions, wars, the Great Depression and into the modern era with legislative acts that have led to significant changes in education and employment. Simultaneously, the formation of the Deaf community and Deaf culture will be studied to illustrate the meaning of "Deaf heritage." Hard-of-hearing and late-deafened individuals involved in the Deaf community will be included, and racial, ethnic and gender issues will be discussed as they relate to this heritage. Students learn how technology has impacted the lives of deaf people, as have local, state and national organizations of the deaf. The achievements of many deaf people in a variety of fields will underscore self-identity and self-advocacy issues. (0882-200) **Class 3, Credit 3 (F, W, S)**

0882-222 **Deaf Culture and Community*‡**
Introduces students to aspects of Deaf culture and community around the world. The distinction between these is reviewed, and characteristics of each are identified. Students learn about the language, norms of behavior, values, traditions and possessions of deaf people. Deaf culture and community are analyzed from a historical and sociological perspective. Cross-cultural issues relating to the role of hearing people with the Deaf community are also covered. (0882-200 or permission of instructor) **Class 3, Credit 3 (W)**

0882-223 **Deaf Women's Studies*‡**
This course provides a historical review of deaf women in their professional and personal lives. The issues covered in this course include the exploration of the social, political and economic conditions affecting deaf women and how this compares to other women in society. Hard-of-hearing and late-deafened women and ethnic/minority women with hearing loss are included in this course. Students will be able to summarize trends from the social/political analysis and apply their learning to their own personal development and empowerment. (0882-200 or permission of instructor) **Class 3, Credit 3 (F, S)**

0882-245 **Deaf People and the Holocaust*‡**
The study of cultural, economic and political history is an important part of social sciences as it broadens our understanding of the events in present times. Events leading up to World War II and the Nazi Final Solution will be examined. The eugenics movement towards preventing life, terminating unborn life and exterminating "useless eaters" will be explored in understanding how the Nazis implemented their doctrine and mechanisms to the "final solution." Lives of Deaf people during the Nazi regime will be investigated. The course will explore the implications of Nazi laws that restricted the rights and lives of "undesirable people;" i.e., the disabled, gays and lesbians, Jehovah's Witnesses, communists, Romi (gypsies), Jewish people, and particularly deaf people. (0882-200 or permission of the instructor) **Class 3, Credit 3 (W)**

0886-200 **American Sign Language II†**
Designed for deaf and hard-of-hearing NTID students. This course expands the basic principles presented in ASL I. The course teaches students to use linguistic features, cultural protocols and core vocabulary to function in additional basic ASL conversations, including ASL grammar, for giving directions; describing others; making requests; talking about family, occupations and routines; and attributing qualities to others. Classroom and lab activities include practicing conversations and videotaping. (0886-199 or equivalent; NTID supported students or permission of instructor) **Class 4, Credit 4 (F, W, S)**

0886-201 **American Sign Language III*†**
Designed for deaf and hard-of-hearing NTID students. This course is a continuation of ASL II, expanding the emphasis on ASL grammar, syntax, spatial referencing and vocabulary development. ASL III teaches further communicative competencies in ASL conversations beyond the basic level that include telling life events, describing events in time, asking for clarification, correcting, conforming, elaborating on information, agreeing and disagreeing, resolving conflicts and giving directions. Classroom and lab activities include practicing dialogues, short stories, narratives and short conversations. (0886-200 or equivalent) **Class 4, Credit 4 (W, S)**

0886-249 **Structure of American Sign Language*†**
Provides students with basic knowledge about the linguistic structure of American Sign Language (ASL). Through an introduction to language components, students examine the phonology, morphology and syntax of ASL. Information regarding historical and cultural aspects of ASL is also introduced and discussed. This course is taught in ASL. **Class 3, Credit 3 (W, S)**

Bridging (Level D)

0881-219 **Creative Translation for Stage*†**
Focuses on different translation forms used by theater, mime and dance companies. Students learn to distinguish between English and American Sign Language (ASL). They translate stories, poems and plays into ASL and other sign languages. Theatrical integrity dealing with translation issues and visual access is a central goal. (ACT arts/literature reading score 8-10 or permission of instructor; 0881-210 or 256) **Class 3, Credit 3 (S)**

0882-285 **Civil Rights and Deaf People*‡**
Reviews the history of oppressed groups in the United States and their struggle for equality. Parallels will be drawn between various groups with a focus on deaf people. Patterns of oppression and empowerment will be compared and contrasted for black Americans, Native Americans, women, lesbians and gays, and deaf people. Specific strategies and techniques employed to gain civil rights are covered. Court cases are reviewed and discussed. (ACT social studies/science reading score 9-11 or permission of instructor) **Class 3, Credit 3 (W, S)**

0886-250 **Introduction to ASL Teaching*†**
Provides overview of how second languages have traditionally been taught, what the current methods and theories are, and their applications to the teaching of sign language. Students are provided opportunities to practice basic teaching techniques, select appropriate materials, and learn basic curriculum design and evaluation techniques, including how to teach cultural and grammatical features in lessons. Students learn about resources to support their efforts to teach sign language. **Class 3, Credit 3 (S)**

English

Introductory (Level A)

0883-102 **English A I**
This is the first course in a two-course developmental sequence in which students work on the reading and writing skills necessary for all degree programs at NTID. Students develop the English language knowledge, reading comprehension strategies and written language skills included in Nonfiction Reading I and Academic Writing I. Students also learn strategies for integrating the use of reading and writing. Upon successful completion of this two-course sequence, students continue their academic reading and writing skill development in Nonfiction Reading II and Academic Writing II courses. (NTID Reading Test score below 80 and NTID Writing Test score below 40) **Class 5, Credit 5 (F)**

0883-103 **English A II**
This is the second course in a two-course developmental sequence in which students work on the reading and writing skills necessary for all degree programs at NTID. Students develop the English language knowledge, reading comprehension strategies and written language skills included in Nonfiction Reading I and Academic Writing I. Students also learn strategies for integrating the use of reading and writing. Upon successful completion of this two-course sequence, students continue their academic reading and writing skill development in Nonfiction Reading II and Academic Writing II courses. (NTID Reading Test score below 80, NTID Writing Test score below 40 and 0883-102) **Class 5, Credit 5 (W)**

*This course satisfies the Deaf Cultural Studies/American Sign Language requirement.

†This course satisfies the humanities requirement.

‡This course satisfies the social sciences requirement.

Fundamental (Level B)

0883-112 **English B I**
This is the first course in a three-course developmental English language sequence at the second level offered at NTID in which students work on reading and writing skills necessary for AOS programs at NTID. General topics in science and humanities provide the context in which students review the basic constituents of English sentences, begin to develop skills for comprehending and using complex sentences, increase their English content word vocabulary to about 5000 words, learn to use independent reading strategies, and develop skills for writing paragraphs and longer compositions. Upon successful completion of this course, students will continue their reading and writing skill development in English B-II (0883-113). (Completion of English A-II, 0883-103, or NTID Reading Test score from 80 to 97 and NTID Writing Test score from 40 to 59) **Class 4, Credit 4 (F,W,S)**

0883-113 **English B II**
This is the second course in a three-course developmental English language sequence at the second level offered at NTID for students who begin with reading skills higher than those in English B-I or have completed English B-I. Students work on reading and writing skills necessary for AOS programs at NTID. General topics in science and humanities provide the context in which students use the skills included in English B-I, develop skills for comprehending and using additional complex sentence elements, increase their content word vocabulary to about 6000 words, learn to use additional independent reading strategies, and develop skills for writing paragraphs and longer compositions. Upon successful completion of this course, students will continue their reading and writing skill development in English B-III (0883-114). (Completion of English B-I, 0883-112, or NTID Writing Test score from 40 to 49 and NTID Reading Test score above 98 to 124) **Class 4, Credit 4 (F, W, S)**

0883-114 **English B III**
This is the third course in a three-course developmental English language sequence at the second level offered at NTID for students who have completed English B-II. Students continue to work on reading and writing skills necessary for AOS programs at NTID. General topics in science and humanities provide the context in which students use the skills included in English B-II, develop skills for comprehending and using additional complex English sentence elements, increase their content word vocabulary to about 7000 words, begin to evaluate reading tasks to select appropriate reading strategies, and expand their skills for writing paragraphs and longer compositions. Upon successful completion of this course, AOS students will continue their reading and writing skill development in Career English courses. (Completion of English B-II, 0883-113) **Class 4, Credit 4 (F,W, S)**

Intermediate (Level C)

0883-212 **Career English I**
This is the first course in a three-course sequence. It is designed to develop reading, writing, grammar, and vocabulary skills that students need for AOS course work and for the work environment. The reading and writing components are thoroughly integrated with approximately equal time being devoted to each. Grammar and vocabulary are thoroughly integrated into the reading and writing components. Course content includes general and technical articles, memorandums, letters, electronic communication, directions, work-related forms, and short reports. (The three NTID level-B courses.) **Class 4, Credit 4 (F, W, S)**

0883-213 **Career English II**
This is the second course in a three-course sequence. It is designed to improve reading, writing, grammar, and vocabulary skills that students need for AOS course work and for the work environment. The reading and writing components are thoroughly integrated with approximately equal time being devoted to each. Grammar and vocabulary are thoroughly integrated into the reading and writing components. Course content includes general and technical articles, memorandums, letters, electronic communication, directions, work-related forms, and short reports. (Career English I 0883-212) **Class 4, Credit 4 (F, W, S)**

0883-214 **Career English III**
This is the third and final course in a three-course sequence. It is designed to refine reading, writing, grammar, and vocabulary skills that students need for AOS course work and for the work environment. The reading and writing components are thoroughly integrated with approximately equal time being devoted to each. Grammar and vocabulary are thoroughly integrated into the reading and writing components. Course content includes general and technical articles, memorandums, letters, electronic communication, directions, work-related forms, and short reports. (Career English II 0883-213) **Class 4, Credit 4 (F, W, S)**

0883-221 **Intensive English I**
Intensive English I (0883-221) is the first course in a series of five which are offered in one academic year. This course, as with all of the others in the sequence, uses a thematic approach to reading and writing. Throughout the year, attention is focused on many aspects of English—reading, writing, grammar, and vocabulary. At the end of this sequence of courses, students will have the skills necessary to successfully place in Written Communication I or II. To progress to the next courses in the series (0883-222 and 0883-223), students must complete course with a grade of C or better. Students may not repeat any Intensive English course. **Class 4, Credit 4 (F, S)**

0883-222 **Intensive English II**
Intensive English II (0883-222) is the second course in a series of five courses which are offered in one academic year and is taken in the same quarter as Intensive English III (0883-223). Throughout the year, attention is focused on many aspects of English—reading, writing, grammar, and vocabulary. At the end of this sequence of courses students will have the skills necessary to successfully place in Written Communication I or II. To progress to the next courses in the series (0883-224 and 0883-225), students must complete this course with a grade of C or better. Students may not repeat any Intensive English course. Each Intensive English course must be taken in conjunction with its corequisite course. (0883-221 with grade of C or better; corequisite: 0883-223) **Class 4, Credit 4 (F, W)**

0883-223 **Intensive English III**
Intensive English III (0883-223) is the third course in a series of five courses offered in one academic year and is taken in the same quarter as Intensive English II (0883-222). Like the other courses in the sequence, Intensive English III uses a thematic approach to reading and writing. These courses focus on many parts of English—grammar, writing, reading and vocabulary. At the end of this sequence of courses, students will have the skills necessary to successfully enter Written Communication I or II. To progress to the next courses in the series (0883-224 and 0883-225), students must complete this course with a grade of C or better. Students may not repeat any Intensive English course. Each Intensive English course must be taken in conjunction with its corequisite course. (0883-221 with grade of C or better; corequisite: 0883-222) **Class 4, Credit 4 (F, W)**

0883-224 **Intensive English IV**
Intensive English IV is the fourth course in a series of five courses offered in one academic year and is taken in the same quarter as Intensive English V (0883-225). Like the other courses in the sequence, Intensive English IV uses a thematic approach to reading and writing. These courses focus on many parts of English: grammar, writing, reading, and vocabulary. At the end of this sequence of courses, students will have the skills necessary to enter Written Communication I or II and be successful. Learning how these topics function in texts will help students become better readers as well as better writers. To progress to the next course (0502-110 or 0502-111) students must complete this course with a grade of C or better. Students may not repeat any Intensive English course. Each Intensive English course must be taken in conjunction with its corequisite course. (0883-222 and 0883-223 with grades of C or better; corequisite: 0883-225) **Class 4, Credit 4 (W, S)**

0883-225 **Intensive English V**
Intensive English V is the fifth course in a series of five courses offered in one academic year and is taken in the same quarter as Intensive English IV (0883-224). Like the other courses in the sequence, Intensive English V uses a thematic approach to reading and writing. These courses focus on many parts of English: grammar, writing, reading, and vocabulary. At the end of this sequence of courses, students will have the skills necessary to enter Written Communication I or II and be successful. Learning how these topics function in texts will help students become better readers as well as better writers. To progress to the next course (0502-110 or 0502-111) students must complete this course with a grade of C or better. Students may not repeat any Intensive English course. Each Intensive English course must be taken in conjunction with its corequisite course. (0883-222 and 0883-223 with grades of C or better; corequisite: 0883-224) **Class 4, Credit 4 (W, S)**

Bridging (Level D)

0883-250 **Themes and Symbols in Literature**
Students with experience in literary analysis will apply their knowledge and ability to independently comprehend literary works in preparation for entry to College of Liberal Arts literature course work. Students will effectively report in writing the results of such activities as individual literary analyses, critiquing and research study. In addition, students will examine the multicultural voices and views expressed through literature. (ACT arts/literature reading score 8–9 or 0883-200 or permission of instructor) **Class 4, Credit 4 (F, W)**

0883-260 **Nonfiction Reading IV**
In this developmental course, students learn and practice the reading comprehension skills and English language skills necessary to increase their comprehension of nonfiction reading materials required for success in AAS and higher degree programs at NTID and RIT. (NTID Reading Test score between 125 and 143 or grade C or higher in 0883-210) **Class 4, Credit 4 (F, W, S)**

0883-261 **Academic Writing IV**
In this developmental course, students learn and practice the writing skills necessary for College of Liberal Arts writing courses. Students gather information from various sources, plan, draft, revise and edit longer essays (of at least 500 words) of various discourse types, with particular emphasis on description and exemplification. Students learn how to organize and develop their texts for various topics, purposes and audiences. Students also learn how to revise, edit and present texts according to the conventions, format and mechanics expected by the discourse community for which they write. (NTID Writing Test Score between 60 and 67 or grade C or higher in 0883-211) **Class 4, Credit 4 (F, W, S)**

0883-398 **Special Topics: English**
Credit variable (F, W, S)

0883-399 **Independent Study: English**
Credit variable (F, W, S)

Humanities

The humanities distribution requirement can also be satisfied by completing courses in American Sign Language, communication studies, deaf cultural studies, and performing arts. See courses listed under these headings. C-level courses satisfy the AOS requirement. Humanities courses may also satisfy the deaf cultural studies/American Sign Language requirement as noted.

Fundamental (Level B)

0880-185 **Perspectives on Literature and the Arts**
Students are introduced to basic concepts and terminology in the study of the humanities (visual and performing arts, history, and philosophy) through a variety of literary works presented in English and/or American Sign Language (short story, storytelling, novel excerpts, drama, film, poetry, and ASL literature). Students will learn about the nature of intellectual/academic inquiry and questions asked within these disciplines. (ACT Arts Literature Reading scores 1–4) **Class 3, Credit 3 (S)**

0880-190 **Introduction to Deaf Cultural Studies and ASL***
Introduces students to major concepts and issues in the field of Deaf Cultural Studies. The course integrates the fields of history, anthropology, linguistics, creative arts and literature as they apply to Deaf culture and the Deaf community. The course is designed to foster students' active participation as a means of developing strong leadership and advocacy skills among NTID students. After completing this course, students will be able to pursue specific areas of interest within the deaf cultural studies/ASL program. (ACT Arts/literature reading score 1–4 or permission of instructor). **Class 3, Credit 3 (F, W)**

Intermediate (Level C)

0880-230 **The American Past: An Introduction to the History of the United States**
Provides an overview of United States history beginning in 1607 and continuing through the 20th century. The course introduces students to issues, ideas and people influential in shaping our country's past. It focuses on major political, economic and social developments as well as contributions and perspectives of diverse cultural groups. The course increases students' knowledge of American history and prepares them for further history courses. (ACT arts/literature reading score 5–7 or permission of instructor) **Class 3, Credit 3 (F)**

0880-235 **Diversity and Identity in Literature**
This course is for students who are familiar with basic literary analysis and are ready to engage in activities that enhance skills in identifying themes, exploring personal values, investigating cultural diversity, summarizing plots, and recognizing accepted literary works and authors commonly found in the literary and Deaf cultural cannon. Students will discuss the relevance of literary works to their own life experiences and search for identity. Deaf literature classics are used as foundational materials for comparisons to English structures, as well as comparisons pertaining to literary styles. (ACT Arts/Literature Reading score 5–7 or permission of instructor) **Class 3, Credit 3 (F, S)**

*This course satisfies the Deaf Cultural Studies/American Sign Language requirement.

0880-240 **The Big Questions: An Introduction to Philosophy**
Surveys the quest to understand humanity's place in the world and the significance of the human experience. Starting with the Greeks and sampling major contributions of the great philosophers, this course explores how and why the great questions were asked. (ACT arts/literature reading score 5-7 or 0880-180 or permission of instructor) **Class 3, Credit 3 (W, S)**

0880-247 **Deaf Art/Deaf Artists***
Examines art works and artists' statements, goals and intentions. The artwork and the statements of artists are examined to determine if the artists focus on being deaf as the subject of their art or if the focus of their art is related to Deaf issues or other subjects. By examining these connections and influences and comparing the varieties of choices artists have made, a definition of Deaf Art is developed. From the readings and reviews, students develop a list of issues that lead to identification of a person as a Deaf artist or an artist who is deaf. The question of what is culture and what is art is examined, and comparisons to cultural groups are made. An in-depth analysis of Deaf View/Image Art (De'VIA) will be conducted, and parallels will be drawn to other disenfranchised groups' artwork. Furthermore, students will create their own self-portrait using De'VIA themes and/or motifs. **Class 3, Credit 3 (F, S)**

Bridging (Level D)

0880-294 **Capstone: Explorations in Social Responsibility**
Social and economic forces of modern life drive us to hold on to what we have, while working hard for personal advancement in an increasingly competitive world. Amidst this struggle to be the best that we can be, what is our responsibility to others? Students begin by looking at personal goals and needs, then seeing how each of us is linked to family, neighbor, community, global society, and people from diverse cultures, lifestyles, and life circumstances. Students undertake civic engagement, working in teams to research and propose solutions to a community problem or issue. Teams develop and communicate proposed solution(s) in presentations and supporting documentation, using the knowledge and competencies each student brings from his or her major. Critical thinking, problem solving, and appropriate communication skills are emphasized. (Students must be within two quarters of graduation with an AOS or AAS.) **Class 3, Credit 3 (F, W, S)**

Laboratory Science Technology

0879-200 **Introduction to Laboratory Science Technology**
This course introduces students to the laboratory science technology (LST) program's curriculum, content, entry requirements, graduation requirements and employment options. Topics will also include an introduction to historical and current issues in the field of laboratory testing, concepts of analytical testing, basic laboratory applications and fundamental technical skills used in the laboratory. **Class 1, Lab 2, Credit 2 (F)**

0879-201 **Laboratory Science Technology:
Laboratory Applications I**
This is the first of a six-course sequence that focuses on the application of laboratory tools, techniques and procedures. Each course builds on the knowledge and skills developed in previous laboratory applications courses. This introductory course establishes an expectation of high performance and introduces the concepts of lab protocols and standards. Course topics include laboratory safety, laboratory notebooks and information management, scientific reference and information sources, the identification and use of laboratory equipment and glassware, and maintaining a laboratory environment. This course integrates and reinforces information learned in previous and concurrent technical courses. Students begin to organize a laboratory science technology portfolio. (0879-200) **Class 1, Lab 2, Credit 2 (W)**

0879-202 **Laboratory Science Technology:
Laboratory Applications II**
This is the second of a six-course sequence that focuses on the application of laboratory tools, techniques and procedures. This course continues to reinforce an expectation of high performance and introduces concepts surrounding quality control. Course topics also include the analytical process, laboratory organizational set-up, chain-of-custody and record keeping and computer skills related to the field. This course integrates and reinforces information learned in previous and concurrent technical courses. A laboratory science technology portfolio will continue to be developed. (0879-201) **Class 1, Lab 2, Credit 2 (S)**

0879-203 **Laboratory Science Technology:
Laboratory Applications III**
This is the third of a six-course sequence that focuses on the application of laboratory tools, techniques and procedures. Course topics include regulations governing laboratory environments, following written technical procedures and monitoring and reporting as applied to the sampling, testing and disposal of substances. Students also synthesize information learned in previous and concurrent courses by participating in job-related simulations. A laboratory science technology portfolio will continue to be developed. (0879-202) **Class 1, Lab 2, Credit 2 (F)**

0879-204 **Laboratory Science Technology:
Laboratory Applications IV**
This is the fourth of a six-course sequence that focuses on the application of laboratory tools, techniques and procedures. Course topics include laboratory information management systems (LIMS), technical writing and the reporting and presentation of scientific information. Students also synthesize information learned in previous and concurrent courses by participating in job-related simulations. A laboratory science technology portfolio will continue to be developed. (0879-203) **Class 1, Lab 2, Credit 2 (W)**

0879-205 **Laboratory Science Technology:
Lab Applications V**
This is the fifth of a six-course sequence that focuses on the application of laboratory tools, techniques and procedures. Professional and ethical behavior standards in the science laboratory environment are central to this course. Qualities of valued team members and their contribution to the overall performance of the laboratory are introduced, practiced and critiqued. This course also serves as a final mechanism for co-op preparation. This course integrates and reinforces information learned in previous and concurrent technical courses. A laboratory science technology portfolio will continue to be developed. (0879-204) **Class 1, Lab 2, Credit 2 (S)**

0879-206 **Laboratory Science Technology:
Lab Applications VI**
This is the sixth of a six-course sequence that focuses on the application of laboratory tools, techniques and procedures. The goal of this course is to work on individual student needs related to the reinforcement of knowledge and skill areas identified in co-op evaluations as requiring more effort. This course integrates and reinforces information learned in previous and concurrent technical courses. Students finalize a laboratory science technology portfolio. (0879-205; corequisite: 0879-250) **Class 1, Lab 2, Credit 2 (F)**

0879-218 **Introduction to
Laboratory Science Technology Microbiology**
This general microbiology course includes basic concepts for the evaluation of bacteria, virus, fungi (molds and yeast), algae and protozoa. Students learn laboratory procedures in the collection of samples; selection of media; techniques in sterilization; asepsis; staining, cultural, microscopic, biochemical and molecular identification; and antimicrobial susceptibility. The students develop knowledge of the processes microorganisms are responsible for that are vital to our lives. (0885-215; corequisite: 0885-205) **Class 2, Lab 3, Credit 3 (W)**

0879-241 **Laboratory Science Technology Microbiology**
This microbiology course focuses on concepts related to microorganisms common in the fields of laboratory science. The emphasis is on the major families of microorganisms that are important in food processing, preservation, distribution, utilization and public health. Students will study the organisms' roles in ecology, recycling and biogeochemical cycles and the testing procedures for microbes in water, air, soil, sewage and the pathogens that affect humans. Students will develop knowledge and skills in the collection of samples, identification procedures and in understanding the laws related to public health and sanitation. (0885-205; 0879-218; corequisite: 0885-206) **Class 3, Lab 3, Credit 4 (S)**

0879-250 **Laboratory Science Technology: Senior Seminar**
This course provides a forum in which peers, faculty and professionals discuss current topics and careers in the field of laboratory testing. Students also have an opportunity to synthesize their cooperative work experience with previous course experiences. Additional topics include communications, literature sources in the field and the importance of professional societies and federal/state/local agencies. (0879-299) **Class 2, Credit 2 (F)**

0879-280 **Sampling and Testing Soils and Groundwater**
Students begin to learn about soil and groundwater and how it is contaminated. Content includes vocabulary, origin, identification, classification, characteristics, and methods for sampling and testing. Students use standard references and classifications. (0879-321 or 0879-311) **Class 3, Lab 3, Credit 4 (F, S)**

**This course satisfies the Deaf Cultural Studies/American Sign Language requirement.*

0879-299 **Co-op: Laboratory Science Technology**
This 10-week, full-time experience gives students matriculated in the laboratory science technology (LST) program a practical sampling of working in the laboratory testing field. Students will work under the supervision of qualified professionals, performing a variety of tasks pertaining to the field. As part of this experience, students complete a student evaluation form. This experience must be satisfactorily completed before graduation. **Credit 0 (Su)**

0879-301 **Instrumental Analysis I**
In this course students learn and apply basic concepts and principles of analytical testing using laboratory instruments, instrumentation theory and procedures. Concepts surrounding spectroscopy and electroanalytical methods of analysis are presented. Techniques including sample preparation, instrumentation set-up and maintenance, calibration, precision measurement, safety, and data collection and analysis are introduced. Selected instrumentation presented in this course includes analytical balances, electroanalytical meters and probes, and atomic and molecular spectrophotometers. (0879-202, 0885-206, 0884-231) **Class 2, Lab 3, Credit 3 (F)**

0879-302 **Instrumental Analysis II**
In this course students learn and apply advanced concepts and principles in analytical testing using sophisticated laboratory instruments, instrumentation theory and procedures. Concepts surrounding chromatography methods of analysis are presented. Techniques including sample preparation, instrumentation set-up and maintenance, calibration, precision measurement, safety, and data collection and analysis are introduced. Selected instrumentation presented in this course includes liquid and gas chromatography, mass spectrometry and electrophoresis. (0879-203, 301, 0885-291, 0884-232) **Class 2, Lab 3, Credit 3 (W)**

0879-303 **Instrumental Analysis III**
In this course students learn and apply advanced concepts and principles in analytical testing using sophisticated laboratory instruments, instrumentation theory and procedures. Concepts related to advanced and automated methods of instrumental analysis are presented. Techniques including sample preparation, instrumentation set-up and maintenance, calibration, precision measurement, safety, and data collection and analysis are introduced and reinforced. Selected procedures presented in this course include advanced techniques in atomic and molecular spectroscopy, liquid and gas chromatography, mass spectrometry, and automated and computer-based instrumentation. (0879-204, 302, 0885-292) **Class 3, Lab 3, Credit 4 (W)**

0879-311 **Food Laboratory Science**
This course prepares students to follow standard protocols to perform laboratory procedures commonly used in the food industry. Product analysis includes testing for protein and moisture. Emphasis is on precise and accurate data collection, data analysis and presentation, and practicing laboratory information management systems (LIMS). Federal regulations governing the food industry are examined and applied. Additional topics related to prepared foods and food additives are presented. (0879-301, 0885-291, 0884-231) **Class 3, Lab 3, Credit 4 (W)**

0879-313 **Chemical Technology**
This course prepares students to perform industry-specific applications of chemical analysis. Standard methods, operating procedures and protocols are introduced and reinforced. Sampling, testing and reporting in the fields of environmental, industrial, forensic, pharmaceutical and food testing are covered. Instrumental, volumetric and gravimetric techniques are practiced as they relate to the fields of chemical technology. (0879-203, 301, 0885-291, 0884-232, or permission of department) **Class 3, Lab 3, Credit 4 (W)**

0879-314 **Biotechnology**
This course prepares students to perform biotechnical applications in industry-specific fields of analysis. Standard methods, operating procedures and protocols are introduced and reinforced. Sampling, testing and reporting in the field of biotechnology are covered. (0879-204, 218, 302, 0885-215, 292, or permission of department) **Class 3, Lab 3, Credit 4 (S)**

0879-321 **Environmental Laboratory Science I**
This course prepares students to follow standard protocols to perform laboratory procedures commonly used in environmental laboratories. Standard sampling and testing methods are introduced and practiced; e.g., gravimetric analysis, pH applications and chemical analysis using spectrophotometry. Emphasis is on precise and accurate data collection, data analysis and presentation, and practicing laboratory information management systems (LIMS). Federal regulations governing sampling and testing procedures are examined and applied. Additional topics related to quality control schemes, regulatory protocols and protocols governing sample collection are presented. (0879-301, 0884-232, 0885-291) **Class 3, Lab 3, Credit 4 (W)**

0879-322 **Environmental Laboratory Science II**
This course prepares students to follow standard protocols to perform laboratory procedures commonly used in environmental laboratories. A continuation of standard sampling and testing methods are presented and practiced; e.g., chemical analysis using atomic absorption, chromatography techniques and mass spectrometry. Emphasis is on precise and accurate data collection, data analysis and presentation, and practicing laboratory information management systems (LIMS). Federal regulations governing sampling and testing procedures are examined and applied. Additional topics related to quality control schemes, regulatory protocols and protocols governing sample collection are presented. (0879-302, 321, 0885-292) **Class 3, Lab 3, Credit 4 (S)**

0879-341 **Applied Microbiology**
This course builds on concepts of microbiology in the fields of laboratory science with an emphasis on food-borne pathogens and environmental pathogens in water, air and soil and current methods for detecting, isolating and identifying microorganisms. Students study food and industrial fermentation with a focus on biotechnology and genetic engineering as it applies to agriculture, manufacture of food ingredients and bioremediation or decomposition of materials and pollution. Students develop knowledge and skills in the technology and instrumentation used in testing laboratories and in industrial applications according to the standards set by the regulating agencies. (0879-241, 303 and 0879-311 or 0879-312) **Class 3, Lab 3, Credit 4 (F)**

0879-398 **Special Topics: Laboratory Science Technology**
Credit variable (F, W, S)

0879-399 **Independent Study: Laboratory Science Technology**
Credit variable (F, W, S)

Mathematics

Introductory (Level A)

0884-120 **Preparation for Algebra**
This course is designed for students with no significant algebra experience. Topics include signed numbers, an introduction to variables and modeling, work with solving simple equations, introductions to the coordinate plane, and interpreting and displaying data. Estimation, calculator use and language are emphasized and problem solving stressed. (0884-100 or equivalent) **Class/Lab 5, Credit 4 (F, W)**

Fundamental (Level B)

0884-150 **Concepts of Measurement**
Explores the mathematical concepts involving linear measurement, proportion and percent through the use of examples from printing, photo/media and applied art. (0884-100 or equivalent) **Class 4, Credit 3 (W)**

0884-155 **Mathematics Applications for the Business Technologies**
This course explores concepts in mathematics and basic algebra, as they relate to applications in business. (0884-100 or equivalent) **Class 3, Lab 1, Credit 3 (W)**

0884-180 **Foundations of Algebra**
Introductory algebra course consisting of a lecture and a lab component in which the basics of evaluating algebraic expressions, solving linear equations and inequalities and graphing linear functions are studied. Technology, in particular the graphing calculator, is an integral part of the learning and problem solving in this course. To progress to 0884-210 or 0884-212, student must pass 0884-180 with a grade of C or better. (0884-120) **Class 3, Lab 2, Credit 4 (F, W, S)**

Intermediate (Level C)

0884-205 **Trigonometry for Coordinate Analysis I**
Students will study right-angle trigonometry with an emphasis on concepts and applications related to computer integrated machining technology (CIMT) and computer aided drafting technology (CADT). Topics include Pythagorean Theorem, trigonometric ratios in right triangles, coordinate geometry calculations, circle properties, tapers and bevels, V-blocks, dovetails and angle cuts. Development of numerical and geometric estimation and interpretation of visual data is emphasized. (0884-180) **Class 2, Lab 2, Credit 3 (S)**

0884-206 **Trigonometry for Coordinate Analysis II**
This course is a continuation of Trigonometry for Coordinate Analysis I and continues the development of problem solving using right-angle trigonometry with an emphasis on concepts and applications related to computer integrated machining technology (CIMT). Topics include complex machine applications, compound angles, slots and pockets, irregular-shaped grooves, Law of Sines, Law of Cosines, and 3-D coordinate geometry. (0884-205) **Class 2, Lab 2, Credit 3 (F)**

0884-210 **Applications of Algebra**
An intermediate algebra course consisting of a lecture and a lab component in which exponents, rational expressions, polynomials, roots and radicals, and non-linear functions are studied. Technology, in particular the graphing calculator, is an integral part of the learning and problem solving in this course. Students may not take both 0884-210 and 0884-212 for credit without permission of the department. To progress to 0884-260 student must pass 0884-210 with a grade of C or better. (0884-180 with grade of C or better) **Class 3, Lab 2, Credit 4 (F, W, S)**

0884-212 **Integrated Algebra**
An intermediate algebra course consisting of a lecture and a lab component in which non-linear functions and graphs, systems of linear equations, exponents, polynomials, roots, radicals and properties of the complex numbers are considered. There is significant emphasis on scientific and geometric models, as well as the use of a variety of graphing utilities. Integrated algebra is recommended for students enrolled in applied computer technology, lab science technology, computer aided drafting technology and automation technologies programs as well as for students preparing for baccalaureate programs in science, engineering and computer-related fields. Students may not take both 0884-210 and 0884-212 for credit without permission of the department. To progress to 0884-275, student must pass 0884-212 with a grade of C or better. (0884-180, with a grade of C or better) **Class 3, Lab 2, Credit 4 (F,W,S)**

0884-220 **Elements of Trigonometry**
This course includes topics from trigonometry with an emphasis on the study of right and oblique triangles, rotational angles, trigonometric functions and their graphs. An introduction to trigonometric identities is also provided. (0884-212) **Class 3, Lab 2, Credit 4 (F, W, S)**

0884-231 **Laboratory Mathematics I**
This course addresses classic laboratory calculations and elementary descriptive statistics in the context of modern information technology and computing power. Use of hand-held calculators and computer spreadsheet software to exchange, analyze and chart electronically-stored data is a central focus. Study is closely coordinated with work in associated technical courses. Application areas encountered in this course may include basic gas laws, preparation and dilution of solutions, and analysis of chemical composition. (0884-212 or permission of department) **Class 2, Lab 2, Credit 3 (S)**

0884-232 **Laboratory Mathematics II**
This course continues study of computations relating to laboratory procedures in the context of modern information technology and computing power. Emphasis is on the capture and analysis of realistic laboratory data and the preparation of formal reports. Topics studied include the use of statistical procedures in quality control. (0884-231) **Class 2, Lab 2, Credit 3 (F)**

Bridging (Level D)

0884-250 **Preparation for Statistics**
An introductory statistics course consisting of a lecture and a lab component in which statistics concepts, elements of probability and probability distributions, and bivariate data are studied. The course emphasizes number sense and algebraic concepts as they relate to statistics and probability. Technology, in particular the graphing calculator, is an integral part of the learning and problem solving in this course. (0884-210 with a grade of C or better and Written Communication II (0502-111)) **Class 3, Lab 2, Credit 4 (S)**

0884-260 **Explorations in College Algebra**
Students will study topics from algebra with an emphasis on functions and graphs. Topics include the algebra of functions and the study of inverse functions. Rational, radical, exponential and logarithmic functions and systems of linear equations are also studied. Exploration of mathematical concepts through use of a graphing calculator is an integral feature of the course. Students may not take both 0884-260 and 0884-275 for credit without permission of the department. (0884-210 with a grade of C or better) **Class 3, Lab 2, Credit 4 (F, W, S)**

0884-275 **Advanced Mathematics**
Topics from precalculus mathematics are studied with an emphasis on functions and graphs. Topics include the algebra of functions and the study of inverse functions. Exploration of mathematical concepts through the use of a graphing calculator is an integral feature of the course. Students may not take both 0884-260 and 0884-275 for credit without permission of the department. (0884-212 with a grade of C or better, and 0884-220) **Class 3, Lab 2, Credit 4 (F, W, S)**

0884-290 **Concepts of Calculus**
Explores topics traditionally encountered in a first calculus course. Limits, continuity and the derived function are studied. A graphing calculator is used extensively to develop concepts and to aid in problem solving. (0884-275) **Class 4, Credit 4 (F)**

0884-398 **Special Topics: Mathematics**
Credit variable (F, W, S)

0884-399 **Independent Study: Mathematics**
Credit variable (F, W, S)

Performing Arts

Fundamental (Level B)

0881-166 **Sign Mime and Creative Movement***
Focuses on the dominant historical form of expression used by theaters of the Deaf. Topics include principles for effective use of space, creative movement strategies and expression of original ideas in sign-mime. This course satisfies the deaf cultural studies/ASL requirement. (ACT arts/literature reading score 1-4 or permission of instructor) **Class 3, Credit 3 (F, W)**

0881-167 **Dance Performance**
Provides an introduction to dance that gives students access to the language as well as the fundamental movements of dance. The styles and technique of Martha Graham (contraction) and José Limon (fall and rebound) are explored. Ensemble work, performance standards and creation of character and theme are stressed. This course counts as one course towards the wellness activity graduation requirement. (ACT arts/literature reading score 1-4 or permission of instructor) **Class 3, Credit 3 (W)**

0881-168 **Jazz**
Provides students with a wider range of dance vocabulary, which is created from ballet, modern dance and ethnic dance traditions. The styles of Bob Fosse and the fall and rebound style of José Limon are a basis for this course. This course counts as one course towards the wellness activity graduation requirement. (ACT arts/literature reading score 1-4 or permission of instructor) **Class 3, Credit 3 (F, S)**

Intermediate (Level C)

0881-202 **History of Theater†**
Examines theater from its early origins in primitive societies to contemporary types of theater and issues in dramatic presentation. The role of theater in society and in a variety of cultures is examined with particular attention to the role of deaf performers, directors and play creators in specific historical periods. (ACT arts/literature reading score 5-7 or permission of instructor) **Class 3, Credit 3 (W)**

0881-204 **Deaf Theater History*†**
Examines the Deaf experience in theater and the roles that deaf people have played in theater history. Particular attention is given to the documented achievements of individuals and companies in the 19th and 20th centuries. This course satisfies the deaf cultural studies/ASL requirement. (ACT arts/literature reading score 5-7 or permission of instructor; 0881-202 or 0882-221) **Class 3, Credit 3 (W)**

0881-210 **Acting II†**
Covers fundamental vocabulary for developing the actor's craft, process and technique. The vocabulary is Stanislavsky-based and explored through improvisation and simple monologue work. This course is crucial for character development, which is the core of Acting II. (ACT arts/literature reading score 5-7 or permission of instructor) **Class 3, Credit 3 (F, W)**

*This course satisfies the Deaf Cultural Studies/American Sign Language requirement.

