Course Numbering

In addition to its title, each course is identified by two numbers. The alpha-numeric directly to the left of the course title is the official Institute course number. The number will appear on grade reports, transcripts, and other official correspondence. This is what the alpha-numeric means.

First letter: College offering the course
Second and third letters: School or department of that college
Fourth letter: Discipline
First number: Course level: 0 = Non-credit, 1 = Diploma; 2 or 3 — Lower level degree courses; 4, 5, or 6 = Upper level undergraduate degree courses; 7 or 8 = Courses for graduate credit.
Second and third numbers: Course differentiation and sequencing

Directly below the alpha-numeric in the course description is the registration number. You must use this number with a section number (i.e. 01, 02) when you register for a course, because the alpha-numeric course number cannot be read by the computer system.

Course prerequisites are shown in parentheses after course descriptions.

Courses of Study 1982-83
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P.O. Box 9887
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(716) 475-6631
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College of Applied Science and Technology

Department of Instructional Technology

All courses in the Department of Instructional Technology are offered at least once every three years and/or upon sufficient demand:

**Audiovisual Communications**

ICIC-401 Message Design
Registration #0612-401
Reviews media formats as they may be applied to the design of instructional communications. Examines social psychological principles as they relate to attitude change and motivation in learners. Students use design principles and structure messages for different media forms. Required for all students.
Credit 4

ICIC-405 Audiovisual Seminar
Registration #0612-405
Permits students to discuss in a seminar setting a series of topics related to the field of audiovisual communications, including career choices, academic preparation, and professional growth opportunities. Required for all students.
Credit 2

ICIC-421 Producing Audiovisual Presentations I
Registration #0612-421
Students develop slide/tape presentations in order to communicate an idea or to change the attitudes or behavior of the viewer. The development process includes: analyzing the needs of clients and audiences; preparing communications objectives; preparing treatment, storyboard and script; producing audio track and visual materials; synchronization and presentation preparation. Project required. (Photographic skills required)
For nonmajors.
Credit 4

ICIC-422 Producing Audiovisual Presentations II
Registration #0612-422
Basic slide/tape planning and production similar to ICIC-421 but with increased emphasis on scripting and production planning and the unique characteristics of slide/tape as a delivery medium; increased emphasis on synchronization methods and more sophisticated presentation hardware.
(ICIC-421) For nonmajors.
Credit 4

ICIC-423 Producing Audiovisual Presentations III
Registration #0612-423
Similar to ICIC-421 and 422 but with production of presentations using media other than slide/tape. Characteristics of various presentation media are emphasized along with the hardware and software available for various media.
(ICIC-421, 422) For nonmajors.
Credit 2

ICIC-440 Audiovisual Program Design I
Registration #0612-440
Students differentiate between audiovisual presentations and programs and then design programs which incorporate a number of presentations within a program. Emphasis is on analyzing the performance problem, setting appropriate communications objectives, and then developing a program to improve performance. Actual case studies are used to illustrate the design process in business and industrial settings. Required for all students.
Credit 4

ICIC-460 Selection, Storage, and Dissemination of Media Resources
Registration #0612-460
Reviews methods of searching for, selection and evaluating visual information and nonprint materials such as films, filmstrips, videotapes and audiotapes. Covers location of pictorial material in primary and secondary sources and current copyright restrictions governing its use. Also covers proper storage and distribution methods for these materials.
Credit 4

ICIC-489 Audio for Audiovisual Presentations
Registration #0612-489
Students record, transfer, edit, and mix sound tracks with music, narration and sound effects for audiovisual programs. Course stresses practical approach with hands-on experience. (Enrollment for 4 credits requires production of the audio portion of a presentation.) For nonmajors.
Credit variable (3-4)

ICIC-490 Audio Techniques
Registration #0612-490
Students review principles of sound recordings and produce audiocassettes in a variety of situations. Course includes both practical and theoretical aspects of studio and field recording, selection of equipment, acoustical considerations and the electronics related to audio recording. (ICIC-489 or equivalent).
Credit 4

ICIC-500 Practicum in a Special Interest Area
Registration #0612-500
Permits students to explore or develop a special competence in an area of special interest and to work with "clients" in real or simulated work environments. A proposal (guidelines available from the department) must be submitted prior to registration. For audiovisual communications majors only.
Credit variable (1-4)

ICIC-501 Practicum in Audiovisual Program Design
Registration #0612-501
Permits students to explore or develop a special competence in audiovisual program design and to work with "clients" in real or simulated work environments. A proposal (guidelines available from the department) must be submitted prior to registration. For audiovisual communications majors only.
Credit variable (1-4)

ICIC-502 Practicum in Audiovisual Management
Registration #0612-502
Permits students to explore or develop a special competence in audiovisual management and to work with "clients" in real or simulated work environments. A proposal (guidelines available from the department) must be submitted prior to registration. For audiovisual communications majors only.
Credit variable (1-4)

ICIC-503 Practicum in Audiovisual Production
Registration #0612-503
Permits students to explore or develop a special competence in advanced production and work with "clients" in real or simulated work environments. A proposal (guidelines available from the department) must be submitted prior to registration. For audiovisual communications majors only.
Credit variable (1-4)

ICIC-510 Writing for Audiovisual Programs
Registration #0612-510
Emphasizes the principles of script writing for visual and verbal continuity, clarity, and impact. Considers the audience and purpose for which the script is being written, the intended medium and styles of writing. Required for all students.
Credit: 4

ICIC-550 Management of Audiovisual Programs
Registration #0612-550
Covers organizational strategies, management practices, budgeting and fiscal control, personnel recruitment, selection, training and supervision, resource center operation and organization.
Credit 4

ICIC-560 Media Facilities Design
Registration #0612-560
Examines major variables influencing the design of such media facilities as media production areas, darkrooms, audio and television studios and control rooms, and training and instructional areas. Topics include acoustics, lighting, ventilation, electrical circuits, space requirements and layouts.
Credit 4
ICIC-570 Survey of Audiovisual Equipment Registration #0612-570
Permits the student to survey the wide spectrum of AV equipment available and to do an in-depth analysis of one type of equipment. Different groups of students will then report to the class the results of their in-depth study, using demonstrations, media presentations, visits by dealers or manufacturers and other methods.
Credit 2

ICIC-580 Producing Multi-Image Presentations I Registration #0612-580
Students design, produce, and present multi-image productions (3-6 projectors). Covers both theory and practice of aspects such as synchronization, presentation planning and equipment selection, and the presentation development process. Projects required. (Photography skills, ICIC-489, ICIC-401 or ICIC-421 or equivalent)
Credit 4

ICIC-581 Producing Multi-Image Presentations II Registration #0612-581
Students design and produce multi-image presentations (6-15 projectors) controlled by microprocessor-based programmers using leisure time programming. Basic research and theory of multi-image covered. Two presentations required. (ICIC-489, ICIC-580, and ICIC-401 or ICIC 421 or equivalent)
Credit 4

ICIC-583 Advanced Multi-Image Project Registration #0612-583
A special project to develop an advanced, complex multi-image presentation using memory programming and multiple projectors. Projects may focus on a single special effect or a complete presentation. The number of credits allowed depends on the scope and complexity of the project undertaken. (ICIC-580, 581, approval of project prior to enrollment)
Credit variable (1-4)

ICIC-585 Producing Special Effects Slides Registration #0612-585
Building on basic black and white and color photography, the student designs, produces and evaluates optically produced graphic and pictorial slides for use in audiovisual presentations. Includes techniques to produce effects such as multiple exposures, streaks, zooms, neons, registration techniques to produce slide animation and seamless masking. Emphasis is on design and planning as well as production and use of slides in presentations. (Enrollment for 4 credits requires the prior approval of special effects sequence for multi-image.)
Credit 3-4

ICIC-595, 596 Senior Project Registration #0612-595, -596
Focus is on the design and production of an interview presentation package based on each student's own job aspirations, professional skills, personal qualities and portfolio materials. These courses are to be taken in the senior year. Both are required for graduation. For audiovisual communications majors only.
Credit 2/Qtr.

ICIT-705 Sources of Information in Instructional Technology Registration #0613-705
Students develop general search techniques and strategies for finding information, evaluating it, and establishing a reference file. Sources of print material include journals and periodicals related to instructional technology, books, research reports and conference proceedings, catalogues and commercial information, and automated information systems. Interpreting recent copyright changes is also covered. Actual search problems are given and an information search project is required. To receive 4 credits, the student applies the general search techniques to sources of visual materials and completes a search for primary and secondary sources of prepared visual material relating to training and instruction.
Credit variable (3-4)

ICIT-710 Programmed Instruction Registration #0613-710
Students review principles and techniques of preparing programmed instruction; then design, produce and validate their own programmed instruction materials; includes research and development related to programmed instruction and sources of programmed materials.
Credit 4

ICIT-712 Computer Assisted Instruction Registration #0613-712
Students review the use of the computer for instruction (computer-assisted instruction) and then produce their own teaching programs actually using a computer. Examines research about computer assisted instruction, various hardware and software configurations, programming languages and sources of already developed computer-assisted courses, also discusses various methods of course and lesson development. (ICIT-710 or permission of department.)
Credit 4

ICIT-715 Instructional Television Registration #0613-715
Explores the various uses of television as an instructional medium, e.g., individualized instruction, instruction of mass audiences, stand-alone instruction, integrated instruction. Students must produce at least one television program. Surveys the hardware, technology and software of television.
Credit 4
Offered on demand.