†This course satisfies the humanities requirement.

0881-217 **Stage Combatt**
Explores fundamentals of safe stage combat historically, analytically and physically. Focus is on physical scene work related to hand-to hand combat, with some stage fencing. Falls, tumbling, punches, kicks and the eight basic positions for single rapier engagement are included. A final scene is created from classroom vocabulary and evaluated as part of the final exam. This course counts as one course towards the wellness activity graduation requirement. (ACT arts/literature reading score 5-7 or permission of instructor) **Class 3, Credit 3 (offered biennially)**

0881-218 **Dance History†**
Examines early examples of dance in Western and non-Western societies, initially as a form of religious and dramatic expression. Development of ethnic styles; formalization of ballet in France, England and Russia; the evolution of modern dance; and the role of dance in visual theater are explored. (ACT arts/literature reading score 5-7 or permission of instructor) **Class 3, Credit 3 (S)**

0881-222 **Scenic Technology I†**
Provides hands-on exploration of basic construction techniques utilized in theater productions. Students gain an understanding of scenic construction methods and technology as well as the safe and proper use of equipment. Readings on the production process and formal critiques are also required. (ACT arts/literature reading score 5-7 or permission of instructor) **Class 3, Credit 3 (W, S)**

0881-223 **Scenic Technology II†**
This project-oriented class focuses on methods, materials, rigging and props. Students use and apply the skills learned in Scenic Technology I to individual projects. The course allows students the opportunity to work with more advanced materials. This course prepares students for more specialized work in the theater practicum. (ACT arts/literature reading score 5-7 or permission of instructor; 0881-222) **Class 3, Credit 3 (W, S)**

0881-224 **Scene Painting†**
Provides an introduction to the craft of scene painting. Techniques, communication with designers and use of appropriate materials and tools are emphasized. (ACT arts/literature reading score 5-7 or permission of instructor) **Class 3, Credit 3 (E, W, S)**

0881-231 **Costume Technology I†**
Provides hands-on exploration of basic costume techniques utilized in theater. Students gain an understanding of costume construction techniques, research and terminology as well as the role of the costume shop in the production process. (ACT arts/literature reading score 5-7 or permission of instructor) **Class 3, Credit 3 (W)**

0881-232 **Costume Technology II†**
Advanced course in costume construction develops students' sewing skills, problem solving and knowledge of costume history. The course prepares students for design courses, application of skills to a historical garment and costume assistantship through theater practicum. (ACT arts/literature reading score 5-7 or permission of instructor; 0881-231) **Class 3, Credit 3 (W)**

0881-233 **Stage Make-up†**
Introductory course explores basic stage make-up techniques (e.g., corrective, aging, gender change, scarring, bruising, and fantasy). Student designers and actors learn through demonstration and hands-on experience. The course prepares students for theater practicum and running crew. (ACT arts/literature reading score 5-7 or permission of instructor) **Class 3, Credit 3 (E, S)**

0881-241 **Lighting Technology I†**
Teaches the basic understanding of lighting software, equipment and practices that are utilized in theater production. This course prepares students for supervised practicum experience. (ACT arts/literature reading score 5-7 or permission of instructor) **Class 3, Credit 3 (E, W)**

0881-242 **Lighting Technology II†**
Introduces the student to the mechanics and guidelines of lighting design. The structure of this course is designed to take the student through the step-by-step process of building a solid design foundation prerequisite to all lighting design application. (ACT arts/literature reading score 5-7 or permission of instructor; 0881-241 or permission of instructor) **Class 3, Credit 3 (W)**

Bridging (Level D)

0881-250 **Introduction to Performing Arts†**
Studies the characteristics and elements of theater/performing arts, emphasizing the principles that have guided theater productions through history. The course examines the ways that theater influences and is influenced by cultures and by individual life experience. Particular attention is paid to the development of performing arts by and for deaf persons. This course satisfies part of the humanities requirement. (ACT arts/literature reading score 8-10 or permission of instructor) **Class 3, Credit 3 (E, W)**

0881-253 **Arts Management†**
Addresses the skills required to manage artistic/theatrical projects and programs while maintaining artistic vision. Topics include the relationship of art and management, communication skills, fundraising in private and public sectors, and marketing strategies. (ACT arts/literature reading score 8-10 or permission of instructor) **Class 3, Credit 3 (offered biennially)**

0881-256 **Script Analysis†**
Explores the prominent questions an actor/dancer/designer must research before and during the time a text can develop into playable action. The course uses texts from world literature, American Sign Language literature and dance choreography. Particular attention is paid to the physical, emotional and mental actions a character reveals to his/her audience. (ACT arts/literature reading score 8-10 or permission of instructor) **Class 3, Credit 3 (S)**

0881-257 **Introduction to Dramatic Literature†**
Introduces students to the play script as literature, genres of dramatic literature, critical periods in the development of dramatic literature and the use of analytical literary vocabulary. (ACT arts/literature reading score 8-10 or permission of instructor) **Class 3, Credit 3 (W)**

0881-258 **Introduction to Play Creating†**
Uses a workshop approach to explore what being a playwright/play creator means. Class topics include exploring each writer's values and points of view, bringing those viewpoints to life on the stage, developing rounded characters, structuring action, creating dialogue and taking a play through workshop critique. The goals of the course for each student are to develop a more finely tuned theatrical sensitivity and to have a playable scene, act, or one-act play by the end of the quarter. These plays may be scripted in English, American Sign Language or visual theater systems. (ACT arts/literature score 8-10 or permission of instructor) **Class 3, Credit 3 (S)**

0881-259 **Creative Translation for Stage††**
Focuses on different translation forms used by theater, mime and dance companies. Students learn to distinguish between English and American Sign Language (ASL). They translate stories, poems and plays into ASL and other sign languages. Theatrical integrity dealing with translation issues and visual access is a central goal. (ACT arts/literature reading score 8-10 or permission of instructor; 0881-210 or 0881-256) **Class 3, Credit 3 (S)**

0881-260 **Acting III†**
Covers vocabulary for developing the actor's craft, process and technique related to basic scene-study and character development. The work is Stanislavsky-based. Improvisation and scene work focus on characterization and engaging conflict. (ACT arts/literature reading score 8-10 or permission of instructor; 0881-210 or audition with instructor) **Class 3, Credit 3 (W, S)**

0881-261 **Audition Technique†**
Emphasizes preparation for career research. Major topics include interviewing, portfolio, résumé, photo selection, monologue repertoire development and cold reading. (ACT arts/literature reading score 8-10 or permission of instructor; 0881-210, 260 or permission of instructor) **Class 3, Credit 3 (offered biennially)**

0881-266 **Ballet†**
Introduces the art of ballet, its vocabulary (French, Sign and English), discipline base, protocols and specific movements. Students are introduced to key concepts through lecture demonstration; video; and floor, center and barre work. This course counts as one course towards the wellness activity graduation requirement. (ACT arts/literature reading score 8-10 or permission of instructor) **Class 3, Credit 3 (F)**

0881-267 **Fundamentals of Choreography†**
This course explores the freedom and discipline that balance the art of choreography. Visualization and notation systems are studied. Students are required to both choreograph for student ensembles and perform in original works of other students in the class. (ACT arts/literature reading score 8-10 or permission of instructor; 0881-218, 266 or permission of instructor) **Class 3, Credit 3 (W)**

*This course satisfies the Deaf Cultural Studies/American Sign Language requirement.

†This course satisfies the humanities requirement.

0881-272 **Stage Management†**
Advanced course designed to train stage managers. Leadership and organizational skills are developed in relation to rehearsal schedules, production meetings and performance. Projects include setting up and understanding the use of the stage manager's prompt book. The course also addresses the protocols of dealing with designers, actors, directors and crew members as well as the rehearsal process and calling the cues for the run of the show. This is a required course for stage managing any of the college's/department's main stage shows. (ACT arts/literature reading score 8–10 or permission of instructor) **Class 3, Credit 3 (W, offered biennially)**

0881-298 **Theater Practicum†**
Applies technical, performing, script analysis, stage management and other skills to an actual production. Students contract with a faculty mentor for responsibilities and the appropriate credit expectations. **Class 1–6, Credit 1–6 (F, W, S)**

0881-398 **Special Topics: Performing Arts**
Credit variable (F, W, S)

0881-399 **Independent Study: Performing Arts**
Credit variable (F, W, S)

Pre-baccalaureate Studies

0853-200 **Freshman Seminar**
Provides entering pre-baccalaureate and baccalaureate students with opportunities to enhance academic, personal and social skills needed for success in the mainstream college environment. Students have opportunities to explore and negotiate the college environment, learn how to effectively use support services, confront questions of identity and social role, and establish relationships with faculty and students in their program. Emphasizes integration into the academic and social systems of both the NTID community and the mainstream college environment. **Class 3, Credit 2 (F)**

0853-399 **Independent Study: Science/Engineering Support**
This course is designed to help students evaluate their strengths and weaknesses and to improve their learning efficiency and effectiveness through training in the application of appropriate learning strategies. Students have the opportunity to improve their learning skills in time management and test taking. Activities include individual conferences based on instruction presented through online interactive materials and a workbook. **Class variable, Credit variable (W, S)**

Science

Fundamental (Level B)

0885-151 **Processes of Science: Astronomy**
Covers introductory science processes using the content of astronomy as a vehicle to establish an appreciation of the scientific method, critical thinking and problem solving. The basic processes of observing, classifying, comparing and measuring using metric units are addressed in both class and laboratory using the concepts of astronomy. **Class 2, Lab 2, Credit 3 (S)**

0885-153 **Processes of Science: Environmental Studies**
Covers introductory science processes using the content of environmental studies as a vehicle to establish an appreciation of the scientific method, critical thinking and problem solving. The basic processes of observing, classifying, comparing and measuring using metric units are addressed in both class and laboratory using the concepts of environmental studies. **Class 2, Lab 2, Credit 3 (F, W)**

0885-154 **Processes of Science: Physics of Matter**
This course focuses on introductory science processes using the content of physical properties of matter as a vehicle to establish an appreciation of the processes of science. The basic processes of observing, collecting data, classifying, comparing, analyzing and forming hypotheses will be addressed using the concepts of physics. (0884-180 or equivalent) **Class 2, Lab 2, Credit 3 (F, W)**

0885-155 **Processes of Science: Biological Studies**
This course focuses on introductory science processes using the content of biological studies as a vehicle to establish an appreciation of the processes of science. The basic processes of observing, collecting data, classifying, comparing, analyzing and forming hypotheses will be addressed using the concepts of biology. Students will investigate microorganisms, metabolism, nutrition, physiology and embryology and prepare laboratory reports with appropriate detail and accuracy. **Class 2, Lab 2, Credit 3 (F, W)**

†This course satisfies the humanities requirement.

0885-156 **Processes of Science: Forensics**
This course focuses on introductory science processes using the content of forensic studies as a vehicle to establish an appreciation of the processes of science. The basic processes of observing, collecting data, classifying, comparing, analyzing and forming hypotheses will be addressed using the concepts of forensics. Students will analyze crime scenes, perform tests on blood, fingerprints, chemicals and DNA and prepare laboratory reports with appropriate detail and accuracy. **Class 2, Lab 2, Credit 3 (F, W)**

Intermediate (Level C)

0885-200 **Applied Optical Physics**
Studies light, reflection and refraction. These principles are applied to the study of the behavior of spherical and plano mirrors, prisms and lenses. The usefulness and application of dioptric power, the lens maker's equation, image and object dimensions and focal-length measurements are addressed. Also included is study of the electromagnetic spectrum. Emphasis is on geometrical (ray) optics. Includes a comprehensive laboratory experience that supplements and closely follows classroom instruction. (0884-180 or permission of department) **Class 4, Lab 1, Credit 4 (W)**

0885-201 **Physics I**
Physics I is designed to provide a broad background in general physics. Required for students entering NTID engineering technology programs. Students are provided with hands-on laboratory experience in a supervised setting. Topics, which are presented in a lecture/lab format, include kinematics and dynamics, Newton's Laws of Motion, forces, analysis of vectors. (Permission of department) **Class 4, Lab 1, Credit 4 (W, S)**

0885-205 **Fundamentals of Chemistry I**
This course is an introduction to the fundamental theories and principles of chemistry governing the structure and behavior of matter at the atomic and molecular levels. The language of chemistry, including nomenclature, chemical reactions and equations, is introduced as well as the computational strategies used in chemistry. Basic laboratory skills and techniques are used to investigate chemical components. Activities focus on precision and accuracy in the collection of data. Chemical hygiene and safety procedures in the laboratory are emphasized. **Class 3, Lab 3, Credit 4 (W)**

0885-206 **Fundamentals of Chemistry II**
This course is the continuation of an introduction to the fundamental theories and principles of chemistry governing the structure and behavior of matter at the atomic and molecular levels. Topics include stoichiometry, solution chemistry, electrolytes, acid/base and redox theories. Computational and laboratory skills and techniques related to solution chemistry, including application in concentration expressions, acid/base and redox, are presented. Activities focus on precision and accuracy in the collection of data and sample tracking. Chemical hygiene and safety procedures in the laboratory are emphasized. **Class 3, Lab 3, Credit 4 (W)**

0885-215 **Fundamentals of Cellular Biology**
This course provides students with the fundamentals of cellular biology on the molecular level. Principles governing chemical components of cells, cellular processes and molecular genetics are introduced. Methods used to record and present data and write formal lab reports are emphasized. Laboratory activities complement classroom activities. **Class 3, Lab 3, Credit 4 (F)**

0885-216 **Fundamentals of Human Biology**
Provides students with the fundamentals of human biology, beginning with organization at the tissue level. Body systems and their interrelationships are presented on a structural, functional and homeostatic level. Skills necessary for success in future science courses will be emphasized. Laboratory activities, including the use of prepared specimens, complement classroom activities. (0885-215) **Class 3, Lab 3, Credit 4 (W)**

Bridging (Level D)

0885-251 **Biological Concepts I**
Develops and/or enhances knowledge and skills necessary for success in a college-level general biology course. Themes include chemistry in living systems, movement through membranes, macromolecules, metabolism and enzymes. Laboratory activities complement each theme. (Permission of instructor) **Class 3, Lab 3, Credit 4 (F, S)**

0885-252

Biological Concepts II

Develops and/or enhances knowledge and skills necessary for success in a college-level general biology course. Themes include molecular genetics, microevolution, cell functions, cell nutrition and regulation of homeostasis. Laboratory activities complement each theme. Successful completion of Biological Concepts I (0885-251) is suggested but not required. (0885-251 or permission of instructor) **Class 3, Lab 3, Credit 4 (W)**

0885-270

Concepts of College Physics

This is an introductory algebra-based physics course focusing on mechanics. It is designed to develop and enhance knowledge and skills necessary for success in college-level physics courses. Topics covered will include uncertainty, propagation of error, significant figures, unit conversion, translational motion in one and two dimensions, circular motion, kinematics and dynamics (both translational and angular), torque, and angular motion. (0884-220, 275) **Class 2, Lab 4, Credit 4 (W, S)**

0885-281

Human Genetics and Evolution

Introduces basic human genetics, basic human evolution and the relationship between 21st century discoveries in genetics and current human evolution dogma. The history of scientific discovery in both fields is paired with a study of current concepts in molecular biology, and bridges between genetics and evolution are explored. This presentation/discussion/laboratory course includes topics in human reproductive history, cytology, embryology, molecular biology of the gene, the origin of life, human origins, heredity, genetic variations, population genetics, biotechnology, and Old World and New World evolutionary theory. (Permission of instructor) **Class 3, Lab 3, Credit 4 (F)**

0885-282

Scientific Basis of Social Responsibility

Interactive course designed to provide students with both tools and confidence to become more literate in the sciences. Students select and analyze contemporary social issues and/or problems with a basis in science utilizing basic processes of scientific inquiry. Sample topics include the following: infectious disease processes; traditional vs. alternative medicine; biogenetics; lifestyle; euthanasia; environmental resources and management; world population trends; and stem cell research. Following a definition of the issue/problem, students formulate research questions and share their collective findings. They then complete weekly topic summaries that articulate their positions. Topic-related laboratory exercises and community interactions provide hands-on lab opportunities to experience contemporary science and technology. (Permission of instructor) **Class 3, Lab 3, Credit 4 (S)**

0885-283

Developmental Human Anatomy and Physiology

Introduces basic human development and maturation from a multidisciplinary perspective. In this course, the fields of human anatomy and physiology are merged with developmental psychology for the purpose of examining the human life cycle from a holistic perspective. Changes that take place in the structure and function of the human body are studied over nine stages of the human life span. Concurrently, psychological and cognitive development are discussed, beginning with conception and ending with death processes. (Permission of instructor) **Class 3, Lab 3, Credit 4 (W)**

0885-291

Principles of Analytical Chemistry

This course introduces quantitative analysis utilizing both gravimetric and volumetric techniques. Topics include the evaluation of analytical data, gravimetric analysis, acid/base and redox titrations. Chemical hygiene and safety procedures in the laboratory are emphasized. (0885-206 or equivalent, 0884-231) **Class 3, Lab 3, Credit 4 (F)**

0885-292

Principles of Organic Chemistry

This course provides an introduction to the principles of organic chemistry. Topics include structure, nomenclature and properties of organic molecules. Concepts surrounding carbon chemistry and bonding, functional groups and polymers are also presented. Investigations involving data collection and qualitative and quantitative analyses provide a framework for laboratory activities. Chemical hygiene and safety procedures in the laboratory are emphasized. (0885-205 or equivalent, 0884-231) **Class 3, Lab 3, Credit 4 (W)**

0885-398

Special Topics: Science

Credit variable (F, W, S)

0885-399

Independent Study: Science

Credit variable (F, W, S)

Social Sciences

The social sciences distribution requirement can also be satisfied by completing courses in communication studies. See courses listed under this heading. C-level courses satisfy the AOS requirement. Social sciences courses may also satisfy the deaf cultural studies/American Sign Language requirement as noted.

Intermediate (Level C)

0882-200

Introduction to Social Sciences

This course is intended to explore the understanding of human behavior and everyday life using important concepts from social sciences. This course covers the fields of psychology, sociology and political science. Materials from anthropology and economics may be used as well. The course focuses on the application of the social sciences to the study of business, art, education, government and other areas of interest. (ACT social studies/science reading score 6-8) **Class 3, Credit 3 (F, W, S)**

0882-205

The Changing American Family

Students are introduced to basic concepts and terminology in the study of the evolving American family from its Judeo-Christian roots to its multi-cultural reality in the 21st century. Students will learn about the nature of the family unit, the contributions of its members to the family organization, and the family's contribution to society. (0882-200 or permission of instructor) **Class 3, Credit 3 (F, W, S)**

0882-210

The Black Experience

This course helps students pursuing an AOS, AAS, or BS degree gain an understanding of the experiences of black people in America. This course offers a historical perspective of black people from their origins in Africa to their settlement in America. This perspective includes the period of slavery, the reconstruction period, the civil rights struggle and modern race relations among black people (hearing and deaf) and other groups in America. (0882-200 or permission of instructor) **Class 3, Credit 3 (S)**

0882-215

Current Social Problems

Studies social issues that impact individuals who live in the United States and Canada. Important issues covered include cultural pluralism, the inequity among various ethnic and racial groups, and public and political policies. These social issues are related to the global environment, health care and family. Special consideration is given to how these issues impact the Deaf community. (0882-200 or permission of instructor) **Class 3, Credit 3 (W, S)**

0882-221

Deaf Heritage*

The course will examine the lives of deaf people throughout history, particularly during critical events such as revolutions, wars, the Great Depression, and into the modern era with legislative acts that have led to significant changes in education and employment. Simultaneously, the formation of the Deaf community and Deaf culture will be studied to illustrate the meaning of "Deaf heritage." Hard-of-hearing and late-deafened individuals involved in the Deaf community will be included, and racial, ethnic and gender issues will be discussed as they relate to this heritage. Students learn how technology has impacted the lives of Deaf people, as have local, state and national organizations of the Deaf. The achievements of many deaf people in a variety of fields will underscore self-identity and self-advocacy issues. (0882-200) **Class 3, Credit 3 (F, W, S)**

0882-222

Deaf Culture and Community*

Introduces students to aspects of Deaf culture and community around the world. The distinction between these is reviewed, and characteristics of each are identified. Students learn about the language, norms of behavior, values, traditions and possessions of Deaf people. Deaf culture and community are analyzed from a historical and sociological perspective. Cross-cultural issues relating to the role of hearing people with the Deaf community are also covered. (0882-200 or permission of instructor) **Class 3, Credit 3 (W)**

0882-223

Deaf Women's Studies*

This course provides a historical review of deaf women in their professional and personal lives. The issues covered in this course include the exploration of the social, political and economic conditions affecting deaf women and how this compares to other women in society. Hard-of-hearing and late-deafened women and ethnic/minority women with hearing loss are included in this course. Students will be able to summarize trends from the social/political analysis and apply their learning to their own personal development and empowerment. (0882-200 or permission of instructor) **Class 3, Credit 3 (F, S)**

*This course satisfies the Deaf Cultural Studies/American Sign Language requirement.

0882-235 **Individual and Social Identity**
Provides an introduction to examining social constructs and perspectives in a broad spectrum of experiences related to race, ethnicity, gender, class, religion, age, sexuality, disability and other cultural identities. This course also focuses on analysis of diversity within groups as well as the multiple interactions between them. Students develop an understanding of how the power and complexities inherent in groups influence individual, as well as group, identity. (0882-200 or permission of instructor) **Class 3, Credit 3 (W, S)**

0882-242 **Law and Society**
This course introduces students to general issues regarding the American legal system, jurisprudence and the responsibilities of free society and individual citizens of that society. The course provides an overview of the historical aspects of the American constitution, legislative intent of law making and how laws are made and interpreted at the local, state and federal levels. The course explores the roles of lawyers and other practitioners within the legal system and specifically addresses situations with criminal law, juvenile justice, tort law, consumer and mercantile laws, family law, and individual rights and liberties. (0882-220 or permission of instructor) **Class 3, Credit 3 (F, W, S)**

0882-245 **Deaf People and the Holocaust***
The study of cultural, economic and political history is an important part of social sciences as it broadens our understanding of the events in present times. Events leading up to World War II and the Nazi Final Solution will be examined. The eugenics movement towards preventing life, terminating unborn life and exterminating "useless eaters" will be explored in understanding how the Nazis implemented their doctrine and mechanisms to the "final solution." Lives of Deaf people during the Nazi regime will be investigated. The course will explore the implications of Nazi laws that restricted the rights and lives of "undesirable people;" i.e., the disabled, gays and lesbians, Jehovah's Witnesses, communists, Romi (gypsies), Jewish people, and particularly deaf people. (0882-200 or permission of the instructor) **Class 3, Credit 3 (W)**

Bridging (Level D)

0882-285 **Civil Rights and Deaf People***
Reviews the history of oppressed groups in the United States and their struggle for equality. Parallels will be drawn between various groups with a focus on deaf people. Patterns of oppression and empowerment will be compared and contrasted for Black Americans, Native Americans, women, lesbians and gays, and deaf people. Specific strategies and techniques employed to gain civil rights are covered. Court cases are reviewed and discussed. (ACT social studies/science reading score 9-11 or permission of instructor) **Class 3, Credit 3 (W, S)**

0882-297 **Capstone: Society and Technology**
In today's global society, we face challenges of seemingly epic proportions... but with problems come solutions, often in the form of innovative technology or policy. In this course, students will draw on their previous studies to address a specific problem related to their majors. Students will review and internalize a general research "process" (with emphasis on critical thinking and problem solving skills) in order to produce and effectively communicate a "product" in the form of a presentation with supporting documentation. This course will explore topics with a broad focus on corporations, communities, government or society. Students will also explore their personal values and beliefs on these global issues, with the goal of applying them to their work environments. (Students must be within two quarters of graduation with the AOS or AAS degree.) **Class 3, Credit 3 (F, W, S)**

0882-398 **Special Topics: Social Sciences**
Credit variable (F, W, S)

0882-399 **Independent Study: Social Sciences**
Credit variable (F, W, S)

**This course satisfies the Deaf Cultural Studies/American Sign Language requirement.*

College of Science

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Course numbering: RIT courses are generally referred to by their seven-digit registration number. The first two digits refer to the college offering the course. The third and fourth digits identify the discipline within the college. The final three digits are unique to each course and identify whether the course is noncredit (less than 099), lower division (100–399), upper division (400–699), or graduate level (700 and above).

Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's schedule of courses, published by the Office of the Registrar. Prerequisites/corequisites are noted in parentheses near the end of the course description.

Biological Sciences

1001-201 **General Biology I**
A study of the characteristics and origin of life; basic principles of modern cellular biology, including cell organelle structure; chemical basis and functions of life, including enzyme systems, cellular respiration and photosynthesis; nutrient procurement in plants and animals. (High school biology and chemistry) **Class 3, Credit 3 (F, Su)**

1001-202 **General Biology II**
A study of the physiological processes of gas exchange, internal transport, osmoregulation, excretion and hormonal control in plants and animals; nervous system and behavior in animals. (1001-201 or permission of instructor) **Class 3, Credit 3 (W, Su)**

1001-203 **General Biology III**
A study of cellular and organismal reproduction, the principles of genetics and developmental biology, and an introduction to evolution and ecology. (1001-202 or permission of instructor) **Class 3, Credit 3 (S, Su)**

1001-205 **General Biology Laboratory I**
Laboratory work to complement the lecture material of General Biology (1001-201). The experiments are designed to illustrate concepts; develop laboratory skills and techniques; and improve ability to make, record and interpret observations. (Corequisite 1001-201) **Lab 3, Credit 1 (F, Su)**

1001-206 **General Biology Laboratory II**
Laboratory work to complement the lecture material of general biology (1001-202). The experiments are designed to illustrate concepts, develop laboratory skills and techniques, and improve ability to make, record and interpret observations. (Corequisite 1001-202) **Lab 3, Credit 1 (W, Su)**

1001-207 **General Biology Laboratory III**
Laboratory work to complement the lecture material of general biology (1001-203). The experiments are designed to illustrate concepts, develop laboratory skills and techniques, and improve ability to make, record and interpret observations. (Corequisite 1001-203) **Lab 3, Credit 1 (S, Su)**

1001-251 **Introduction to Biology I**
A study of the chemical basis of life, including biologically important molecules, the structure and function of cells, the inheritance of genetic traits, and control of the expression of genes. The course emphasizes an evolutionary perspective and the integration of different levels of biological organization. Lab consists of two multi-week projects in which teams of students apply biological information and laboratory techniques in real-world applications. (High school biology and chemistry; biological sciences program major; or permission of instructor) **Class 3, Lab 3, Credit 4 (F)**

1001-252 **Introduction to Biology II**
A study of archaea, bacteria, viruses, protists, and plants that emphasizes the value of an evolutionary approach in biomedicine, bioinformatics, and biotechnology. Lab consists of two multi-week projects in which teams of students expand on basic studies of real world biological problems to develop their own hypotheses and design experiments to test them. (Above Sections 1-5 FOR SBIB, SBIF, SBIC & SBIF majors only) (Biological sciences program major and 1001 251, or permission of instructor) **Class 3, Lab 3, Credit 4 (W)**

1001-253 **Introduction to Biology III**
A study of animal physiology, behavior, and ecology that explores the relationship between structure and function from an evolutionary perspective with emphasis on the application of basic biological information. Lab includes a project that is selected and carried out by teams of students and culminates in a poster session in the final week of the quarter. (Biological Sciences program major and 1001-252, or permission of instructor) **Class 3, Lab 3, Credit 4 (S)**

1001-260 **Introduction to Bioinformatics**
This course is intended to provide an overview of bioinformatics for those who are either curious about what this exciting field entails or about whether bioinformatics represents a sound career path. Pursuant to this goal we will touch upon many subjects but will not explore any one in particular detail. Nevertheless, suggestions are welcome from anyone regarding projects to pursue outside of class in order to gain a deeper understanding of any aspect of bioinformatics that appeals to a personal interest. **Class 2, Credit 2 (F)**

1001-265 **Unix Under the Hood**
This course will explore Unix from a practical standpoint in order to either prepare students for further studies of computer science or to simply increase their appreciation of this pervasive operating system. Students from any department are welcome to take this course. **Class 2, Credit 2 (F)**

1001-280 **Laboratory Teaching Experience**
This course provides qualified undergraduate students the opportunity to gain experience in a laboratory instructional setting under the direct guidance of a faculty member. Students are required to prepare and present pre-lab discussions, assist in the design and set up of labs, answer enrolled-student questions, and perform lab demonstrations and other associated duties and responsibilities. (Contact faculty member for specific eligibility criteria.) **Class 0, Lab 3, Credit 1 (F, W, S)**

1001-289 **Independent Study**
Faculty-directed study of appropriate topics on a tutorial basis. Enables an individual to pursue studies of existing knowledge in the literature. (One year of Introductory Biology or equivalent) **Class variable, Credit variable (F, W, S, Su)**

1001-291 **Biological Science Research**
Faculty-directed research projects involving field or laboratory work including data collection and analysis. (Permission of instructor) **Class variable (F, W, S, Su)**

1001-292 **Biological Science Research**
Continuation of faculty-directed research projects involving field or laboratory work including data collection and analysis initiated in 1001-291. (1001-291 and permission of instructor) **Class variable (F, W, S, Su)**

1001-293 **Biological Science Research**
Continuation of faculty-directed research projects involving field or laboratory work including data collection and analysis initiated in 1001-291 and continued in 1001-292. (1001-292 and permission of instructor) **Class variable (F, W, S, Su)**

1001-302 **Vertebrate Zoology**
A study of the morphology, physiology, behavior, classification and ecology of chordates. (One year of introductory biology or equivalent or permission of instructor) **Class 3, Lab 3, Credit 4 (F)**

- 1001-307** **Perl for Bioinformatics**
This is an introductory course in Perl scripting language and its applications to biological data. The use of Perl for processing sequence data, managing a variety of biological data types, and providing effective web and graphical interfaces to existing tools for analysis of these data will be investigated. (4003-231, 4003-232 or equivalent) **Class 2, Credit 2 (S)**
- 1001-308** **Biology of Plants**
This course will focus on aspects of plant anatomy and diversity and their impact on plant physiology. Adaptations to the environment and biotechnological approaches to unraveling the physiology of plants will be explored. A feature of this course will be discussion groups on plant topics from the popular scientific literature- e.g. Biofuels, Bioengineered Plants. The laboratory classes will follow the lectures closely, with an emphasis on hands-on exploration. Elements of garden design and planting are also covered in the laboratory classes. (One year of introductory biology or equivalent, 1001-350) or permission of instructor. **Class 3, Lab 3, Credit 4 (F)**
- 1001-311** **Cell Biology**
Principles of cell biology including internal cell structure, cell cycle and growth control, cell interactions, cell differentiation and the extracellular matrix with an emphasis on the observations and experimental evidence supporting them. (One year of introductory biology or equivalent) **Class 4, Credit 4 (F, W)**
- 1001-314** **Tissue Culture**
Study of the techniques and applications of culturing eukaryotic cells, tissues and organs in vitro. Emphasis is on mammalian systems. Lectures will cover the historical background of tissue culture, how to authenticate cell lines, basic cell culture techniques as well as stem cells, tissue engineering, and the role of cell culture in regenerative medicine. In laboratory, students will be introduced to growth curves, cloning techniques, primary cell culture, making a cell line as well as detecting mycoplasma and other cell culture contaminants. (One year of introductory biology or equivalent) **Class 3, Lab 4, Credit 5 (W)**
- 1001-315** **Hybridoma Techniques**
This course is designed to acquaint each student with the basic methods employed in the production of hybridoma cell lines and monoclonal antibodies. Includes preparation of viable cell suspensions, lymphocyte-myeloma cell fusion using polyethylene glycol, selection for and culturing of hybridoma cells, cloning by limiting dilution, ELISA, immunization of mice, monoclonal antibody production and scale up of hybridoma cells. (1001-311 and 1001-314 required; 1001-312 recommended) **Lab 4, Credit 2 (S)**
- 1001-315** **Bioinformatic Analysis of Macromolecules**
Course will introduce the fundamental concepts of bioinformatics, especially in regards to computational analysis of nucleic acids and proteins. The nature and extent of information available in bioinformatic databases will be presented. Discussion and utilization of computational programs for analysis of individual and multiple sequences for functional and evolutionary information will be discussed. The computational laboratory will highlight the multitude of web-based applications available for analysis of molecular sequences. (One year of introductory biology; 1001-311) **Class 2, Lab 2, Credit 3 (W)**
- 1001-340** **General Ecology**
Introduction to ecosystem ecology stressing the dynamic interrelationships of plant and animal communities within their environments. A study to include such ecological concepts as energy flow and trophic levels in natural communities, plant responses and animal behavior, population dynamics, biogeography and representative ecosystems. (One year of introductory biology or equivalent) **Class 3, Lab 3, Credit 4 (F)**
- 1001-350** **Molecular Biology**
The study of structure, function and organization of proteins, nucleic acids and other biological macromolecules in prokaryotic and eukaryotic cells. Major topics of this course include organization of the genome, replication and repair of the genome, and regulation of gene expression. The laboratory portion of this course emphasizes basic techniques of molecular biology with emphasis on recombinant DNA technology. (One year of introductory biology or equivalent, 1001 311) **Class 3, Lab 3, Credit 4 (W, S)**
- 1001-365** **Evolutionary Biology**
Topics covered will include the historical framework of evolutionary biology, the meaning and nature of evidence pertinent to biological evolution, Earth history, the evolution of proteins and the genetic code, cellular and metabolic evolution, molecular evolution, neutral theory vs. selection, genetic variation, natural selection, migration, mutation, genetic drift, fitness, population dynamics and genetics, species concepts and speciation, systematics and classification systems, molecular phylogenetics, the evolution of protozoans, plants, fungi, invertebrates and vertebrates, behavioral evolution, interactions among species, historical biogeography, human evolution and variation. (One year of introductory biology or equivalent) **Class 3, Lab 3, Credit 4 (F)**
- 1001-390** **Vertebrate Evolution**
A study of the major changes in vertebrate functional morphology through time, beginning with fish and ending with humans; fossil evidence depicting major transitions between the vertebrate classes; modern taxonomy, including cladistic analysis, geologic time and stratigraphy; and plate tectonics. (1001-253 or equivalent) **Class 4, Credit 4 (F)**
- 1001-393** **Evolution and Creationism**
A lecture/discussion course that explores the current controversy over the teaching of evolution in the public schools. Topics covered include pre-Darwinian views of natural history, Natural Theology and the argument from design, pre-Darwinian views of evolution, On the Origin of Species, and the public and scientific reception of natural selection. The major 20th and 21st century court cases, beginning with Scopes, and the Creationist responses, will be presented. The social and philosophical implications of evolution will be a major underlying theme. (1004-211, 212, and 259; or 1001-201, 202, 203; or 1001-253, or permission of instructor) **Class 4, Credit 4 (W)**
- 1001-404** **Introduction to Microbiology**
An introduction to microorganisms and their importance. Principles of structure and function, metabolic diversity, taxonomy, environmental microbiology, bioremediation and infectious diseases of bacteria are discussed. Basic laboratory techniques: microscopy; staining, culturing, isolation and identification of bacteria; isolation and identification of normal flora; identification of unknown bacteria; antibiotic resistance; metabolic tests; clinical and commercial testing protocols; detection and counting of bacteria in environmental samples (foods, water, soils). (1001-311 required; 1001 350, 1013-233 recommended) **Class 3, Lab 3, Credit 4 (F)**
- 1001-405** **Plants, Medicine, and Technology**
Plants have played a significant role in the shaping of our world from the beginning to the present day. This course will explore our utilization of plants as food, fuels, materials, medicines, gene sources, and social aspects over time in different cultures. The world depends on about fifteen plant species most of which have been changed by plant improvement methods. We will explore the changes that have occurred in these important crops. This course will be a blend of the uses of plants and plant constituents in medicine and how technology is used to produce, purify, and provide the plant produced constituents. (Third-year status in the College of Science or consent of instructor) **Class 4, Credit 4 (F)**
- 1001-406** **Virology**
This course is an introduction to virology with specific emphasis on the molecular mechanisms of virus infection of eukaryotic cells and virus-cell interactions. Virus structure, genetics, the infectious cycle, replication strategies, pathogenesis, persistence, effects on host macromolecular synthesis, viral oncogenesis, viral vectors, emerging viral diseases, and strategies to protect against and combat viral infection will be discussed. (1001-350, 1001-421) **Class 4, Credit 4 (W)**
- 1001-408** **Comparative Vertebrate Anatomy**
A comparative study of organ systems of representative members of the vertebrates with emphasis on structural changes that occur during evolution. (1001-302 or 1001-365, or permission of instructor) **Class 3, Lab 6, Credit 5 (W)**
- 1001-413** **Comparative Animal Physiology**
A comparative study of fundamental physiological mechanisms. A broad range of organisms are studied from the standpoint of evolution of functional systems, the mechanisms and morphological variations that exist to deal with functional problems posed by the environment, and the special mechanisms used to cope with extreme environments. (One year of general biology or 1001-253, and 1001-365) **Class 3, Lab 3, Credit 4 (W)**

- 1001-416** **Plant Biotechnology**
The course will investigate fundamental aspects of plant tissue culture and manipulation, the genetic transformation of plant cells, and the construction, characterization and application of transgenic plants to agriculture, plant molecular biology and novel product development. The laboratory will provide experiences to complement the lecture information in plant cell culture and in the use of *Agrobacterium* as the gene shuttle to introduce genetic information into plants. (1001-311, 1001-350, 1001-404) **Class 3, Lab 4, Credit 5 (W)**
- 1001-421** **Genetics**
An introduction to the principles of inheritance; the study of genes and chromosomes at molecular, cellular, organismal and population levels. (1001-253 or equivalent) **Class 4, Credit 4 (F, W, S, Su)**
- 1001-422** **Developmental Biology**
A study of the processes of growth, differentiation and development that lead to the mature form of an organism. (1001-253 or equivalent, 1001-311) **Class 3, Lab 3, Credit 4 (F)**
- 1001-427** **Microbial and Viral Genetics**
The study of molecular genetics of bacteria, bacteriophages, fungi and eucaryotic viruses. (1001-350, 421; one biochemistry course) **Class 3, Lab 3, Credit 4 (F)**
- 1001-443** **Tropical Ecology**
This course is designed to provide an introduction to the concepts of tropical ecology and ecosystems, including elements of structure and function. Both biotic and abiotic components will be considered. Following a survey of the major tropical ecosystem types, case studies of tropical rain forests and mangrove swamps will be covered in depth. (1001-340 or permission of instructor) **Class 4, Credit 4 (W)**
- 1001-450** **Genetic Engineering**
An introduction to the theoretical basis, laboratory techniques and applications of gene manipulation. (1001-350) **Class 2, Lab 8, Credit 5 (S)**
- 1001-475** **Conservation Biology**
This course concentrates on the application of ecological principles to conservation issues. Human impact on species diversity will be emphasized as it relates to agricultural, forest, coastal and wetland ecosystems. Case studies of management practices used to manage and restore disturbed ecosystems will be included. Laboratory exercises will concentrate on methodologies for assessing human impacts on ecosystems, including the use of GIS technology. (1001-340, 341) **Class 3, Lab 3, Credit 4 (W)**
- 1001-481** **Independent Research**
Faculty-directed projects of research usually involving original field or laboratory work. (Third-year status with a GPA of 2.5 in science and mathematics courses and consent of faculty) **Class variable, Credit variable (F, W, S, Su)**
- 1001-482** **Independent Research**
Faculty-directed projects of research usually involving original field or laboratory work. (Third-year status with a GPA of 2.5 in science and mathematics courses and consent of faculty) **Class variable, Credit variable (F, W, S, Su)**
- 1001-483** **Independent Research**
Faculty-directed projects of research usually involving original field or laboratory work. (Third-year status with a GPA of 2.5 in science and mathematics courses and consent of faculty) **Class variable, Credit variable (F, W, S, Su)**
- 1001-492** **Genomics**
Genomics will introduce students to the analysis of complex genomes. Emphasis will be placed on genetic information derived from the human genome project but advances with genomes of other model systems will be discussed. Lectures will cover scientific techniques used to map and sequence the human genome, as well as strategies for identification of disease susceptibility genes. The wet-bench laboratory will utilize an automated DNA sequencer to demonstrate the acquisition of genetic sequences. Laboratory sessions will emphasize cycle sequencing of cloned DNA fragments using an automated fluorescent DNA sequencer and mapping tactics using radiation hybrid cell panels. (1001-350) **Class 3, Lab 3, Credit 4 (F)**
- 1001-493** **Bioinformatics**
Bioinformatics will introduce students to the analysis of genetic sequences. Emphasis will be placed on genetic information derived from the human genome project but findings from genomes of other model systems will be presented. Lectures will discuss available computational tools for extracting biological information from nucleotide and protein sequences. The computer-based laboratory will utilize bioinformatics software to demonstrate how to manage, search and analyze genetic sequences. Laboratory sessions will cover gene prediction programs, DNA fragment assembly, multiple sequence analysis, secondary structure predictions, phylogenetic constructions and web access to public databases. (1001-350) **Class 3, Lab 3, Credit 4 (W)**
- 1001-494** **Molecular Modeling and Proteomics**
The course will explore two facets of protein molecules: their structure and their expression. The structure component will build upon information from the Bioinformatics course and will add further sophistication with analysis of intermolecular interactions and ligand/receptor pairing. Software that permits molecular docking experiments will be employed. Tissue-specific protein expression will be addressed in lectures with description of micro-array technology and, in the laboratory, with two-dimensional protein gel electrophoresis. (1001-492, 493) **Lab 6, Credit 4 (S)**
- 1001-499** **Biology Co-Op**
Cooperative education experience for undergraduate biological sciences students. **Credit 0 (offered every quarter)**
- 1001-502** **Advanced Immunology**
The lecture material covers in depth the molecular and cellular events of innate and adaptive immune responses. The genes and proteins for antigen-specific receptors of T and B lymphocytes, as well as the functions of the immune cell subsets, will be covered. Case studies highlighting various states of immunopathology or immunodeficiency will be discussed. Intracellular signaling following antigen receptor binding will be presented. The phenomenon of positive/negative selection within the thymus during T cell differentiation will be covered. (1001-312, 350) **Class 3, Lab 3, Credit 4 (S)**
- 1001-530** **Bioremediation: A Practical Approach**
An introduction to bioremediation focusing on the interactions between engineers, chemists, biochemists, hydrologists, agronomists, and microbiologists to develop, design, and implement strategies to remediate soils or waters contaminated with various pollutants. The course will include topics in site assessments, risk assessments, characterization of contaminated sites, economics of remedial design, in situ processes, and ex situ processes. (1001-404 or permission of instructor) **Class 3, Lab 3, Credit 4 (F)**
- 1001-542** **Advanced Biological Science Research**
Faculty-directed student projects in biochemistry, usually involving laboratory work and/or calculations that would be considered original. (Permission of adviser) **Class variable, Credit variable (F, W, S, Su)**
- 1001-559** **Special Topics: Biology**
Special topics are advanced courses of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and have specified prerequisites, contact hours and examination procedures. **Class variable, Credit variable (Offered upon sufficient request) (F, W, S)**
- 1001-567** **Environmental Microbiology**
This is an advanced course in the principles of soil microbiology, groundwater microbiology, wastewater microbiology and composting microbiology. The class will also focus on practical applications of microorganisms isolated from various types of environments. Examples of commercial use of microorganisms will also be presented. The lab consists of a series of experiments looking at the microbial flora of soils and water. Students will also determine the biological oxygen demand of various water sources and sediment samples found in Western New York. (1001-404) **Class 3, Lab 3, Credit 4 (F)**
- 1001-570** **Research Scholars I**
This course is taken in the first quarter of the Research Scholars Program. Students undertake long-term research projects under the mentorship of a faculty sponsor. Students must apply to the Research Scholars Program and be accepted prior to registration. **Class variable, Credit variable 1-4 (F, W, S, Su)**

1001-571 **Research Scholars II**
This course is taken in the second quarter of the Research Scholars Program. Students undertake long-term research projects under the mentorship of a faculty sponsor. Students will give oral presentations on their research projects which will be evaluated by a faculty committee. Students must have an A or B in Research Scholars I and submit an updated research plan to the Research Scholars Committee in order to register. **Class variable, Credit variable 1-4 (F, W, S, Su)**

1001-572 **Research Scholars III**
This course is taken in the third quarter of the Research Scholars Program. A student must earn at least a B in this course to be designated as a "Research Scholar." Students undertake long-term research projects under the mentorship of a faculty sponsor. Students must have received an A or B in Research Scholars II and submit an updated research plan to the Research Scholars Committee in order to register. **Class variable, Credit variable 1-4 (F, W, S, Su)**

1001-599 **Independent Study-Elective**
Faculty-directed study of appropriate topics on a tutorial basis for program elective credit. Enables an individual to pursue studies of existing knowledge in the literature. (1001-253 or equivalent) **Class variable, Credit variable (F, W, S)**

General Biology

1004-240 **Cell and Molecular Biology for Engineers**
This is the first course of a two-quarter sequence designed to introduce biomedical engineering students to the molecular and cellular basis of life with a particular emphasis on the integration of molecular systems that underscore human physiology. This course will start with the basic chemistry of biological macromolecules and then explore the cell starting from the nucleus and moving outward. Major topics will include: DNA replication; molecular basis of inheritance; the biology of RNA; gene expression; protein synthesis; the secretory pathway; and enzyme kinetics. In lab students will develop a core competency in modern molecular techniques and explore the problems and challenges faced by molecular biologists by molecularly characterizing their own genomic DNA. (High school biology and chemistry required. Restricted to Engineering majors, or permission of instructor) **Class 3, Lab 3, Credit 4 (F)**

1004-241 **Cell and Molecular Biology for Engineers II**
The second course of a two-quarter sequence designed to introduce biomedical engineering students to the molecular and cellular basis of life with particular emphasis on the integration of molecular systems that underscore human physiology. This course will continue exploring subcellular systems by touring the function of each cellular organelle and describing the pathologic consequences that result from interruption of its normal function. Major topics will include: cell energy production; cytoskeleton; lysosome; plasma membrane; vesicle transport; cell-cell communication; signaling pathways; cell cycle; and cell division. In lab students will develop a core competency in modern cell biology techniques by manipulating cells in culture and participating in an open-ended research project that emphasizes engineering. (1004-240, restricted to Engineering majors, or permission of instructor) **Class 3, Lab 3, Credit 4 (W)**

1004-242 **Biocompatibility and the Immune System**
This course combines a basic immunology course with an introduction to principles of human tissue response to biomaterial implantation. Topics include: organization of the immune system and its myriad cells and cytokines, review of bacterial and viral life cycles, antibody/ antigen specificity, inflammation, bacterial adhesion, biomaterial surface characterization and sterilization. Students will explore biocompatibility testing, and learn the molecular basis for surface recognition and masking in implanted materials. The course emphasizes the interaction of the immune system components with engineered biological devices, implants, cells and tissues, and explores strategies and solutions for biocompatibility of engineered bio-materials with the immune system. (1004-241) **Class 3, Credit 3 (S)**

1004-259 **Special Topics**
Special topics

Field Biology

1005-210 **Field Biology for Non-Science Students**
This course is an introduction to the ecology of individuals, populations, and communities. The dynamic interaction between organisms and their environment will be stressed. Included will be the concepts of energy flow and nutrient cycling in ecosystems, population dynamics, food webs, and the causes of temporal and spatial changes in communities. **Class 3, Lab 3, Credit 4 (S)**

1005-305 **Bird Banding**
This course is designed to prepare the student to safely band passerine species of birds and to safely engage in research using banding methods. The course is also designed to meet requirements of the United States Fish and Wildlife Service and the North American Banding Council for banders and for bander training. This course constitutes the first step towards obtaining a USFWS permit to band birds and to conduct research. (One year of biology or permission of instructor) **Class 2, Lab 6, Credit 2**

1005-559 **Special Topics**
Special topics

Environmental Science

1006-201 **Introduction to Environmental Science**
Introduction to environmental science is a three-quarter sequence that presents an integrated approach to the interrelated, inter-disciplinary principles of environmental science through the study of the Earth's ecosystems. Throughout the sequence, the focus will be on sustainability as the foundation for problem solving. The first quarter will establish the educational foundation that will be built upon in subsequent courses. To demonstrate the interdisciplinary methodology of environmental science, elements of government/political science/policy, ethics, economics, sociology, history and engineering are embedded in the scientific matrix used to present this course. (Permission of instructor) **Class 2, Lab 4, Credit 4 (F)**

1006-202 **Concepts of Environmental Science**
This course introduces the interdisciplinary nature of environmental science through the study of topics like ecosystems and biodiversity, land cover change, energy, pollution, and global climate change. A unifying theme is the concept of sustainability. This is part of the required course sequence for all students in the environmental science degree program. **Class 3, Lab 3, Credit 4 (F)**

1006-203 **Environmental Science Field Skills**
This course introduces students to problem-based learning by focusing on a watershed assessment while learning about water quality and water quantity issues and analyses, land cover change, wetlands, and soils. The watershed project will also involve environmental education and outreach activities linked to Earth Day. Part of the required course sequence for all students in the environmental science degree program. **Class 3, Lab 3, Credit 4 (S)**

1006-320 **Environmental Science Field Skills**
Environmental Science Field Skills is the final course in a three-quarter course group (including Concepts of Environmental Science and Environment and Society) that when combined presents an integrated approach to the interrelated, interdisciplinary principles of environmental science through case studies, site visits and field work. In this course, the focus will be on water and soil resources and quality and land use/land cover change. Students will learn analysis techniques for water and soil, culminating in a stressed stream analysis of a local water shed. Additional topics may include geographic information systems, environmental education and sustainable food production. The interdisciplinary nature of environmental science will be illustrated through elements of government/political science/policy, ethics, economics, sociology, history and engineering. (1006-202; 1001-251, 1001-252 and 1001-253)

1006-350 **Applications of Geographic Information Systems**
Through hands-on projects and case studies, this course illustrates concepts and applications of vector geographic information systems (GIS) in a variety of disciplines, such as environmental science, biology, geology, geography, sociology, and economics. Students will learn how to use GIS software, plan a project, create a database, and conduct independent analysis. No official prerequisites, but students should be comfortable working with computers and experience with programming is also useful. **Class 3, Lab 3, Credit 4 (F)**

1006-499 **Environmental Science Co-Op**
Cooperative education experience for undergraduate environmental science students. **Credit 0**

1006-503 **Environmental Science Capstone**
This course is linked to the Great Lakes course sequence (0508-463, 464) and will bring together all of the principles of environmental science the student has learned during his or her four year undergraduate education at RIT. To accomplish this, students will work in teams to provide solutions to a real environmental problem or issue. In addition to working with RIT faculty, the students will work with practicing environmental scientists and the public. (0508 463, 464) **(W, S)**

1006-559 **Special Topics**
Courses that are of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and may have specified prerequisites, contact hours, and examination procedures. **Class variable, Credit variable (F, W, S, Su)**

1006-599 **Environmental Science Independent Study**
Independent study is a faculty-directed study of appropriate topics on a tutorial basis that enables an individual to pursue studies of existing knowledge available in literature. **Class variable, Credit variable (F, W, S, Su)**

Analytical Chemistry

1008-261 **Quantitative Analysis I**
This course is designed for chemistry, polymer chemistry and biochemistry majors or those interested in pursuing the major. Topics include theoretical introduction to quantitative methods, including gravimetric techniques, equilibria, statistical methods and solution chemistry. (Corequisites 1008-265, 1010-252) **Lecture 3, Credit 3 (W)** 1010-252 Gen Chem I Corequisite: 1008-265 Quan An I Lab & 1010-252 Gen Chem II Lec

1008-262 **Quantitative Analysis II**
This course is designed for chemistry department majors or those interested in pursuing the major. Topics include equilibrium for polyprotic acids, electrochemistry and redox reactions, spectroscopy, potentiometry and electrogravimetric determinations. (Corequisite 1008-266) (1008-261, 265) **Lecture 4, Credit 4 (S)**

1008-265 **Quantitative Analysis I Laboratory**
This laboratory is designed for chemistry department majors or those interested in pursuing the major. Experiments include statistics, calibration of equipment, spectroscopy, volumetric analyses and kinetics. (Corequisites 1008-261, 1010-252) **Lab 4, Credit 1 (W)**

1008-266 **Quantitative Analysis II Laboratory**
This laboratory is designed for chemistry department majors or those interested in pursuing the major. Experiments include statistics and calibration of equipment; Gran Plot, double endpoint titration (carbonate/bicarbonate), potentiometric titration, electrogravimetric and photometric determination of copper; water hardness. Lab report writing is emphasized. (Corequisite 1008-262) (1008-261, 265, 1010 252) **Lab 6, Credit 2 (S)**

1008-311 **Analytical Chemistry: Instrumental Analysis**
This course provides an elementary treatment of instrumental theory and techniques; properties of light and its interaction with matter; ultraviolet, visible and infrared absorption spectroscopies; atomic absorption and molecular fluorescence spectroscopy; nuclear magnetic resonance spectroscopy. (1010-252 or 1011 217; corequisite 1008-318) **Class 3, Credit 3 (F, W)**

1008-312 **Analytical Chemistry: Separations**
The theory of current chemical separations methods will be discussed. This will include solvent extraction, planar chromatography, gas chromatography and various mechanisms of high performance liquid chromatography. Current theory and applications of mass spectroscopy will also be covered. (1008-262 or 1011-217 or equivalent; corequisite 1008-319) **Class 3, Credit 3 (S, Su)**

1008-318 **Instrumental Analysis Laboratory**
This lab accompanies 1008-311 and provides quantitative and qualitative experiments in ultraviolet, visible, infrared, fluorescence and atomic absorption spectroscopies. Laboratory report writing is emphasized. (Corequisite 1008-311) (1010-252 or equivalent) **Lab 4, Credit 1 (F, W)**

1008-319 **Separations Laboratory**
This lab accompanies 1008-312 and provides experiments with chemical separations techniques including extractions (both solution and solid phase), thin layer chromatography, HPLC, gel filtration, gas chromatography and mass spectroscopy. Laboratory report writing is emphasized. (Corequisite 1008-312) (1008-262 or 1011-217 or equivalent) **Lab 4, Credit 1 (S Su)**

1008-511 **Advanced Instrumental Analysis**
Theory, applications and limitations of selected instrumental methods in qualitative, quantitative, and structural analysis are discussed. Possible topics include electrochemistry, surface analysis, NMR spectroscopy, mass spectroscopy, ICP and other modern instrumentation. (1014-441) **Class 3, Credit 3 (F)**

1008-620 **Building Scientific Apparatus**
Basic skills associated with the construction of scientific laboratory apparatus—some of which is not commercially available are covered: machine shop skills, working with glass, vacuum technology, optics and electronics. Special emphasis is on function-structure relationship between an instrument and its intended use. Several references on construction techniques are provided, and information about current manufacturers and suppliers of necessary components is given. (1014-441, 1017-212, 213 or 312, 313; corequisite 1018-621) **Class 3, Credit 3 (Offered upon sufficient request)**

1008-621 **Instrumental Analysis Laboratory**
This lab is a capstone course requiring students to develop experimental protocols to accomplish assigned experiments involving advanced techniques in instrumental analysis. Library, literature and textbook research will be required. Upon agreement with instructor, two to four major experimental techniques will be required. (1014-441, 445; corequisite 1008-511 or 711) **Lab 6, Credit 2 (F, W)**

Biochemistry

1009-230 **Freshman Symposium for Biochemistry**
This course will explore biochemistry and related biochemical sciences. It will include discussion of biochemistry-related opportunities including research, co-op, and careers. The biochemistry curriculum and biochemical resources will also be discussed. **Class 1, Credit 1 (F)**

1009-502 **Biochemistry: Conformation and Dynamics**
This course provides a foundation for the biochemistry course sequence and for participation in undergraduate research in biochemistry. The relationship between the three-dimensional structure of proteins and their function in oxygen transport and enzymatic catalysis is examined. In preparation for the next course in the sequence (1009 503 Biochemistry: Metabolism), membrane structure and the physical laws that apply to metabolic processes are also discussed. (1013-233 or 1013-433, or permission of instructor) **Class 3, Credit 3 (F, W)**

1009-503 **Biochemistry: Metabolism**
Introduction to the metabolic pathways used for energy production and for the synthesis and degradation of the building blocks of living organisms. The pathways are presented individually, then integrated to show the balance between pathways; for example, the products generated by one pathway that are necessary for a second pathway. The efficiency of chemical synthesis in biological organisms is discussed. Finally, the metabolic basis of selected diseases is examined. (1009-502 or permission of the instructor) **Class 3, Credit 3 (F, W, S)**

1009-504 **Biochemistry: Nucleic and Molecular Genetics**
Nucleic acid structures, including the classical Watson-Crick DNA secondary structure, as well as more recently discovered forms, are described. Nucleic acid metabolism and the flow of genetic information including replication of DNA, its transcription into RNA and the translation of messenger RNA into protein, as well as regulation of gene expression in prokaryotes are presented. DNA sequencing and recombinant DNA techniques having practical applications in medicine, agriculture and forensics are described. The nucleic acid biochemistry of viruses and oncogenes is surveyed. (1009-502) **Class 3, Credit 3 (W, S)**

1009-505 **Biochemistry: Experimental Techniques**
An introduction to the theory and practice of modern experimental biochemical laboratory techniques and concepts. The weekly one-hour lecture provides a theoretical framework for the course and includes a discussion of the properties of biomolecules and how those properties are exploited in the separation and characterization of the molecules. Practical laboratory techniques include the preparation of buffers, centrifugation, gel exclusion chromatography, electrophoretic methods, and UV-visible and fluorescence spectrophotometry as applied to the isolation and characterization of proteins and nucleic acids. The manipulation of genetic material in *E. coli* will also be examined. **Class 1, Lab 3, Credit 2 (F, W)**

1009-510 **Advanced Protein Biochemistry: Structure and Function**
In this course, we will analyze protein structure-function relationships. We will investigate how proteins function and how the structure relates to that function. The principles that explain enzyme rate enhancements, mechanistic enzymology will be examined. We will also explore protein superfamilies for phylogenetic relationships to enhance our understanding of protein structure function relationships. We will do this by reading and discussing current scientific literature and classic papers. (1009-502) **Class 3, Credit 3 (S)**

1009-541 **Biochemistry Research**
Faculty-directed student projects or research in biochemistry, usually involving laboratory work and/or calculations that would be considered original. (Permission of research adviser) **Class variable, Credit variable (F, W, S, Su)**

1009-542 **Biochemistry Research**
Faculty-directed student projects or research in biochemistry, usually involving laboratory work and/or calculations that would be considered original. (Permission of research advisor) **Class variable, Credit variable (F, W, S, Su)**

1009-543 **Biochemistry Research**
Faculty-directed student projects or research in biochemistry, usually involving laboratory and/or calculations that would be considered original. (Permission of research advisor) **Class variable, Credit variable (F, W, S, Su)**

1009-559 **Special Topics**
Special topics

1009-561 **Advanced Biochemistry Research I**
Student research in biochemistry, usually involving laboratory work and/or other types of scholarship that would be considered original. (Permission of research adviser) **Class variable, Credit variable (F, W, S, Su)**

1009-562 **Advanced Biochemistry Research II**
Student research in biochemistry, usually involving laboratory work and/or other types of scholarship that would be considered original. (Permission of research adviser) **Class variable, Credit variable (F, W, S, Su)**

1009-563 **Advanced Biochemistry Research III**
Student research in biochemistry, usually involving laboratory work and/or other types of scholarship that would be considered original. (Permission of research adviser) **Class variable, Credit variable (F, W, S, Su)**

Chemistry

1010-200 **Chemistry Safety**
A basic course in safe chemical laboratory practices. Topics include protective equipment; toxicity; safe reaction procedures; storage and disposal methods; and handling of all chemicals, including flammable materials, compressed gases, cryogenics, radioactive materials and other special chemicals. **Class 1, Credit 1 (F)**

1010-230 **Introduction to Co-Op Seminar**
Exploration of cooperative education opportunities with practice in writing letters of application and resumes and in interviewing techniques. Careers related to chemistry, polymer chemistry, and biochemistry are discussed. RIT co-op and career placement services are utilized. **Class 1, Credit 1 (F)**

1010-251 **General Chemistry I**
This course is designed for chemistry department majors and includes topics on measurement, atomic theory, periodicity, moles and stoichiometry, solutions, titrations, redox reactions, gas laws, kinetic theory of gases and LeChatelier's principle. (Corequisite 1010 255) **Class 3, Recitation 1, Credit 4 (F)**

1010-252 **General Chemistry II**
This course is designed for chemistry department majors and includes topics on atomic theory and electronic structure, chemical bonding, VSEPR and valence bond theory, molecular orbital theory, enthalpy and entropy, rate laws, catalysis and nuclear chemistry. (1010-251; corequisite 1008-265) **Class 3, Credit 3 (W)**

1010-255 **General Chemistry I Laboratory**
This laboratory is designed for chemistry department majors to complement General Chemistry I (1010-251). Experiments involve exploration of various topics and applications of chemistry including but not limited to biochemistry, physical chemistry, synthetic chemistry, inorganic chemistry, and forensic chemistry. Students are given unique problems to solve using the skills developed in the course. (Corequisite 1010-251) **Lab 3, Credit 1 (F)**

1010-401 **Chemical Literature**
Instruction is given on the use of chemical literature resources such as Chemical Abstracts, Science Citation Index, Beilstein, Current Contents and computerized information retrieval. Students prepare a library-based research paper and poster on a chemical topic of their choice as a culmination of instruction on planning a research paper: outlining, using correct scientific English and formats for documentation (footnotes, endnotes, bibliographies) preparing visuals, abstracts and letters of transmittal. **Class 2, Credit 2 (F, S)**

1010-480 **Laboratory Teaching Experience**
This course is designed to offer students teaching experience in an undergraduate laboratory setting. Evaluation by a faculty supervisor is based on teaching performance and preparation of materials required for the lab. (Must have completed the course and laboratory or equivalent experience under consideration with a grade of A or B; permission of instructor/laboratory coordinator and department head) **Class 3-6, Credit 1-2 (F, W, S, Su)**

1010-499 **Chemistry Co-Op**
Cooperative education experience for undergraduate chemistry students. **Credit 0 (offered every quarter)**

1010-541 **Chemical Research**
Faculty-directed student projects or research usually involving laboratory work and/or calculations that would be considered original. (Permission of research adviser) **Class variable, Credit variable (F, W, S, Su)**

1010-542 **Chemical Research**
Faculty-directed student projects or research usually involving laboratory work and/or calculations that would be considered original. (Permission of research adviser) **Class variable, Credit variable (F, W, S, Su)**

1010-543 **Chemical Research**
Faculty-directed student projects or research usually involving laboratory and/or calculations that would be considered original. (Permission of research adviser) **Class variable, Credit variable (F, W, S, Su)**

1010-559 **Special Topics: Undergraduate Chemistry**
Courses in which topics of special interest to a sufficiently large group of students, and not covered in other courses, may be offered upon request. **Class variable, Credit variable (offered upon sufficient request)**

1010-561 **Advanced Undergraduate Chemistry Research 1**
Course provides an opportunity for undergraduates to participate in a research project with chemistry faculty, requiring a more formalized presentation of results than the 1009-541 or 1010-541 series. Results from the research must be reported in a public forum (such as a written report, poster, and/or oral presentation) as determined by the research adviser and the head of the department of chemistry. (Permission of the research adviser and approval by the head of the department of chemistry) **Class/lab variable, Credit variable (F, W, S, Su)**

1010-562 **Advanced Undergraduate Chemistry Research 2**
Course provides an opportunity for undergraduates to participate in a research project with chemistry faculty, requiring a more formalized presentation of results than the 1009-541 or 1010-541 series. Results from the research must be submitted in a formal report, following American Chemical Society guidelines. Public presentations of results, such as a poster or oral presentation, may also be required by the research adviser and the head of the department of chemistry. (Permission of the research adviser and approval by the head of the department of chemistry) **Class/lab variable, Credit variable (F, W, S, Su)**

1010-563 **Advanced Undergraduate Chemistry Research 3**
Course provides an opportunity for undergraduates to participate in a research project with chemistry faculty, requiring a more formalized presentation of results than the 1009-541 or 1010-541 series. Results from the research must be submitted in a formal written report, following American Chemical Society guidelines. Public presentation of results, such as a poster or oral presentation, may also be required by the research adviser and the head of the department of chemistry. (Permission of research adviser and approval by the head of the department of chemistry) **Class/lab variable, Credit variable (F, W, S, Su)**

1010-599 **Chemistry Independent Study: Undergraduate**
Faculty-directed study of appropriate topics on a tutorial basis. Enables an individual to pursue studies of existing knowledge available in the literature. (Permission of independent study adviser) **Class variable, Credit variable (F, W, S, Su)**

General Chemistry

1011-201 **Foundations of General Chemistry**
A survey course in general chemistry. Fundamentals include: dimensional analysis; matter and energy; atomic theory; molecular structure; chemical bonding; chemical reactions; solution chemistry; and the Gas Laws. The material will emphasize the relationship between chemistry and modern sociological, nutritional, and environmental issues. (Credit or co-registration in 1011-205) **Class 4, Credit 4 (F)**

1011-202 **Foundations of Organic Chemistry**
A survey course in organic chemistry. Fundamentals include reaction rates, equilibrium, and acid/base chemistry. Organic functional groups covered include hydrocarbons, alcohols, carbonyls, and amines. The course will familiarize the students with the relationship between organic chemistry and modern pharmaceutical, nutritional and environmental issues. (Credit or co-registration in 1011-207) **Class 4, Credit 4 (W)**

1011-203 **Foundations of Biochemistry**
A survey course in biochemistry. Application of carbohydrates, lipids, proteins, and amino acid metabolism to nutrition and health is covered. The roles of DNA, RNA, and proteins are investigated. The relationship of fundamental biochemical topics to nutrition and energy will be discussed. (Prerequisite 1011-202) **Class 3, Credit 3 (S)**

1011-205 **Chemistry Principles I Laboratory**
Laboratory course to introduce basic laboratory techniques: gravimetric, volumetric, thermal and titration analyses. Experiments complement material in first-quarter lecture. Also offered in distance learning format. (Corequisite 1011-201, 215, or 271) **Lab 3, Credit 1 (F, W)**

1011-206 **Chemistry Principles II Laboratory**
Laboratory course to introduce techniques of chemical analysis: spectrometry, calorimetry, separations, reaction schemes, titrations and kinetic studies. Experiments complement material in second quarter lecture. Also offered in distance learning format. (1011-205; corequisite 1011- 230 or 216) **Lab 3, Credit 1 (W, S)**

1011-207 **Introduction to Organic Chemistry Laboratory**
An introduction to organic laboratory techniques. Methods of separating, purifying and characterizing organic compounds are covered. Also offered in distance learning format. (1011-205; corequisite 1011 202) **Lab 3, Credit 1 (W, S)**

1011-208 **College Chemistry**
This course is primarily for, but not limited to, engineering students. Topics include an introduction to some basic concepts in chemistry, stoichiometry, First Law of Thermodynamics, thermochemistry, electronic theory of composition and structure, chemical bonding. **Class 4, Credit 4 (F, W)**

1011-215 **General and Analytical Chemistry I**
This is a general chemistry course for students in the life and physical sciences. College chemistry is presented as a science based on empirical evidence that is placed into the context of conceptual, visual, and mathematical models. Students will learn the concepts, symbolism, and fundamental tools of chemistry necessary to carry on a discourse in the language of chemistry. Emphasis will be placed on the relationship between atomic structure, chemical bonds, and the transformation of these bonds through chemical reactions. (Corequisite 1011-205) **Class 4, Credit 4 (F)**