ICIT-720 Research in Instructional Technology Registration #0613-720
Examines the fundamentals of educational research: hypothesis stating, designs, statistical procedures, reporting techniques, and types of research. Specifically examines the research in instruction. Students learn to critique research articles and develop evaluation plans.
Credit 4

ICIT-721 Evaluation of Training and Instruction Registration #0613-721
A course to train students in the development and application of testing methods used in measuring performance, principally cognitive and psychomotor skills, as well as methods to determine overall course effectiveness. Covers methods for both formative and summative evaluation, test construction, and means of validating instructional materials and instructional systems.
Credit 4

ICIT-722 Research Project Registration #0613-722
A variable credit course which allows a student to conduct a research project based on the student's interests and with the advice and consent of a faculty member. A formal research proposal must be submitted before registering for this course (guidelines available from the department). (ICIT-756, 751, and 720 or 721)
Credit variable (1-4)

ICIT-735 Psychology of Learning and Teaching Registration #0613-735
Relates various theories of learning to actual teaching and training. Students review learning principles and apply them to practical instructional situations. Emphasis is on behavioral approach to developing instruction and training. Course required for graduation.
Credit 4

Instructional Technology

ICIT-700 Introduction to Instructional Technology I Registration #0613-700
An overview of the basic elements of instructional technology including: technology and its application to instruction; instructional development; past, present, and future trends in instructional technology; and, instructional objectives. The course is a mix of self-instructional modules and seminars. Completion of modules and seminars on topics above are required (2 cr.). Additional modules cover specialized areas of instructional technology such as health sciences and community college applications, television and instruction, training and development. Course credit varies with the number of modules completed. Course required for graduation.
Credit variable (2-4)

ICIT-701 Introduction to Instructional Technology II Registration #0613-701
A continuation of ICIT-700 offering the student an opportunity to complete additional modules as described in ICIT-700 course description. (ICIT-700)
Credit variable (1-3)
ICIT-736  
**Applications of Behavioral Psychology to Training and Adult Learning**  
The course distinguishes between counseling, coaching, and training, stressing task-related interpersonal and cognitive skills such as working with a subject matter expert or job counseling. Includes methods of interaction to maintain communications and to shape behavior.  
Credit 3

ICIT-745  
**Instructional Facility Design**  
Registration #0613-745  
Designed to enable the instructional developer to assist and participate in the design of spaces and related facilities for effective learning. Specific topics include acoustics, lighting, ventilation, electric circuits, planning for electronic distribution systems, equipment specifications, spatial relationships, together with architectural engineering and contracting procedures.  
Credit 4

ICIT-750  
**Instructional Development I**  
Registration #0613-750  
Covers the concepts and principles underlying the development of instructional programs and materials. Instructional development is the systematic solution of instruction and learning problems involving needs assessment, task analysis, specification of objectives, analysis and synthesis of instructional strategies, and methods of evaluation. A limited instructional development project is part of the course. Required for graduation. (Note: ICIT-700 must be taken before or simultaneously with ICIT-750; must be taken before 18 hours of program are completed.)  
Credit 4

ICIT-751  
**Instructional Development II**  
Registration #0613-751  
A continuation of Instructional Development (ICIT-750) in which instructional development principles are applied in an actual project selected by the student. More sophisticated means of development, evaluation, and revision are included along with strategies for media selection and development. Literature of the field is also covered. Required for graduation. (Prerequisite: ICIT-750)  
Credit 4

ICIT-752  
**Instructional Development III**  
Registration #0613-752  
Stresses the difference between personnel/faculty development, instructional/program development, and curriculum/organizational development and how the instructional developer or trainer becomes an agent for change. Examines the methods of disseminating and promoting the adoption of innovative methods and materials. Students research special problems related to selected areas of instructional development. (Prerequisite: ICIT-750 & 751)  
Credit 4

ICIT-755  
**Criterion Referenced Instruction and Technical Training I**  
Registration #0613-755  
Credit 3

ICIT-756  
**Criterion Referenced Instruction and Technical Training II**  
Registration #0613-756  
Credit 3

ICIT-757  
**Techniques of Work Analysis**  
Registration #0613-757  
Students learn a variety of analysis and task analysis techniques based on Work Sampling. Data gathered from analyses is cast into various formats for job restructuring, writing job descriptions, establishing task and job hierarchies, and developing training programs. Students learn to develop job inventories and checklists for gathering task information for a number of interrelated purposes. Students must complete two additional job analyses to receive 3 credits.  
Credit variable (2-3)

ICIT-758  
**Developing Instructional Modules**  
Registration #0613-758  
The course is designed to follow either ICIT-756 and/or ICIT-751 to give the student extended practice in the development, evaluation, and revision of self-instructional materials. The course, largely self-instructional and project oriented, emphasizes structuring the module, actual module writing, and tryout and revision procedures. Students must have already selected a content area and developed objectives, a course plan, and criterion tests. ICIT-750 & 751 or ICIT-755 & 756)  
Credit 3

ICIT-762  
**Management & Budgeting in Instructional Technology**  
Registration #0613-762  
Applies basic theories of management to areas of instructional technology and to management of personnel of those areas. Examines the organizational structure of instructional development units. Covers budgeting and actual financing for services and projects.  
Credit 4

ICIT-765  
**Individual Learning Style Analysis**  
Registration #0613-765  
Examines the ways different individuals learn and relates instructional strategies to learning styles. Covers cognitive style mapping, aptitude treatment interaction, application of norm and criterion referenced tests as they relate to individual learning style. (ICIT-735)  
Credit 2

ICIT-770  
**Interpersonal Communications**  
Registration #0613-770  
Instructional development requires that instructional technologists be able to work well with people. Participants in the course are taught to be sensitive to others as well as to examine their own feelings in a group situation. Required for graduation.  
Credit 2

ICIT-772  
**Group Development and Organizational Change**  
Registration #0613-772  
Similar in format to ICIT-770, the course extends the concept and practice of interpersonal communications to the areas of work- and task-oriented team building and organizational change. The course stresses actual personal interaction in a training laboratory environment while including some of the theoretical aspects of causing work-oriented, personal and organizational change. Offered on demand. (ICIT-750, 751, 757, 770)  
Credit 3

ICIT-780  
**Selected Topics in Instructional Technology**  
Registration #0613-780  
This seminar provides a forum for a small group of students to examine various areas of interest to them. Students select topics, examine them thoroughly, and present the findings for group consideration. Required for graduation. (30 hours course work)  
Credit 2

ICIT-840  
**Internship**  
Registration #0613-840  
Special opportunities may occur for students to obtain work experience in a job or environment similar or coincident with their career objectives. In fact, students are encouraged to locate such opportunities. This course recognizes this experience. A proposal ( guidelines available from the department) must be submitted prior to registering for this course. (ICIT-750, 751 and 20 hours of course work)  
Credit variable (1-3)

ICIT-850  
**Independent Study**  
Registration #0613-850  
An opportunity for a student to explore, with a faculty advisor, an area of interest to the student. A proposal ( guidelines available from the department) must be submitted prior to registering for this course. (ICIT-750, 751 and 20 hours of course work)  
Credit variable (1-3)
Department of Career and Human Resource Development

All courses are offered on demand with sufficient enrollment. Note: Graduate courses applicable to the program are also listed under the College of Business.

IJCC-701 The Two-Year Colleges
Registration #0615-701
The study of the philosophies, organizations, developments, finance, goals, curricula, and spirit of the two-year college.
Credit 3

IJCC-702 Teaching, Learning, Content, & Environment
Advising/counseling relationships, learning styles, student activities, motivations, developmental education, and the implications of the "open door" policy are investigated.
Credit variable (1-3 credits)

IJCC-703 Management of Learning
Registration #0615-703
Systems of curriculum planning and cognitive styles, goals, objectives, evaluation, measurement, and productivity are studied as they relate to the accountability of faculty, students, and administration.
Credit variable (1-6 credits)

IJCC-704 Instructional Techniques
Registration #0615-704
To develop professional competence in direct applications and uses of various learning styles, including television, special audiovisuals, prepared lectures, seminars, computer assisted instruction, and programmed learning.
Credit variable (1-4 credits)

IJCC-741 The Nature of Work
Registration #0615-741
Analysis of the changed meaning of work throughout history with emphasis on the 20th century. Different theoretical and practical approaches to job satisfaction and work motivation will be studied as well as recent efforts to redesign work and/or apply alternative time patterns. New work trends and the changed work-leisure relationship also will be explored.
Credit 3

IJCC-742 Career Decision Making Concepts
Registration #0615-742
Based upon prior knowledge of basic sociological and psychological constructs, this course concentrates on the processes and influences involved in choices regarding careers. The relative and collective impacts of peers, teachers, friends and relatives, immediate family, and professional advisors are analyzed. Additional course goals include applications of processes such as socialization, acculturation, assimilation; status and role playing; and perception to related activities such as career education-orientation-advising. Current psychological research relating personality/self concepts/motivation to career decision making will be studied. A special topic involves the problems of communicating information on emerging careers to individuals to effect real and valid perceptions.
Credit 4

IJCC-743 Education/Business/Industry Interrelationships
Registration #0615-743
A study of the interrelationship of the world of formal education to the business, industrial, and labor communities. Constraints, problems, and values of cooperative effort will be studied in relation to organizations of varying size. Elementary, secondary and post-secondary education, differing size business organizations and industrial groups that involve differing levels of technical specialization are studied.
Credit 2

IJCC-745 Career Concepts: Production
Registration #0615-745
Credit 3

IJCC-746 Career Concepts: Commerce
Registration #0615-746
Credit 3

IJCC-747 Career Concepts: Services
Registration #0615-747
These three courses form a single set and are separated only to facilitate registration and scheduling flexibility.

Each of these three courses concentrates on particular careers. Production includes manufacturing, construction, mining, skilled trades, design and engineering related fields, and food processing and the field of agriculture, fisheries, etc. Commerce covers general business, banking and finance, sales and advertising, communications, hospitality and tourism, retail and wholesale distribution and related fields. Service includes allied health careers, education, government and civil service, law and criminal justice careers, and other service careers.

Each course is designed to present a foundation view of several types of a particular employer. Investigated will be systems of career opportunities, management, personnel policies, employer/employee relations, required training/educational levels, manpower long-range projections, philosophies, in-house education and training, competitive relationships, national/international affiliations, and civic/humanitarian expectations.
Credit 3

IJCC-748 Information Retrieval Systems
Registration #0615-748
This course offers educators firsthand exposure to industrial/and or occupational work environments, with focus on the various components of the work force such as research, skilled trades, computer-related areas, production supervision, finance and retailing. Students will have presentations from executives, training directors, employment personnel and workers about the skills required for entry-level jobs, application and interview procedures, scope of work, economic benefits, salary and wage scales, employment outlook, and worker and employment expectations.
Credit 5

IJCC-751 Occupational/Industrial Environments
Registration #0615-751
This course offers educators firsthand exposure to industrial/or occupational work environments, with focus on the various components of the work force such as research, skilled trades, computer-related areas, production supervision, finance and retailing. Students will have presentations from executives, training directors, employment personnel and workers about the skills required for entry-level jobs, application and interview procedures, scope of work, economic benefits, salary and wage scales, employment outlook, and worker and employment expectations.
Credit 5

IJCC-752 Career Education in Colleges & Registration #0615-752 Special Settings
The course goals are to develop the abilities and knowledge necessary to function effectively in college career education and information centers and other organizations helping adults develop career plans. Topics include career education components in community/junior and four year colleges and universities; multiple, middle, and late careers; advocacy; spouse and family concerns; and special settings for career assistance.
Credit 3
This course concentrates on the abilities needed to plan, conduct and evaluate various group counseling and peer assistance processes as used in assisting individuals to formulate career plans. Each participant will understand the appropriate functions, advantages and disadvantages of different group dynamic procedures; and will demonstrate the required “attending”, listening, guidance, problem solving, and decision making skills needed to plan and moderate such sessions.