1011-216 **General and Analytical Chemistry II**
This course covers the relationship between chemical structure, energetics, and kinetics. Chemical structure is treated through an introduction to organic compounds. The course then deals with the energy and entropy changes that drive chemical reactions. After a brief coverage of the rates of reactions the course finishes with an introduction to chemical equilibrium. (1011-215; corequisite 1011-206) **Class 3, Credit 3 (W, S)**

1011-217 **General and Analytical Chemistry III**
Comprising 80% of our bodies and 2/3 of the Earth's surface, water is arguably the most important compound. This course uses the tools and concepts introduced in the previous two courses of the sequence to focus on the chemistry of aqueous solutions. It takes a quantitative look at: 1) solubility equilibrium, 2) acid-base equilibrium, and 3) oxidation-reduction equilibrium, to illustrate the importance of the interaction of ions in aqueous solutions. (1011-216; corequisite 1011-227) **Class 3, Credit 3 (F, S, Su)**

1011-227 **General and Analytical Chemistry III Laboratory**
This is a continuation of 1011-206 laboratory. Topics include quantitative analysis of a multicomponent mixture using complexation and double endpoint titration, pH measurement, buffers and pH indicators, and the electrochemical analysis of osmosis and oxidation reduction reactions. Experiments are designed to complement lecture material of 1011-217. The course emphasizes the use of experiments as a tool for chemical analysis. Also offered in distance learning format. (1011-206; corequisite 1011-217) **Class 3, Credit 1 (S Su)**

1011-271 **Fundamentals of Chemistry**
This is an introduction to basic concepts of chemistry, assuming no prior experience. Topics include atomic theory, chemical bonding, stoichiometry, states of matter and the periodic table. The online course 1011-230 can be used as a substitute for 1011-271. (Corequisite 1011-205) **Class 3, Credit 3 (F)**

1011-272 **Chemistry of Water and Waste Water**
This course discusses the chemistry of water analyses, including solids, pH, alkalinity, acidity chloride, phosphate, BOD, COD, nitrogen, metals, radioactivity, residual chlorine and chlorine demand. Polymers are also covered. (1011-271 or equivalent; corequisite 1011-276) **Class 3, Credit 3 (F)**

1011-273 **Introduction to Chemical Materials**
This course applies the basic concepts of chemistry to energy conversion (thermochemistry, nuclear chemistry), reaction kinetics and equilibria, electrochemistry and materials (metals, ceramics and polymers). (1011-271 or 1011-208; corequisite 1011-277) **Class 3, Credit 3 (W, S)**

1011-276 **Chemistry of Water and Waste Water Lab**
This laboratory is to be taken concurrently with 1011-272. Techniques used in water and waste water analysis are covered. (1011-271 or equivalent) **Lab 3, Credit 1 (F)**

1011-277 **Introduction to Chemical Materials Labor**
Experiments in thermochemistry, kinetics, equilibrium, oxidation reduction and the properties of matter that complement the lecture material. (1011-205 or 1011-208; corequisite 1011-273) **Lab 3, Credit 1 (W, S)**

1011-308 **Introduction to Hydrogen Technology**
This course will discuss hydrogen as a fuel with an emphasis on the sources of renewable energies and the principles of utilization including the issue of global warming. The technical aspects of hydrogen requirement for kilowatts of power generation, rate of production of water and the fuel cross-over problem will be reviewed. The fundamentals of chemistry will be covered to develop a foundation for an understanding of renewable energy and hydrogen technology. This course will concentrate on clean energy sources, theories of fuel cell operations, hydrogen infrastructure, and the introduction of devices that employ hydrogen. (1011-208 or 1011-215 or 1011-230 or 1011-271 or 1010-251, or permission of instructor) **Class 4, Credit 4 (W)**

Inorganic Chemistry

1012-562 **Inorganic Chemistry I**
For common elements, mastery of chemical reactions that describe their: (1) isolation, (2) characteristic chemical reactivities with other common reagents, (3) use in nano-structured materials, (4) large-volume industrial processes, and (5) environmental impacts is required. Nomenclature and isomerism are included. (1013-433, 1014 441) **Class 4, Credit 4 (F)**

1012-563 **Inorganic Chemistry II**
This course provides a view of how bonding theories endeavor to account for and predict the physical properties of a wide variety of inorganic compounds; e.g., color, magnetism, stability, chemical potential and electrical conductivity. Applications of bonding theory to current research areas are included. (1012-562, 1014-442 or permission of instructor) **Class 4, Credit 4 (W)**

1012-565 **Preparative Inorganic Chemistry Laboratory**
In this laboratory, the chemistries of different areas of the periodic table are examined; advanced synthetic and characterization methods are utilized. (1012-562 or permission of instructor) **Recitation 1, Lab 3, Credit 2 (W, S)**

Organic Chemistry

1013-211 **Organic Chemistry I**
This course is a survey of the structure, nomenclature, reactions and synthesis of the major functional groups. (Corequisite 1013-235) (1011-216 or permission of instructor) **Class 3, Credit 3 (F, W)**

1013-232 **Organic Chemistry II**
In this course the mechanisms of main classes of reactions are discussed. (1013-231; corequisite 1013-236) **Class 3, Credit 3 (W, S X*)**

1013-233 **Organic Chemistry III**
Structure, nomenclature, reactions and properties of the important classes of bio-organic molecules (carbohydrates, lipids, amino acids, proteins and nucleic acids) are covered in depth. Emphasis is on structure and reactivity in relation to biochemical processes. (1013-232; corequisite 1013-237) **Class 3, Credit 3 (S, F-X*)**

1013-235 **Organic Chemistry Laboratory I**
Laboratory work emphasizes techniques, preparations and analyses. (Corequisite 1013-231) **Lab 3, Credit 1 (F, W)**

1013-236 **Organic Chemistry Laboratory II**
Laboratory work emphasizes techniques, preparations, and analyses. (Corequisite 1013-232) **Lab 3, Credit 1 (W, S-X*)**

1013-237 **Organic Chemistry Laboratory III**
Laboratory work emphasizes reactions and properties of biomonomers and polymers. (Corequisite 1013-233) **Lab 3, Credit 1 (S, F-X*)**

1013-431 **Organic Chemistry I**
This course is a rigorous survey of the mechanisms and reactions of organic functional groups, emphasizing alkanes, alkenes and alkynes. Stereochemistry is also included. (1010-252; corequisite 1013-435) (1010-252) **Class 3, Credit 3 (F, W)**

1013-432 **Organic Chemistry II**
This course is a continued survey of reactions and mechanisms of organic functional groups including aromatic compounds, alcohols, ethers, aldehydes and organometallics. Spectral analysis (IR, UV, NMR) is also included. (1013-431; corequisite 1013-436) **Class 3, Credit 3 (W, S)**

1013-433 **Organic Chemistry III**
This course is a continued survey of reactions of major organic functional groups, including carboxylic acids, carboxylic acid derivatives, amines and enolate anions. Structure, nomenclature, reactions and properties of important classes of bio-organic molecules are also included. (1013-432; corequisite 1013-437) **Class 3, Credit 3 (F, S)**

1013-435 **Preparative Organic Chemistry I Laboratory**
This laboratory is designed for chemistry department majors to complement 1013-431, Organic Chemistry I. Synthesis, purification and characterization of organic compounds are conducted. (1010-252; corequisite 1013-431) **Lab 4, Credit 1 (F, W)**

1013-436 **Preparative Organic Chemistry II Laboratory**
This laboratory is designed for chemistry department majors to complement 1013-432, Organic Chemistry II. Emphasis is on synthesis, functional group reactivities, separations, IR and NMR analysis and introduction to microscale synthesis. (1013-431; corequisite 1013-432) **Lab 4, Credit 1 (W, S)**

1013-437 **Systematic Identification of Organic Compounds**
This is a laboratory course utilizing synthesis, chemical and spectral (IR, NMR and GC/MS) techniques to identify and characterize organic compounds. (Should be taken concurrently with 1013-433.) (1008-319, 1013-432, 436) **Lab 6, Credit 2 (F, S)**

1013-510 **Literature Exploration of Organic Synthesis**
This course will be a survey of the recent literature in organic chemistry with a focus on the chemistry concerning those that synthesize natural products and/or methodology towards synthesizing natural products. During each week of the course a student is selected to lead a discussion based on an article from a premier journal. Repeatable for credit. (1013-537 or 1013-757 or permission of instructor) **Class 1, Credit 1 (F, W, S)**

1013-537 **Advanced Organic Chemistry Synthesis**
This course will revisit undergraduate organic chemistry topics at a more advanced level with specific examples from the current chemical literature. Multi-step synthesis and synthesis of complex multi-functional molecules will be emphasized. (Students requiring 4 credits should register for 1013-737.) (1013-433) **Class 3, Credit 3 (F)**

Physical Chemistry

1014-441 **Chemical Thermodynamics**
Properties of gases; temperature; energy and the First Law of Thermodynamics; entropy and the Second and Third laws; Helmholtz and Gibbs free energies; criteria for equilibrium and spontaneity; chemical equilibrium; phase equilibrium; equilibrium in ideal and non ideal solutions; and electrochemistry are discussed. (1010-252, 1016-282, 1017-211 or 311; corequisite 1014-445) **Class 4, Credit 4 (F)**

1014-442 **Quantum Chemistry**
This course is an introduction to quantum mechanics and spectroscopy; Planck's Law; photoelectric effect; the Bohr atom; deBroglie, Schrodinger and Heisenberg theories; eigenvalue/eigenfunction equations; variation and perturbation theory; quantum statics; Heitler-London theory of covalent bonds; selection rules and spectroscopy; and matrices applicable to quantum chemistry. (1014-441, 1016-306; corequisite 1014-446) **Class 4, Credit 4 (W)**

1014-443 **Chemical Kinetics**
Kinetic molecular theory, transport properties of gases, chemical kinetics, surface chemistry, photochemical kinetics, irreversible processes in solution and an introduction to statistical mechanics are discussed. (1014-441; corequisite 1014-447) **Class 4, Credit 4 (S)**

1014-445 **Chemical Thermodynamics Laboratory**
This is an introduction to physical chemistry laboratory; chemical thermodynamics and equilibrium. (Should be taken concurrently with 1014-441.) **Lab 3, Credit 1 (F)**

1014-446 **Quantum Chemistry Laboratory**
Experiments in the application of quantum chemistry, atomic and molecular spectroscopy are performed. (Should be taken concurrently with 1014-442.) **Lab 3, Credit 1 (W)**

1014-447 **Chemical Kinetics Laboratory**
Laboratory experiments in chemical dynamics are conducted. (Should be taken concurrently with 1014-443.) **Lab 3, Credit 1 (S)**

1015-521 **Atmospheric Chemistry**
This course is an overview of the major forces controlling the chemical composition of Earth's atmosphere with emphasis on the role of the biosphere and the changes induced by human activity. Emphasis is placed on urban pollution, acid rain, stratospheric ozone depletion, and climate change. (1014-443) **Class 3, Credit 3 (S-X*) (not offered 2012-2013)**

1015-522 **Aquatic Toxicology and Chemistry**
This course is an introduction to key chemical, biological, microbiological and toxicological concepts and processes that govern the presence and fate of pollutants in the aquatic environment; environmental fate of specific inorganic, organic and pathogenic pollutants; analytical testing and modeling methods used to assess the toxicity impact of aquatic pollutants. (Organic chemistry, 1011 201) **Class 3, Credit 3 (S-X*) (not offered 2012-1013)**

Polymer Chemistry

1029-301 **Introduction to Polymer Technology**
This course is a survey of polymer science, including terminology, synthesis, structures, properties, applications and processing techniques of commercially significant polymers. (General chemistry, 1016-251 or equivalent) **Class 2, Credit 2 (F)**

1029-501 **Organic Chemistry of Polymers**
The synthesis of high molecular weight organic polymers and their properties are introduced. Mechanisms of step growth and chain growth polymerization reactions, polymer reactions and degradation are also considered. The end properties of polymers can be 'tailored' by their method of synthesis. Controlled synthesis is particularly achievable when using coordinative polymerization, which will be discussed in detail. (1013-433) **Class 4, Credit 4 (W)**

*X, extended day (after 5 p.m.)

1029-503 **Polymer Chemistry: Properties of Bulk Materials**
This course is designed to give the student with a chemistry or materials science background a thorough grounding in the main concepts that describe bulk polymer structure, behavior and properties. The course follows a synthetic path; the structure property relationships for polymeric materials are built up from a microscopic to a macroscopic level. One of the most important lessons of the course is that polymers are almost never in a thermodynamically stable state. Consequently, the behavior of polymers and the properties they display are time dependent and vary with the thermo-mechanical history of the materials. (1029-501, 502) **Class 4, Credit 4 (F-X*)**

1029-504 **Polymer Characterization Laboratory**
This course introduces, and gives the student experience with, analytical techniques commonly employed to characterize high polymers. To accomplish this, the course is divided into five sections, each high-lighting a particular characteristic of polymeric materials: 1) molecular weight distributions; 2) spectroscopic analysis of chemical structure; 3) thermal stability; 4) morphology and phase transitions, and 5) mechanical properties. The experiments, each requiring eight lab hours to complete, are designed to give students exposure to laboratory techniques not generally covered in undergraduate science/engineering curriculum. Although the documentation of experimental results is important, and will be evaluated, the main purpose is to give the student hands-on experience, hopefully piquing his/her interest in and enthusiasm for the field. (1008-319, 1029-301) **Lab 6, Credit 2 (not offered 2012–2013)**

1029-505 **Synthesis of High Polymers Laboratory**
Students will carry out about eight experiments. They will conduct in about half of those experiments step-growth polymerizations and in the other half chain-addition polymerizations. Among the polymers produced will be Nylon 6-10, Nylon 11, polystyrene, high-density polyethylene, linear low density polyethylene, copolymer of styrene and methyl methacrylate and polyurethane. The most specific types of polymerizations and reactions introduced will be cross-linking polymer, interfacial and bulk step-growth polymerizations, cyclopolymerization, radical, ionic, and coordinative chain polymerizations. Instructors may add or delete polymer-related experiments of their choice. Experiments also include basic characterization of products by at least one method. (1013-437) **Lab 6, Credit 2 (not offered 2012–2013) (F)**

Mathematics and Statistics

1016-200 **Algebra**
An algebra course including such topics as operations involving polynomials, algebraic fractions, factoring, exponents and radicals, solution of linear and quadratic equations, and graphing linear equations. (High school algebra and geometry) **Class 4, Credit 4 (F, W, S)**

1016-204 **College Algebra**
This course prepares students to enter a non-trigonometry based, introductory level calculus course. Topics include a review of the fundamentals of algebra; solution of linear, fractional and quadratic equations; functions and their graphs; polynomial, exponential, logarithmic and rational functions; systems of linear equations. (Two years of high school algebra and score below 35% on the Mathematics Placement Exam) **Class 4, Credit 4 (F, W, S, Su)**

1016-205 **Discrete Math for Technologists I**
An introduction to topics of discrete mathematics for students of Information Technology, including number systems, sets and logic, counting and matrices. (1016-204) **Class 4, Credit 4 (F, W, S, Su)**

1016-206 **Discrete Math for Technologists II**
A continuation of an introduction to topics of discrete mathematics for students of Information Technology, including relations, Boolean algebra, graph theory and regular sets. (1016-205 or 1016-265) **Class 4, Credit 4 (F, W)**

1016-210 **Mathematics and Statistics Seminar I**
An introductory course for freshmen and some transfers that explores the three majors and shows typical problems that applied mathematicians, computational mathematicians and applied statisticians solve in academic and industrial settings. **Class 1, Credit 1 (F)**

1016-211 **Mathematics and Statistics Seminar II**
A continuation of 1016-210 with an introduction to co-op and the types of technical writing mathematicians and statisticians do. Students will model and write about a mathematical problem at the calculus level. **Class 1, Credit 1 (W)**

1016-214 **Elementary Calculus I**
This course is an introduction to the study of differential calculus. The following topics are covered: functions and graphs, limits, continuity, the derivative concept, derivative formulas, and applications of derivatives, with an emphasis on manipulative skills. (1016-204) **Class 3, Credit 3 (W)**

1016-215 **Elementary Calculus II**
This course is a continuation of 1016-214, with an emphasis on an introduction to integral calculus. The major topics covered are: the definite integral, the fundamental theorem of calculus, techniques of integral approximation, exponential and logarithmic functions, techniques of integration, an introduction to differential equations, and geometric series. Various applications relevant to the students' majors are made throughout the development of these topics. (1016 214) **Class 3, Credit 3 (S)**

1016-225 **Algebra for Management Science**
This course is an introduction to functions, including linear, quadratic, polynomial, exponential, logarithmic and rational functions with applications to supply and demand, cost, revenue and profit functions. Additional topics include matrices, linear programming and mathematics of finance. (Three years of high school mathematics) **Class 4, Credit 4 (F, W, S)**

1016-226 **Calculus for Management Science**
This course stresses applications of calculus concepts to solving problems in business and allied health. Topics include the limit concept, differentiation, partial differentiation and integration. (1016-225) **Class 4, Credit 4 (F, W, S, Su)**

1016-228 **Analytical Geometry**
This is a course covering topics in analytical geometry such as slopes, lines, and conic sections. Additional topics may include polar coordinates, determinants, parametric equations, trigonometry, and two and three dimensional vectors. (1016-204) **Class 4, Credit 4 (W)**

1016-230 **Precalculus**
The course covers a study of functions and their graphs and concentrates on a thorough coverage of trigonometric functions and prepares students to start their study of calculus and its applications. (Three years of high school mathematics and a score below 55% on the School of Mathematical Sciences Placement Exam) **Class 3, Workshop 1, Credit 4 (F, W, S)**

1016-231 **Calculus for Engineering Technology I**
This is the first course in the sequence of two courses. Topics covered in this course include limits, derivatives, indefinite and definite integrals, and numerical approximations. Applications to physical and engineering technology problems are emphasized. (Grade of C or better in 1016-230 or a score between 55% and 75% on the School of Mathematical Sciences Placement Exam) **Class 3, Workshop 1, Credit 4 (F, W)**

1016-232 **Calculus for Engineering Technology II**
This is the second course in a sequence of two courses. Topics covered in this course are applications of the integral calculus, differential and integral calculus of the transcendental functions, and basic techniques of integration with emphasis on applications to engineering technology problems. (Grade of C or better in 1016-231) **Class 3, Workshop 1, Credit 4 (F, W, S)**

1016-258 **Introduction to Symbolic Computing**
This course is an introduction to a symbolic computing language, its uses and applications in several undergraduate courses. Symbolic manipulations, numerical calculations, and graphics techniques are explored, as well programming techniques. (Corequisites: A basic calculus course such as 1016-281, 1016-231, 1016-271 or 1016-214) **Class 2, Credit 2 (S)**

1016-260 **Statistical Computing With Excel and Minitab**
This course is an introduction to statistical computing using the Excel and Minitab software packages. (Permission of instructor) **Class 2, Credit 2 (S)**

1016-265 **Discrete Mathematics I**
This course is an introduction to discrete mathematics with applications in computer science and mathematics with an emphasis on proof techniques. Sets, functions, the natural numbers, the integers modulo n and simple combinatorics are covered. (Corequisites: 1016 272 or 1016-282 or permission of instructor) **Class 4, Credit 4 (F, W, S)**

*X, extended day (after 5 p.m.)

- 1016-271** **Calculus A**
 First course in a sequence of four: 1016-271, 272, 273, 283. The first three cover the equivalent of 1016-281, 282 Project-based Calculus I and II, with algebra and trigonometry inserted into the curriculum in a "just in time" fashion. The course consists of a study of functions, continuity, and differentiability. The study of functions includes the definition, representations and the trigonometric functions. Limits of functions are used to study continuity and differentiability. The study of derivative includes the definition, the basic rules including the chain rule, and implicit differentiation. Applications to the derivative include problems in related rates. (At least three years of high school math and a score between 55% and 75% on School of Mathematical Sciences Placement Exam) **Class 4, Workshop 2, Credit 4 (F, W)**
- 1016-272** **Calculus B**
 This is the second course in a sequence of four courses (1016-271, 272, 273, 283). The first three courses cover the equivalent of our current Project-based Calculus I and II, with algebra and trigonometry inserted into the curriculum in a "just in time" fashion. The course consists of a study of applications of differentiation to curve sketching, optimization problems, Newton's method, and linear approximations. The course also covers indeterminate forms, anti-differentiation, Riemann Sums, the Fundamental Theorem of Calculus, and the calculus of the natural logarithmic function. (Grade of C or better in either 1016-271 or 1016-262) **Class 4, Workshop 2, Credit 4 (F, W, S)**
- 1016-273** **Calculus C**
 This is the third course in a sequence of four courses (1016-271, 272, 273, 283). The first three courses cover the equivalent of our current Project-based Calculus I and II, with algebra and trigonometry inserted into the curriculum in a "just in time" fashion. The course consists of a study of techniques of integration, applications of the definite integral and improper integrals. The techniques of integration include substitution, integration by parts, and partial fractions. The applications of the definite integral include areas between curves, volumes, work, arclength, and average values of functions. (Grade of C or better in 1016-272) **Class 4, Workshop 2, Credit 4 (F, W, S)**
- 1016-281** **Project-Based Calculus I**
 This is the first course in a sequence of three courses. Project-based Calculus is intended for students majoring in mathematics, science or engineering with the major emphasis on understanding the concepts and using them to solve a variety of physical problems. Project-based Calculus I covers two-dimensional analytic geometry, functions, limits, continuity, the derivative and its formulas, and applications of the derivative. (Three years of high school mathematics and a grade of 75% or higher on the School of Mathematical Sciences Placement Exam) **Class 4, Workshop 2, Credit 4 (F, W)**
- 1016-282** **Project-Based Calculus II**
 This is the second course in a sequence of three courses. Project based calculus is intended for students majoring in mathematics, science or engineering with the major emphasis on understanding the concepts and using them to solve a variety of physical problems. Project-based Calculus II covers optimization problems and Newton's method, integral calculus and techniques of integration with emphasis on applications of integration. (Grade of C or better in 1016-281) **Class 4, Workshop 2, Credit 4 (F, W, S)**
- 1016-283** **Project-Based Calculus III**
 This is the third course in a sequence of three courses intended for students majoring in mathematics, science or engineering with the major emphasis on understanding the concepts and using them to solve a variety of physical problems. Major themes are techniques of integration, representing functions by infinite series, and the convergence and divergence of series. (Grade of C or better in 1016-282 or 1016-273) **Class 4, Workshop 2, Credit 4 (F, W, S)**
- 1016-289** **Contemporary Science: Mathematics**
 A basic survey of mathematical structures as well as an introduction to problem solving. Topics are chosen from foundations of mathematics, algebra, topology, number theory, graph theory, probability and statistics. These structures are examined as they occur naturally in modern settings. NOTE: Not acceptable as science credit for College of Science majors. **Class 4, Credit 4 (W)**
- 1016-304** **Differential Equations for Engineering Technology**
 This course is a continuation of 1016-232. Course covers selected applied mathematics topics, including differential equations, Laplace transforms, numerical methods and the calculus of functions of two variables. Emphasis is on the application of these topics to engineering technology problems. (1016-232) **Class 4, Credit 4 (F, W, S)**
- 1016-305** **Multivariable Calculus**
 This course is a study of the calculus of functions of two or more variables, including limits and partial derivatives of these functions, as well as a study of three dimensional analytic geometry and vector algebra, and multiple integrals with applications in engineering and science. (Grade of C or better in 1016-273 or in 1016-282) **Class 4, Credit 4 (F, W, S, Su)**
- 1016-306** **Differential Equations I**
 This course is an introduction to the study of ordinary differential equations and their applications. Topics include solutions to common first-order equations and linear second-order equations, method of undetermined coefficients, variation of parameters, linear independence and the Wronskian, numerical solution techniques, vibrating systems and Laplace transforms. (1016-283) **Class 4, Credit 4 (F, W, S, Su)**
- 1016-307** **Differential Equations II**
 This is a second-quarter course in ordinary differential equations that includes power series solutions to ordinary differential equations about ordinary and regular singular points; orthogonal polynomials; solution of systems of linear differential equations; phase plane analysis, stability and chaos. (1016-305, 306) **Class 4, Credit 4 (offered upon sufficient request)**
- 1016-309** **Introduction to Biostatistics**
 An introduction to the use of statistical techniques for solving problems in the health and biological sciences. The statistical software package Minitab will be used to reinforce these techniques and to introduce the students to the use of computers in statistical analysis. This is a general introductory course for students interested in the applications of statistics to the health and biological sciences. (1016-204 or equivalent) **Class 4, Credit 4 (F, W, S, Su)**
- 1016-314** **Engineering Statistics**
 Basic statistical concepts including descriptive statistics, probability, inference, and quality control are covered in this course. The statistical package Minitab will be used to reinforce these techniques. The focus of this course is on statistical applications and quality improvement in engineering. This course is intended for engineering programs and has a calculus prerequisite. NOTE: This course may not be taken for credit if credit is to be earned in 1016-319. (1016-283) **Class 4, Credit 4 (F, W, S)**
- 1016-318** **Matrices and Boundary Value Problems**
 This course is an introduction to matrix algebra and boundary value problems. Topics include matrix operations, solution of linear systems of algebraic equations, Fourier series, separation of variables, the heat equation and the wave equation. (1016-305, 1016-306) **Class 4, Credit 4 (F, S, Su)**
- 1016-319** **Data Analysis I**
 This course will study the statistical principles of presenting and interpreting data. Topics covered will include: descriptive statistics and displays, random sampling, the normal distribution, confidence intervals and hypothesis testing. The statistical software package Minitab will be used to reinforce these principles and to introduce students to the use of technology in statistical analysis. This is a general introductory statistics course and is intended for a broad range of programs. NOTE: This course may not be taken for credit if credit is to be earned in 1016-314. (1016-204) **Class 4, Credit 4 (F, W, S, Su)**
- 1016-320** **Data Analysis II**
 This course is an elementary introduction to the topics of regression and analysis of variance. The statistical software package Minitab is used to reinforce these techniques. The focus of this course is on business applications. This is a general introductory statistics course and is intended for a broad range of programs. (1016-319 or equivalent) **Class 6, Credit 6 (F, W, S, Su)**
- 1016-328** **Engineering Mathematics**
 This course is an introduction to matrix algebra and vector calculus. Topics include matrix operations with applications to the solution of linear systems of algebraic equations; gradient, divergence and curl; line and surface integrals; independence of path and the divergence theorem; and Stoke's theorem with discussion of engineering applications and analysis. NOTE: Credit may not be earned in both 1016-328 and 1016-410 (1016-305, 306) **Class 4, Credit 4 (F, S, Su)**
- 1016-331** **Linear Algebra I**
 This course is an introduction to the basic concepts of linear algebra, with an emphasis on matrix manipulation. Topics include Gaussian elimination, matrix arithmetic, determinants, Cramer's rule, vector spaces, linear independence, basis, nullspace, row and column spaces of a matrix, eigenvalues and eigenvectors. Various applications are studied throughout the course. (1016-305 or 1016-366) **Class 4, Credit 4 (F, W, S)**

*X, extended day (after 5 p.m.)

- 1016-345** **Probability and Statistics for Engineers**
This course will introduce students to: sample spaces and events; axioms of probability; counting techniques; conditional probability and independence; distributions of discrete and continuous random variables; joint distributions (discrete and continuous); central limit theorem; descriptive statistics; interval estimation; applications of probability and statistics to real-world problems. (1016-305) **Class 4, Credit 4 (F, W, S)**
- 1016-351** **Probability**
This course covers descriptive statistics; sample spaces and events; axioms of probability; counting techniques; conditional probability and independence; distributions of discrete and continuous random variables; joint distributions; and central limit theorem. (1016-273 or 1016-282) **Class 4, Credit 4 (F, W, S)**
- 1016-352** **Applied Statistics**
This course covers basic statistical concepts, sampling theory, hypothesis testing, confidence intervals, point estimation and simple linear regression. A statistical software package is used for data analysis and statistical applications. (1016-351) **Class 4, Credit 4 (F, W, S)**
- 1016-354** **Introduction to Regression Analysis**
This course is a study of regression techniques with applications to the type of problems encountered in real-world situations. It includes use of statistical software. Topics include review of simple linear regression, residual analysis, multiple regression, matrix approach to regression, model selection procedures, various other models as time permits. (1016-353 and 331 or equivalent) **Class 4, Credit 4 (W)**
- 1016-355** **Design of Experiments**
This course is a study of the design and analysis of experiments and includes extensive use of statistical software. Topics include single factor analysis of variance; multiple comparisons and model validation; multifactor factorial designs; fixed, random and mixed models; expected mean square calculations; confounding; randomized block designs; other designs and topics as time permits. (1016-314 or 1016-352) **Class 4, Credit 4 (F)**
- 1016-358** **Statistical Quality Control**
This course is a review of probability models associated with control charts; control charts for continuous and discrete data; interpretation of control charts; and some standard sampling plans. A statistical software package is used for data analysis. (1016-314 or 1016-352) **Class 4, Credit 4 (S)**
- 1016-365** **Combinatorial Mathematics**
This is an introduction to the mathematical theory of combination, arrangement, and enumeration of discrete structures. Topics include enumeration, recursion, inclusion-exclusion, block design, generating functions. (1016-265 or permission of instructor) **Class 4, Credit 4 (W)**
- 1016-366** **Discrete Mathematics II**
This course is a continuation of 1016-265 Discrete Mathematics I with applications in computer science. Topics include relations, their closures, equivalence relations, partial orderings, recursively defined sets, countable and uncountable sets, and an introduction to graph theory. (1016-265) **Class 4, Credit 4 (F, W, S)**
- 1016-385** **History of Mathematics**
This is an introduction to the history of mathematics that provides the student the opportunity to study the historical background of some topics in the mathematical sciences and to write about those topics. The set of topics studied will vary. (1016-306) **Class 4, Credit 4 (offered upon sufficient request)**
- 1016-399** **Mathematics Co-op Seminar**
This course provides an exploration of cooperative education opportunities, practice in writing letters of application, resume writing and interviewing procedures. **Class 1, Credit 0 (W)**
- 1016-407** **Dynamical Systems**
The course revisits the equations of spring-mass, RLC circuits and pendulum systems in order to view and interpret the phase space representations of these dynamical systems. This begins with linear systems followed by a study of the stability analysis of nonlinear systems. Matrix techniques are introduced to study higher order systems. The Lorentz equation will be studied to introduce the presence of chaotic solutions. A computer algebra system will be used. (1016-306, 1016-331) **Class 4, Credit 4 (S)**
- 1016-410** **Vector Calculus**
This course is a continuation of multivariable calculus. Stokes's and Green's theorems and the divergence theorem are covered along with an introduction to the applications of these theorems in physics. NOTE: Credit may not be earned in both 1016-328 and 1016-410 (1016-305) **Class 4, Credit 4 (W)**
- 1016-411** **Real Variables I**
This course is an investigation and extension of the theoretical aspects of elementary calculus. Topics include mathematical induction, real numbers, functions, limits, continuity, differentiation, L'Hospital's rule, Taylor's theorem. (1016-265 and 1016-305 or permission of instructor) **Class 4, Workshop 2, Credit 4 (F, W)**
- 1016-412** **Real Variables II**
This is a continuation of 1016-411 which concentrates on integration: definition of the definite integral, its existence and properties, improper integrals, infinite series, sequences and power series. (1016-411) **Class 4, Credit 4 (W, S)**
- 1016-415** **Statistical Analysis for Bioinformatics**
This course is an introduction to the probabilistic models and statistical techniques used in computational molecular biology. Probabilistic and/or statistical techniques will be presented for the understanding of pairwise and multiple sequence alignment methods, gene and protein classification methods, and phylogenetic tree construction. (1016-273 or 1016-282, 1016-265 and 1016-319) **Class 4, Credit 4 (W)**
- 1016-420** **Complex Variables**
This course provides a brief introduction to complex numbers and their arithmetic, differentiation and the Cauchy-Riemann equations, path integrals, analyticity, complex integration, Cauchy's integral theorem and integral formulas, Taylor and Laurent series, residues, and real integrals by complex methods. (1016-283, 1016-305) **Class 4, Credit 4 (F, W, Su)**
- 1016-432** **Linear Algebra II**
This course provides a further development of the basic concepts of linear algebra, including orthogonality. Topics include similarity, linear transformations, diagonalization, inner products, Gram Schmidt, quadratic forms and various numerical techniques. Several applications of these ideas are also presented. (1016-331) **Class 4, Credit 4 (F, W, S)**
- 1016-451** **Mathematical Statistics I**
This course provides a brief review of basic probability concepts and distribution theory; mathematical properties of distributions needed for statistical inference. (1016-352 or 1016-314) **Class 4, Credit 4 (W)**
- 1016-452** **Mathematical Statistics II**
This is a continuation of 1016-451 covering classical and Bayesian methods in estimation theory; chi-square test; Neyman-Pearson lemma; mathematical justification of standard test procedures; sufficient statistics and further topics in statistical inference. (1016-451) **Class 4, Credit 4 (S)**
- 1016-454** **Non-Parametric Statistics**
This is an in-depth study of inferential procedures that are valid under a wide range of shapes for the population distribution. Topics include tests based on the binomial distribution, contingency tables, statistical inferences based on ranks, runs tests and randomization methods. A statistical software package is used for data analysis. (1016-314 or 1016-352) **Class 4, Credit 4 (F)**
- 1016-457** **Research Sampling Techniques**
This course provides a basis for understanding the selection of the appropriate tools and techniques for analyzing survey data. Topics include design of sample surveys, methods of data collection, a study of standard sampling methods. A statistical software package is used for data analysis. (1016-352 or 1016-314) **Class 4, Credit 4 (S)**
- 1016-461** **Mathematical Modeling**
This course explores problem solving, formulation of the mathematical model from physical considerations, solution of the mathematical problem, testing the model, and interpretation of results. Problems are selected from the physical sciences, engineering and economics. (1016-305, 306, 331, 352) **Class 4, Credit 4 (F)**
- 1016-465** **Linear Optimization**
This course is a presentation of the general linear programming problem. A review of pertinent matrix theory, convex sets and systems of linear inequalities; the simplex method of solution; artificial bases; duality; parametric programming; and applications are covered. (1016-331) **Class 4, Credit 4 (offered upon sufficient request)**

- 1016-466** **Advanced Optimization**
This course provides a study of the theory of optimization of linear and non-linear functions of several variables with or without constraints. Applications of this theory to solve problems in business, management, engineering, and the sciences are considered. Algorithms for practical applications will be analyzed and implemented. Students taking this course will be expected to complete applied projects and/or case studies. (1016-465 or equivalent) **Class 4, Credit 4 (offered upon sufficient request)**
- 1016-467** **Graph Theory**
The basic theory of graphs and networks, including the concepts of circuits, trees, edge and vertex separability, planarity and vertex coloring, and partitioning are discussed. There is a strong emphasis on applications to physical problems and on graph algorithms such as those for spanning trees, shortest paths, non-separable blocks and network flows. (1016-265) **Class 4, Credit 4 (F, S)**
- 1016-469** **Mathematical Simulation**
This is an introduction to computer simulation, simulation languages, model building and computer implementation, and mathematical analyses of simulation models and their results using techniques from probability and statistics. (1016-352, 4003-231, 232 or permission of the instructor) **Class 4, Credit 4 (offered upon sufficient request)**
- 1016-470** **Undergraduate Research**
The students work on a research topic under the supervision of a faculty member. A form describing the research goals must be signed by the faculty member and the head of the school before registration. (Permission of instructor) **Credit 2-4 (F, W, S, Su)**
- 1016-481** **Topics in Mathematical Problem Solving**
This course helps students develop strategies for solving problems that are chosen from a wide variety of areas in mathematics. Emphasis is on attempting problem solutions and presentation of efforts to the class or to the instructor. (One year of calculus or permission of instructor) **Class 2, Credit 2 (F)**
- 1016-485** **Number Theory**
This course is a study of the structure of the set of integers. Topics such as divisibility, congruences, arithmetic functions, primitive roots, quadratic residues, and the nature and distribution of primes are investigated. (1016-265) **Class 4, Credit 4 (W)**
- 1016-511** **Numerical Analysis**
This course covers numerical techniques for the solution of nonlinear equations, interpolation, differentiation, integration, initial value problems. (1016-306, 1016-331 and some programming knowledge) **Class 4, Credit 4 (F)**
- 1016-512** **Numerical Linear Algebra**
This course covers numerical techniques for the solution of systems of linear equations, eigenvalue problems, singular-values and other decompositions, applications to least squares, boundary value problems, and additional topics at the discretion of the instructor. (1016-305, 1016-306, 1016-432 and some programming knowledge) **Class 4, Credit 4 (W)**
- 1016-524** **Introduction to Time Series**
A study of the modeling and forecasting of time series is provided. Topics include ARMA and ARIMA models, autocorrelation function, partial autocorrelation function, detrending, residual analysis, graphical methods and diagnostics. A statistical software package is used for data analysis. (1016-352 or 1016-314) **Class 4, Credit 4 (offered upon sufficient request) (S)**
- 1016-525** **Stochastic Processes**
This course explores Poisson processes and Markov chains with an emphasis on applications. Extensive use is made of conditional probability and conditional expectation. Further topics, such as renewal processes, Brownian motion, queuing models and reliability, are discussed as time allows. (1016-331, 351, or permission of instructor) **Class 4, Credit 4 (W)**
- 1016-511** **Abstract Algebra I**
This course covers basic set theory and number theory, groups, subgroups, cyclic and permutation groups, Lagrange's theorem, quotient groups, isomorphism theorems, and applications to scientific problems. (1016-265, 1016-432) **Class 4, Workshop 2, Credit 4 (W)**
- 1016-532** **Abstract Algebra II**
The basic theory of rings, integral domains, ideals and fields, applications to coding theory or abstract vector spaces, function spaces, direct sums, applications to differential equations and scientific problems are discussed. (1016-531) **Class 4, Credit 4 (F, S)**
- 1016-541** **Actuarial Mathematics**
Students study challenging problems whose solutions require a combination of skills that one acquires in a typical mathematics based curriculum. Course work synthesizes basic, essential problem solving ideas and techniques as they apply to various areas, such as actuarial mathematics. (1016-432 or permission of instructor) **Class 2, Credit 2 (F)**
- 1016-555** **Statistics Seminar**
The seminar introduces the student to statistical situations not encountered in the previous course of study. Topics include open ended analysis of data, motivating use of statistical tools beyond the scope of previous courses, introduction to the statistical literature, development of statistical communication skills and the pros and cons of statistical software packages. (1016-354, 1016-355) **Class 4, Credit 4 (S)**
- 1016-558** **Multivariate Analysis**
A study of the multivariate normal distribution, statistical inference on multivariate data, multivariate analysis of covariance, canonical correlation, principal component analysis and cluster analysis. A statistical software package is used for data analysis. (1016-354, 1016-331) **Class 4, Credit 4 (offered upon sufficient request)**
- 1016-559** **Special Topics**
Topics of special interest to a sufficiently large group of students, and not covered in other courses, may be offered upon request. (Permission of instructor) **Class variable, Credit variable (offered upon sufficient request)**
- 1016-565** **Game Theory**
This is an introduction to the theory of games with solution techniques and applications. Topics include game trees, matrix games, linear inequalities and programming, convex sets, the minimax theorem, n-person games. (1016-331 or permission of instructor) **Class 4, Credit 4 (offered upon sufficient request)**
- 1016-566** **Nonlinear Optimization Theory**
The theory of optimization of nonlinear functions of several real variables is presented. Topics include unconstrained optimization (Newton-Raphson, steepest ascent and gradient methods), constrained optimization (Lagrange multipliers, Kuhn-Tucker theorem, penalty concept, dynamic programming) and computational aspects (rates of convergence, computational complexity). (1016-305, 1016-432) **Class 4, Credit 4 (offered upon sufficient request)**
- 1016-571** **Topology I**
Metric spaces, topological spaces, separation axioms, compactness, connectedness, and product spaces are discussed. (1016-412 or permission of instructor) **Class 4, Credit 4 (offered upon sufficient request)**
- 1016-572** **Topology II**
A continuation of topics from 1016-571. (1016-571 or permission of instructor) **Class 4, Credit 4 (offered upon sufficient request)**
- 1016-581** **Introduction to Linear Models**
This course is an introduction to the theory of linear models. Least squares estimators and their properties; matrix formulation of linear regression theory; random vectors and random matrices; the normal distribution model and the Gauss-Markov theorem; variability and sums of squares; distribution theory; the general linear hypothesis test; confidence intervals; confidence regions; correlations among regressor variables; ANOVA models; geometric aspects of linear regression; and less than full rank models are introduced. (1016-331, 1016-354) **Class 4, Credit 4 (offered upon sufficient request)**
- 1016-599** **Mathematics: Independent Study**
Faculty-directed study of appropriate topics on a tutorial basis. Used to enable an individual to pursue studies of existing knowledge available in the literature and not taught in regularly offered courses. **Class variable, Credit variable**

Physics

1017-200 Introduction to Special Relativity
Students will learn aspects of Einstein's Theory of Special Relativity including time dilation, length contraction, Lorentz transformations, velocity transformations, relativistic Doppler effect, issues with simultaneity, and relativistic expressions for energy and momentum. (High school physics and algebra) **Class 3, Credit 2 (F)**

1017-202 Exploration in Physics
This is an activity-based course in which topics will encompass a range of physical phenomena. Scientific concepts are introduced to provide a basis for understanding phenomena such as sight and optics, motion, rainbows, cloud formation, and global warming. Typically two topics per quarter will be covered. The main emphasis will be on the process of scientific investigation, with students developing hands on projects throughout each quarter. **Class 4, Lab 2, Credit 4 (W, S)**

1017-211 College Physics I
This is an introductory course in algebra-based physics focusing on mechanics. The course is taught in a lecture/workshop format that integrates material traditionally found in separate lecture and laboratory courses. Topics include kinematics, planar motion, Newton's Laws, gravitation; rotational kinematics and dynamics; work, kinetic and potential energy; momentum and impulse; conservation laws; data presentation and analysis, error propagation. (Competency in algebra, geometry and trigonometry). **Class 6, Credit 4 (F, W, S, Su)**

1017-212 College Physics II
This is an introductory course in algebra-based physics focusing on basic topics in oscillatory motion, wave motion, sound, geometrical optics, physical optics, fluids, heat, and thermodynamics. The course is taught in a lecture/workshop format that integrates material traditionally found in separate lecture and laboratory courses. (Prerequisite: 1017-211 College Physics I). **Class 6, Credit 4 (F, W, S, Su)**

1017-212T College Physics Transition: Waves
This is a course in algebra-based physics focusing on waves and optics. Topics include mechanical and electromagnetic waves; geometrical optics; physical optics and interference; fluids; data presentation/analysis and error propagation. This course will only be offered in spring and summer 2012 as a transition to semesters. This course and 1017-211 is equivalent to the semester course PHYS-111. (1017-211) **Class 1, Workshop 2, Credit 2 (S, Su)**

1017-213 College Physics III
This is an introductory course in algebra-based physics focusing on the topics of electrostatics, dc and ac electrical circuits, magnetic forces and fields, electromagnetic induction, Bohr model of the atom, radioactivity. The course is taught in a lecture/workshop format that integrates material traditionally found in separate lecture and laboratory courses. (Prerequisites: 1017-211 College Physics I; 1017 212 College Physics II recommended). **Class 6, Credit 4 (F, W, S)**

1017-230 Stellar Astronomy
An introduction to the basic concepts of stellar astronomy, including celestial sphere, constellations, nomenclature, physical properties of the stars, principles of spectroscopy as applied to astronomy, double stars, variable stars, star clusters, stellar evolution, gaseous nebulae, stellar motions and distribution, and the Milky Way system is provided. This course is not recommended for students required to take University Physics. (Competency in algebra) (May be taken before or after 1017-235, 240) **Class 3, Credit 3 (F)**

1017-231 Stellar Astronomy Laboratory
This laboratory course includes experiments related to the principles and theories discussed in the corresponding lecture. Observational exercises utilizing the RIT observatory and associated equipment are emphasized. (Credit or co-registration in 1017-230) **Class 2, Credit 1 (F)**

1017-235 Solar System Astronomy
This course is an introduction to basic concepts of solar system astronomy, including celestial sphere, zodiac, astronomical telescopes, sun, moon, eclipses, earth as a planet, planets and their satellites, comets, meteors, and theories of the origin of the solar system. This course is not recommended for students required to take University Physics. (Competency in algebra) (May be taken before or after 1017-230, 240) **Class 3, Credit 3 (S)**

1017-236 Solar System Astronomy Laboratory
This laboratory course includes experiments related to the principles and theories discussed in the corresponding lecture. Observational exercises utilizing the RIT observatory and associated equipment are emphasized. (Credit or co-registration in 1017-235) **Class 2, Credit 1 (S)**

1017-240 Extragalactic Astronomy
An introduction to extragalactic astronomy, including the history of our discovery of the external galaxies and their classification, the "cosmic distance ladder," quasars and other distinct objects, the Big Bang theory of cosmology, and the future of the universe. This course is not recommended for students required to take University Physics. (Competency in algebra) (May be taken before or after 1017-230, 235) **Class 3, Credit 3 (W)**

1017-241 Electronics for Technologists
This course is an introduction to analog circuit theory and applications for engineering technology students. Topics include: the concepts of voltage and current sources, constructing Thevenin and Norton equivalent circuits, applying Kirchhoff's Laws, measuring DC and AC device characteristics, characterization and measurement of time-dependent waveforms, transient and frequency-dependent behavior of circuits and devices. The associated laboratory will reinforce the lecture material and teach practical skills essential to modern engineering. (1016-232, 1017-213) **Class 3, Lab 3, Credit 4 (S)**

1017-289 Contemporary Science: Physics
This is an introductory science for non-science students. One or more topics such as astronomy, space exploration, relativity, nuclear energy and lasers are discussed and simply explained to give an appreciation of the significance of physics in our contemporary technological society. A minimum of mathematics is used. A laboratory or discussion option may be offered for small group meetings once a week, which reinforces the material given in demonstration lectures and audiovisual presentations. NOTE: Not acceptable for science credit for College of Science majors. (Competency in algebra) **Class 4, Credit 4 (offered upon sufficient request)(F, W, S)**

1017-301 University Astronomy
This course is an introduction to the basic concepts of astronomy and astrophysics for scientists and engineers. Topics include the celestial sphere, celestial mechanics, methods of data acquisition, planetary systems, stars and stellar systems, cosmology, and life in the universe. (1017-311 or equivalent; 1016-281 or 1016-271, 272 or equivalent) **Class 4, Credit 4 (F, S)**

1017-311 University Physics I
This is an intensive course in calculus-based physics for science and engineering majors. The course is taught in a lecture/workshop format that integrates the material traditionally found in separate lecture and laboratory courses. Topics include kinematics, planar motion, Newton's Laws, gravitation; work, kinetic and potential energy; momentum and impulse; conservation laws; systems of particles; data presentation and analysis; and error propagation. (Grade of C or better in 1016-281; Credit or co-registration in 1016-282) **Class 6, Credit 5 (F, W, S)** *Important: revised prerequisite information, please go to: www.rit.edu/cos/physics/UPrequirements.html

1017-312 University Physics II
This course is a continuation of University Physics I (1017-311). The course is taught in a lecture/workshop format that integrates the material traditionally found in separate lecture and laboratory courses. Topics include rotational kinematics and dynamics, rigid body motion, angular momentum, static equilibrium, oscillatory motion, wave motion, sound, and physical optics. (Grade of C or better in 1017-311 and 1016-282) **Class 6, Credit 5 (F, W, S, Su)** *important: revised prerequisite information, please go to: www.rit.edu/cos/physics/UPrequirements.html

1017-312T University Physics II: Transition
This is a course in calculus-based physics for science and engineering majors. Topics include rotational motion, static equilibrium, mechanical oscillations and waves, and data presentation/analysis. The course is taught in a workshop format that integrates the material traditionally found in separate lecture and laboratory courses. This course will only be offered in spring and summer 2012 as a transition to semesters. This course and 1017-311 or 1017-369 is equivalent to the semester course PHYS-211. (Grade of C or better in 1016-282 or 1016-272; and 1017-311 or 1017-369) **Workshop 4, Credit 3 (S, Su)**

1017-313 **University Physics III**
This course is a continuation of University Physics II (1017-312). The course is taught in a lecture/workshop format that integrates the material traditionally found in separate lecture and laboratory courses. Topics include electrostatics, Gauss' law, electric field and potential, capacitance, resistance, DC circuits, magnetic field, Ampere's law, and inductance. (Grade of C or better in 1017-312 or in University Physics IIA* and in 1016-273 or in 1016-282, co-registration in 1016-305) **Class 6, Credit 4 (F, W, S)** *Important: revised prerequisite information, please go to: www.rit.edu/cos/physics/UPrequirements.html

1017-314 **Modern Physics I**
An introductory survey of elementary quantum physics at the sophomore level. Relativistic dynamics, quantization, photons, wave-particle duality, deBroglie waves, Bohr model, introduction to wave mechanics, the Schrodinger equation, energy levels, degeneracy, hydrogen atom, spin, multi-electron atoms. (1017-313) **Class 4, Credit 4 (F, W, S)**

1017-315 **Modern Physics II**
A continuation of a survey of modern physics at the sophomore level. This course introduces the fundamentals of multi-electron atoms, statistical treatment of systems of particles, elementary solid state physics, applications to semiconductors and nuclear and particle physics. (1016-314) **Class 4, Credit 4 (S)**

1017-316 **Particle Physics, Stars and the Big Bang**
This course is a second course in modern physics and designed for students who have completed the introductory modern physics course. Topics include: an introduction to the structure of nuclei, nuclear reactions, and elementary particle physics; the creation of the elements through the lives of stars, hydrogen fusion, black holes, supernovae; and the origin and fate of the universe from the Big Bang to the unknown future. (1017-314 or permission of instructor) **Class 4, Credit 4 (offered upon sufficient request) (S)**

1017-317 **Introduction to Computational Physics and Programming**
An introduction to techniques of computational physics, such as numerical differentiation, integration, solutions of the equations of Newtonian mechanics, coupled differential equations. The course includes a very brief introduction to computer programming, focusing on documentation, style and clarity, as well as introducing functional programming language. (Credit or co-registration in 1017-312 or equivalent and 1016-282 or 1016-273) **Class 4, Credit 4 (S)**

1017-318 **Vibrations and Waves**
An introduction to the physics of vibrations and waves. (1017-312, 1016-282 or 1016-273; Credit or co-registration in 1017-313, Credit or co-registration in 1016-283) **Class 4, Credit 4 (S)**

1017-320 **Principles of Optics**
An introductory course in physical and geometrical optics. Wave and photon description of light; propagation of electromagnetic waves in vacuum and transparent media; mirrors, lenses, and simple optical instruments; basics of optical fibers; polarization of light and polarizing optical elements; interference; Michelson interferometer; Fraunhofer and Fresnel diffraction; diffraction gratings. (1017-213, 1016-206) **Class 4, Credit 4 (W)**

1017-321 **Introduction to Laboratory Techniques**
An introduction to common techniques used in the physics laboratory including data acquisition using LabVIEW, thermometry, optical systems, vacuum systems, and methods of dealing with small signals and noise. (1017-313, 1017-317, 1017-431) **Class 3, Lab 3, Credit 4 (S)**

1017-341 **Foundations of Scientific Thinking**
Definition of science; historical perspective; ingredients of the scientific quest; the scientific method; scientific explanation, laws, theories and hypotheses; the role of mathematics; probability and induction; science and other disciplines. (At least a year of basic sciences at the college level) **Class 2, Credit 2 (offered upon sufficient request) (F, W)**

1017-350 **Sophomore Physics Seminar**
A study of concepts that unify the diverse topics covered in the introductory physics sequence. Preparation for Comprehensive Oral Exam I. Techniques of physics literature searches and the preparation and organization of technical papers and oral presentations. Physics majors must pass this course before going on to 400-level courses. (1017-311, 312, 313; Credit or co-registration in 1017-314) **Class 2, Credit 1 (F, W, S)**

1017-369 **University Physics IA**
University Physics IA An intensive course in calculus-based physics for science and engineering majors whose performance on the Math Placement Exam resulted in their placement in the Calculus A/B/C or Calculus Foundations sequences. The course is taught in a workshop format that integrates the material traditionally found in separate lecture and laboratory courses. Topics include kinematics, planar motion, Newton's Laws, gravitation; work, kinetic and potential energy; momentum and impulse; conservation laws; systems of particles; data presentation and analysis, error propagation. (1016-271 or 1016-262 or 1016-281, and credit or co-registration in 1016-272 or 1016-282; a grade of C or better is required in all prerequisites) **Class 8, Credit 5 (F, W, S)** *Important: revised prerequisite information, please go to: www.rit.edu/cos/physics/UPrequirements.html

1017-374 **Experiments in Modern Physics I**
This course consists of experiments representative of the experimental foundations of modern quantum physics, including experiments investigating wave particle duality, measurement of fundamental constants, and the earliest of quantum mechanical models. Experiments include electron diffraction, the photoelectric effect, optical diffraction and interference, atomic spectroscopy, charge to mass ratio of an electron, and black-body radiation. (1017-313, 314) **Class 1, Lab 3, Credit 2 (S)**

1017-378 **Experiments in Modern Physics II**
This course consists of more experiments investigating the foundations of modern quantum physics and its applications. These experiments span topics in atomic and nuclear physics, semiconductor physics, and phase transitions and critical phenomena. Experiments include the Franck-Hertz experiment, Ramsauer-Townsend effect, optical pumping in rubidium atoms, nuclear spectroscopy, radioactive half-life, the Hall effect in semiconductors and metals, properties of light emitting diodes, transistors, ferromagnetic and superconducting phase transitions. (1017-313, 314) **Class 1, Lab 3, Credit 2 (F)**

1017-389 **University Physics IIA**
University Physics IIA A continuation of 1017-369 University Physics IA for science and engineering majors whose performance on the Math Placement Exam resulted in their placement in the Calculus A/B/C or Calculus Foundations sequences. The course is taught in a lecture/workshop format that integrates the material traditionally found in separate lecture and laboratory courses. Topics include rotational kinematics and dynamics, rigid body motion, angular momentum, static equilibrium; oscillatory motion, wave motion, sound, physical optics. (1017-369 and 1016-272 or 1016-282, credit or co-registration in 1016-273; a grade of C or better is required in all prerequisites) **Class 8, Credit 5 (F, W, S, Su)** *Important: revised prerequisite information, please go to: www.rit.edu/cos/physics/UPrequirements.html

1017-395 **Physics Research**
Faculty-directed student project or research involving laboratory work or theoretical calculations that could be considered of an original nature. The level of study is appropriate for students in their first three years of study. (Permission of instructor) **Class variable, Credit variable (offered every year)**

1017-399 **Physics: Intermediate Independent Study**
Faculty-directed study of appropriate topics on a tutorial basis. The level of study is appropriate for students in their first three years of study. **Class variable, Credit variable**

1017-400 **Capstone Preparation**
This course is a preparation for the two-quarter physics capstone project to be carried out in the following year. It includes selection of a project and faculty mentor, preparation of a feasibility study, preparation of a paper and a public oral presentation. (1017-350, Departmental approval required) **Class 1, Credit 1 (S)**

1017-401 **Intermediate Mechanics I**
Particle dynamics in one, two and three dimensions; systems of particles; conservation laws; rigid body motion; gravitational fields and potentials. (Credit or co-registration in 1017-480) (1016-306, 1017-312, 313) **Class 4, Credit 4 (F)**

1017-402 **Intermediate Mechanics II**
Translating and rotating coordinate systems, mechanics of continuous media, wave motion, Lagrangian formulation of mechanics. (1017-401, 480, Credit or co-registration in 1017-350) **Class 4, Credit 4 (W)**

- 1017-411 Electricity and Magnetism I**
Electric and magnetic fields using vector methods, Gauss's law, theory of dielectrics, Ampere's law and Faraday's law, vector potential, displacement current, Maxwell's equations, wave propagation in dielectrics and conductors; and production and propagation of radiation. (1016-306; 1017-312, 313, 350, 480) **Class 4, Credit 4 (W)**
- 1017-412 Electricity and Magnetism II**
Electric and magnetic fields using vector methods, Gauss's law, theory of dielectrics, Ampere's law and Faraday's law, vector potential, displacement current, Maxwell's equations, wave propagation in dielectrics and conductors; and production and propagation of radiation. (1016-306; 1017-312, 313, 350, 411, 480) **Class 4, Credit 4 (S)**
- 1017-415 Thermal Physics**
Introduction to the principles of classical thermodynamics and kinetic theory. Equations of state, the First and Second Laws of Thermodynamics, entropy, thermodynamic potentials, applications of thermodynamics, and kinetic theory of gases. (1016-305; 1017-312, 313) **Class 4, Credit 4 (S)**
- 1017-431 Electronic Measurements**
An introduction to electronic measurement and instrumentation for analog and digital circuits. Building and testing circuits using discrete components and integrated circuits. (1017-313 or 1017-213, college level calculus) **Class 3, Lab 3, Credit 4 (F)**
- 1017-435 Introduction to Chaotic Dynamics of Physics**
Basic concepts for visualizing the behavior of nonlinear physical systems. Use of the computer as an exploratory tool for generating and observing transitions between periodic and chaotic behavior. The driven, damped pendulum as a model dynamical system for exploring such concepts as sensitivity to initial conditions, routes to chaos, strange attractors and fractal basin boundaries. Students are asked to extend general ideas to a specific physical system by performing a term project. (1017-317, 401) **Class 4, Credit 4 (offered upon sufficient request) (F or W)**
- 1017-440 Stellar Astrophysics**
A survey of basic concepts of the astrophysics of stars and stellar systems. Observed characteristics of stars, stellar atmospheres, stellar structure, stellar evolution, interstellar medium, and the Milky Way. (1017-301 or permission of instructor, 1017-314) **Class 4, Credit 4 (offered upon sufficient request) (W)**
- 1017-441 Galactic and Extragalactic Astronomy**
A survey of the basic concepts of the astrophysics of stellar systems, galaxies, and cosmology. Emphasizes extragalactic astronomy and high-energy processes. (1017-301 or permission of instructor, 1017-314) **Class 4, Credit 4 (offered upon sufficient request) (S)**
- 1017-442 Galactic Astrophysics**
This course is a survey of the astrophysics of galaxies and other stellar systems. Emphasis is on the structure and dynamics of the Milky Way galaxy. (1017-301 or permission of instructor, 1017-314) **Class 4, Credit 4 (offered upon sufficient request) (W)**
- 1017-443 Extragalactic Astrophysics and Cosmology**
This course is a survey of our current understanding of the structure, origin, and evolution of the universe. (1017-301 or permission of instructor, 1017-314) **Class 4, Credit 4 (offered upon sufficient request) (S)**
- 1017-445 Observational Astronomy**
This course provides a practical, hands-on introduction to optical astronomy. Students will use the RIT Observatory telescopes and CCD cameras to take images of celestial objects, reduce the data, and analyze the results. The course will emphasize the details of image processing required to remove instrumental effects from CCD images. (1017-301 or permission of instructor) **Class 4, Credit 4 (offered upon sufficient request) (S)**
- 1017-455 Physical Optics**
Physical optics including interference, diffraction, and polarization. Brief introduction to modern optics. (1016-305; 1017-312, 313, 480) **Class 4, Credit 4 (S)**
- 1017-480 Mathematical Methods in Physics I**
This course serves as an introduction to the tools needed to solve intermediate and upper-level physics problems. Topics to be covered include matrix algebra, vector calculus, Fourier analysis, and partial differential equations in rectangular coordinates. (1016-306, 1017-312, 313) **Class 4, Credit 4 (F)**
- 1017-481 Mathematical Methods in Physics II**
This course is a continuation of 1017-480. In the context of intermediate-level physics problems, this course serves as an introduction to the tools needed to solve those encountered in upper-level physics courses. Topics typically covered include series solutions to ordinary differential equations, solving partial differential equations in various coordinate systems, phase-space treatment of differential equations (stability, non-linear systems), matrix eigenvalue problems, and the calculus of variations. (1017-480) **Class 4, Credit 4 (W)**
- 1017-499 Physics Co-Op**
Physics co-op
- 1017-502 Capstone Project I**
In collaboration with faculty mentor(s), students will carry out the first phase of an experimental, theoretical or computational physics research project, will prepare an interim paper, and will present a short talk on their progress to physics faculty and students. The projects are those planned during the capstone preparatory course taken during the prior spring quarter. (1017-350, 400) **Lab 12, Credit 4 (F)**
- 1017-503 Capstone Project II**
In collaboration with faculty mentor(s), students will carry out the second phase of an experimental, theoretical or computational physics research project and will prepare a written paper and present an oral report and a poster on their project to physics faculty and students. The projects are those planned during the capstone preparatory course taken during spring quarter, and commenced during the prior fall quarter. (1017-350, 502) **Lab 12, Credit 4 (W)**
- 1017-522 Quantum Mechanics I**
A study of the concepts and mathematical structure of non-relativistic quantum mechanics. Wave functions and the Schrodinger equation. Solutions to the one-dimensional and three-dimensional time independent Schrodinger equation. Stationary states and their superposition to produce time-dependent states. Quantum-mechanical operators, commutators, and uncertainty principles. Solutions to central potential problems, including the hydrogen atom. (1017-314, 350, 402, 480) **Class 4, Credit 4 (F)**
- 1017-523 Quantum Mechanics II**
Continued study of the concepts and mathematical structure of non-relativistic quantum mechanics presented in Quantum Mechanics I, with an emphasis on applications to real physical systems. Topics to be covered include: orbital angular momentum, effect of magnetic field on spinning charged particles, systems of identical particles, many electron atoms and band structure solids, and absorption and emission of radiation by atoms. (1017-350, 522) **Class 4, Credit 4 (W)**
- 1017-531 Solid State Physics**
The structure of solids and their thermal, mechanical, electrical and magnetic properties. (1017-315, 350, 415, 480 and 522) **Class 4, Credit 4 (offered upon sufficient request)**
- 1017-539 Astrophysics Research**
Faculty-directed student project or research involving observational or theoretical work that could be considered of an original nature. (1017-445 or permission of instructor) **Class variable, Credit variable (offered upon sufficient request)**
- 1017-553 Nuclear Physics**
A study of the structure of the atomic nucleus as determined by experiments and theory. Description and quantum mechanical analysis of nuclear properties, radioactivity and nuclear reactions. (1017 522) **Class 4, Credit 4 (offered on sufficient request)**
- 1017-556 Laser Physics**
The semi-classical theory of the operation of a laser, characteristics and practical aspects of laser systems, applications of lasers in scientific research. (1017-455) **Class 4, Credit 4 (offered upon sufficient request)**
- 1017-559 Special Topics**
Advanced courses that are of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and have specific prerequisites, contact hours and examination procedures. Topics could include introductory statistical mechanics, plasma physics, general relativity, linear integrated circuits, cryogenics, radio astronomy, history of physics, astrophysics, or astronomy. (The level of study is appropriate for students in their fourth or fifth years of study.) **Class variable, Credit variable (offered upon sufficient request)**

1017-595 **Advanced Physics Research**
Faculty-directed student project or research involving laboratory work or theoretical calculations that could be considered of an original nature. The level of study is appropriate for students in their fourth and fifth years of study. (Permission of instructor) **Class variable, Credit variable (offered upon sufficient request)**

1017-599 **Physics: Advanced Independent Study**
Faculty-directed study of appropriate topics on a tutorial basis. The level of study is appropriate for students in their fourth or fifth years of study. **Class variable, Credit variable**

1017-602 **Statistical Physics**
Introduction to the statistical description of systems of particles with mechanical, electrical, and thermal interactions. Statistical calculation of thermodynamic quantities. Basic methods and results of statistical mechanics. Applications of statistical mechanics to elementary classical and quantum systems. (1017-314, 1017-415, 1017-480) **Class 4, Credit 4 (offered upon sufficient request)**

General Science

1018-210, 211 **Science Exploration I, II**
This course provides an introduction to the opportunities available within the College of Science and RIT. It offers the students the opportunity to increase their knowledge of science programs and careers, develop group skills, and establish a sense of community within the group. **Class 2, Credit 2 (F, W)**

1018-621 **Building Scientific Apparatus Laboratory**
Basic skills associated with the construction of scientific laboratory apparatus, some of which is not commercially available, are covered: machine shop skills, working with glass, vacuum line technology, optical spectrometer design and instrument electronics. (Corequisite 1008-620) (1014-441; 1017-212, 213 or 312, 313; or permission of instructor) **Lab 4, Credit 1 (offered upon sufficient request)**

Imaging Science

1051-211 **Programming for Imaging Science**
This course will introduce the student to a 4th generation programming language. The student will learn the various capabilities of the package and how they can rapidly prototype solutions to various science and engineering problems. As these solutions are developed, fundamental concepts of programming and data structures will be introduced. Programming assignments will include fundamental imaging related problems and will work with scalar, vector and array processes. This course will emphasize the need for concrete problem definition, problem decomposition into smaller sub-problems, implementation/testing, and presentation/documentation of the algorithm and results. (Algebra and trigonometry) **Class 4, Credit 4 (F)**

1051-215 **Imaging Science Fundamentals**
An exploration of the fundamentals of imaging science and the imaging systems of the past, present and future. Imaging systems studied include the human visual system, consumer and entertainment applications (e.g., traditional and digital photography, television, digital television and HDTV, virtual reality); medical applications (e.g., X-ray, ultrasound, MRI); business/document applications (e.g., impact and non-impact printing, scanners, printers, fax machines, copiers); and systems used in remote sensing and astronomy (e.g., night-vision systems, ground- and satellite-based observatories). The laboratory component includes experiments related to the principles and theories discussed in the corresponding lecture. Laboratory experiments give students experience with many imaging systems and exposure to the underlying scientific principles. (Competency in algebra) **Class 3, Lab 2, Credit 4 (F, W)**

1051-217 **Fundamentals of Astronomical Imaging**
Familiarizes students with the goals and techniques of astronomical imaging. The broad nature of astronomical sources will be outlined in terms of requirements on astronomical imaging systems. These requirements are then investigated in the context of the astronomical imaging chain. Imaging chains in the optical, X-ray, and/or radio wavelength regimes will be studied in detail as time permits. Laboratory assignments will range from construction and characterization of a hand-held telescope to analysis of images collected at the RIT Observatory. (1051-215 or permission of instructor) **Class 3, Lab 2, Credit 4 (S)**

1051-253 **Special Topics: Imaging Science**
Topics of special interest, varying from quarter to quarter, selected from the field of imaging science and not currently offered in the curriculum. Specific topics are announced in advance. (Not offered every quarter, for more information see www.cis.rit.edu/node/309 or consult director of the Center for Imaging Science) **Class variable, Credit variable**

1051-290 **Introduction to Scientific Research**
This course will expose a student who is at the early stages of their post-secondary education or at the end of their secondary education to the process of conducting scientific research in an established university research laboratory setting. The student will perform experiments, document results, present their findings, and work closely with a faculty mentor who will design the research to be conducted. It is anticipated that this may be the student's first exposure to the field in which they are conducting research and the importance of background research and literature review will be emphasized. (Permission of instructor) **Credit variable (F, W, S, Su)**

1051-300 **Introduction to Imaging Systems**
This course provides a framework for the study of imaging science. Elements of imaging science taxonomy, including the imaging chain, image analysis and imaging systems characterization are introduced or reviewed. Practical examples drawn from familiar imaging systems such as digital and film still cameras, LCD displays, NTSC video, etc., are introduced and selected systems are studied in depth. Current events in the development or use of imaging science will be incorporated at the discretion of the instructor to reinforce understanding of the structure of the field of imaging science. The student will master basic laboratory skills in the use of still and video cameras, including effects of and control of illumination, exposure, focus and depth of field, focal length, dark and flat field calibration. (1017 311, or equivalent and permission of department) **Class 3, Lab 3, Credit 4 (F)**

1051-303 **Geometrical Optics**
This course introduces the description of optical imaging systems based on the ray model of light. Topics include refraction, reflection, imaging with lenses, stops and pupils, and optical system design using computer software. (1017-313) **Class 3, Lab 3, Credit 4 (W)**

1051-313 **Interactions Between Light and Matter**
Fundamental aspects of the interaction of electromagnetic radiation and materials. The course is designed to provide students with an understanding of the physical mechanisms underlying instruments used to detect, measure, and image electromagnetic energy (CCDs, silver halide film, OPC, vidicon, etc.). Basic concepts of quantum theory, atomic structure and the particle/wave duality of light and matter are introduced. Electronic transitions in materials and the physical and chemical results of light absorption are explored, with practical examples in image detection. Applications in detector sensitivity, spectroscopy, human vision, and colorimetry will be touched on. (1016 283, 1017-314) **Class 4, Credit 4 (F)**

1051-320 **Linear Mathematics for Imaging**
This course applies the concepts of complex numbers, vectors, and matrices to represent models of discrete linear imaging systems. Representations of discrete imaging systems are considered and the representation in the frequency domain is derived via the discrete Fourier transform. The continuous Fourier transform is introduced. (1016-305) **Class 4, Credit 4 (W)**

1051-350 **Vision and Psychophysics**
The final "component" in many imaging systems is visual perception. The human visual system can also be considered as an imaging system itself; arguably the most complex system, from visual optics through high-level cortical processing such as the perception of depth and motion. An understanding of the characteristics and limitations of the visual system aids in designing and evaluating imaging systems. Unlike other elements of imaging systems, it is difficult or impossible to get objective measures of visual perception; psychophysics provides tools for measuring perceptual mechanisms. This course presents an overview of the organization and function of the human visual system and some of the psychophysical techniques used to study visual perception. (1051-300 or permission of instructor) **Class 4, Credit 4 (W)**

1051-361 **Digital Image Processing I**
This course is an introduction to the basic concepts of digital image processing. The student will be exposed to image capture and image formation methodologies, sampling and quantization concepts, statistical descriptors and enhancement techniques based upon the image histogram, point processing, neighborhood processing, and global processing techniques based upon kernel operations and discrete convolutions as well as the frequency domain equivalents, geometrical operations for scale and rotation, and grey-level resampling techniques. Emphasis is placed on applications and efficient algorithmic implementation using the IDL programming language. (1016-283, 1016-305, 1051-211 or equivalent) **Class 4, Credit 4 (S)**