Credit 3

IJCC-754 Human Resources Topics
Registration #0615-754
This course provides classroom studies, research, and experiential learnings that relate general knowledge about occupations and careers to information about individual and personal characteristics needed for success in the careers. The specific topics and objectives will vary each time the course is offered in order to meet differing needs. They will, however, relate to career development, planning, advising and counseling. Applications to human resource planning, personnel administration, career education, and career assistance will be stressed. Interested persons should understand the particular objectives for a scheduled offering of the course prior to registration. Because of the differences in selected concentrations within the general goal, the course may be repeated for credit.

Credit variable (1-6 credits)

IJCC-755 Career Development Project
Registration #0615-755
This is a variable credit (1 to 5) course that is required of all students unless they have had sufficient approvable experience. It is an opportunity to practice one or more of the defined functions in career education or human resource development.

Credit variable (1-5 credits)

IJCC-760 Career Counseling Skills
Registration #0615-760
Students are introduced through demonstration and role playing to selected interviewing and counseling skills including attending, listening, questioning, paraphrasing, reflection of feelings, giving directions, and interpreting. The primary tenets of related counseling theories are presented and discussed.

Credit 3

IJCC-762 Career Education Seminar-Women
Registration #0615-762
An elective course for students in Career and Human Resource Development concentrating on the ability to provide effective counseling for women who wish to enter non-traditional career fields. Case studies, first person presentations, readings, media and discusions are used to develop the knowledge and skills needed. A project related to the elimination of bias and stereotyping in career counseling materials will be required.

Credit 3

IJCC-763 Career Education Seminar-Handicapped
Registration #0615-763
An elective course for students in Career and Human Resource Development concentrating on the ability to provide effective counseling for handicapped persons who wish to plan and succeed in desired careers.

Credit 3

IJCC-777 Career Internship
Registration #0615-777
This is a variable (1 to 5) credit course, and is an elective that is available only when satisfactory arrangements can be made to function as a specialist in business/industry. It is possible this would only be available for full-time students.

Credit variable (1-5 credits)

IJCC-840 Teaching Internship
Registration #0615-840
An individual arrangement with an appropriate community or junior college will be made for those persons not having sufficient experience. This will provide definite teaching assignments and responsibilities, together with participation in other faculty functions, including advising, committee work, planning, and student evaluation on a full semester or term basis at a two year college. Supervision, assistance, and evaluation will be provided by a mentor in the participating college and by the CHRD.

Credit variable (3-6 credits)

IJCC-850 Special Projects
Registration #0615-850
This course provides for independent study, investigation, or research activity in subject matter areas not formalized by the Center's program, but having specialized value. Proposals require approval by the director.

Credit variable (1-6 credits)
Computer Science Courses

Computer science and technology courses may be taken as computer science electives except as noted.

ICSP-208 Introduction to Programming
Fundamentals of programming using a structured programming language. Topics include basic problem solving methods, algorithm development, elementary data types, expression evaluation, use of basic control structures, and subprograms. Programming projects will be required.
Class 4, Credit 4

ICSP-210 Program Design and Validation
Program design, including specification, structured development, advanced data types, procedures and functions, program validation and verification: programming paradigms, including basic internal sorting and searching algorithms. Programming projects will be required. (ICSP-208)
Class 4, Credit 4

ICSP-305 Assembly Language Programming
A study of assembly language concepts and programming methods, including computer organization, assembly process, addressing, binary arithmetic, repeatability, storage allocation, subroutine linkage, loop and address modification, character manipulation, bit manipulation, floating point arithmetic, decimal instructions, some system I/O, macros and debugging techniques. Programming projects will be required. (A high-level programming language)
Class 4, Credit 4

ICSP-306 Advanced Assembly Techniques
A study of advanced techniques in assembly language programming. Topics include macro definition and invocation, conditional assembly, system macros and supervisor calls, program linkage, reentrant and recursive programs, I/O programming at the interrupt level. Programming projects will be required. (ICSS-315, ICSS-325)
Class 4, Credit 4

ICSP-307 Business Applications Programming
The mastery of the techniques and concepts of programming within a business programming environment. Emphasis on algorithmic solutions to business application problems, including report generation, sorting and table processing and generation, and complex I/O processing. Project management, programming teams, testing and debugging are used in the course. Structured COBOL is used. Students will also program against a database in a host-embedded programming language. Laboratory emphasis. (ICSS-325)
Class 4, Credit 4

ICSP-319 Scientific Programming Languages
The high level programming languages—FORTRAN and APL—will be mastered. Discussion of the languages includes programming design and style, data structuring, expression formation and evaluation, and I/O. Special topics in FORTRAN include subroutine construction, modularity, and plotting. Special topics in APL include workspace management, report formatting, definition, and recursion. Both scientific and business applications will be programmed. Programming projects will be required. (ICSS-320)
Class 4, Credit 4

ICSP-330 PL/I Programming
Topics include elementary data types and control structures, data structuring capabilities (arrays and records), run time error handling, standard built-in functions, text processing, user written functions and subroutines. Emphasis is placed on developing well structured and modular programs. Programming projects will be required. (A high-level programming language)
Class 4, Credit 4

ICSP-350 Programming Language Concepts
A study of the syntax and semantics of a diverse set of high-level programming languages. The similarities and differences of the languages chosen are discussed in order to demonstrate general principles of programming language design. Programming projects will be required. (ICSS-320)
Class 4, Credit 4

ICSP-320 Data Structure Analysis
Information structures: sequential lists, stacks, queues, sequential allocation; linked lists, circular lists, doubly linked lists, linked allocation; trees, tree traversal; lists, orthogonal lists, multitubular structures; dynamic storage allocation and garbage collection. Programming projects will be required. (Either ICSP-210 or ICSP-216, and ICSP-305)
Class 4, Credit 4

ICSS-200 Introduction to Computer Science
A study of the syntax and semantics of a diverse set of high-level programming languages. The similarities and differences of the languages chosen are discussed in order to demonstrate general principles of programming language design. Programming projects will be required. (ICSS-307, ICSS-315, ICSS-325)
Class 4, Credit 4

ICSS-202 Introduction to Computer Science
An introduction to the computer: information representation, instruction execution, and the software interface to the user. Topics include integer (binary and decimal) and floating point arithmetic, logical operations; introduction to machine language and assembly language, input/output operations; operating systems and editors.
Class 4, Credit 4

ICSS-315 Digital Computer Organization
An introduction to the logical design of a computer. Topics include a review of arithmetic and boolean algebra, combinatorial and sequential circuit design, flip-flops and adders, storage mechanisms and their organization, instruction fetch decode and execution in a simple CPU, input/output subsystems, interrupts, and variations in memory addressing. (ICSP-305)
Class 4, Credit 4

ICSS-325 Data Structure Analysis
Information structures: sequential lists, stacks, queues, sequential allocation; linked lists, circular lists, doubly linked lists, linked allocation; trees, tree traversal; lists, orthogonal lists, multitubular structures; dynamic storage allocation and garbage collection. Programming projects will be required. (Either ICSP-210 or ICSP-216, and ICSP-305)
Class 4, Credit 4

ICSS-335 Systems Specification, Design and Implementation
Students are introduced to basic concepts of system specification, design, system implementation and project management. Tools used include PERT/CPM scheduling tools, structured English, structured flowcharts, and decision trees (description tools), dataflow diagramming (description and design tool), and hierarchical design of programming systems (design tool). Students are also introduced to other tools (e.g., HP0 charts, N-S charts, etc.). An introduction to the structured design methods of Youndon is included. (ICSS-325)
Class 4, Credit 4

ICSS-340 Finite State Machines and Automata
Topics include finite state models, machine capabilities, descriptive methods, decomposition methods, regular expressions, bilateral analysis and synthesis, sequential iterative systems, and space-time transformations. (ICSS-315)
Class 4, Credit 4

ICSS-355 The Human Side of Computers
The impact of computer systems on society is studied using class discussion, lectures and films. Current topics such as the following are covered: the impact of computers on employment, automation and the labor force; overview of computer applications in government; innovative medical applications; computers in education and computer assisted instruction issues, privacy and the Freedom of Information Act; computer abuses and crimes—the impact on law enforcement; the future—a cashless society, universal identifiers, computers in the home. Participants will develop several short discussion papers and a major study in one of the course topics. (ICSS-200 or ICSS-202)
Class 4, Credit 4
ICSS-360 Fundamentals of Computer Science
Registration #0603-360
For Transfer Students
Selected topics from ICSS-202, ICSP-208, ICSP-210 and ICSP-305 are presented. This course is required for students transferring into the School of Computer Science and Technology with previous programming experience. Open only to transfer students; not to be taken as a computer science elective.
Class 4, Credit 4

ICSS-400 Logical Design
Registration #0603-400
Topics include an introduction to switching theory, sequential circuit analysis and synthesis, error detection, error correction networks, speed-up techniques, serial and parallel approaches, interface techniques, and comparative studies of digital computer architecture. (ICSP-315)
Class 4, Credit 4

ICSS-420 Data Communication Subsystems
Registration #0603-420
Data communication and telecommunication systems, including communication techniques, communication interfaces; common carrier implications and tariffs, exchanges; concentrators, multiplexors, front-end computers; buffering, response time and human factors; network cost and design analysis, software considerations. (SMAM-309 or SMAM-352, and third year standing in computer science and technology)
Class 4, Credit 4

ICSS-430 Numerical Methods
Registration #0603-430
Topics include introductory error analysis, roots of an equation, solution of systems of linear and non-linear equations, interpolation, power series calculation of functions, numerical integration and first-order ordinary differential equations. The computational aspects rather than mathematical formulation will be emphasized. Programming projects will be required. (Either SMAM-252 or SMAM-215, and a high-level scientific programming language)
Class 4, Credit 4

ICSS-440 Operating Systems
Registration #0603-440
A general survey of operating system concepts. Topics include process synchronization, interprocess communication, deadlocks, 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. (ICSS-319, ICSS-320)
Class 4, Credit 4

ICSS-480 Formal Languages
Registration #0603-480
Formal language theory and principles. Topics include context free, context sensitive grammars, regular expressions, Turing machines; introduction to unsolvability and computability. (ICSS-340)
Class 4, Credit 4

ICSS-485 Data Base Concepts
Registration #0603-485
Topics include data organization and structure; relational, hierarchical, and network approach; data security and recovery. Comparison of the data base approach with traditional file organization and access methods, performance and management issues. Existing data base systems will be studied. (ICSS-325)
Class 4, Credit 4