1051-370 Radiometry
This course introduces the concepts of quantitative measurement of electromagnetic energy. The basic radiometry terms are introduced using calculus-based definitions. Governing equations for source propagation and sensor output are derived. Simple source concepts are reviewed and detector figures of merit are introduced and used in problem solving. The radiometric concepts are then applied to simple imaging systems so that a student could make quantitative measurements with imaging instruments. (1016-283, 1017-313) **Class 3, Lab 3, Credit 4 (S)**

1051-402 Color Science
This course presents an introduction to color perception, measurement, and reproduction. Based upon an understanding of the human visual system, psychophysics, and radiometric measurements and computations, this course explores in more detail the basis of color perception, applies those principles to the measurement of color stimuli, and then explores applications of color science in imaging. (1051-350, 370) **Class 4, Credit 4 (F)**

1051-420 Environmental Applications of Remote Sensing
An introduction to the wide range of environmental applications of remote sensing. Systems for detecting physical phenomena and analysis techniques for extracting useful information are described for active and passive sensors operating throughout the electromagnetic spectrum from both airborne and spaceborne sensors. The Earth's atmospheric, hydrospheric and terrestrial processes are examined at a global scale. Application areas studied include monitoring vegetation health, identifying cultural features, assessing water resources, and detecting pollution and natural hazards. (1017-213 or permission of instructor) **Class 4, Credit 4 (S)**

1051-446 Multi-Wavelength Astronomical Imaging
Survey of modern imaging techniques in astronomy. Students analyze astronomical imaging systems in terms of the requirements placed on the systems, and the strengths and limitations of each component in the imaging chain. Examples of specific techniques covered include optical CCD cameras and spectrometers, X-ray CCD imaging spectroscopy, and radio molecular mapping. (1017-314, 1017-301 also recommended) **Class 3, Lab 1, Credit 4 (S)**

1051-452 Modulation Transfer Function
This course applies the mathematical and computational skills acquired in previous courses to the analysis and modeling of spatial properties of both linear and non-linear systems of both discrete and continuous processes. Experimental techniques for measuring resolution, MTF, CTF, PSF, and LSF of individual and complex systems will be described. These functions will be modeled mathematically for both individual imaging processes and for sequences of linear and non linear processes. Physical mechanisms (including finite detectors and sampling, optical turbidity, and electronic time constraints) will be treated mathematically for their impact on MTF. (1051-320) **Class 3, Credit 3 (W)**

1051-453 Noise and Random Processes
This course applies the mathematical and computational skills acquired in previous courses to the analysis and modeling of noise and random processes in a sequence of imaging processes. Experimental techniques for measuring noise will be studied and practiced. Noise characteristics of imaging systems will be modeled based on mathematical probability and moment theory. Jacobian operators and Fourier theory will be used to model correlated noise and to propagate noise properties through complex sequences of imaging processes. Practical metrics of noise and signal/noise ratios will be examined for their utility as figures of merit for imaging systems. (1051-452, 1016-351 or equivalent) **Class 3, Credit 3 (S)**

1051-455 Physical Optics
Physical principles are used to develop a firm fundamental understanding of optics and imaging. Main topics include light as an electromagnetic wave, light at an interface, polarization, interference, and diffraction. Also includes a brief introduction to modern optics. Emphasis is placed on the fundamental limitations of an optical system on resulting images. (1017-313, 1051-320 or 1017 480) **Class 3, Lab 1, Credit 4 (S)**

1051-462 Digital Image Processing II
This course is an introduction to the more advanced concepts of digital image processing. The student will be exposed to image reconstruction, noise sources and techniques for noise removal, information theory, image compression, video compression, wavelet transformations and the basics of digital watermarking. Emphasis is placed on applications and efficient algorithmic implementation using the a fourth generation programming language. (1051-361) **Class 4, Credit 4 (F)**

1051-463 Digital Image Processing III
This course discusses the digital image processing concepts and algorithms used for the analysis of hyperspectral, multispectral, and multi-channel data in remote sensing and other application areas. Concepts are covered at the theoretical and implementation level using current, popular commercial software packages and high-level programming languages for examples, homework and programming assignments. The requisite multivariate statistics are presented as an extension of the univariate statistics to which the students have been previously exposed. Topics to be covered will include methods for supervised data classification, clustering algorithms and unsupervised classification, multispectral data transformations, data redundancy reduction techniques, image-to-image rectification, and data fusion for resolution enhancement. (1051-211 or equivalent, 1051 462, 1016-314) **Class 4, Credit 4 (W)**

1051-465 Detectors
This course provides an overview of the underlying physical concepts, designs, and characteristics of detectors used to sense electromagnetic radiation having wavelengths ranging from as short as X-rays to as long as millimeter radiation. The basic physical concepts common to many standard detector arrays will be reviewed. Some specific examples of detectors to be discussed include photomultipliers, microchannel plates, hybridized infrared arrays, PIN detectors, and SIS mixers. The use of detectors in fields such as astronomy, high energy physics, medical imaging, and digital imaging will be discussed.(1051-313, 1051-370) **Class 3, Demonstration 1, Credit 4 (S)**

1051-490 Undergraduate Research
This course engages a student in the process of conducting scientific research in an established university research laboratory. The student will work with a research team (with at least the sponsoring faculty mentor), perform experiments, document results, present findings, and work closely with the faculty mentor. The interaction will allow the student to develop approaches to solving the particular problem based on their experiences and through detailed technical discussions/presentations to the members of the research team. The team will critically review the results of the experimental work and the student's proposed plans as well as offer suggestions concerning options for future work. The student will have a firm scientific foundation in imaging science. Domain-specific knowledge for the course will be gained through review of the literature. (Permission of instructor) **Class variable (F, W, S, Su)**

1051-499 Imaging Science Co-Op
Cooperative education experience for undergraduate imaging science students. **Credit 0 (offered every quarter)**

1051-501 Research Practices
Develops skills in scientific research, including use of library resources, technical report writing, technical presentations. Students are required to research, write and present a proposal for a research project. The proposed research may be performed in 1051-502, 503. (Matriculation in SIMG) **Class 3, Credit 3 (S)**

1051-502 Senior Project I
Students perform the independent research project defined in 1051-501 under the direction of a faculty member in imaging science. The student presents the results of the project to a public meeting. **Class 1, Credit 4**

1051-503 Senior Project II
Students perform the independent research project defined in 1051-501 under the direction of a faculty member in imaging science. The student presents the results of the project to a public meeting. **Class 1, Credit 4**

1051-528 Design and Fabrication of a Solid State Camera
The purpose of this course is to provide the student with hands-on experience in building a CCD camera. The course provides the basics of CCD operation including an overview, CCD clocking, analog output circuitry, cooling and evaluation criteria. (Senior status imaging science or permission of instructor) **Class 1.5, Lab 7.5, Credit 4 (W)**

1051-553 Special Topics: Imaging Science
Topics of special interest, varying from quarter to quarter, selected from the field of imaging science and not currently offered in the curriculum. Specific topics are announced in advance. (Not offered each quarter. For more information see www.cis.rit.edu/node/309 or consult director of the Center for Imaging Science) **Class variable, Credit variable**

1051-599 **Independent Study**
A student-proposed advanced project sponsored by an instructor. Approval required by the department chairperson and the director. Available to upper-level students with a GPA of 3.0 or greater. **Credit variable**

Honors Courses

1055-265 **Honors Discrete Mathematics**
This is an honors course in discrete mathematics designed to challenge honors students and others capable of excellence in mathematics with demanding problems and proofs in introductory number theory, set theory, logic, and combinatorics. (Honors student status or permission of instructor) **Class 4, Credit 4 (F)**

1055-300 **The Greening of RIT**
This course seeks to teach students about the concept of sustainability by using the campus of RIT as their laboratory. During the quarter, students will investigate methods and strategies used by other colleges and universities to minimize environmental impacts in areas such as energy use, solid and hazardous waste management, transportation, landscaping and construction, food production and consumption, and purchasing. They will assess their personal and RIT's environmental impacts, develop strategies for minimizing the impacts, implement changes where possible, and prepare reports designed to guide RIT to becoming a greener campus. (Honors student status) **Class 3, Lab 3, Credit 4 (S)**

1055-302 **Adventures in Ornithology**
In this course we will explore some of the incredible adaptations of physiology and behavior that characterize birds as a class of organisms and as an individual species. Specific topics will include, but are not limited to, adaptations for flight, navigation during migration, communication by song, cooperative behavior, and avian conservation. Unique adventures through field experience will be an important component of this course, including a three-day camping trip to Pt. Pelee, Canada, during a weekend in May. Other possible adventures include participation at the RIT bird-banding site and at Braddock's Bay Observatory, a trip to the Seneca Park Zoo, and a variety of other activities designed to complement the classroom portion of the course. (Corequisites: 1001-253 or 1006-202, or permission of instructor) **Class 3, Field work 25 per quarter, Credit 4 (S)**

1055-303 **Humans are Animals**
Viewing humans from an evolutionary perspective shows that we are the products of our evolutionary history. This course integrates information about human anatomy, physiology, ecology, anthropology, psychology, sociology and medicine in an evolutionary context. The course is conducted as a seminar with extensive online components (discussions and a wiki). (Honors students and permission of the instructor) **Seminar 4, Credit 4 (F)**

1055-304 **Science of Forensics**
This course will address the scientific, ethical, and legal aspects of forensic analyses. The course includes a critical overview of ethical and legal issues, and will concentrate on the explanation and description of the scientific bases of chemical and biological assays used in the crime laboratory. Also included will be discussions of issues related to evidence handling and conflicts between law and science. Each major topic will be presented in the context of an actual case and discussed in class. (One year of biology or equivalent, one year of chemistry or equivalent, and permission of instructor) **Class 3, Credit 3 (S)**

1055-319 **Honors Research Statistics**
This is a project-based introductory statistics course for RIT honors students. Students will learn to formulate research problems in statistical terms, summarize data, draw inferences about populations, and then state results in the context of an application. The statistical software package Minitab and a graphing calculator will be used. This course may be taken in place of 1016-319 or 1016-314. (1016-204, honors student status or permission of instructor) **Class 4, Credit 4 (W)**

1055-351 **Honors Probability**
Topics discussed in this course include: descriptive statistics; sample spaces and events; axioms and probability; counting techniques; conditional probability and independence; distributions of discrete and continuous random variables; joint distributions; and central limit theorem. (1016-283 and Honors student status, or permission of instructor) **Class 4, Credit 4 (S)**

1055-359 **Special Topics**
Special topics are courses of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and have specified prerequisites, contact hours and examination procedures. **Class variable, Credit variable (Offered upon sufficient request) (F, W, S)** See the Honors website for course-specific details.

1055-361 **Honors Codes and Ciphers**
This course will introduce, explain, and employ the basic techniques of cryptography, both classical and modern. Topics will include: shift, Vignere, affine, Hill ciphers, one-time pad, Enigma and modern day cryptosystems: Data Encryption Standard (DES) and Advanced Encryption Standard (AES), public key encryption schemes-RSA, and hash functions. The course will include a brief introduction to number theoretic tools used in cryptography. (Honors standing or permission of instructor) **Class 4, Credit 4 (upon sufficient demand)**

1055-366 **Honors Discrete Mathematics II**
This course is a continuation of 1055-265 Honors Discrete Mathematics I. Topics include, relations, their closures, equivalence relations, partial orderings, recursively defined sets, countable and uncountable sets, algebra and an introduction to graph theory. (1055 265 and Honors student status and corequisite 1016-283, or permission of instructor) **Class 4, Credit 4 (R)**

1055-559 **Special Topics**
Special topics are courses of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and have specified prerequisites, contact hours and examination procedures. **Class variable, Credit variable (Offered upon sufficient request) (F, W, S)** See the Honors website for course-specific details.

Interdisciplinary Science

1099-260 **Frontiers of Science I**
This class enables students to develop knowledge and skills in four areas of frontier scientific research undertaken on the RIT campus. **Class 3, Lab 2, Credit 4 (W)**

1099-261 **Frontiers of Science II**
Students will extend their knowledge and skills in an area chosen from 1099-260 Frontiers of Science I. They will work independently as individuals or in teams to advance their scientific literacy and communication skills. (1099-260 or permission of instructor) **Class 3, Lab 2, Credit 4 (S)**

Academic Support Center

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Course numbering: RIT courses are generally referred to by their seven-digit registration number. The first two digits refer to the college offering the course. The third and fourth digits identify the discipline within the college. The final three digits are unique to each course and identify whether the course is noncredit (less than 099), lower division (100–399), upper division (400–699), or graduate level (700 and above).

Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's schedule of courses, published by the Office of the Registrar. Prerequisites/corequisites are noted in parentheses near the end of the course description.

Academic Support

1716-061 **Applied Study Strategies**
This hands-on course is designed for students interested in further developing their abilities in the specific areas of study skills and time management. Students enrolled in this course will gain a greater understanding of the learning process and will be able to identify and use strategies that meet their preferred learning style. Students will apply these strategies to their current credit courses to develop advanced proficiency as active learners. Additionally, students will receive support through individualized coaching sessions. **Credit 0 (F, W, S)**

1716-062 **Insights on Success**
This course provides students an opportunity to gain foundational insight into their learning process and learn basic study strategies, how they are used, and why they are valuable. Students will set and monitor goals, reflect on their source(s) of motivation and learning process, and report progress on organization, time management, and study skills. Class discussion topics include the 10 scales of the Learning and Study Strategies Inventory (LASSI). **Credit 0 (F, W, S)**

Discovery and Pathways

1720-050, 051 **Discovery**
Discovery is a required transition course which focuses on such topics as independent thinking, ethical decision-making, personal and social responsibility, and utilizing resources at RIT. It also explores academic fundamentals such as time management and study skills. Discovery is required for all first-year students and meets one time per week in the fall term (a limited number of winter or spring class sections are offered for first-year transfer students). **Credit 1 (F)**

1720-052, 053, 054 **Pathways**
Pathways is a required first-year course that focuses on working in teams, project management, and the presentation of information. Course sections utilize one of three themes: leadership, innovation and creativity, or service. Students will work with peers on project teams with students from multiple majors and colleges. The Pathways course is required for all first-year students and meets one time per week in either winter or spring terms. **Credit 1 (W, S)**

Discovery (1720-050 or 1720-051) and Pathways (1720-052, 1720-053 or 1720-054) are two required courses for first-year students. First-year transfer students who have successfully completed the equivalent of one semester or two full-time quarters (24 quarter credits) at an accredited institution of higher education and students who are at least 20 years of age may request exemption from this first-year requirement from the Sr. Director or the Assistant Director of the Academic Support Center (ASC).

Center for Recreation, Intramurals, and Wellness

Wellness Instructional Program

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Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's schedule of courses, published by the Office of the Registrar. Prerequisites/corequisites are noted in parentheses near the end of the course description.

Health and Wellness

1107-026

Wellness for Life

This core wellness course is designed specifically to assist students in making healthy decisions regarding lifestyle behaviors. Students will be presented with wellness information (multidimensional) that will help students prepare for co-op, job interviews, the workplace and the building of healthy, lifelong relationships. Key areas that are covered: Behavior change strategies, stress, high risk behaviors, physical wellness, emotional wellness, psychological well being, safety and spirituality. Unique in design, this course meets once per week and includes ice breakers, instructional sessions and interactive group activities. Successful completion of this course can be used as one activity credit toward the graduation requirement. A course fee does apply. **(All quarters)**

1107-027

Wellness Challenge Exam

This core wellness course is designed specifically as a "test out" option for students wishing to complete a wellness activity class for graduation. Strong wellness background is required (multidimensional). Textbooks are available to prepare for the exam in the RIT Bookstore (*Wellness: Concepts and Applications*, Anspaugh, Hamrick and Rosato). Passing the exam can fulfill one (1) activity credit for graduation. Students should contact Dugan Davies: dugan.davies@rit.edu, SLC 1260. A course fee applies. Study guides are available in the SLC Lobby. **Students may contact the instructor directly for more info and set up exam date. A course fee applies via SFS bill. **(All quarters)**

1107-028

Massage: Wholistic Therapy

Massage Therapy is fast becoming an accepted part of many rehab programs and has been proven beneficial in many acute and chronic medical conditions. There are many forms of massage: Medical, Orthopaedic, Swedish, Therapeutic, Myofascial Trigger Point/Release/Accupressure. Licensed Massage Therapists go through extensive training in the US. They are REGISTERED and BOARD CERTIFIED after passing the State Boards. Most states require the therapist to have passed the state tests in order to practice in that state. Anyone can feel a need for some kind of therapy to relieve stress, chronic or acute conditions. This course provides SIMPLE but effective methods of relieving stress and the freedom of enjoying everyday activities. Welcome to a new and sacred adventure that will promote your health and total well-being. A course fee applies via SFS bill. **(All quarters)**

1107-030

Motivation and Leadership

What inspires you? Who motivates you? Would you like to learn more about how you can motivate others? Many people, past and present, stand out as great leaders, but what makes them great? Each one of us can learn from our experiences and challenges, using these opportunities to lead, inspire, and motivate in our own way. Can you? Register for this course and find out! LEARN about leadership styles and discover your own along the way. EXPLORE what keeps you motivated through stressful and challenging times. LEARN from past examples by examining great leaders-their characteristics, and their great speeches. GET STARTED on the road to becoming a better leader and motivator! Successful completion of this course can be applied as a wellness activity credit. A course fee applies via SFS bill. **(All quarters)**

1107-040

Eating, Body Image and Food

This course is designed to focus on the psychology of eating behaviors, body image, and attitudes toward food. Issues that will be addressed include: the meaning of food, factors which influence body image, dieting behaviors, cultural influences on eating and body image, obesity, eating disorders, and finally-healthy eating. Successful completion of this course counts as one (1) activity course (toward the graduation requirement). A course fee applies via SFS bill. **(All quarters)**

1107-050

Relationship Health

This course is designed to provide students with educational concepts and strategies regarding relationships while keeping personal safety in mind. Instructors and students will explore the topic of relationships (friends, dating, and partnerships) and being able to set appropriate boundaries: so that relationships are able to thrive. Issues of Relationship violence, stalking and sexual assault will also be addressed throughout the course. This course is taught by Women's Center staff. Successful completion of this course can be used as one (1) activity course credit toward the graduation requirement. A course fee applies via SFS bill. **(All quarters)**

1107-070

Health Bonus Pass

The Bonus Pass is a program offered to students who have successfully completed 2 different wellness activity courses and are focused on continuing to improve their fitness levels. It is perfect for student interested in taking a variety of fitness classes each quarter. A quarterly schedule will be provided to students registered in this class that outlines the possible fitness based classes they can freely attend. This course will provide activities and includes 25 hours of fitness instruction. Students will receive an "audit" (X) grade (audits only). This course is restricted. To enroll, students must see the instructor (Michelle Schrouder, mabcst@rit.edu; 475-6995 to register.) A course fee applies via SFS bill. **(All quarters)**

1107-080

Health/Fitness Challenge

The course is based on the RIT health challenge. This class is designed to assist and motivate individuals who are interested in making changes to live healthier. Participants will be setting and reaching goals in the 3 following areas: fitness, nutrition and wellness. Students will monitor their progress using a customized website at www.rithealthchallenge.com. Examples of past accomplishments include: cutting down on caffeine, getting more sleep, eating healthier, training for a marathon or 10k, running three miles a day/4x per week, added weight training to exercise routines and much more. Topics that will be covered include: fad diets, exercise options, healthy eating and caloric levels, weight management, disease prevention and healthy permanent habits. A course fee applies via SFS bill. **(All quarters)**

1107-100

Stress Management

This course focuses on the dynamic ways that students can effectively manage stress. Today's fast-paced daily grind can easily become overwhelming for people. It is difficult to balance the various duties and responsibilities that we, as a society face on a daily basis. This course will examine what stress is, how stress affects the body and how to effectively manage stress in a healthy fashion. Students will have the opportunity to experience a variety of different stress management techniques in order to determine which ones are best suited for them: Deep breathing, massage, tai chi practices, yoga and muscle relaxation are just a few of the techniques that will be introduced. This course can be applied to one "activity" credit toward the wellness graduation requirement. A course fee applies via SFS bill. **(All quarters)**

1107-110**How to Become Smoke Free**

This course is a self-help, low stress and “no test” class. If you have tried to quit smoking before, take comfort in the fact that most smokers try several times before successfully quitting. Your past attempts are not failures, but rather a step in the process towards becoming a non-smoker! The information presented in this class will help to ease your way through the quitting process. Discussions will include: Techniques to become “smoke free”; healthy behavior changes; stress management strategies and more! Options to obtain nicotine replacement therapy are available through the N.Y. Quits and RIT Student Health. So, join your friends and learn how to quit together! A course fee applies. (All quarters)

1107-130**Spirituality and Health**

This interactive course, through multiple aspects of spiritual exploration, will focus on understanding some of the laws that govern all of life. A human is a four-fold being governed by physical, mental, emotional and spiritual laws. When you learn to live and apply these teachings, you solve many human problems. These self mastery techniques: Meditation, contemplation, mysticism, color therapy, the power of intentions, sacred spaces, charkas, chanting, labyrinths, dowsing, visualization, healing and developing intuition are aimed at the spirit which has no boundaries and therefore is universal and non-denominational. This course focuses on the discovery of the wisdom within and developing the capacity to sense, understand and tap into the highest parts of yourself, others and the world around you. A course fee applies via SFS bill. (All quarters)

1107-135**Meditation Practices**

Learn and practice a variety of meditation techniques that develop mindfulness, concentration, tranquility and insight. This approach to wellness is one that can assist you in reducing stress and anxiety by the way of thought, contemplation and reflection. Through this course students will gain an understanding of the physical as well as the emotional benefits of meditative practices. Successful completion of this course can be applied as an activity course credit toward the graduation requirement. A course fee applies via SFS bill. (All quarters)

Dance**1108-070****Ballet**

Ballet is a form of dancing performed for theatre audiences. Like any other dance forms, ballet may tell a story, express a mood, or simply reflect the music. But a ballet dancer’s technique (way of performing) and special skills differ greatly from those of other dancers. Ballet dancers perform many movements that are unnatural for the body, but when these movements are well executed, they look natural and beautiful. This course will focus on the various ballet movements, from the very fundamental to more complex movements and poses and classical styles. A course fee applies via SFS bill. (All quarters)

1108-080**Ballroom Dance**

This foundational course is designed for the complete beginners to advanced, covering dances that are currently socially trendy and popular. The focus is on a mixture of melodies and Latin rhythms to give the student an overall feel for social dancing. The intent is to create a sense of student competency as an above average ballroom dancer. Major course objectives include: Body and self-awareness, how to mix well with the same and opposite sexes, boosting self confidence, developing natural body rhythms and improving posture and poise. Dances covered are: Foxtrot, Merengue, Swing, Salsa, Jazz, Tango, Waltz, Cha-cha, Ballet and Jitterbug. A course fee applies (All quarters)

1108-090**Beginner’s Dance**

This beginner level dance class will focus on all the basic dance fundamentals, including but not limited to: Steps, swings, footwork, rhythms, body awareness, arm movements and partner dance movements. Additionally, a variety of different dances will be introduced and practiced throughout the quarter so that the beginner level dancer can advance to the next level of dance expertise! Contemporary music selections are presented to motivate and drive the energy of the class to a high level of activity and enjoyment. A course fee applies via SFS bill. (All quarters)

1108-100**Jazz Dance**

This course provides students with a wide range dance vocabulary which is created from ballet, modern dance and ethnic traditions. The styles of Bob Fosse and the fall and rebound of Jose Limon are a basis for this jazz course. The course will focus on the basic, intermediate and some advanced movements of contemporary jazz dance to help enable students to experience successful and enjoyable jazz dancing. A course fee applies via SFS bill. (All quarters)

1108-120**Country Line Dance**

Covering the latest line dances, club, and studio couples dances, Country Line Dancing is designed for beginning to intermediate dancers. Traditional dances give depth and background to the various basic terminology and techniques. Becoming familiar with today’s social sector, dance adds excitement to body coordination, improved memorization, gained confidence, partner skills, self-confidence and enhanced creativity. The Electric Slide, Chattahoochee, Dr. CC, Earthquake and Bubba are line dances of distinction. Couples pursue the Cha-Cha, Two Step, Waltz and the Sugar Waltz (full of turns and spins). Beginning with music beats and basic dance choreography counting, students pursue understanding that lays foundation to all. A course fee applies via SFS bill. (All quarters)

1108-260**Hip Hop Dance**

Hip Hop dance refers to styles primarily danced to hip hop music or that have evolved as a part of the hip hop culture. Hip hop dances are often considered street dances because of how they were formed and are being practiced. This hip hop class offers basic to more advanced skills that will encourage students to use their bodies in ways that help to develop/execute many different stylistic techniques. This class is high-paced and challenging and allows students to emphasize their creative rhythmic talents. As hip hop is a broad genre in dance studios the instructor has the freedom/room for personal interpretation thus allowing the class to be highly creative. A course fee applies via SFS bill. (All quarters)

1108-265**Hip Hop Fitness**

This class is a popular high energy urban class that uses the latest music combined with movement and choreography inspired by today’s hottest hip-hop music videos. This includes a wide range of styles, notably breaking, and locking and popping. What separates hip-hop dance from other forms of dance is that it is often “freestyle” in nature and hip-hop dancers frequently engage in “battles”—formal or informal freestyle dance competitions. These three elements: freestyling, battles, and ciphers are key components of hip-hop dance. This class will add the fitness aspect to dance to improve muscular strength, endurance and flexibility. A perfect combination: dance and fitness. A course fee applies via SFS bill. (All quarters)

1108-280**Irish Step Dance**

Often marked with a blur of flashing feet, Irish step dancing has emerged from the pubs of Ireland to the international stage. This course teaches the style of dance made famous by the shows Riverdance and Lord of the Dance. In addition to being introduced to the rich history of Irish dance, students will learn soft shoe, hard shoe and ceili (group) dances. Be prepared for a great cardiovascular workout. Irish dance requires endurance, coordination and strength. The first dances (reels, jigs and slip jigs) are taught in soft shoe. These dances begin to teach the fundamentals of Irish dance. As you progress, you will start to learn more complex soft shoe dances, and then move onto learning hard shoe dances (treble jigs and hornpipes). A course fee applies via SFS bill. (All quarters)

1108-340**Swing Dance**

Swing Dance is a popular social dance. This course includes two styles of Swing Dance: the Lindy and East Coast Swing. The Lindy Hop, or Jitterbug, is a joyful, flowing style that closely reflects its music from the late 20’s hot jazz to the early 40’s big band. Partners are connected smoothly to each other while relating closely to the music. The energetic East Coast Swing is a variation of the Lindy Hop, while the footwork is somewhat different, the basic lead and follow partnering skills are the same. A fun way to meet new friends, dance, and hear great music! Beginner and advanced (Winter and Spring/Advanced) classes are offered. A course fee applies via SFS bill. (All quarters)

1108-360**Tango**

Tango Dancing covers several subjects, including tango step patterns. Class sessions will focus on breaking down these patterns into a few very simple patterns of no more than 3 individual steps. Students will learn a few easy ways to vary and combine these basic patterns and create an understanding to learn new complex patterns very quickly and easily, also allowing for individual creativity. The “steps” of a dance are the most visible part of Tango, so every student should be eager to learn them—both to lead and to follow—and how to navigate the dance floor. This is Argentine Tango. Students will also learn about one of the most important parts of any dance—its MUSIC. A course fee applies via SFS bill. (All quarters)

1108-380**Tap Dance**

Rhythm, technique, and musicality are the three areas of tap dance emphasized in this course. Whether you are brand new to tap or have previous experience, this course challenges students of all levels. Each level will receive tap steps and variations appropriate for their level. Beginners will learn basic steps, shuffles, ball changes, flaps, Maxie Fords, buffalos, and turns. Intermediate and advanced technique include wings, pullbacks (pickups), more intricate footwork, directional changes, and challenging variations. Styles include soft shoe, waltz clog, swing tap, musical theater and urban. Tap shoes are required. A course fee applies via SFS bill. **(All quarters)**

Fitness**1109-002****Power Sculpt**

This fitness course is designed to facilitate cardiovascular fitness as well as increase muscular strength, endurance and flexibility. All aerobics classes combine a balance of high and low impact moves that include a sequence of muscular strengthening and stretching exercises. In addition to the benefits of improved heart and lung function, students will have an opportunity to burn calories, increase muscular strength and endurance, and increase flexibility. Throughout the course students will be encouraged to work at individual paces, utilizing high or low impact moves where appropriate. Through instructor-led group movements, with the use of music, brief explanations of basic aerobic principles, definitions and guidelines for proper technique will be covered. A course fee applies via SFS bill. **(All quarters)**

1109-003**Aqua: Tone and Condition**

Aqua Core and Sculpt is an excellent cardio and strength workout in the pool. Some classes will use both the recreation pool and the diving well, and some just the recreation pool. It is a total body workout in the water/with music. This energizing class will incorporate upper body workouts using aqua-barbells to focus on toning/conditioning of the arms. Lower body workouts include kickboxing moves and resistance exercises and water running to tone the legs. The entire class works core muscles for a 50 minute workout as well. No need to know how to swim for this class since aqua belts are provided. A perfect class for weight loss and toning with no pressure on your joints. A course fee applies via SFS bill. **(All quarters)**

1109-004**Deep Water Challenge**

Aqua exercise is an excellent cardio and strength workout in the pool. You can burn 700 calories in a 50 minute class? You will love the music and ultra-effective workout for both the upper and lower body. Classes meet in the Diving Well (Deep Water) in the pool. Workouts are done in the water, incorporating aqua barbells to tone and condition the arms. Underwater kickboxing and water running tones the lower body. There is no need to be a strong swimmer for this class as aqua belts are provided, however you should feel comfortable in chest level water. A perfect class for weight loss and toning with no pressure on your joints. This provides an intense workout with every punch. A course fee applies via SFS bill **(All quarters)**

1109-007**Group Personal Training**

This course is designed as a small group Personal Training session. Students will meet with a Personal Trainer weekly to develop fitness plans. Students will be assessed in fitness areas to develop baseline norms. Students will then work with the Personal Trainer to establish a Personal Fitness Program tailored for each student's needs and unique fitness goals. The small group session will provide a nice way for students to interact and support one another's goals while at the same time allow for more one-on-one opportunities with the Trainer to assist with technique and program development. A course fee applies via SFS bill **(All quarters)**

1109-008**Water Walking**

Using the concept of 'drag' versus 'propulsion' to increase resistance Water Walking is a work out that can range from high to low intensity and can be done in both shallow and deep water. Water Walking has an extremely effective cardiovascular component MINUS the wear and tear on the joints. Proper positioning, foot placement and full range of motion movements strengthen muscles around joint areas, increase flexibility and maintain tendon/ligament function. Water Walking is a smooth and continuous movement targeting the whole body: Enhancing muscle strength toning and definition and develops core body stabilization. Class will end with a dynamic mix of conditioning, stretching and balance exercises leaving participants invigorated, yet calm and serene. Non-swimmers and swimmers will both enjoy this beneficial, fun, low-impact work out! A course fee applies via SFS bill. **(All quarters)**

1109-009**Turbo Kick**

Want to burn 700 calories in a 50 minute class? If yes, Turbo kick is perfect for you. You will love the music which keeps the energy high and the calories burning. This is an ultra-effective workout that strengthens upper and lower body. If you are looking to tone and condition your whole body, this is the workout for you. It is also an intense ab workout since every punch comes from the core. This class is offered at over 2,000 fitness clubs in the United States. A course fee applies via SFS bill. **(All quarters)**

1109-010**Turbo Ball**

This fitness-based group exercise class is designed to provide students with a new way to "have a ball and get in great shape" at the same time. Based on high level Turbo exercises, the exercise ball is used during the exercise routines for a whole new workout. This class is fun, funky, fast-paced and targets the core abdominal muscles like no other workout can. The "Turbo Ball's" round surface delivers quick results by working the core muscles harder from every angle. This group exercise course is a fantastic new way to fit by using an exercise ball to maximize core strength and development. A course fee applies via SFS bill. **(All quarters)**

1109-011**Cardio Core and Sculpt**

This class is designed to be high-impact-high intensity, perfect for intermediate and advanced fitness enthusiasts. The class is organized to provide work sessions on muscle groups using hand weights and/or resistance bands to tone and shape muscles resulting in improved overall fitness. Alternative exercises will be demonstrated to accommodate all levels of fitness. Also offered as Step Conditioning and "Total Body Conditioning". A course fee applies via SFS bill. **(All quarters)**

1109-012**Personal Training and Diet**

This course is designed for students who desire "1 on 1" Personal Training and Nutritional consultation services. The course offers nine individual personal training sessions as well as a weekly lecture and a requirement to commit to an additional nine hours of independent study outside of class times. The course also includes an on-line component to track progress and as a forum for class discussion. Registration is conducted via the SIS system. Students will be contacted by their assigned personal trainer to establish training session dates/times. A course fee applies via SFS bill. **(All quarters)**

1109-013**Core Glutes and Abs**

Core Glutes and Abs course will focus on developing/strengthening the body's core muscles, lower back, abdominals, hips, and gluteus. The body's core muscles are the foundation for all other movements of the body. Through use of Resist-a-Balls, weights, bands and conditioning exercises, the focus will be to develop and strengthen the body's trunk and pelvis area where the center of gravity is located. Benefits include improved posture, increased flexibility and range of motion, increased strength and protection of the spine, more stable center of gravity and controlled movement. This class is designed for all fitness levels. Instructor lead exercises and explanation of core principles and proper technique will be covered. A course fee applies via SFS bill. **(All quarters)**

1109-014**Personal Training**

This course is designed for students who desire "1-on-1" Personal Training Services. The course offers nine individual Personal Training contact hours as well as a requirement to put in an additional 9 hours of independent study/work outside of the time working with a Personal Trainer. Registration for this course is conducted via the SIS system during the registration period at RIT. Students will be contacted by their assigned personal trainer directly for training session dates and times. Successful completion of this course work can be used/applied as an activity course toward the graduation requirement. A course fee applies via SFS bill. **(All quarters)**

1109-015**Jogging**

Cardiovascular fitness, exercise awareness, endurance increase, resting heart rate improvement, and the pure joy of jogging will add an element of educational self-confidence building activity to your college career. Lecture, participation and gradual endurance awareness enlighten your jogging. A course evaluation based on attendance, practical work improvement and attitude, allow Jogging Class students experience in building many miles on a gradual time increased program from one to four miles per run throughout the quarter. Jogging is a delightful mind-freeing exercise. The course is offered on a periodical basis. A course fee applies via SFS bill. **(All quarters)**

1109-016 **Jogging: 10k Training**
This is intended to be an activity course that will prepare students to participate in and complete a 10k run. Running provides many long and short term health benefits as well as skills that are beneficial in professional and personal life. Students will improve their fitness as well as develop knowledge about the basics of nutrition and appropriate training (training plan and cross training). Class includes lecture, participation, supplemental readings and class workouts. Students will be expected to do some readings and assignments outside of class and will be required to complete 2-3 workouts independently during the week. Students will be graded on participation, weekly performance on assignments and a final exam: The final exam will be entry, participation and completion of a local 10k race. A course fee applies via SFS bill. **(All quarters)**

1109-017 **Run/Fitness/Competition**
This fitness and conditioning course is for students who enjoy running as a means to cardiovascular health: designed for all types of runners who want to improve their running form and efficiency, improve their overall cardiovascular health, or even train for a race. This course benefits all fitness levels. Every-other class is active running, the other will be a classroom session/teach the different training methods of aerobic running, lactate threshold, VO2 max training, etc. The how to's of structuring one's own running program will be covered. There will also be components on proper nutrition and shoes. Students will also learn about the resources available to race and train with others in their community. The overall goal is to provide for proper training while also improving running performance. A course fee applies via SFS bill. **(All quarters)**