ICSS-513 Computer Graphics
Registration #0603-513
A study of computer graphics in the generation of two dimensional images. Topics of study will include a survey of graphics, hardware, graphics packages, construction of windows and viewport, 2-D transformations, special techniques of raster graphics, user interface considerations, and use of color. Programming lab work is an integral part of the course. Open only to students in Printing and Applied Computer Science Program. Programming projects will be required. (ICSS-320)
Class 3, Lab 2 Credit 4 (Offered upon sufficient demand)

ICSS-515 Analysis of Algorithms
Registration #0603-515
This course is designed to teach the mathematics and techniques necessary to properly analyze the computational effort of a given algorithm. Selected algorithms will be analyzed and modified for space and time efficiency. (Third-year standing in computer science and technology)
Class 4, Credit 4

ICSS-520 Computer Architecture I
Registration #0603-520
An introduction to computer architecture. Includes a survey of computer architecture fundamentals exemplified in commercially available computer systems, to include classical CPU and control unit design, register allocation, primary memory organization and access, internal and external bus structures, and virtual memory schemes. Comparisons to classical machine architecture, such as the stack machine and the associative processor, are defined and then compared. Parallel processors are also presented, along with an analysis of their performance relative to non-parallel machines. Programming projects will be required. (ICSS-440)
Class 4, Credit 4

ICSS-521 Introduction to Microprocessor Systems
Registration #0603-521
An examination of microcomputers and microcomputer applications. Includes the study of microprocessors and their use in the construction of microcomputers. Actual microprocessor systems are used in "hands on" laboratory projects. Several commercially available microcomputer systems are used to explore hardware and software design concepts and considerations. Microcomputer programming is taught. Memory design and I/O interface techniques are studied. Trends in commercial systems are analyzed. Programming projects may be required. (ICSS-315)
Class 4, Credit 4

ICSS-525 Assemblers, Interpreters, and Compilers
Registration #0603-525
A survey of the three basic programming language processors. Topics include design and construction of language processors, formal syntactic definition methods, parsing techniques, and code generation techniques. Laboratory work includes actual construction of language processors. (ICSS-320)
Class 4, Credit 4

ICSS-530 Fundamentals of Discrete Simulation
Registration #0603-530
An introduction to discrete simulation modeling. Methods for the design of discrete simulation models are examined, and simulation models are designed and implemented using a general purpose discrete simulation language. Related topics such as the validity and appropriateness of generated statistics for the model are covered. Both the theoretical and practical aspects of modeling are included. (Third-year standing in computer science and technology) (SMAM-309 or equivalent)
Class 4, Credit 4

ICSS-540 Operating Systems Laboratory
Registration #0603-540
Application of operating system concepts. Laboratory work includes development of a small multi-tasking operating system and a study of process functional characteristics; special topics include I/O programming, interrupt handling, resource allocation and scheduling methods. Laboratory emphasis. (ICSP-306, ICSS-440)
Class 4, Credit 4

ICSS-541 Introduction to Computer Networks
Registration #0603-541
An overview of computer communication network design and implementation. Fundamental vocabulary and configurations are studied, with equal emphasis on both hardware and software components. Current technology is examined, along with possible trends for future evolution. Measurement and evaluation of network utilization and performance is also discussed. Programming projects will be required. (ICSS-420, SMAM-309 or SMAM-352, and third-year standing in computer science technology)
Class 4, Credit 4

ICSS-545 Computer Architecture II
Registration #0603-545
A survey of processor design and implementation techniques. Topics include microprogramming and emulation, comparisons of microcode and hardwired logic, I/O processors and subystems, high-level language and operating system support, and processor speedup techniques. Lectures will be supplemented with outside reading and/or programming assignments. (ICSS-520)
Class 4, Credit 4

ICSS-560 Compiler Construction Laboratory
Registration #0603-560
Design of full-scale processors for the purpose of language translation. Laboratory projects to be completed in a structured environment in the areas of parsing, code generation, code optimization, and language design. (ICSS-580)
Class 4, Credit 4
Graduate Courses

Undergraduate computer science and technology students may take ICSS 600 level courses as undergraduate computer science electives. They must be fourth- or fifth-year students and have already completed any stated prerequisites or have the consent of the instructor. Undergraduate computer science and technology students may take 700 and 800 level courses only by consent of the school director and the consent of the instructor. Graduate students must obtain the consent of a graduate advisor in order to enroll in graduate courses not listed in their own program of study.

Computer Science

ICSS-706 Foundations of Computing Theory
Registration #0603-706
Principles of computing theory; review of mathematical logic, set theory, relations, functions, algebraic structures; graph theory and proof techniques; introduction to automata and formal languages; overview of computability and complexity theories. (SMAM-265 or equivalent; ICSS-320 or ICSM-703)
Credit 4

ICSS-708 Software Architecture
Registration #0603-708
An introduction to the basic concepts and terminology of hardware and software systems. Such topics as elementary circuit design, interrupt programming, and virtual memory will be addressed. The intent is to prepare the student for future study in computer architecture and operating systems. Programming projects will be required. (ICSP-305; ICSS-320 or ICSS-703)
Credit 4

ICSS-709 Programming Language Theory
Registration #0603-709
A survey of several important modern programming languages, their methods of specifying data and control structures, and their approach to parallel computers are presented along with analyses of the problems preventing them from achieving an ideal n-fold speedup. (ICSS-320 or ICSS-703 and ICSP-305 prerequisites, ICSS-708 corequisite)
Credit 4

ICSS-720 Computer Architecture
Registration #0603-720
A study of microprocessors, microcomputers, and their applications. Topics include microprocessor hardware, microcomputer organization, software, microcomputer programming, interface techniques and development trends. Case studies will be provided. Programming projects will be required. (ICSS-720)
Credit 4

ICSS-730 Modeling and Simulation I
Registration #0603-730
A study of microprocessors, microcomputers, and their applications. Topics include abstract properties of simulations modeling, analysis of a simulation run, and statistics. One or more general purpose simulation languages will be taught. Programming projects will be required. (ICSS-320 or ICSS-730; Statistics)
Credit 4

ICSS-731 Modeling and Simulation II
Registration #0603-731
A study of microprocessors, microcomputers, and their applications. Topics include abstract properties of simulations modeling, analysis of a simulation run, and statistics. One or more general purpose simulation languages will be taught. Programming projects will be required. (ICSS-320 or ICSS-730; Statistics)
Credit 4

ICSS-735 On-Line Information Systems Design
Registration #0603-735
Topics include basic on-line system characteristics, design guidelines, hardware requirements, comparison of systems and languages, file organization concepts, the simultaneous access problem, file security and recovery, error recovery, system evaluation, and case studies. (ICSS-320 or ICSS-730 and ICSP-305; background in systems analysis is recommended)
Credit 4

ICSS-736 Data Base System Implementation
Registration #0603-736
Requirements and characterization of generalized data base systems, the role of the data base administrator, creation of a general data base, elements of data base management systems, data base management in a multi-access environment, survey of data base management systems, selecting a data base management system. Projects in data base systems implementation will be emphasized. (ICSS-836)
Credit 4

ICSS-740 Computer Communication Networks
Registration #0603-740
A study of hardware and software principles of computer communication networks. Topics include network configuration and vocabulary, network hardware components, network software components, network technologies, examples of existing networks, network utilization, measurement and evaluation. (ICSS-720 and Statistics)
Credit 4
ICSS-770 Registration #0603-770
Fundamentals of Computer Graphics
Topics include basic concepts, 2-D transformations, windowing, clipping, interactive and raster graphics, 3-D transformations and perspective, hidden line and hidden surface techniques, graphical software packages and graphics systems. Programming projects will be required. (ICSS-320 or ICSM-703)
Credit 4

ICSS-771 Registration #0603-771
Advanced Topics in Computer Graphics
Animation techniques and packages. Modeling of solids, including shading, perspective, hidden line and surface removal. Three-dimensional graphics software packages; algorithms and heuristics. Special purpose computer hardware for graphics. Programming projects will be required. (ICSS-570 or ICSS-770)
Credit 4

ICSS-826 Registration #0603-826
Models of Operating Systems
Deterministic and stochastic models of operating systems. Concurrent process control, processor scheduling models, computer sequencing problems, auxiliary and buffer storage models, storage allocation in paging systems, memory management of multiprogramming computers. (ICSS-706 and I CSS-708)
Credit 4

ICSS-836 Registration #0603-836
Data Base Systems
Topics include data organization and structure; relational, hierarchical, and network approach; data security and recovery. Comparison of the data base approaches with the traditional file organization and access methods. Performance and management issues. Existing data base systems will be studied. (ICSS-320 or ICSM-703)
Credit 4

ICSS-846 Registration #0603-846
Information Storage and Retrieval
Topics include an overview of history, development and traditional approaches of information storage and retrieval, automatic text analysis, automatic classification, file structure and maintenance. Programming projects will be required. (ICSS-320 or ICSM-703)
Credit 4

ICSS-850 Registration #0603-850
Computability
The theory of computation as it relates to computable functions is examined. Topics include finite state machines, Turing machines, recursive function theory, Post's symbol manipulation systems, the limitations of the concept of effective computability. (ICSS-706)
Credit 4

ICSS-851 Registration #0603-851
Computational Complexity
This course is concerned with the mathematical analysis of computer algorithms. Topics include matrix operations, combinatorial algorithms, integer and polynomial arithmetic, NP-complete problems, and lower bounds on algorithms involving arithmetic operations. (ICSS-706)
Credit 4

ICSS-852 Registration #0603-852
Coding Theory
Study of error correcting codes and their applications. Topics include algebraic structure of group codes, linear switching circuits, cyclic codes and the decoding problem. (ICSS-706)
Credit 4

ICSS-856 Registration #0603-856
Theory of Parsing
Application of theoretical concepts developed in formal language and automata theory to the design of programming languages and their processors, syntactic and semantic notation for specifying programming languages and the theoretical properties of some grammars, general parsing, non-backtrack parsing, and some limited backtrack parsing algorithms. (ICSS-706)
Credit 4

ICSS-860 Registration #0603-860
Compiler Construction
Language definition, lexical analysis, syntactic analysis, storage allocation and management, code generation, code optimization, diagnostic generation, bootstrapping. (ICSS-706 and ICSS-709)
Credit 4

ICSS-880 Registration #0603-880
Systems Programming
A study of systems program organization and systems programming techniques. Topics include systems programming languages, assemblers, macro processors, linkage editors and loaders, compilers, text processors. Programming projects will be required. (ICSS-320 or ICSM-703 and ICSP-305)
Credit 4