1109-018 **Endurance Spinning**
This group exercise course will be lead by an instructor who will take students through fairly high levels of endurance spinning workouts. At the end of this course, students will be at a higher level of fitness based on workouts during class sessions. This is an indoor group cycling class which uses motivating music and disco lights to create a challenging yet motivating class environment for endurance fitness development. Top of the line Johnny G Spinning bikes are used with a high intensity, low impact workout. The general fitness goals are to facilitate a high cardio-fitness workout, enhance overall fitness, development coordination and balance and improve overall muscle tone and flexibility. A course fee applies via SFS bill. **(All quarters)**

1109-019 **Walking for Fitness**
This Walking for Fitness Course is designed to be beneficial for individuals of all fitness levels and we will enjoy the outdoors as weather permits. The major course objectives are to improve cardiovascular endurance, increase energy expenditure, develop overall toning, improve circulation, and relieve tension. There are additional benefits of a prolonged low impact physical activity such as purposeful walking done regularly. One can substantially reduce the risk of heart disease, lower total cholesterol, raise healthy HDL cholesterol and lower blood pressure. Course content will include stretching, warm-up, proper form, pace management, interval training, determining intensity and target heart rate and individual goal setting. A course fee applies via SFS bill. **(All quarters)**

1109-020 **Kick Boxing**
This fairly new and exciting course is designed to develop physical fitness, strength, stamina, power, speed, endurance and flexibility. Students will have the opportunity to develop self-defense skills by utilizing the combination of boxing and karate techniques. Instructors will introduce basic kicking and punching skills and combine the element of aerobic activity with music to provide an outstanding workout. Students will be encouraged to enhance their overall health, thus helping them look and feel good about themselves. Teaching methods include explanation, demonstration, program guidance and motivational lecturing. A course fee applies via SFS bill. **(All quarters)**

1109-021 **Spinning**
The Spinning Course Program: Essentially is a form of exercise with classes focusing on the energy zones: endurance, strength, intervals, high intensity (race days) and recovery, that involve using a special stationary exercise bicycle with a weighted flywheel. Because the Spinning program provides both high-intensity workouts and active recovery, without stress to the joints often associated with running, participants can experience a personalized ride every class. By focusing on specific training objectives during each class, students can map out a training plan to maximize results. Spinning Program class options vary (check schedule): Spinning (beginning, intermediate, advanced); Spin and Sculpt (added resistance training to spinning cardiovascular workout); Spin and Core (added core/abdominal) training to spinning cardiovascular workout. A course fee applies via SFS bill. **(All quarters)**

1109-023 **Zumba Fitness**
Zumba is like no other workout you will ever experience. Zumba Fitness was created in the mid-90's for international pop superstars. Inspired by cumbia, salsa, samba and merengue, paired with Latin rhythms the red-hot international dance steps Zumba Fitness was born! Zumba Fitness (slang for "to move fast and have fun") has become one of the fastest growing dance-based crazes in the country. The music is infectious and the dance moves are easy to follow and have body-beautiful benefits. The instructor for this class will guide students through initial competence to highly challenging moves. A course fee applies via SFS bill. **(All quarters)**

1109-024 **Drums Alive**
Drums Alive is a course that combines traditional aerobic movements with strong rhythms to create a fun, powerful percussion workout for the entire body. This high energy class combines the exercise "ball", drumsticks and dynamic movements to give students a complete workout, strengthening the core muscles groups as well as the upper and lower body. Students should wear sneakers to class and should bring a towel as well. A course fee applies via SFS bill. **(All quarters)**

1109-030 **Swimming for Fitness**
This fitness and conditioning activity course is designed for students who enjoy the venue of swimming to develop cardiovascular health. Designed for intermediate-advanced swimmers. This is NOT an instructional swimming class. The course will focus on: General aquatic fitness; stretching; all swimming stroke refinement and development; lap swims, sprints, combination of times laps and outlined swim practices. Cool down sessions will take place followed by ideas for muscular strength and endurance development (outside of aquatic environment). This course is a perfect fit for individuals who wish to pursue physical fitness development in a "non-impact" situation. Students must provide their own swimming attire. A course fee applies via SFS bill. **(All quarters)**

1109-045 **Water Polo**
This exciting aquatic-oriented activity course is designed for students who wish to learn the sport of water polo. Students must be able to swim comfortably and at times challenging, before deciding to take this course, which is a basic-advanced skills of water polo. The general course outline covers: Basic swimming/sculling skills; individual physical building blocks (strength, flexibility, speed, fitness) and core individual skills; game rules/history/basic strategies; offensive skills and strategies; defensive skills and strategies; goal-keeping; plays; refereeing; and tournament play. Students must provide their own swimming attire (suit, goggles if desired, deck shoes, towels). RIT provides all other equipment. Class meets in the competitive pool and provides an excellent fitness workout! A course fee applies via SFS bill. **(All quarters)**

1109-046 **Bootcamp**
"Bootcamp" is an exciting full-body conditioning fitness program that is designed to challenge, tone, trim, stretch and completely exercise your body in 10 intense weeks. Whether you're a workout novice looking to jump-start a healthier lifestyle, training for a special event such as a wedding or high school reunion, or an athlete looking for a new challenge, this program can help you reach your fitness goals while enjoying it! Boredom is not an option in this 2 day a week program based on philosophies from both personal training and group fitness by combining calisthenics, plyometrics, resistance training, cardio challenges, relay races and partner drills, you get an action packed work out in one exciting hour. A course fee applies via SFS bill. **(All quarters)**

1109-048 **Introduction to Weight Training**
Basic weight training fundamentals offer beginners through intermediates the chance to build strength through method discovery. Content includes: stretching; flexibility; spotting; safety; free weights; cybex; the different kinds of program designs; and cardiovascular development. Course design will focus on individual need and desire, leading to unique and successful program designs. Instructors will present information on muscle development, basic CV training; use of free weights and Cybex equipment. Highlight: Individual program effort. Class work involves initial orientation, handouts/discussion, definitions, Cybex station techniques; free weight specifics, and routine development for total body work. Beginner, intermediate, advanced and women's sections are offered. A course fee applies via SFS bill. **(All quarters)**

1109-049 **Humans vs. Zombies Bootcamp**
Are you sick of getting tagged by zombies? Want to tag more humans when you participate again? This 10-week class is a progressive training program designed to increase your knowledge and skills for successful Humans vs. Zombies (HVZ) participation. The course will address strength, flexibility, speed and endurance along with agility, hand-eye coordination, reaction time, balance and competitions. A skills and physical assessment are included for all participants. A course fee applies via SFS bill. **(All quarters)**

1109-051 **90 Day Challenge**
Get ready to burn fat, boost your metabolism, and get lean. This class uses resistance training to get you better results in less time. The routine is based on proven techniques that shift your fat-burning focus from cardio to resistance training. By adding resistance training for 3 months, you'll build lean muscle, and that is what supercharges your metabolism so you burn fat longer after your workout even while you sleep. It is recommended that students register for a cardio class on Tuesdays and Thursdays if possible to compliment this routine. A course fee applies via SFS bill. **(All quarters)**

1109-300 **PiYo**
This course dramatically transforms the body to help look, feel and perform better. PiYo is an athletic blend of Pilates, Yoga and so much more? It includes modifications for the group exercise environment, yet also offers progression to challenges for all levels of student participants (faculty/staff are welcome too). PiYo exercises are selected and balanced through strategic variations (pose angles and application of force), with each specific movement. Each PiYo class session builds on the last to increase exercise adherence and avoid hitting "plateaus". Beginner, Intermediate and Advanced levels are offered. A course fee applies via SFS bill. **(All quarters)**

1109-307 **Power Pilates**
This "Power Pilates" course is designed for students with a knowledge of Pilates and will be challenging and build stamina. The pace is dynamic, with the emphasis on fluid movement, muscle control, strength and will work to help students master the entire Pilates matwork as developed by Joseph Pilates. Exercises adapted from the apparatus, arm weights, and the Pilates Ring will be included. A course fee applies via SFS bill. **(All quarters)**

1109-308 **Pilates**
This course will progress from Pilates fundamentals and basic exercises to a traditional intermediate level workout by the final class. Pilates focuses on abdominal strength, stability of the pelvis, flexibility and balance. Mindful, intelligent movement and a deeper understanding of your body is the goal. Relaxation and some stretching may be added to the traditional matwork of Joseph H. Pilates. An Intermediate section assumes that the student has a grounding in Pilates fundamentals and the mechanics of basic classic exercises. Class will be more vigorous and will begin to develop concepts of flow and transition. The class will move and flow more than the beginner level. Previous experience in Pilates or a previous class in Pilates is required for Intermediate sections. A course fee applies via SFS bill. **(All quarters)**

1109-309 **Pilates Bootcamp**
Pilates Bootcamp will combine classic Pilates with traditional Boot Camp exercises, such as plyometrics, squats, lunges, and resistance work. Classes will be fast-paced and dynamic, providing a total body workout, while remaining true to the Pilates principles of control, concentration and centering. Students will work to improve not only core strength, but also balance, muscle tone, flexibility, alignment and posture, while conditioning the total body. A course fee applies via SFS bill. **(All quarters)**

1109-310 **Extreme Fitness**
Extreme Fitness is an exciting indoor full-body fitness program that will challenge, tone and trim your body in 10 intense weeks. Whether you are a novice or an athlete looking for a new challenge, this class will help you reach your fitness goals! Definitely challenging-working core muscle groups, endurance, PiYo type activities-they are all part of this newly designed, very dynamic class. Boredom is not an option in this 2 day a week class. By combining calisthenics, plyometrics, resistance training, Cardio, relay races, partner drills--you get an action packed workout in every session. Similar to "bootcamp" but very much designed for those who want the "ultimate" fitness experience in an hour! A course fee applies via SFS bill. **(All quarters)**

1109-330 **Yoga**
A body/mind discipline, Yoga enables posture improvement, flexibility development and learned relaxation. Mastered through learning an ancient posture series incorporating breath control, the body and mind relationship is explored. The practice of meditation gives one an opportunity to experience stress management. Relaxation is Yoga practice's key. Attendance is required. Classes contain sequential stretches, postures and relaxation exercise, incorporated with breathing and visualization. Recommended clothing is comfortable and loose fitting. Mats are provided. Music featuring New Age and mainstream artists provide an inspiring atmosphere. Hatha Yoga exploration includes a diverse discipline collection for improving mental and physical health. A course fee applies via SFS bill. **(All quarters)**

1109-335 **Core and Flexibility**
This class will push your core to the limit with intense training using many different methods including stability balls, dumbbells, Bosu balls and your own body weight. A person's flexibility refers to the ability of your joints to move through a full range of motion. Having flexibility in your muscles allows for more movement around the joints and you can achieve this with a basic to advanced "stretching workout" during this class. This is a perfect class for students who are looking to change their "ab" routine and see results without doing traditional crunches and floor work. A course fee applies via the SFS bill. **(All quarters)**

1109-340 **Kundalini Yoga**
Kundalini yoga as taught by Yogi Bhajan is a 5,000-year-old authentic system of yoga exercise and meditation that promotes health, happiness, and spiritual awareness. Kundalini yoga is taught in over 300 centers in 35 countries by teachers trained through the international Kundalini Yoga Teacher's Association—combining breathing, movement, stretching and sound, Kundalini yoga is a safe, comprehensive technology that can be practiced by everyone. Through yogic breathing and meditation peace of mind can be obtained, giving an experience of deep inner calm and self-confidence. Kundalini yoga is more than a system of physical exercise. The technology is aimed at the spirit that has no boundaries therefore, it is universal and non denominational. A course fee applies via SFS bill. **(All quarters)**

Health and Safety

1110-012 **CPR and First Aid**
This course is designed to provide certification by the American Red Cross for CPR and First Aid. Upon successful completion of the course, students will receive certification cards for CPR and for First Aid. Class sessions are generally 2-4 hour formats, meeting once a week. Students will be presented with information on the following skills that apply to: Infants, Children and Adults: Rescue Breathing, Blocked Airway for a conscious/unconscious person, CPR, responding to an emergency situation, controlling bleeding and splinting techniques. Class sessions include the use of video tapes, lectures, demonstrations, partner practice and skill evaluation (by the instructor). All equipment (mannequins, mats, wraps) are provided by RIT. "CPR Pro" is offered optionally. A course fee applies via SFS bill. **(All quarters)**

1110-049 **Lifeguarding**
RIT's Lifeguarding course is designed to provide students with a certification by the American Red Cross (ARC). Training consists of methods for individual rescue around and in the water. Basic skills and concepts will be presented. Objectives are: Successful completion and certification for each individual by the final class day, following a ten-week course. Prerequisites for this course include a continuous 500 yard swim and demonstrated accomplishment in the front crawl, side stroke, and breast stroke. Students are required to have or purchase a lifeguarding textbook. This course covers all skills required by ARC. A course fee applies via SFS bill that includes the required face mask. The textbook can be purchased at the RIT bookstore. **(All quarters)**

1110-060 **Water Safety Instruct**
Water Safety Instruction (WSI), a certification course through the American Red Cross, enables students to teach swimming and lifesaving classes following successful completion. Preparation for teaching proper Red Cross classes follows instruction in lifeguarding skill review, strokes, teaching methods, class structuring and organization. Current Lifeguarding certification is required as a class prerequisite. Assignments, quiz evaluation and a written course final are given. Purchase of a book series is necessary for course completion. An intriguing course exploring teaching methods and problems, WSI allows actual teaching experience within the class curriculum. A course fee applies via SFS bill that includes all the required textbook materials. **(All quarters)**

Lifetime Recreation Activities

1111-001 **Archery**
This course is designed to present the lifetime recreational activity of archery in a broad perspective for future use as a recreational and /or competitive pursuit. A major objective of the course is to develop strength in the upper back, neck and shoulder girdle. Students will be presented with the proper shooting techniques and forms. Instruction in the proper selection, use and care of archery tackle (equipment) will be provided. Students will be introduced to the rules, safety, etiquette of archery and archery competition. Once the fundamental skills have been well mastered, students will participate in a variety of class competitions (field, American, hunter, golf, clout, and flight.) Equipment provided by RIT. A course fee applies via SFS bill. **(All quarters)**

1111-003**Badminton**

Most people regard badminton as a gentle, noncompetitive, backyard diversion for relaxing summer afternoon play. However, the best setting has been found to be indoors or a breezy court. Here the shuttle cock ("birdie") can zip back and forth under great control and amazing speed: It becomes a very exciting game! Because it is physically/mentally demanding, it is one of the most invigorating and challenging sports in the world. It is also a great reducer of stress/tension and a wonderful muscle-toning activity. For the competitive person, badminton offers limitless opportunity to develop skills and for others, a wonderful recreational activity. A course fee applies via SFS bill. **(All quarters)**

1111-004**Basketball**

This course is designed for beginner-advanced male and female students. It is designed to emphasize basic skill development and refinement, team competition and tournament play. Students will be encouraged to develop individualized skills of the game of basketball: Passing, shooting, dribbling, rebounding, offensive and defensive movement techniques. Objectives of the course are to enjoy playing the game of basketball/team competition, physical conditioning enhancement, to become more informed as to the strategies of the game and to benefit from the sociological aspects of becoming involved with a team sport. The general format of each class will include a warm-up, basic and advanced drills and in class competitions. Students must be dressed in appropriate athletic attire and sneakers. Course fee applies. **(All quarters)**

1111-009**Pocket Billiards**

"Pocket Billiards" is enjoyed by many of all ages and of all levels of proficiency and skill. The purpose of this course is to develop the fundamentals of a sound game. Emphasis is placed on stance, grip, bridges, stroking and aiming. Other topics introduced are: Stop shots, follow, draw, "english", position play, banks, caroms, combinations, eliminations, break shots and safety play. Games taught and played are: 8-Ball, 9-Ball, Straight (14.1) and Cutthroat. Each class period is divided into three segments: Lecture/demonstration/practice and play. All equipment is provided by RIT and no previous experience is necessary for beginner's sections. 24 student limit. Meets in the SAU game room. Advanced sections offered. A course fee applies via SFS bill. **(All quarters)**

1111-012**Bowling/off-campus**

This course is designed for beginner, intermediate/advanced students who wish to participate in the lifetime recreational sport of bowling. The course is designed to practice the basic techniques of bowling and covers the following: Stance, push-away, back swing, approach and release (fundamental skills of the game). Students will learn the importance of proper ball selection and care of equipment (balls, shoes, gloves). The class will be presented with the rules and etiquette of the game. Once averages have been established, students will be placed on teams and will bowl as a competitive league (format) for the remainder of the quarter. Course held off campus at Terrace Gardens. Directions in the SLC. RIT does not provide transportation. A course fee applies via SFS bill. **(All quarters)**

1111-027**Diving**

This course is designed to accommodate all ability levels. The fundamentals of diving will be covered early in the quarter. Students will progress to the next ability levels at their own pace and with the guidance of the instructor. The course objectives are: To teach basic diving safety, fundamentals of diving, to build skill level and develop confidence to as high a point as possible. Course content includes the following areas: Approach, take off, aerial positions, twists and entries. Students must be reasonably coordinated, with average strength and have a basic swimming competency (should be comfortable in deep water). Materials needed: Swim suit and towel. A course fee applies. **(All quarters)**

1111-028**Fencing**

Introduction to the sport of fencing, basic moves, rules knowledge and understanding in combination with conditioning principles, stretching and flexibility design a class full of detail, competition and tactics. Objectives include basic footwork proficiency, fencing blade work skills, rules understanding, experiential learning and the opportunity to direct (officiate) for one another. Classes begin with a light warm-up, followed by stretching and conditioning exercises. Focus on the basics and teaching fencing moves, also includes competition discussion and bout situations. Grading is on attendance. Variety in class options include and advanced fencing section (experience required) A course fee applies via SFS bill. **(All quarters)**

1111-030**Introduction to Fencing: Sabre**

Introduction to the sport of Sabre, basic moves, rules, conditioning and stretching/flexibility will be taught. Focus will be on footwork, Sabre blade work and skills, experiential learning and the opportunity to direct (officiate) for one another. Classes begin with warm ups and stretching followed by sabre moves and discussions on competitions and bouts will take place. Grading is on attendance. Final weeks include mini competitions, games, Olympic video and free "Sabre" time. An advanced section offered periodically in the Spring. A course fee does apply via SFS bill **(All quarters)**

1111-032**Fresh Water Fly Fishing**

This "Fresh Water Fly Fishing" course introduces students to fly fishing skills. This includes: identifying trout species, understanding trout behavior and trout habitat, basic entomology and hatch calendar, recognizing common artificial wet and dry patterns, tying wet and dry fly patterns, viewing some popular trout streams in the northeast and western United States, and reading stream conditions. This course includes hands-on sessions for fly casting techniques. A course fee applies (via student financial services bill). Equipment is provided for students who need it (rod, reel, leader material and flies). Class meets weeks 4-9 of the quarter, with the last class meeting off site at the same regular class time. RIT does not provide transportation. Car pooling with others in class exists. A course fee applies via SFS bill. **(All quarters)**

1111-033**Flag Football**

Flag football offers a chance to experience football at its best. Sport equipment will be provided. Individual skills combine in an atmosphere of teamwork, goal attainment, leadership awareness and excitement. Skill presentation, demonstration, drill work and play allow students of all levels to benefit from flag football activity involvement. Passing, catching, flag techniques, offensive/defensive play, creativity, kickoffs, point after attempts, handoffs and rule review will highlight the course. Active participation progresses fitness levels in many areas. Flag football will be offered at various times throughout the school year (depending on instructor/facility availability). A course fee applies via SFS bill. **(All quarters)**

1111-035**Dodgeball**

Re-live the glory days of summer camp and middle school by taking part in one of the fastest growing activities on college campuses across the country. Dodgeball is a great way to exercise, relieve stress and most importantly- have fun! This course will focus on the recreational game of Dodgeball as it is sanctioned by many leading organizations such as: The World Dodgeball Association (WDA), The National Amateur Dodgeball Association (NADA), the International Dodgeball Federation (FDA) and the National Dodgeball League (NDL). Students will play the game of Dodgeball using different rules, formats and balls, court and team sizes. This will be an intense, competitive class but with a relaxed, open environment that will accommodate all ability levels. A course fee applies via SFS bill. **(All quarters)**

1111-036**Ultimate Frisbee**

Ultimate Frisbee is a non-contact disc sport played by two teams of 7 players. The object of the game is to score goals. A goal is scored when a player catches any legal pass in the end zone of the opposing team. The disc (frisbee) is advanced by throwing or passing it to team mates. The disc may be passed in any direction. Any time a pass is incomplete, intercepted, knocked down, or contacts an out of bounds area, a turnover occurs. A turnover results in an immediate change of team possession of the frisbee (disc). Students will learn the rules, basic throws and strategies of this exciting game while developing levels of physical fitness. A course fee applies via SFS bill. **(All quarters)**

1111-038**Golf**

Beginning golf familiarizes the student with basic principles of technique, rules, etiquette, equipment and various course layouts. Players will benefit from play alongside novice and experienced level players. Unique individual critiques, etiquette discussion, grip coverage, stance, posture and swing planes are learned, as well as use of irons, woods and putters. When appropriate, videotaped presentations are shown. Stretching, technique demonstration and review combine with various club hitting practice to fill fifty minutes of experiential golf education. Professional presentation delivery and breadth of information in combination with practice, lead to a 27-hole class required performance. Written examination tests learning levels, as well as a self-performance videotape. A course fee applies via SFS bill. **(All quarters)**

1111-041 **Horseback/English**
Student equitation skills, horse control, walking work, the trot and canter develop within this beginning Horseback/English course. Moving on to higher level intermediate and advanced courses, students learn fence jumping and fence course introduction, while further refining equitation skills. Course objectives include riding and stable safe work techniques, developing correct positioning, riding control and specifics dealing with a variety of horses and presented situations. Ground work education such as horse stall exiting, ground leading and correct mounting procedures along with walking, sitting, posting and two-point positioning, walking without stirrups, trotting and cantering lead into intermediate skills. Must call Huntington Meadows Stables to set up lesson times (872-6286) Leave phone number! Course and Instructor fee applies **(All quarters)**

1111-042 **Horseback/Western**
Enjoy scenic trail riding while learning how to safely work and communicate with western trained horses at Liberty Stables in Bloomfield, NY. This class includes weekly discussions/rides. Designed with the novice in mind, students will learn to ride at a walk, trot, and canter. However, the variety of 15 lesson horses allow for varied experience levels. Class discussions/demonstrations include ground and riding safety, basic care/maintenance of horses as well as a bit of history of the human/horse relationship over the past 3000 years! With 80 beautiful acres of rolling countryside, open fields and forested areas as well as outdoor/indoor lesson rings, you are sure to develop your riding foundation. Attendance is key to success in this class. Course and instructor fee applies **(All quarters)**

1111-046 **Pickleball**
Pickleball is a sport described as a combination of ping-pong, tennis and badminton. It is an intense work out, very social and athletic as well as competitive game. It is typically played on a badminton court with a net that is lowered to 34 inches in the middle. Players use a baseball sized wiffle ball and a paddle, similar to a large ping-pong paddle, to volley the ball back and forth to score on the opposing team. People of all athletic abilities can play this sport because it is easy to learn. Course fee applies via SFS bill. **(All quarters)**

1111-047 **Lacrosse**
The sport of Lacrosse brings excitement to activity. This course is designed for students who have either played Lacrosse or have an interest in gaining basic skills and knowledge of the game. Beginners as well as advanced players are welcome. Students must bring their own lacrosse stick to each class. RIT will provide safety goggles along with all other required equipment and instruction. Objectives of the class include: Learning to catch/pass/dodge and shoot while playing in a team setting. Students must be dressed in appropriate athletic attire and sneakers. Variations of course options are: men's lacrosse, co-ed lacrosse and women's lacrosse depending on instructor and facility availability. Check SIS for quarterly offerings. A course fee applies via SFS bill. **(All quarters)**

1111-049 **Ice Hockey**
This course is designed for beginning to advanced ice hockey players. Students must provide their own skates, helmet, hockey stick and gloves. Course objectives: To learn the basics of equipment, safety, skating acceleration, stick handling, skating agility (forward and backward), and basic drills. The advanced classes (POWER SKATING) are NOT for beginners! These classes will cover advanced hockey skills, including: Shooting, passing for accuracy, advanced drills, defensive zone coverage and competitive play. If the class is above average in ability, a session on Power Plays and Penalty Kills may be added. There is NO body checking allowed in class. All penalties during class will be penalty shots. Students may rent skates (rental fee applies). A course fee applies via SFS bill. **(All quarters)**

1111-050 **Ice Skating**
This course is designed for beginner-advanced ice skaters. Instructional emphasis will be placed on safely learning the life-long activity of ice skating. Early in the quarter, students will be introduced to aspects of basic use and care of equipment and safety implications. Once basic skills have been obtained, students will progress as follows: Gliding and snow plough stop; forward glide and sculling; backward glide and sculling; forward cross-overs; short jumps/turns; two foot spins; forward chasses; Killian hold; backward chasses waltz hold; foxtrot hold; forward drag, bunny hop and lunge; forward arabesque; combination jumps and spins; Sal chow and basic program development. Students may use their own skates or can rent skates at the rink. A course fee applies via SFS bill. **(All quarters)**

1111-053 **Juggling**
This course is designed to acquaint students with the art of juggling in theory and practice while at the same time conditioning their minds and bodies. Course concentrates on 3 and 4 ball juggling patterns and is geared to accommodate all levels of learners. Instructor will teach one-on-one as well as group demonstration. Clubs, rings, combination cigar boxes, scarves, club swinging and 5 ball juggling will be taught (where appropriate to advanced students). Personal instruction will be supplemented with juggling movies, literature and video taping. The goal of the course is not only for each student to achieve maximum juggling ability, but also to increase their mental concentration and physical coordination. A course fee applies via SFS bill. **(All quarters)**

1111-065 **Racquetball**
Racquetball is designed to teach skill development from beginners to advanced level players. Focus for the beginner is on skill development and refinement, while intermediates to advanced focus on perfecting the strokes and competitive strategies. Activity level is high. Students will have the opportunity to develop overall fitness elements. The basic course objectives are: skill understanding, enhancement of the social/emotional components, CV fitness, basic shots, equipment, warm up/cool down, training and game strategies. This course meets 1-2x/week in the SLC racquetball courts. Racquets and balls are provided. Eye guards are required and may be purchased locally. All students must bring their RIT ID to every class. A course fee applies via SFS bill. **(All quarters)**

1111-075 **Skiing/Snowboarding/Rental**
Skiing begins early January/runs for 6 weeks Tuesday nights only. Fees vary per Bristol Mountain. This class includes lift ticket and the lessons are optional. Ski RENTAL in this class (Lift ticket, optional lessons, ski rental). Students receive credit after completing 20 hours of either skiing or snowboarding. Skiing begins in January. There is a required pre-class meeting in the Gordon Field House TBA the Tuesday before holiday break. RIT does not provide transportation although car-pooling options exist. For directions to Bristol Mountain go to: www.bristolmountain.com. Course fees are via SFS bill.

1111-077 **Skiing/Snowboarding/No Rental**
Participation in this program may be for wellness activity credit or just for fun. Bristol Mountain will determine the cost of the class each fall. The packaged fee for this class includes both lift ticket and optional lessons. NO SKI RENTAL in this class. Class begins with a pre-trip meeting before Holiday break followed by skiing in January. Students receive 1 wellness "activity" credit by participating for 20 hours of skiing. Class begins the 1st week of January. A required class meeting is held in the field house in December. RIT does not provide transportation although carpooling opportunities exist. Fees are subject to Bristol Mountain. Directions at the SLC. Course fees are via SFS bill.

1111-078 **Soccer**
Soccer, the sport of all the world, is a game of constant action. Each player involved in this game must be able to perform as an individual, as well as be an essential part of team play. In this class, we will cover fundamentals of ball control, trapping, dribbling, passing, heading, shooting, defensive (zone, man-to-man) techniques, offensive techniques, goal keeping and soccer terms. In this class, we will also discuss how every team is comprised of individual skill, group skill and team tactics. Class format will follow a warm-up session with skill practice, instruction for the day, along with mini-games in a controlled scrimmage situation. Winter offering will be indoors. A course fee applies via SFS bill. **(All quarters)**

1111-081 **Softball: Slow Pitch**
Co-ed activity class designed for beginner to advanced players of the game of slow-pitch softball. Class will meet outdoors on the turf field or IM field, weather permitting. During inclement weather, class will meet in Clark gym, and play a modified game of softball: Mush-ball. Course consists of basic fundamentals of slo-pitch softball, with "speed up" rules of 3 balls and 2 strikes; including rules, outfield play, infield defensive skills, hitting, pitching techniques, base running, basic game strategies and umpiring. No metal spikes will be allowed. First class: Meets indoors and consists of orientation session and instruction regarding rules of the game. Most other classes: Outdoor drills and skill refinement. A course fee applies via SFS bill. **(All quarters)**

1111-083 **Swimming/Beginner's Only**
Participation, enjoyment, improvement, knowledge, fitness conditioning and safety, class shares the latest swimming information and techniques. Course procedure includes individual and group instruction. Objectives involve work on skill improvement, safety development, all stroke recommendations, endurance improvement and swimming enjoyment. Course content delivers beginner, intermediate and advanced swimming skill work, freestyle, side, back, breast, fly and elementary backstroke. In addition to turns and variation, water orientation and entry, stroke mechanics, understanding fitness conditioning, games, diving and safety skills, students explore water enjoyment. Note: This is strictly a "beginner's" class. A course fee applies via SFS bill. **(All quarters)**

1111-087 **Tennis**
Participation, enjoyment, and lifetime game appreciation fulfill class expectations. Introduction to beginning fundamentals and skills will be covered. Objectives of the course reflect upon: game skills, rules, etiquette, tennis appreciation, and attaining a level of play that allows competition with comparable players. Court layout, surfaces, scoring, equipment, individual skills (forehand, backhand, serve, the volley, overheads) and footwork allow progression into preliminary games and round robin play. *Note: Indoor tennis periodically is now offered in the winter, focusing on tennis drills aimed at increasing cardiovascular strength/breathing and advanced footwork. Students will do circuit training, court positioning and continuous feeding drills. A course fee applies via SFS bill. **(All quarters)**

1111-089 **Volleyball**
Course designed for all levels of players of the lifetime recreational and competitive game of volleyball. Course evaluation is based on attendance, effort, improvement and enthusiasm. The basic course outline includes instruction and rehearsal of basic volleyball skills (under hand pass, over head pass, spike and serve); rules; basic formations/positions/strategies; and tournament play. Students will have ample time to practice/refine basic-advanced skills of the game. Tournament play will take place in the form of a random team selection from class to class. Students should dress in athletic wear, with comfortable sneakers and knee pads (if desired). Advanced section offered periodically. A course fee applies. **(All quarters)**

1111-097 **Water Volleyball**
All students can benefit from the fast moving game of Volleyball. The sport has risen in popularity nationwide. An enhanced volleyball game, players get active in an aquatic setting (shallow, recreational pool) and play water volleyball. Teamwork is explored, basic volleyball skills are practiced as well as basic strategies. The resistance of the water enhances the fitness benefits to this fun and exciting class without the "bouncing and impact" on the joints. A course fee applies via SFS bill. **(All quarters)**

1111-101 **Table Tennis**
Table tennis is the second most popular sport in the world. It is a sport played by all ages. At the beginner level it is recreational. At the top level, it is a world class sport requiring years of dedication and top notch training/fitness! It combines technique, speed, spin, power, touch, smarts and concentration. Course content includes: basic strokes, footwork, drills, strategies and rules. Games and matches will also be played, based on practice drills, and then a tournament near the end of the quarter. All equipment is provided. Must wear sneakers. This course is designed for beginners who want to learn more about how table tennis is played and practiced. Successful completion of this course can be applied as (1) activity course credit toward the graduation requirement. A course fee applies via SFS bill. **(All quarters)**

1111-105 **Curling**
This course will focus on the Olympic sport of Curling. Curling is a competition between two teams with 4 players each. The game is played on ice, and the teams take turns pushing a 19.1kg stone towards a series of concentric circles. The object is to get the stone as close to the center of the circles as possible scoring more points than the opposing team. Instruction will cover all rules, equipment, safety, basic-intermediate skills and competitions. All classes will meet off campus (Rochester Curling Club). The core of these classes that meet will take place at the Rochester Curling Club on 71 Deep Rock Rd. (11 minutes from campus). RIT does not provide transportation. For directions call 585-235-8246 or e-mail Instructor at: www.rochestercurling.com. A course fee applies via SFS bill. **(All quarters)**

1111-120 **Inline Skating and Ice Skating**
This course is designed to introduce students to the sport of in-line skating and ice skating. Instructional emphasis will be placed on safely learning the lifelong activities of both in-line skating and ice skating. The first 1/2 of the course will focus on basic intermediate ice skating skills. The second part of the quarter will focus on the skills and enjoyment of in-line skating outdoors. Instruction will be given on skating basics, including: Skating forwards and backwards, turning, cross-overs and braking/stopping. Additional topics include: Discussions on the proper use of protective gear and the proper maintenance of equipment. Students are required to provide their own set of in-line skates, helmets and wrist guards. Ice skates may be rented from the ice rink (nominal fee). A course fee applies via SFS bill. **(All quarters)**

1111-130 **Team Handball**
The verbal similarity between team handball and the more familiar "handball" played in a small court causes much confusion when talking about the game of team handball. The similarity of the two sports stops with the name. Team handball is played on a court like Basketball. Each team has seven players-six court players and a goalie that plays both offense and defense. The basic objectives are to throw the ball into the goal of the opposing team and to defend one's own goal against attacks by the other team. Team Handball is a rapid, continuous play type of activity. Students will learn the rules, throws and basic strategies of the game while at the same time develop cardiovascular fitness levels. A course fee applies via SFS bill. **(All quarters)**

Interactive Adventures

1112-001 **Snowshoeing/Hiking**
This class is designed to utilize the sport of snowshoeing as a means of promoting and imparting physical fitness, outdoor preparedness, outdoor winter skills and knowledge of our local parks and natural resources. Students can expect to gain the necessary knowledge to continue enjoying this sport on their own. This class will typically meet at the Red Barn and depart for one of our many local trails and parks. In the event of a "no snow" day, hiking will be the substitute activity for the day. Equipment is provided by RIT. Offered in Winter periodically. Please refer to SIS for possible offerings and/or visit www.interactiveadventures.rit.edu (Interactive Adventures website). Course fee applies via SFS bill. **(All quarters)**

1112-005 **Adirondack Snowshoeing**
This class consists of a mandatory pre-trip meeting followed by a weekend trip to the Adirondack State Park. Skills introduced include: snowshoe use, cold-weather preparedness and backcountry travel. This class meets for the (mandatory) pre-trip meeting and the weekend trip only. Must attend both for full activity course credit. Check the SIS system for more detailed class information. A course fee applies (via SFS bill) that includes all equipment, transportation, lodging and instruction **(All quarters)**