ICSS-885 Systems Programming Laboratory
Registration #0603-885
Systems programming techniques applied to the design and implementation of a large systems program or module. Past projects have included floating point simulators, a small data base system, system utilities, and a command language interpreter. Programming projects will be required. (ICSS-880)
Credit 4

ICSS-890 Seminar
Registration #0603-890
Current advances in computer science.
Credit 2-4

ICSS-895 MS Thesis
Registration #0603-895
Capstone of the master's degree program. Student must submit an acceptable thesis proposal in order to enroll.
Credit 4-8

ICSS-899 Independent Study
Registration #0603-899
Faculty directed study of appropriate topics on a tutorial basis. This course will generally be used to enable an individual to study computer science topics in greater depth and more detail. (Faculty approval is required prior to registration.)
Credit 2-4

Computer Systems Management

ICSM-700 Review of Programming
Registration #0611-700
This course is intended for the incoming student with programming deficiencies. Topics include assembly language programming; high-level languages in general and one high-level language in particular; design, construction, and testing of programs; programming technique and style. Programming projects will be required. (ICSP-208 or equivalent)
Credit 4

ICSM-703 Algorithms and Data Structures
Registration #0611-703
Topics include data representation, data structures such as: linked lists, trees, stacks, queues, hash tables, sparse matrix techniques. Searching and sorting techniques, file structure and maintenance. Programming projects will be required. (ICSP-210 or ICSM-700)
Credit 4

ICSM-720 Data Processing and Administration
Registration #0611-720
A study of management topics as related to data processing, management planning, computers and profits, security and privacy, data processing planning, and managerial development. Other selected topics will be discussed based upon specific interests of class participants. (Graduate Computer Science Core)
Credit 4

ICSM-725 Systems Development
Registration #0611-725
A study of technically oriented data processing management, operations, cost control, and standards and documentation. Other selected topics will be discussed based upon specific interest of class participants. (ICSM-720)
Credit 4

ICSM-765 Advanced Computer Utilization
Registration #0611-765
A study of advanced computer utilization techniques. Topics include resource allocation of available software in business, mathematical and engineering applications. Information storage and retrieval techniques as well as characteristics of some more frequently used programs are studied. (ICSM-720)
Credit 4
School of Engineering Technology

All School of Engineering Technology courses are offered at least once a year except as noted by an asterisk.

Upper-Division Civil Engineering Technology

ITEC-420 Hydraulics
Study of principal physical and mechanical properties of liquids, hydrostatic pressure and forces; pressure measuring devices; buoyancy and flotation, 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.
Class 3, Lab 3, Credit 4

ITEC-428 Technical Communications
The principles of organizing data and information into clear and concise civil engineering memos, letters, reports, and presentations. The techniques of library research and oral presentations, including audiovisual, are also emphasized.
Class 3, Credit 2

ITEC-432 Water & Wastewater Transport Systems
Discussion of surface and groundwater sources. Introduction to well hydraulics. The hydraulic design of sanitary and storm sewer systems, and water distribution systems.
Class 2, Recitation 3, Credit 3

ITEC-434 Environmental Pollution
The study of various forms of pollution including air, thermal, noise, erosion, pesticides, radiation, and visual pollution, with the investigation of the sources, measurement, methods of control, legislation, codes, and enforcing agencies, water pollution and land pollution.
Class 3, Credit 3

Information Science

ICSI-722 Library Automation and Management
This course summarizes the computer techniques applied to library automation and the study of management techniques and problems in a modern automated library. Case studies in current library systems will be included. Management models in selected libraries will be discussed. (Graduate Computer Science Core)
Credit 4 (Offered upon sufficient demand)

ICSI-733 Information Media and Design
A study of current information media and their design. Topics will include microfilm systems, video systems, computer input and output devices, computer interface with media devices, and system design concepts and techniques for applications in libraries and information centers. (Graduate Computer Science Core)
Credit 4 (Offered upon sufficient demand)

ICSM-790 Seminar
Current advances in computer science.
Credit 2-4

ICSM-799 Independent Study
Faculty directed study of appropriate topics on a tutorial basis. This course will generally be used to enable an individual to study computer science topics in greater depth and more detail. (Faculty approval is required prior to registration.)
Credit 2-4

ICSM-999 Co-operative Education
One quarter of appropriate work experience in industry.
Credit 0

ITEC-404 Principles of the Treatment of Water and Sewage
An introduction to water and wastewater treatment interpretation of analytical physical, chemical, and biological parameters of water quality with regard to the design and operation of treatment processes and to the control of the quality of natural water; fundamental principles and applications of physical, chemical and biological processes employed in water and wastewater treatment; analysis of waste assimilative capacity of streams.
Class 3, Lab 2, Credit 4

ITEC-499 Design of Water Treatment Facilities
Principles of water treatment plant design; conceptual and hydraulic design of water purification and conditioning facility. Includes: settling, filtration, softening, disinfection, organics, removal, and plant design and construction elements.
Class 3, Lab 2, Credit 3

ITEC-513 Computer Techniques in Civil Engineering Technology
Introduction to the engineering computing environment, the topics of computer modeling and simulation, and program documentation. Techniques are developed in the lecture and laboratory through the application of software in examining typical engineering problems. (ICSP-205)
Lab 2, Credit 1

ITEC-514 Land Planning
The environmental and social aspects of land planning are covered, as well as the engineering and economic considerations. Topics included are zoning concepts, the Master Plan, subdivision planning and regulations, floodplain controls, conservation of open space, protection of wetlands, transfer of developmental rights and agricultural districts. Local development issues will be studied, and either class attendance at a planning board hearing or a field trip is scheduled.
Class 2, Credit 2

ITEC-515 Analysis and Design of Reinforced Concrete Structures
Introduction to the analysis of indeterminate flexural members and frames, emphasizing the method of moment distribution. Design of continuous reinforced concrete elements and frames. The accent is on building structures and the use of the ACI Code. The working stress method is briefly covered, but primary emphasis is given to the strength method. (ITEM-404)
Class 5, Credit 4

ITEC-520 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 will be discussed. Processes, plant design, and construction elements are stressed.
Class 3, Lab 2, Credit 4

ITEC-527 Soil Mechanics and Foundations
Study of physical, mechanical and engineering properties of soils; methods of determination of bearing capacity, stress distribution within soil mass and settlement; spread footings analysis and design; lateral earth pressure and retaining walls analysis and design, pile foundation analysis and design principles; slope stability, study of modern and traditional soil improvement technology. (ITEM-404)
Class 3, Lab 2, Credit 4
Civil Technology Electives

ITEC-505
Construction Safety
Registration #0608-505
General safe practices in construction operations. Safety standards, both voluntary and mandatory. Employers’ responsibilities under the provisions of OSHA and state labor law. A portion of this course is audio-visual.
Class 3, Credit 3

ITEC-549
Environmental Engineering Project
Registration #0608-549
Fundamental concepts, principles and advanced techniques in the treatment of industrial and domestic wastewater. Laboratory study of certain aspects of water pollution control treatment processes. Field trips to water pollution control plants. Students are required to prepare a technical report based on laboratory study or actual treatment plant data. (ITEC-438, -520 and permission of instructor)
Class 2, Lab 3, Credit 4

ITEC-550
Construction Practices
Registration #0608-550
An introduction to basic construction management and organization with CPM scheduling, estimating, bidding, heavy construction techniques, methods, and equipment applications. (Non-construction students only)
Class 3, Recitation 2, Credit 4

ITEC-552
Analysis and Design of Steel Structures
Registration #0608-552
An introduction to the analysis and design of steel structures. Emphasis is on low-rise buildings of the determinate type which are braced vs. lateral loads. The background of the AISC Code is covered, as well as practice in use of the AISC Manual, such as selection of beam and column sections, and the analysis and design of welded and bolted connections. Current practice in foundation and erection is discussed in addition to a brief study of contract and shop drawings. (ITEM-404)
Class 4, Credit 4

ITEC-556, 557
Wastewater Treatment Plants
Registration #0608-556, -557
Operation and Control I & II
A self-paced audio-visual course. Emphasis on the functional aspects of waste water treatment plants’ operation. Discussion of the significance of the results of laboratory analysis and their interpretation and application to the control of treatment processes. (ITEC-438 and consent of instructor)
Credit 1-4

ITEC-599
Independent Study
Registration #0608-599
A supervised investigation within a civil technology area of student interest. Consent of the instructor is required.
Credit 1-8

ITEC-544
Mechanical Equipment for Buildings
Registration #0608-444
Presentation of mechanical and electrical equipment used in building construction; the pertinent codes will be studied; emphasis will be given to energy aspects of equipment design and selection.
Class 3, Credit 3

ITEC-450
Construction Management
Registration #0608-450
Construction company organization; time and resource scheduling for construction with computer assisted CPM; role of the construction manager; project finance; cash flow; construction projects will be emphasized (ITEC-500, -508, -460, -516, -527)
Class 4, Credit 4

ITEC-460
Construction Equipment
Registration #0608-460
Fundamentals of equipment selection; determining equipment requirements based upon the design and capabilities of currently available construction equipment. Emphasis is given to equipment management, earthmoving and mechanical design. (ITEC-436)
Class 3, Credit 3

ITEC-470
Timber Design and Construction
Registration #0608-470
Application of structural design methods to timber. Topics covered include: the structure and properties of wood; grades, sizes, and design properties of structural lumber, design of wood structures; plywood; nailed joints; *and trusses. (ITEM-404)
Class 3, Credit 3

ITEC-500
Labor Relations
Registration #0608-500
Introduction to labor law, negotiations, arbitration, trade unions and jurisdictions; various aspects of labor management are studied, with and without organized labor. Several guest speakers representing government, private industry and organized labor also lecture. (BBUB-245)
Class 4, Credit 4

ITEC-508
Cost Estimates
Registration #0608-508
A study of construction cost determination and bidding procedure; including construction business practices, overhead costs, break-even analysis, profit determination and statistical cost forecasting. (ITEF-436, ITEC-509 - or may be taken concurrently)
Class 2, Credit 2

ITEC-509
Cost Estimating Problems
Registration #0608-509
Problems dealing with quantity takeoffs for labor and materials, including takeoff procedures and formats used in various types of construction. (ITEC-422)
Class 2, Credit 1

ITEC-580
Senior Construction Seminar
Registration #0608-580
Construction finance, cost engineering, quality and production control, special engineering subjects, and value engineering. (Seniors only and permission of the instructor)
Class 3, Credit 3

Upper-Division Electrical
Engineering Technology

ITEE-310
Electricity
Registration #0609-310
An introduction to electricity for photo management majors. D.C. theory of circuits is introduced and their analysis is stressed. Characteristics of diodes, photo devices, transistors, relays, and other devices are presented.
Class 3, Lab. 3, Credit 4

ITEE-311
Electrical Equipment
Registration #0609-311
Continuation of ITEE-310. A.C. theory of circuits is introduced along with their analysis. Transformers and power supplies are covered. Introduction to circuits used in the 2610 printer and other relevant equipment. (ITEE-310)
Class 3, Lab. 3, Credit 4

ITEC-422
Elements of Building Construction
Registration #0608-422
Elements and details of building construction; study of building codes from a design concept; foundations, wood, steel and concrete construction and wall systems; and introduction to construction specifications for materials and methods.
Class 4, Credit 4
ITEE-538  Digital Computer Design I
Registration #0609-538
Design of logic circuits using 7400 series TTL gates; a study of TTL flip-flops, one shots and oscillator circuits; design of timing circuits, shift registers and counters. (ITEE-424)
Class 3, Lab. 2, Credit 4

ITEE-539  Digital Computer Design II
Registration #0609-539
A continuation of ITEE-538 with application of logic circuits to computer design. Multiplexers, semiconductor memories, ALUs and their applications to computers and microprocessors are considered. The basic operation of computers, and computer systems are examined. Machine language programming, indexing and indirect addressing and interrupt programming are introduced. The student will build a small prototype minicomputer for use in this course. (ITEE-538)
Class 3, Lab. 2, Credit 4

ITEE-542  Microprocessors
Registration #0609-542
An introductory course in Microprocessors emphasizing the Motorola 6800 and Intel 8085. The topics covered include the CPU, ROMS, RAMS, programming and interface ICs. Practical applications of microprocessors are also considered. (ITEE-424)
Class 3, Lab 3, Credit 4

ITEE-543  Minicomputers, Controllers and Peripherals.
Registration #0609-543*
A study of the most common peripherals used with microprocessors and minicomputers. Peripherals include TTY's, MODEMS, CRT drivers, disc drives, cassettes, card readers, line printers, and D/A and A/D converters. Methods of interfacing these peripherals to minicomputers and microprocessors are emphasized. (ITEE-539)
Class 2, Lab 4, Credit 4

ITEE-546  Industrial Electronics
Registration #0609-546
Design of SCR/Triac control circuits for D.C. and A.C. motors; control of lights and heating elements with D.C. power supplies and polyphase rectifier circuits; speed control of D.C. and A.C. motors; process control systems utilizing solid state electronic circuits. (ITEE-532)
Class 3, Lab 2, Credit 4

ITEE-547  Digital Processing of Signals
Registration #0609-547
Analog signal processing including the use of microprocessors. Topics include transducers, A/D, D/A converters, microprocessor programming and I/O devices. Applications include bio-medical, automotive control and communication signals.
Class 4, Credit 4

ITEE-548  D.C. and A.C. Machine Design
Registration #0609-548
The theory, principles of operation and application of A.C. and D.C. rotating machines; the characteristics of shunt, series and compound D.C. motors and generators are explored with torque-speed characteristics, power efficiency and applications of single phase and three phase motors. (ITEE-402)
Class 3, Lab 3, Credit 4

ITEE-550  Power Systems I
Registration #0609-550
Basic principles of a power system, energy sources, substation configuration, load cycles, single phase circuits, balanced and unbalanced three phase circuits, power factor correction, and transmission line configurations and impedances are covered. (ITEE-402, SMAT-422)
Class 3, Lab 3, Credit 4

ITEE-551  Protective Relaying
Registration #0609-551
The physical construction and characteristics of electromechanical relays, short circuit calculation and line, bus, transformer and motor generator protection are studied. Solid state relays, instrument transformers, and telecommunications and supervisory control are included. (ITEE-402 or equivalent)
Class 3, Lab 3, Credit 4

ITEE-554  Electronic Optic Devices
Registration #0609-554*
Basic photometry is discussed. Light emitting and light receiving devices are covered with circuits and applications. Optics is introduced with laser theory and fiber-optics.
Class 3, Lab. 2, Credit 4

ITEE-556  Transmission Lines and Filters
Registration #0609-556
General transmission line equation and approximations; lossless transmission line and analysis using the Smith chart; matching stub design for transmission lines; Butterworth filter design principles and applications. (ITEE-402)
Class 3, Lab. 2, Credit 4

ITEE-580  Senior Project
Registration #0609-580*
Selected independent study of design project by electrical 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

ITEE-544  Applied Mechanics of Materials
Registration #0610-544
The basic concepts of strength of materials as applied to mechanical design are reviewed in depth. The course includes the study of the concepts of stress and strain, the stress-strain relationship and combined stress. Fatigue and properties of materials and analysis of mechanical fatigue, theories of failure. Applications of these concepts to the analysis of machine members.
Class 4, Credit 4

ITEE-545  Applied Dynamics
Registration #0610-545
Examines the principles of kinematics and the basic laws of motion as applied to the design and analysis of mechanical components and systems. (ITEM-404, SMAT-421 or concurrent)
Class 3, Recitation 2, Credit 4

ITEE-546  Dynamics of Machinery
Registration #0610-546
A study of the kinematics of machine elements such as gears, cams and linkages with emphasis on graphical methods. (ITEM-405)
Class 3, Recitation 2, Credit 4

ITEE-547  Mechanical Engineering Laboratory I
Registration #0610-547
A course in mechanical laboratory techniques and the preparation of laboratory reports; experimental work in materials testing, strength of materials, experimental stress analysis, metallurgy, and metallography; instruction in the preparation of laboratory reports. (It is intended that students enroll concurrently in ITEM-404 and ITEM-414.)
Class 2, Lab. 3, Credit 3

ITEE-548  Introduction to Strength of Materials
Registration #0610-408
Elements of statics and strength of materials. Topics include plane equilibrium, friction, stress, strain, torsion, and the bending of beams.
Class 3, Recitation 2, Credit 4

ITEE-549  Mechanical Engineering Laboratory II
Registration #0610-409
A course in mechanical laboratory techniques, the analysis of experimental results and the preparation of laboratory reports. Experimental work in mechanics of materials, materials science and plastics technology will be conducted. Instruction will be provided in several forms of technical communication. (ITEM-404, ITEM-407, ITEM-415 concurrently)
Class 1, Lab. 3, Credit 2

ITEE-550*  Engineering Materials
Registration #0610-411
A study of the physical properties of materials; survey of manufacturing processes including casting, molding, metal removal, metal forming, welding; field trips to local manufacturing installations; material testing inspection labs, and selected heat treating experiments are available. For non-mechanical majors.
Class 3, Recitation 2, Credit 4
ITEM-414 Materials Technology I
Registration #0610-414
A course involving a study of materials, their structure and their characteristics. Topics covered include metallic structures, unit cell, phases and phase diagrams, physical properties, diffusion in metals, recovery, recrystallization and grain growth, ferrous and some non-ferrous metals, heat treatment and age hardening of metals.
Class 3, Credit 3

ITEM-415 Materials Technology II
Registration #0610-415
Three major study areas are plastics, ceramics and corrosion. Included are the structure of plastics, types of polymerization, processing of plastics, ceramic structures and properties, classification of ceramic materials, glasses, bricks, tiles, refractory and insulating materials, corrosion of materials, corrosion rates, types of corrosion, cathode and anode reactions, corrosion control and prevention.
Class 3, Credit 3

ITEM-440 Applied Thermodynamics
Registration #0610-440
The first and second laws of thermodynamics and their applications in mechanical engineering technology. Thermodynamic properties of fluids including ideal gases and pure substances are studied. Thermodynamic processes and applications of thermodynamic principles to steam cycles and refrigeration cycles.
Class 4, Credit 4

ITEM-442 Heat Transfer
Registration #0610-442
A first course in heat transfer. The theory and application of the fundamentals of heat conduction, convection, and radiation. The design and applications of heat transfer apparatus. (ITEM-441)
Class 3, Lab. 2, Credit 4

ITEM-451 Vibration and Noise
Registration #0610-451
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. (SMAT-422)
Class 4, Credit 4

ITEM-460 Applied Fluid Mechanics
Registration #0610-460
A study of the fundamentals of fluid statics and dynamics. Principles and applications of fluid statics, fluid kinematics, fluid mechanics, the energy conservation principle, dimensional analysis and fluid momentum. Also covered are laminar and turbulent flow in pipes and ducts, fluid machinery, fluid meters and lifting vanes. (ITEM-440)
Class 4, Credit 4

ITEM-465 Thermofluid Laboratory
Registration #0610-465
Laboratory experiments in thermodynamics, fluid mechanics and heat transfer, including computer-aided data reduction. (ITEM-441, 461)
Class 1, Lab. 3, Credit 3

ITEM-499 Mechanical Technology Co-op
Registration #0610-499
Class 0, Credit 0

ITEM-500, 501 Senior Design Project I, II
Registration #0610-500, -501
An individual student project in systems design. The student integrates his program, co-op experiences, and independent studies in the solution of a system design project and presents his findings in written and oral presentations.
Class 2, Lab. 4, Credit 4

ITEM-506 Machine Design
Registration #0610-506
The study of the static and dynamic failure of machine elements and the design and analysis of fasteners, springs, shafts and bearings. (ITEM-405)
Class 3, Recitation 2, Credit 4

ITEM-508 Special Topics in Machine Design
Registration #0610-508
The study of selected topics such as clutches, brakes, couplings, belts, chains, lubrication and computer-aided design. (ITEM-506)
Class 3, Lab. 2, Credit 4

ITEM-521 Logic Control Systems
Registration #0610-521
The analysis and design of logic control systems using Boolean algebra. Emphasis is placed on the control of machines with fluid and relay logic. Introduction to electronic programmable controls. The concepts of ordinary and timed sequence control and machine protection are covered. Logic control systems will be demonstrated in the lab.
Class 3, Lab. 2, Credit 4

ITEM-522 HVAC Control Systems
Registration #0610-522
An introduction to controls used in association with HVAC systems. The course integrates controls with HVAC processes to arrive at appropriate control and instrumentation systems. The course examines individual instruments, instrument and control systems, monitoring systems and computer control.
Class 4, Credit 4

ITEM-530 Instrumentation
Registration #0610-530
A basic approach to calibration and use of pressure, temperature, flow, humidity and liquid level measurement instruments. Techniques of test, calibration and proper use of instruments will be demonstrated. Principles of experimentation and computerized data reduction are examined. (ITEE-411)
Class 4, Credit 4