1112-006 **Introduction to Winter Camping**
Explore the winter forest with your home in your pack. Sleep in tents or lean-tos, cook on camp stoves, and hike or snowshoe the trail. Class will focus on the essentials of winter backcountry camping: planning, communication, and execution. Learn to read the weather, pack for the cold, and build fires. No previous experience needed, beginners welcome. This class will teach and follow the seven Leave No Trace principles. Hike requires the ability to walk for at least five hours with a pack. Durable snow boots or hiking boots required. A course fee applies via SFS bill. **(All quarters)**

1112-015 **Ice Climbing**
This class is designed to teach basic ice climbing skills, that will include belaying, ice tool and crampon use as well as special skills and safety considerations particularly climbing on the ice. After required pre-trip meeting, the class will take day trips to local frozen waterfalls for climbing. This class is appropriate for all experience levels and all necessary gear and equipment is provided. Check quarterly schedule on SIS for possible offerings and/or visit the Interactive Adventures website: www.interactiveadventures.rit.edu Course fee applies via SFS bill **(All quarters)**

1112-016 Ice Climbing/Adirondacks
1112-016 Ice Climbing/Adirondacks is an introduction to ice climbing. The class will begin with a required pre-trip meeting (at Red Barn) and then is followed by a weekend trip to the Adirondack State Park for a weekend of climbing. Skills covered will include: Proper and effective use of crampons including front-pointing and "French Technique", ice tool techniques, belays and rope work, and general winter preparedness. This class is open to all skill levels. Check SIS for more detailed quarterly class trip offerings and more specific meeting/Trip dates and times. Visit interactive adventures website for more detailed info: www.interactiveadventures.rit.edu. Course fee applies via SFS bill includes all equipment, transportation, lodging and instruction **(All quarters)**

1112-017 Introduction to Mountaineering
This class is designed to teach basic techniques and concepts involved in travel through frozen terrain. This will include the usage of ice axes, crampons, snow shoes, as well as terrain identification, route finding, winter camping skills, snow shelters and safety considerations. After a required pre-trip meeting, the class will have a winter camping trip where students will learn and apply these skills around camp and on snow/ice covered terrain. All necessary gear and equipment is provided but students must have adequate clothing for winter camping. A course fee applies via SFS bill. **(All quarters)**

1112-020 Cross Country Skiing
This class is designed for anyone interested in cross country skiing and will accommodate all ability levels. In this class we will travel to a local cross country venue and spend a weekend enjoying this amazing sport. Topics include equipment, basic movement technique, preparedness, dealing with terrain, and safe skiing practices. Equipment and transportation will be provided. Students are welcome to bring their own skiing equipment if possible. All students will need to supply their own winter clothing and will be required to spend much of the time outside regardless of weather conditions. A course fee applies via SFS bill. **(All quarters)**

1112-021 Women's Cross Country Skiing
This class is designed for women interested in cross country skiing and will accommodate all ability levels. In this class we will travel to a local cross country venue and spend the weekend enjoying this amazing sport. Topics will include equipment, basic movement techniques, preparedness, dealing with terrain, and safe skiing practices. Equipment and transportation will be provided. Students will need to supply their own winter clothing and will be required to spend much of the time outside regardless of weather conditions. A course fee applies via SFS bill. **(All quarters)**

1112-025 XC Ski/Bristol
Learn to cross-country ski, develop your technique, or log in mileage. Classes are held at Bristol Mountain Resort's Nordic Center, on top of Bristol Mountain. More info on the location: www.bristolmountain.com The center has 100% snow making capability on 3.0km of groomed traditional and skate terrain. Designed for beginner to advanced skiers, this class will focus on developing the classic diagonal stride, which is the main technique used by skiers to rhythmically propel themselves. Other skills learned: stopping, turning and climbing. This class includes a mandatory pre-trip meeting. The first class at Bristol includes one group lesson (1-hour), conducted by a certified Bristol instructor. Course fee applies via SFS bill **(All quarters)**

1112-030 Introduction to Snowboarding
This course is designed to introduce students to snowboarding and help guide students through the process of visiting a ski and snowboarding resort. Students will learn about the history of snowboarding, how to choose appropriate gear, basic skills, terminology, and basic outdoor winter safety and etiquette. This course consists of mandatory pre-trip lecture sessions on campus, and a one day workshop at Bristol Mountain consisting of a lesson and day long practice sessions with the instructor. There will also be a one hour debrief experience. Board, boots, helmets and bindings will be provided. Students will need to supply their own snow pants, winter jacket, synthetic or wool socks, mittens or gloves and hat. Course fee via SFS bill **(All quarters)**

1112-046 Team Building Tools
Progressing into the 21st century working collaboratively in teams will be a key competitive advantage to individuals and groups that can attract them. Providing those we work with the insight and experience of working collaboratively will give them and us workforce advantage. In this series will present and discuss how to create experiences in team building without the benefit of having a ropes course. We will discuss the history and use of experiential activities, stages of group development, activity briefing/debriefing and safety considerations. We will spend time setting up and experiencing a variety of activities and games that require little or no props and can be easily transported and will discuss where to find additional activities, curriculum ideas and local resources. A course fee applies via SFS bill. **(All quarters)**

1112-047 Outdoor Leadership
This course will introduce students to the theories, skills, and practices associated with leadership of outdoor adventure activities. Topics addressed will include history of outdoor education, self-awareness and conduct, decision making and judgment, teaching and facilitation, environmental stewardship, program management, safety and risk management, and core technical competencies. Backpacking will be the basic activity used to address universal issues that can be applied to various other, more specialized activities. This class will involve classroom lecture as well as practical, hands-on exercises and lessons and may take place, in part, in an outdoor setting. A course fee applies via SFS bill. **(All quarters)**

1112-050 Rock Climbing/Indoor
This class is designed to introduce and educate students about the sport of indoor rock climbing. Subject matter includes a variety of climbing techniques and terminology, gear and equipment use, as well as safety practices and protocols specific to the indoor climbing environment. Each class will consist of a lecture, demonstration and practice components-allowing students to learn and practice the skills presented. All necessary gear and equipment will be provided. This is an introductory course set up for individuals with little or no climbing experience. A course fee applies via SFS bill. **(All quarters)**

1112-051 Climbing/Gym Tours
This class meets for (3) day trips to different climbing gyms in the western New York and southern Ontario area. Skills taught/reviewed: belaying with a "gri-gri", tying in and various other indoor climbing techniques and strategies that apply to the multitude of routes, features, boulder problems, caves and climbing walls that exist among the gyms visited. Students will also gain knowledge of where to go during the colder months to satisfy various climbing cravings. **A passport and/or a birth certificate for travel to Canada is required for this class** Check SIS for more detailed quarterly offerings and trip dates/times. A course fee applies (via student financial services bill) that includes all equipment, transportation, gym passes and instruction. **(All quarters)**

1112-052 Rock Climb Training
This class is designed for those with previous climbing experience and that are proficient in basic climbing movement and terminology (it is not required that students have knowledge of belay techniques and rope related skills for this class). We will explore various training techniques and establish a regular training schedule that will be followed throughout the quarter. Training techniques will include the use of standard weight training practices, cardio-respiratory equipment, climbing specific training tools such as campus walls and finger boards, along with other exercises involving your own body weight. Programs will be developed based on individual need and will be tailored so that you progress throughout the quarter. Class sessions will meet in both the Fitness Center (SLC) and the Red Barn. A course fee applies **(All quarters)**

1112-055 Beginning Outdoor Rock Climbing
If you have little or no climbing experience or are a gym climber looking to learn what Outdoor Rock Climbing is like, this course is for you. A major objective is to orient new climbers to the systems, protocols, and foundational techniques of rock climbing. A required pre-trip meeting is held at the Red Barn before the trip to cover skills of knot tying, belaying, commands and safety checks. At the "crag", students will spend the first half of the day mastering these skills and developing confidence, trust and efficient climbing kinesthetics. The second part of the day covers rappelling in addition to climbing on the rocks. Other areas covered: history/climbing, terminology, climbing ethics and environmental concerns. A course fee applies via SFS bill. **(All quarters)**

1112-056 Intermediate Outdoor Rock Climbing
For students who have previous experience and want to take it to the next level, this course is for you. A major objective of this course is to provide the foundations and rationales for the application of advanced climbing skills. Before traveling to a nearby crag, a meeting (required) will take place at the Red Barn and will cover basic skills and trip logistics. The first day of the trip will focus on active and passive familiarization, placement/evaluation, gear anchor systems and equalization methods. The second day will focus on advanced rappelling techniques and an introduction to self rescue with remainder of the day spent on the rocks. Throughout the trip students will be introduced to the larger concepts involved in top rope anchor construction, rock climbing physics and risk management. All equipment and transportation is provided. A course fee applies via SFS bill. **(All quarters)**

1112-060 Rock Climbing/Bouldering
Bouldering is the sport of climbing typically short distances without ropes or harnesses. These safety precautions are replaced with spotters and crash pads. This class is designed to expose students to the sport of bouldering, while teaching a variety of climbing techniques, mental and physical preparedness, proper spotting and other areas of climbing safety. The first session(s) will meet at the Red Barn and future sessions will take place in Niagara Glen bouldering area. All gear and transportation are provided. A course fee applies via SFS bill. For more detailed information please visit the website for interactive adventures at: www.interactiveadventures.rit.edu. Students must bring a copy of their birth certificate and/or passport to each session to enter Canada. Course fee applies **(All quarters)**

1112-063 Bouldering/Cooper's Rock
This course is designed to expose students to the sport of Bouldering in an amazing outdoor setting. Climbing techniques, mental and physical preparedness, proper spotting and other safety techniques are presented. The sport of "Bouldering" is a type of rock climbing that involves shorter climbs or "problems" that require strategy and physical ability to complete. This is a physically demanding class! The first class meets at the Red Barn (required meeting) followed by a long weekend (Thursday-Sunday) trip to Cooper's Rock, WV--a large bouldering area just east of Morgantown, WV. Students will climb for two full days at a premier outdoor location. Visit www.interactiveadventures.rit.edu for more information. Course fee applies (via SFS bill) that covers equipment, transportation and lodging. **(All quarters)**

1112-065 Rock Climb/Top rope Set-up
This class is designed to teach students how to assemble safe and reliable anchors for top rope climbing using natural anchors (no artificial protection will be used). Participants should know how to belay and have had some climbing experience. Skills taught will include: Basic knowledge of all gear and equipment being used, choosing an anchor, tying off anchors, creating equalized and redundant anchor systems, anchoring the belay, redirected belays, top belays, escaping the belay and basic mechanical advantage systems. Class consists of one evening session and a full day trip. The trip will be to Ontario, Canada where participants will learn to set up and use their own climbs. Both sessions are mandatory. All necessary gear and transportation are provided. A course fee applies via SFS bill. **(All quarters)**

1112-068 Rock Climb/Technical Skills
This class is designed for those with some outdoor climbing experience. The class will be taught inside, but in simulated outdoor situations, covering such skills as anchor building and management in a variety of situations; various belay methods and considerations; belay escapes and basic rescue skills; mechanical advantage and hauling systems; and, above all, safety and it's many components in the climbing discipline. Climbing movement will only be covered inasmuch as it pertains to ropework and other technical considerations. For more information and detailed information please visit our website at: www.interactiveadventures.rit.edu. A course fee applies via SFS bill **(All quarters)**

1112-078 Beginner Backpacking
Explore the forests with your home in your pack. Sleep in tents or lean-tos, cook on camp stoves, and hike the trail as you learn about the lush history of the area. Class will focus on the essentials of backcountry camping: planning, communication, and execution. Learn to read the weather, a compass, and map; start fires using new and old tools; as well as interpret the flora and fauna of the trail. This class will follow Leave No Trace principles. All food will be provided. Hike requires the ability to walk for at least five hours with breaks.

1112-080 Backpacking
This class will impart basic backpacking skills such as fitting and properly packing your backpack, camping skills, and general outdoor awareness and preparedness. These skills will be put to use on an overnight backpacking/camping trip. The difficulty of the hike will be based on the abilities of the class. For more information visit our website at: www.interactiveadventures.rit.edu. A course fee applies via SFS bill. **(All quarters)**

1112-081 Backpacking/Trail Maintenance
This course is designed to provide experience in backpacking and volunteer trail maintenance. Students will learn how to choose proper gear, work together as a team and care for the trail they are hiking on. Students will gain a basic knowledge of backpacking skills and equipment selection, learn how to work with trail organizations and trail maintenance projects, learn to demonstrate basic backpacking skills and gear terminology, participate in trail clean-up and preservation, and practice "leave no trace" camping/hiking ethics. This course consists of both (a) mandatory pre-trip session(s), as well as a weekend backpacking and trail maintenance excursion. Basic backpacking and camping gear are provided. A course fee applies via SFS bill **(All quarters)**

1112-082 Adirondack Backpacking
Hike and camp in the High Peaks Region of the Adirondack Park while learning backcountry essentials. Students will get hands-on experience planning and preparing meals, reading maps, and understanding the weather. Course requires sustained effort and stamina for at least one long day of high mileage, physical challenges, and rustic camping. This class will follow Leave No Trace principles.

1112-085 Hiking/Adirondack Peak
This class meets for one evening preparatory session and one overnight trip. The evening session will cover: acquainting the group, appropriate gear for the trip, outdoor preparedness, and general expectations and logistics for the trip. The overnight trip will depart from RIT Friday afternoon in an RIT van. That night, the class will stay in the Adirondacks with bunk-style accommodations. Saturday we will hike one of the many peaks in the Adirondack region. Hiking is typically strenuous on average, but the pace will be moderate and effort will be made to accommodate the abilities of the class when selecting a hike. Because of changing weather conditions and other unforeseeable factors, a peak may not be summited. Participants should possess dependable hiking boots/clothing. A course fee applies via SFS bill. **(All quarters)**

1112-101 Canoeing/Beginner
This course is designed to provide instruction and experience in flat water canoeing. Students will learn how to choose the right equipment and learn the proper canoeing power and steering strokes. Areas of instruction also include canoeing safety, basic knowledge of canoeing skills and equipment selection, gear terminology, and basic rescue/recovery techniques. This course is designed to enable students to participate in future recreational and occupational canoeing skills and experiences in a safe and comfortable way. A course fee applies via SFS bill. **(All quarters)**

1112-105 Canoe Camping
Camping meets canoeing: learn to experience how a canoe allows for unique access to otherwise impractical camping opportunities, while being able to carry a payload greater than what could be feasibly carried on your back. This class involves a required pre-trip training meeting followed by a weekend-long trip to the Adirondacks. Skills to be covered include: Basic paddling, safety and navigation; Camping skill skills: tenting, fire-building, camp-cooking, and water purification as well as invaluable first-hand knowledge of one of the finest parks in the United States. Course fee applies via SFS bill **(All quarters)**

1112-106 Backpacking/Canoeing
This multi-activity course will involve a weekend wilderness trip consisting of both backpacking and open water canoeing; one day of one activity will be followed by one day of the other. Topics addressed will include basic backcountry foot-travel, wilderness camping, outdoor preparedness, paddling skills and canoe navigation, and Leave No Trace ethics. A course fee applies. **(All quarters)**

1112-120 Kayaking-rolling
This class is taught as an introduction to kayaking. It is typically taught in the pool and covers the following skills: Kayak parts, accessories and terminology, wet exits, hip snaps, paddle strokes, j-leans, Eskimo rescues and Eskimo rolls. All skills are taught in progression using drills, games and exercises leading up to a full roll. This class is taught in white water kayaks. All necessary gear and equipment is provided. Participants should expect to be in the water each class. Course fee applies via SFS bill **(All quarters)**

1112-125 **Whitewater Kayaking**
This course is an intermediate approach to whitewater kayaking. The participants should have some, but not necessarily extensive, kayaking experience. A preliminary class meeting will take place in the RIT competitive pool. This meeting will address/review the basics of whitewater paddling, maneuvering, righting and rescue techniques. An all-day trip will follow on easy to moderate whitewater. The meeting and the class trip are required to receive full activity course credit. Additional skills taught will include: whitewater safety skills, river reading/navigation, ferrying, eddying and peeling. Depending on the skill level of the class, other more advanced skills may be introduced as well. A course fee applies via SFS bill for instruction, all equipment (boats, gear), transportation, park fees **(All quarters)**

1112-120 **Wilderness Skills**
This class will cover a variety of topics and is designed to impart a number of skills that pertain to safely and effectively enjoying the backcountry. Skills covered will include water treatment, bear bagging, camping skills, orienteering, backcountry first aid, environmental awareness and preparedness, wilderness ethics, and more. This class will be taught both in and outdoors. For more details visit our website at: www.interactiveadventures.rit.edu. A course fee applies via SFS bill. **(All quarters)**

1112-151 **Leave No Trace Trainer**
This course is for hikers, climbers, campers and explorers. The Interactive Adventures Program presents its first ever "Leave No Trace (LNT)" Trainer Course for outdoor recreation students looking to lessen their environmental impacts on the backcountry and to educate others to do the same. Being more cognizant of the effects of our actions on the environment, we can work to sustain a healthy future. The seven Leave No Trace principles help to guide our awareness in all of our outdoor adventures. The goal of this course is to prepare participants to practice the seven Leave No Trace principles and to train others in the principles through this weekend trip. The course is one pre-trip meeting plus one weekend at the Finger Lakes Trails learning and applying their skills. Course fee applies via SFS bill **(All quarters)**

1112-155 **Camp Cooking**
This is a hands-on course that focuses on the safe operation and practical use of a variety of camping stoves and other backcountry cooking methods to prepare meals in the backcountry. Topics covered will include: stove/method selection, safe and effective use of the chosen apparatus, backcountry nutrition and related considerations, water purification, meal planning and preparation, food dehydration methods, non-cooked nutrition options and a variety of other factors and considerations. Students will be given a light-weight camp stove to keep. For more detailed information visit our website at: www.interactiveadventures.rit.edu. A course fee applies via SFS bill. **(All quarters)**

1112-160 **Orienteering**
The sport of Orienteering presents both physical and mental challenges while providing the participants with the fun of being outdoors, the challenge of being totally engaged and the rewards of physical activity. As part of this course, participants will receive instruction in map reading and interpretation, experience the enjoyment of the sport of "O" by participating in events, unlock the mysteries of the compass and receive coaching on techniques used by experienced Orienteers to find control flags and avoid being "lost". All classes will involve some classroom work as well as outdoor activity. A course fee applies via SFS bill. **(All quarters)**

1112-165 **Backcountry Living**
This is an introductory course in backcountry living. We will work in and out of the classroom to incorporate essential outdoor skills involved in backcountry camping and overnight basics. Students will leave this course with a strong base in fire-building; campsite selection and set up; outdoor cooking; rope work; shelter building; wilderness first aid; hypo/hyperthermia prevention, detection and care; and Leave-No-Trace ethics. A course fee applies via SFS bill. **(All quarters)**

1112-170 **Bicycle Care/Maintenance**
This 20 hour course is taught as a hands-on introduction to building, caring for, maintaining and riding bicycles. Students are supplied with a basic bicycle repair kit and book which is theirs to keep. The focus of the course is to use the repair kit and book to discover the mechanical systems of a bicycle including: breaks, drive train, derailleurs, bearings, wheel truing and more. Repair kit tools are designed for bikes 1995 and newer with external gears. Bikes older than 1995 may require different tools to conduct class procedures. Students must bring their own bicycle to each class. Course fee does apply via SFS bill **(All quarters)**

1112-171 **Bicycling for Fitness**
This class is designed for intermediate riders who feel comfortable operating and maintaining their own bicycle. Class will introduce riders to techniques such as circular pedaling, cadence, shifting and breathing to increase efficiency and fitness. The class will also look at riding etiquette and road safety by practicing and obeying NYS laws for cyclists. Students will also learn how to use a heart rate monitor and bicycle computer to increase fitness level. Weekly group rides will be 20-30 miles per class, which includes drills to improve fitness and efficiency. Important note: Class requires a road or hybrid bicycle (no mountain bikes). Students should be comfortable riding, shifting and controlling their bicycle (Not for beginners). Class will meet on indoor spin bikes during March and when weather is unfavorable (TBA by instructor). A course fee applies via SFS bill. **(All quarters)**

1112-172 **Advanced Bike Care/Maintenance**
This class will expand upon information covered in the basic Bicycle Care and Maintenance class. We will cover bearing overhauls, basic wheel truing, cable and housing replacement, and basic component removal such as cranks, bottom brackets, drivetrain components and forks. The course fee will include a selection of basic hand tools for students to keep that will begin their collection of component specific tools. This will also allow students to perform these repairs outside of the classroom environment. A course fee applies via SFS bill. **(All quarters)**

1112-180 **Mountain Biking**
Do you have a mountain bike and want to learn how to use it on something other than pavement? Come with your bike and helmet (required) to an on-campus meeting, then two Saturday classes at Dryer Rd. Park in Victor, NY. We will spend the first Saturday working on basic skills and using different trails based on ability and experience. The second Saturday will be spent further developing your abilities and exploring the park. This course is for all ability levels and beginners are welcome. The instructor will help rank your competency and hone the course to your needs as a rider. A course fee applies via SFS bill. **(All quarters)**

1112-181 **Indoor Mountain Bike Trip**
Bike riding in the middle of the Winter? Ray's Indoor Bike Park in Cleveland, OH boasts over 100,000 square feet of indoor beginner-expert terrain, ranging from dirt tracks to wood ramps, stunts and bridges. As such, beginners to advanced riders are welcome. This class will focus on developing basic bike control and handling skills. There's something for everyone: learn "the basics of riding" in the beginner room, develop your balance and handling skills in the GT Sport section, or show-off in the Trek session room. More information: www.raysmtb.com. This class involves a mandatory pre-trip meeting followed by a weekend trip to Ray's in Cleveland. A course fee applies via SFS bill. **(All quarters)**

1112-182 **Intermediate Mountain Biking**
Improve your mountain bike trail riding skills. This class is ideal for intermediate cyclists who feel comfortable controlling, operating and maintaining their own bicycle (not for beginners). Class highlights include: trail etiquette and safety, bike set-up, trail-side bike maintenance, control, balance, braking, weight transfer, terrain and stunt navigation, high-speed cornering, attack and descent on hills, and basic nutrition and hydration. Weekly group ride distances will be 5-7 miles per class, which includes daily drills and skills. Class requires a properly tuned "name brand" mountain bike (no department store bikes please) and approved helmet. Class will be conducted on stationary spin bikes (indoors) when weather is unfavorable (determined by instructor). Proof of health insurance is required.

1112-183 **Hiking and Mountain Biking**
Spend the weekend exploring some of New York's best mountain biking and hiking trails. Learn to read trail maps, scout out routes to ride and hike, and discover them. Students will learn to cook on camp stoves and set-up a Leave No Trace campsite. Course requires moderate strength and fitness with some mountain biking experience. As with all Interactive Adventures' courses, this class will follow Leave No Trace principles. All food will be provided. Each student must provide their own trail-ready mountain bike and approved bicycle helmet.

1112-501**Beginner Backpacking**

This program is an ideal way to meet and bond with a small group of your fellow RIT freshmen. Spend one day on the RIT campus learning basic backpacking and wilderness skills and then depart for a 4-night trip backpacking on the Finer Lakes Trail. This trip is perfect for those with little or no experience and will involve hikes on easy to moderate terrain. Learn backcountry skills, enjoy the FLT wilderness and make friends that you will be spending your college years with, while living day-to-day with only what you carry on your back. The trip fee covers most backpacking/camping gear (tents, sleeping bags, backpacks) and all group gear, transportation and meals are provided. Students must have proper backpacking footwear and clothing. Details about this program: www.rit.edu/faceitme

1112-110**Intermediate Backpacking**

Join a small group of fellow RIT freshmen in this trip to the High Peaks of the Adirondacks. Spend one day on campus learning backpack and wilderness skills then depart on a 4-night backpacking trip to the Adirondack High peaks. The terrain will be moderate to strenuous, so this class is a nice fit for those with 'some' experience or for those who seek a challenge. Learn backcountry/wilderness skills and make new friends all while living day-to-day only with what you carry on your back. The training and 4 night trip will bring you back to campus for start of New Student Orientation. Trip fee covers most gear (tents, sleeping bags, backpacks), all group gear, transportation and meals are provided. Students must have proper backpacking footwear and clothing. Details: www.rit.edu/faceitme

1112-520**Outdoor Rock Climbing**

This program is an excellent way to meet/bond with your fellow RIT freshmen while rock climbing at a popular Northeast climbing location. Spend one day at RIT learning basic climbing skills, then spend four nights bouldering and top roping at Cooper's Rock, West Virginia. This trip is a fit for all levels/no previous climbing experience is needed. The program includes and afternoon/evening of climbing and preparation that is followed by a four-night trip that will bring you back to campus for the start of New Student Orientation. Trip fee covers most necessary camping gear, group gear, transportation and meals. Students must have proper clothing for the outdoors. More details about this program: <http://rit.edu/studnetaffairs/faceitme/>

1112-105**Adirondack Spring Break**

This class consists of two mandatory pre-trip meetings followed by a week-long trip to the Adirondack State Park. Students will spend two days at Gore Mountain skiing or snowboarding, two days snowshoeing in the Marcy Dam area, and one day cross-country skiing at Cascade Cross-Country Ski Center. Skills introduced include: Snowshoe and cross-country ski use, cold-weather preparedness and backcountry travel. This class meets for the (mandatory) pre-trip meetings and the week trip only. Students must attend ALL for full activity course credit. Check SIS for more detailed class information. A course fee applies via SFS bill that includes all equipment, transportation, lodging and instruction. This course is restricted. To register, students must contact Tom Connelly at tpcsce@rit.edu. (All quarters)

Martial Arts**1113-021****Karate**

Course designed to help students increase their stamina, flexibility and basic techniques in self-defense. Main course objectives: become more physically fit to enhance self-esteem; develop self-confidence to help students deal with everyday situations; relieve stress by providing an outlet to "blow off steam"; and to gain self-discipline to enable students develop better study, work and life habits. Course content: calisthenics; stretching; upper body/lower body exercises; kata (a prearranged set of movements which deal with being attacked). Course options include: Level I, Level II, (Advanced). Please note that students MUST have successfully completed a Karate Level I class before enrolling into the Karate Level II class. A course fee does apply via SFS bill (All quarters)

1113-022**Self-Defense**

This empowering self defense course, designed for students is designed to help students increase their stamina, flexibility, and basic fundamental techniques needed to feel confident in the ability to protect oneself. In this positive, non-threatening environment, the class will teach proper use of hands and feet as weapons, how to fend off multiple attackers, as well as techniques that can be used against a person with a knife, gun or club. Main course objectives: become more physically fit, enhance self-esteem and gain necessary awareness of potential dangers, develop confidence and self-discipline to help deal with everyday situations, relieve stress, provide resources needed to develop better study, work and life habits. A course fee applies via SFS bill. (All quarters)

1113-023**Kali Level I**

This course is a study of Filipino Indigenous Martial Arts used in Pre-Hispanic colonial periods of the Philippines known as Kali, Arnis and Eskrima. The practice of this art was trained in the guise of cultural dances and theatrical plays to hide the Martial applications from the colonial powers. This course will explore the system's unique training method that begins with weapons and transfers the same movement to empty handed defensive applications using a three dimensional thought provoking process of deciphering and understanding body mechanics. Class includes skills through the use of double/single sticks in place of blades and use of these tools to develop plyometric and two-man dynamic drills. Course fee applies via SFS bill + \$20 rattan stick fee (All quarters)

1113-030**Kung Fu: Shaolin**

Welcome to the Duteau Northern Shaolin Kung Fu Wu Su Academy. Typical classes are 1-2 hours, depending on the class-where all students work together. Most classes start with exercises, which are followed by the introduction of basic technique and their application. Students progress throughout the quarter learning more advanced skills and gain more self-discipline and confidence. Kung Fu is an excellent method of getting in shape. Students will feel a definite improvement in overall well-being as they develop their offensive and defensive abilities. Students can also learn the philosophy, history and analysis of Kung Fu techniques. Varied levels offered. Check SIS for more detailed course offerings. A course fee applies via SFS bill. (All quarters)

1113-031**Kung Fu: Open Practice**

This class is designed to provide extra practice time for students outside of their regular class and to give students the opportunity to receive more individual instruction on techniques they have questions about or feel they need help with. Typically class will run for about an hour and 20 minutes, starting out with a set of warm-up exercises, which will then be followed by a review of techniques or 1-on-1 bouts with a senior instructor present. The format of the class is open, providing the opportunity for previous students to rejoin and refresh on techniques they may have learned several quarters, or years ago. All are welcome to register. For more information about this class or the Kung Fu Academy: <http://www.rit.edu/~kungfu/>. A course fee applies via SFS bill. (All quarters)

1113-032**Kung Fu/Rank Test Review**

A typical review class will be about 1 hour and 20 minutes. The class consists mainly of lectures of philosophy, history, and analysis of Kung Fu techniques. This class is required for any students wishing to test for their first rank, but would be beneficial for any student wishing to learn more in the depth knowledge of this style of Kung Fu. For more information about this class or the Kung Fu Academy please visit: <http://www.rit.edu/~kungfu> A course fee applies via SFS bill. (All quarters)

1113-033**Kung Fu Self-Defense**

This self defense class is designed to teach students the physical and mental techniques/attitudes they need to protect themselves both on campus and off. During class students will learn a variety of self-defense applications and techniques that can be used anywhere and in any situation. Over the course of the quarter students will gain an increase in physical fitness, self-confidence, and awareness, which will better enable them to deal with any situations they may encounter—whether walking back to the dorms late at night or walking home to your off-campus apartment, you'll learn how to stay safe and out of danger. The techniques taught in this course will be based in Shaolin Kung Fu. A course fee applies (All quarters)

1113-040**Tai-chi: Slow Paced**

This course is designed to teach 24 forms of Tai Chi movements with popular meditation ideas. Focus on creating strong internal energy and strength. Pursue and maintain good health, the "qi" sensations. Learn to balance the body with gentle movements that improve health conditions with each progressive section. Tai Chi was created 400 years ago and repeats simple movements again and again in certain frequency, allowing students to develop a special routine for maximal energy, skills and string internal power for application in defense and self-healing. First time learners are welcomed. A course fee applies via SFS bill. (All quarters)

1113-042**Tai Chi: Fast-Paced**

This fast-paced Tai Chi class will focus on all the 88 forms of Tai Chi movements. Students will have the opportunity to obtain the strength, knowledge and capabilities that will bring them to the level of "mastering". Activities during class sessions involve pushing hands in continuous and fluid movements and teaches the release of tensions created by opposing forces thereby enhancing internal strength. This practice simulates devotional fighting in real life. First time learners welcome! A course fee applies via SFS bill. (All quarters)

1113-050**Qigong**

This martial arts course focuses on 'internal energy exercise' based on practices from 2000 years ago. The powerful combination of slow movement, breathing, postures and meditation practices allow the body to open energy channels instantly, thus dramatically healing disease that conventional medicine has failed to overcome. Students will focus on using 'health energy' to pursue success, peace and happiness. Basic course content: Flying Crane Qigong (combines movement with mental concentration); Fragrance Qigong (repeats simple movements in specific frequency for maximal biophysical energy); and Qigong Meditation (involves applying physical pressure to transform 'bad' energy to 'good' energy) to heal at a subconscious state. A course fee applies via SFS bill. **(All quarters)**

1113-060**Aikido**

Aikido was founded by Master Morihei Uyeshiba as a synthesis primarily of Aiki-jitsu, Aiki-ken, Judo and founder's philosophy of peaceful reconciliation of conflict. One of the founder's students, Koichi Tohei Sensei, founded a branch school called the Ki-Society, which emphasizes the development of personal "ki" through Aikido practice. RIT aikido traces its lineage back to the original Hombu dojo in Japan. The objective of this course is to provide physical conditioning by educating and coordinating the whole body-mind-spirit system. Basic ideas and techniques will be taught. The four basic principles to be presented: 'Keep one-point', 'Relax completely', 'Keep weight underside', and 'Extend Ki'. Course fee applies via SFS bill **(All quarters)**

1113-070**Karate: Sparring**

This exciting Martial Arts course is designed to help students increase their stamina, flexibility and basic techniques in self defense, with emphasis on controlled fighting bouts (two students matching their skills against each other). Main course objectives: develop confidence through physical fitness, relieve tension by providing a healthy forum for stress relief and gain the self discipline to enable students to lead a more productive lifestyle. Course content: calisthenics, stretching, and punching and kicking drills (include bag work and sparring with other students) to promote the development of footwork, distancing timing, focus and strategies needed to be a skillful fighter. A course fee applies via SFS bill. **(All quarters)**

1113-090**Capoeira Fitness**

This exciting martial art course is one of the few, if not the only one still in existence, native to Americans, developed in Brazil by the descendants of African slaves brought there by the Portuguese during the era of the Atlantic Slave trade. Capoeira is characterized by dynamic body play, kicking, sweeping, takedowns, aggressive feinting and head butt movements. It is played within a circle of onlookers and fellow participants, called a "Roda". The game is played when two contestants enter the circle and begin to "ginga" ("to swing" in Portuguese), launching various attacks, counters and initiating defense. A course fee applies via SFS bill. **(All quarters)**

Military Sciences

1114-001**Air Force ROTC Physical training**

This course is designed to help the individual establish a physical readiness program. "Physical Readiness" are those factors that determine one's ability to perform heavy, physical work and those that help maintain good health and appearance. Factors/components of readiness: muscular strength, muscular endurance and cardio-respiratory endurance. Major goals of the course: To physically challenge students and help students develop self-confidence, discipline and spirit. Students will work to develop physical readiness to a degree that will enable them to achieve or exceed the physical readiness standard established by the U.S. Air Force. Must be enrolled in RIT ROTC Air Force. There is no course fee.

1114-002**Air Force Leadership Lab**

The ROTC course is an Air Force Leadership Lab. Formerly Air Force Physical Training II, this revised course is designed to provide the students with a foundational understanding of the benefits, privileges and opportunities as well as responsibilities associated with an Air Force commission. Students will also be introduced to Air Force customs, courtesies, environment, drill, flight movement and ceremonies. Prerequisite is enrollment in the RIT ROTC Air Force Program. There is no course fee.

1114-010**Army Conditioning Drills**

This course is designed to help the individual establish a physical readiness program. "Physical Readiness" are those factors that determine one's ability to perform heavy, physical work and those that help maintain good health and appearance. Factors/components of readiness: muscular strength, muscular endurance and cardio-respiratory endurance. Major goals of course: To physically challenge students and help them develop self-confidence, discipline and spirit. Students will work to develop readiness to a degree that will enable them to achieve or exceed the physical readiness standard established by the U.S. Army Evaluation will be determined by the use of the Army's Physical Readiness Test. Must be enrolled in RIT ROTC Army. No course fee applies.

1114-011**Army Leadership Lab: ROTC**

Prerequisite: Successful completion of Army Conditioning Drills (must be enrolled in Army ROTC). Course offered fall, winter and spring quarters. See section notes on SIS under the "Military Sciences" discipline, 1114) for more information on this required Army ROTC class. No course fee applies.

1114-020**Navy Drill: ROTC University of Rochester**

This course is designed to help the individual establish a physical readiness program. "Physical Readiness" are those factors that determine one's ability to perform heavy, physical work and those that help maintain good health and appearance. Factors/components of readiness: muscular strength, muscular endurance and cardiorespiratory endurance. Major goals of the course: to physically challenge students and help them develop self-confidence, discipline and spirit. Students will work to develop physical readiness to a degree that will enable them to achieve or exceed the physical readiness standard established by the U.S. Naval Sciences. Must be enrolled in U of R ROTC Navy. There is no course fee. Call 275-4275 @ U of R for more information.

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