ITEM-540 Thermal Technology
Registration #0610-540
Application of thermodynamics to internal combustion engines, compressors, steam cycles, refrigeration, and air conditioning. (ITEM-441)
Class 3, Lab. 2, Credit 4

ITEM-541 Alternative Energy Applications
Registration #0610-541
The major emphasis of this course is in the area of solar energy. System design of solar hot water and space heating systems, solar-assisted heat pumps. Other alternative sources of energy are also discussed; wind energy, and solid waste. (ITEM-442)
Class 4, Credit 4

ITEM-542 HVAC System Engineering
Registration #0610-542
Principles and applications of refrigeration, air conditioning, comfort heating, and ventilating. Thermodynamics of vapor compression refrigeration cycles, air conditioning, psychrometrics; also related heat transfer topics. (ITEM-540)
Class 3, Recitation 2, Credit 4

ITEM-543, 544 Energy Management I, II
Registration #0610-543, 544
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. (ITEM-540)
Class 4, Credit 4

ITEM-545 Solar Thermal Applications
Registration #0610-545
Study of analytical methods to model and predict the performance of solar energy systems. The emphasis will be on the application and design of systems appropriate for the available technology. Additional areas of study include the economic feasibility and analysis of potential solar energy applications, selection of appropriate equipment based on the energy value and economic based adjustment of system designs derived from technical performance optimizations. (ITEM-541)
Class 4, Credit 4

ITEM-599 Independent Study
Registration #0610-599
A supervised investigation within a mechanical technology area of student interest. Student must submit written proposal and have it approved prior to registering.
Credit variable (1-4)
ITEF-403                 Machine Elements
Registration #0617-403
This course covers the basic principles that apply to the design and selection of such frequently used machine elements as bearings, shafts, fasteners, variable speed drives, gears, cams, and springs. Emphasis will be given to applications for manufacturing equipment.
Credit 4

ITEF-424                 Statistical Quality Control I
Registration #0617-424
The basic concepts of statistics and probability are studied as they apply to quality control and reliability. Included are the study of control charts, sampling procedures and work measurement.
Class 4, Credit 4

ITEF-42S                 Statistical Quality Control II
Registration #0617-425
The course will deal with the application of statistical theory to forecasting, process control, sampling, reliability, quality control and quality assurance. The planning, organizing and implementation of quality controls in the industrial setting will be studied. Inspection techniques dealing with destructive and non-destructive testing and computer-aided measurement will be introduced.
Class 3, Recitation 2, Credit 4

ITEF-431                 Manufacturing Organization
Registration #0617-431
A study of modern industrial organization and how it is managed. Techniques of decision-making process will be studied in problem areas related to manufacturing.
Class 4, Credit 4

ITEF-436                 Engineering Economics
Registration #0617-436
This course covers some of the factors involved in the engineering economy. Capital financing and budgeting, depreciation and valuation, risk and uncertainty, break-even studies, replacement costs and selections between alternatives are typical of the topics covered.
Class 4, Credit 4

ITEF-437                 Value Analysis
Registration #0617-437
This course presents a fundamental coverage of cost systems, cost optimization and cost estimation for engineering projects and processes. Value analysis is presented as a problem solving methodology. The relationship among value, function, quality, reliability, and cost is explored.
Class 4, Credit 4

ITEF-470                 Numerical Control Applications
Registration #0617-470
The philosophy and use of numerical control in manufacturing. The course will review manual programming, examine different format applications of numerical control, and introduce computer assisted programming techniques available. Numerical control machine tools will be demonstrated.
Class 4, Credit 4

ITEF-471                 Computer Numerical Control
Registration #0617-471
An advanced course in applications of numerical control. Emphasis will be placed on computer-assisted part programming for contouring in two and three axes. Application of advanced technologies such as CNC and DNC.
Class 3, Lab. 2, Credit 4

ITEF-472                 Tool Engineering
Registration #0617-472
Machining and machine tools will be reviewed: the selection of tools for production; the specification of tools, jigs, and fixtures; production gauges; selection of tooling for automatic machines; determination of assembly tooling. Emphasis is placed on economic justification for tooling.
Class 3, Recitation 2, Credit 4

ITEF-475                 Computer-Aided Manufacturing
Registration #0617-475
The basic elements, principles, and terminology of the hardware and software for computer-aided integrated manufacturing systems are outlined. Group technology (GT), workpiece classification and coding, cellular production, design retrieval, and generative process planning are described as the basis of the CAM system. The principles and application of robotics for repetitive work handling are presented.
Class 2, Lab. 3, Credit 4

ITEF-480                 Work Simplification and Measurement
Registration #0617-480
Principles and applications of basic methods and techniques to improvement of the worker-job time relationship. Job standards, predetermined time, and motion study. Human engineer in relation to work-space designed for efficient use of laboratory.
Class 3, Recitation 2, Credit 4

ITEF-491                 Material Control
Registration #0617-491
The fundamental principles in the control of industrial production in relation to forecasting purchasing, inventory, production planning, routing, and scheduling the system of control material. Support responsibilities of industrial engineering are studied.
Class 4, Recitation 1, Credit 4

ITEF-492                 Plant Layout and Materials Handling
Registration #0617-492
The study of the arrangement and functional layout of processes and equipment to maximize production efficiency. Also covered are the principles of material handling.
Class 4, Recitation 1, Credit

ITEF-499                 Manufacturing Technology Co-op
Registration #0617-499
Class 0, Credit 0

ITEF-502                 Advanced Manufacturing Processes
Registration #0617-502
This course presents an advanced coverage of manufacturing processes which will emphasize the use of analytical techniques to allow the optimum design of processes. An examination of working loads, tool stresses and metal flow in forging, extrusion, deep drawing of cups and sheet forming of parts will be carried out. Metal removal in single and multi-point cutting processes, abrasive machining, electrical and laser machining will be studied.
Class 3, Lab. 2, Credit 4

ITEF-510, 511             Process Design I, II
Registration #0617-510, 511
The student is placed in a realistic manufacturing situation in which he or she selects, creates, or is assigned a product to manufacture. Use of his or her total program in the solution of the problem and its presentation. Oral and written report presentations.
Class 3, Lab. 2, Credit

ITEF-514                 Special Topics in Material Forming
Registration #0617-514
The topic of formability will be given advanced treatment in this course. The effect of friction, temperature and tool configuration on tool loads and tool life will be examined. Material flow in the more novel process will be explored, and its effect on product properties will be evaluated.
Class 3, Lab. 2, Credit 4

ITEF-526                 Quality Systems
Registration #0617-526
The study of the total quality control engineering field from new product testing and evaluation through manufacturing quality systems to analysis of returned defective products.
Class 4, Recitation 1, Credit 4

ITEF-599                 Independent Study
Registration #0617-599
A supervised investigation within a manufacturing technology area of student interest. Student must submit written proposal and have it approved prior to registering.
Credit variable (1-4)
Packaging Science

All Department of Packaging Science courses are offered at least once annually.

IPKG-201 Principles of Packaging  
Registration #0607-201  
An overview of packaging: 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 will be presented, along with information about economic importance, social implications, and packaging as a profession.  
Class 4, Credit 4

IPKG-301 Engineering Design Graphics  
Registration #0607-301  
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.  
Class 1, Lab. 3, Credit 3

IPKG-310 Methods of Evaluation  
Registration #0607-310  
Information about recognized standard testing procedures will be presented, and students will gain practical experience in the operation of various commonly used testing instruments which are used to determine physical properties of fibre, metal, plastic, and glass packaging materials. (IPKG-201)  
Lab. 4, Credit 2

IPKG-311 Packaging Materials I  
Registration #0607-311  
The manufacture, physical and chemical properties, and uses of commonly used packaging materials, components, and primary packages for consumer and institutional use will be presented. Emphasis is on metals and plastics used in packaging, and adhesives, propellants, and other component materials. (IPKG-201)  
Class 3, Credit 3

IPKG-312 Packaging Materials II  
Registration #0607-312  
The manufacture, physical and chemical properties, and uses of commonly used packaging materials, components, and primary packages for consumer and institutional use will be presented. Emphasis is on paper, paperboard, wood, and glass used in packaging applications. (IPKG-201)  
Class 3, Credit 3

IPKG-315 Container Systems  
Registration #0607-315  
A study of packages which are in direct contact with the product. Structural design and physical and chemical compatibility of product and container will be analyzed and discussed for basic container types. Students will gain practice in the structural design and construction of prototype packages. (IPKG-311, 312, ITEM-301)  
Class 2, Lab. 4, Credit 4

IPKG-401 Career Seminar  
Registration #0607-401  
Career opportunities in Packaging Science; methods and procedures used in obtaining entry-level positions. Career advancement within the corporate organization; job changes. (Packaging Science juniors only.)  
Class 2, Credit 2

IPKG-420 Technical Communication  
Registration #0607-420  
Introduction to the principles of effective written technical communication for the packaging professional. Topics include: memos, business letters, summary activity reports, packaging specifications, technical proposals, and research papers. This course is open only to packaging majors, and is required as part of the writing skills certification process under the RIT policy.  
Class 3, Credit 3

IPKG-431 Packaging Production Systems  
Registration #0607-431  
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. The characteristics of such equipment, and maintenance programs will be considered. Students will gain practice in setting up complete production lines for packaging various products. (IPKG-311, 312)  
Class 2, Lab. 4, Credit 4

IPKG-432 Packaging for Distribution  
Registration #0607-432  
An exploration of different shipping, storage, and use environments common to various products and packages. Structural design of packages for product physical protection, chemical compatibility as a factor in shelf life, and methods for testing and predicting these factors will be studied. (IPKG-311, 312)  
Class 2, Lab. 4, Credit 4

IPKG-433 Packaging for Marketing  
Registration #0607-433  
The interrelationship between packaging and marketing, detailing how the retail consumer package can be used as a scientific 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 will be considered. Students will gain practice in the development of a complete package system. (IPKG-431, 432)  
Class 2, Lab. 4, Credit 4

IPKG-520 Packaging Management  
Registration #0607-520  
A study of packaging organization in the contemporary corporation and project management techniques available to the packaging manager. Organization theory will be discussed, and compared with typical industry practice. Other topics will include PERT, value analysis, and the impact of regulatory agencies upon packaging from a management standpoint. (This course is intended for seniors)  
Class 3, Recitation 1, Credit 4

IPKG-524 Packaging Economics  
Registration #0607-524  
A study of the costs involved in the development, manufacture, and distribution of packages, in order to develop a working knowledge of packaging costs. Cost elements associated with development, tooling, materials, machinery, processing, and distribution will be discussed. The usefulness and validity of various value theories will be considered. (This course is intended for seniors)  
Class 3, Credit 3

IPKG-530 Packaging and the Environment  
Registration #0607-530  
Consideration of packaging in a social context. Factors which enhance secondary use, recycling, recovery of resources, and proper disposal will be discussed. Package design in relation to solid waste disposal and materials and energy shortages will be considered. Other topics of current social interest will be discussed. Primarily a discussion class for senior students. Open to non-majors. (This course is intended for seniors)  
Class 2, Recitation 1, Lab. 2, Credit

IPKG-562 Packaging Regulations  
Registration #0607-562  
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, hazardous materials packaging regulations administered by the Department of Transportation; freight classifications, freight claims, the Interstate Commerce Act as it applies to shipment of goods in packages; consumer product safety law, environmental law, and patent, trademark, and copyright law as it applies to packaging.  
Class 3, Credit 3

IPKG-585 Principles of Shock and Vibration  
Registration #0607-585  
A study of the factors involved in analyzing potential damage to packaged items resulting from impact or vibration forces. Students will be expected to master basic mathematical and physical concepts in addition to the use of the various pieces of testing equipment.  
Credit variable 3-4

IPKG-590 Senior Thesis  
Registration #0607-590  
An in-depth study of some phase of packaging which will enable the student to make use of the knowledge and skills acquired during the course of the program.  
Arranged, Credit 4

IPKG-598, 599 Independent Study  
Registration #0607-598, 599  
Independent study, in consultation with the instructor, on any packaging-related topic.  
Arranged, Credit variable 1-4
College of Business

School of Business

Administration

Accounting

BBUA-210  Financial Accounting
Registration #0101-210
Basic accounting principles and techniques within a framework of sound modern theory. Methods of accounting for revenues, costs, property and debt. Typical records for various types of business enterprise. Preparation and use of classified financial statements.
Class 4, Credit 4

BBUA-211  Managerial Accounting
Registration #0101-211
The accounting function as a source of data for managerial decision making. Control of the operations of the firm is emphasized through the use of reports for internal and external consumption. Major emphasis is on the analysis of accounting data rather than on its collection. (BBUA-210)
Class 4, Credit 4

BBUA-308, 309, 310  Intermediate Accounting I, II, III
Registration #0101-308, 309, 310
A more advanced treatment of accounting theory and of accounting for proprietorships and corporations; determination of income realization and cost expiration; valuation of current and fixed assets and liabilities; funds and reserves; statement of changes in financial position. (BBUA-211)
Class 4, Credit 4

BBUA-420  Cost Accounting
Registration #0101-420
Cost accounting with emphasis on uses of cost data and reports for managerial decision making. Includes problems and procedures relating to job order, process, and standard cost systems, with explanation of the techniques of overhead distribution. Special emphasis on the roles of controllers and their organization in finishing the accounting data and reports required for efficient managerial planning and control. (BBUA-211)
Class 4, Credit 4

BBUA-422  Tax Accounting I
Registration #0101-422
An introduction to federal income taxes for individuals. Includes study of the Internal Revenue Code definitions of revenue, expense, exemption, deduction, gross income, adjusted gross income, taxable income, business expenses, etc. Procedures of the Internal Revenue Service are discussed including filing and appeal processes. (BBUA-310)
Class 4, Credit 4

BBUA-423  CPA Problems
Registration #0101-423
A general view of accounting theory and practice designed both to assist students in preparation for the CPA examination and to review and improve their grasp of the various aspects and applications of accounting. Emphasis is on the analytical reasoning required in problem solving rather than on the solutions themselves. (Senior Standing)
Class 4, Credit 4

BBUA-424  Tax Accounting II
Registration #0101-424
An introduction to federal income taxes for corporations, partnerships, estates and trusts. Includes topics related to income tax filings for most forms of business and the related elections that taxpayers may make. Specific examples include the investment credit, Subchapter S corporations, distributions in corporate liquidations, corporate reorganizations and the unified transfer (estate and gift) tax. (BBUA-422)
Class 4, Credit 4

BBUA-504  Auditing
Registration #0101-504
Auditing applied to both internal and professional practice; verification of original and final records; valuation of assets, liabilities, income and net worth; audit reports, credit investigations, duties and responsibilities of the auditor. (BBUA-310 and senior standing)
Class 4, Credit 4

BBUA-505, 506  Advanced Accounting I, II
Registration #0101-505, -506
The application of modern accounting theory to problems of advanced complexity. The student is made aware of the media for expression of current accounting thought. Topical coverage includes consolidated financial statements, partnerships, estates and trusts, government and not-for-profit entities and an introduction to alternate accounting theories. (BBUA-310 and senior standing)
Class 4, Credit 4

BBUA-554  Seminar in Accounting
Registration #0101-554
A seminar series covering selected topics in accounting, including management accounting, taxation, international accounting and accounting for non-profit organizations. Specific course topics to be announced when seminar is offered. (Permission of instructor)
Class 4, Credit 4 (offered upon demand)

Management

BBUB-201  Management Concepts
Registration #0102-201
A basic course in management theory and practice. The student is introduced to organizational structure and to the application of the behavioral sciences. Particular attention is paid to management's roles in its relations with employees, ownership, government and community.
Class 4, Credit 4

BBUB-245  Business Management
Registration #0102-245
An introductory survey business course for the non-business major. Designed to familiarize the student with the nature and functions of the business organization and approaches to managerial decision making.
Class 4, Crerfct 4 (offered upon demand)

BBUB-300  Career Seminar
Registration #0102-300
Seminars designed to assist the business student in assessing and defining career objectives. Executives and career specialists from a variety of industries will participate.
Class 1, Credit 1

BBUB-301, 302  Business Law I, II
Registration #0102-301, -302
An introduction to legal principles and their relationships to business practices. Topical cases and examples are used as a guide to the observation of legal requirements, the avoidance of infractions, the utilization of professional services, and for familiarity with legal nomenclature.
Class 4, Credit 4

BBUB-401  Behavioral Science in Management
Registration #0102-401
Application of the behavioral sciences to management's problems in human relations. Emphasis on developing the student's understanding of the relationships existing among employees. (BBUB-201 or permission of instructor)
Class 4, Credit 4

BBUB-404  Administrative Policy
Registration #0102-404
Applications of management principles and processes to problem solving. An integrated viewpoint on business operations by analysis and evaluation of actual cases. Course is intended to develop the student's competence in decision making. (BBUB-401, BBUB-434, BBUF-441, BBUM-263 and Senior Standing)
Class 4, Credit 4

BBUB-407  Environment of Business Activity
Registration #0102-407
The impact and effect of law and social responsibilities on business activity and the managerial response to those environmental factors.
Class 4, Credit 4

BBUB-434  Operations Management
Registration #0102-434
The theory and practice of operations management utilizing quantitative methods and computer techniques as applied to business problems. (BBUQ-352 or BBUQ-411, ICSS-200)
Class 4, Credit 4
BBUB-450 Multinational Management
Registration #0102-450
Acquaints the student with the characteristics and impact of the multinational enterprise. It explores in depth the process of leadership, motivation and performance appraisal in a cross-cultural setting. (BBUB-201 and BBUB-401)
Class 4, Credit 4 (offered upon demand)

BBUB-531 Labor Relations
Registration #0102-531
The past and present of the American labor movement are discussed, including union philosophy and objectives, issues and approaches. (BBUB-201)
Class 4, Credit 4

BBUB-534 Purchasing
Registration #0102-534
Industrial purchasing, the organization of the function, the methods of procurement, purchasing policies, sources of supply, and legal aspects of purchasing are covered.
Class 4, Credit 4

BBUB-535 Planning and Decision Making
Registration #0102-535
This course acquaints the student with the most important task of the executive: decision making. Emphasis is placed on quantitative, logical methods.
Class 4, Credit 4

BBUB-536 Organization Theory
Registration #0102-536
Modern methods of organization including the task, structure, and behavior of organizations are presented. Current concerns such as centralization vs. decentralization, and the effects of automation are analyzed. (BBUB-201)
Class 4, Credit 4

BBUB-547 Small Business Administration
Registration #0102-547
A course dealing with management problems of the small business enterprise. Student teams assigned to examine, analyze and prepare reports on specific problems encountered by existing business firms in the local area. (Permission of the instructor)
Class Variable, Credit 4

BBUB-554 Seminar in Management
Registration #0102-554
A seminar series covering selected topics in current management problems. Specific course topics to be announced when seminar is offered. (Permission of instructor)
Variable

Economics

BBUE-381 Money and Banking
Registration #0103-381
Analysis of money, credit, and financial system. Banking operations and the money supply process. The business of commercial banking and the act of central banking. Central bank activities in relation to national and international monetary policies. (BBUA-210, GSSE-302)
Class 4, Credit 4

BBUE-405 Microeconomics
Registration #0103-405
A course in economic theory at an intermediate level dealing with the contemporary analysis of price and distribution under conditions of free competition and various degrees of monopoly control. Business applications are given along with the exposition of the theory itself. (GSSE-302, BUUQ-292 or BUUQ-411)
Class 4, Credit 4

BBUE-406 Macroeconomics
Registration #0103-406
The course is concerned with the overall performance of the economy. It deals with the aggregate analysis of saving and investment, the level of income, the level of employment, and the level of prices. Governmental monetary and fiscal policies will also be evaluated. (GSSE-302, BUUQ-292 or BUUQ-411)
Class 4, Credit 4

Managerial Economics

BBUE-407 Analysis of the firm. Problems facing management: economizing in the use of resources, optimal combinations of products, pricing, competitive forces in markets affecting the firm. (BBUE-381)
Class 4, Credit 4 (offered upon demand)

BBUE-408 Business Cycles and Forecasting
Registration #0103-408
Analysis of economic conditions affecting the firm. Theory of business fluctuations. Forecasting techniques and services available to the firm. (BBUE-381)
Class 4, Credit 4 (offered upon demand)

BBUE-443 Recent Economic Policies
Registration #0103-443
A seminar type course on recent monetary and fiscal policies in the United States. Topics will cover the economic background, nature and effects of the policies during the most recent 10-year period. (BBUE-381)
Class 4, Credit 4

BBUE-509 Advanced Money and Banking
Registration #0103-509
Development of monetary theory. Money and income: theories of interest, liquidity preference and loanable funds; theories of income and employment, Keynesian and neo-Keynesian approach. Money and prices; quantity theory, velocity and cash-balance approach; inflationary process; and money wage rates and prices. (BBUE-381)
Class 4, Credit 4

BBUE-530 Labor Economics
Registration #0103-530
A course in applied economics, using economic theory and analysis for the study of labor institutions and their relation to the economy as a whole. Topics include wage theory, supply and demand, forces of labor, wages and unions, unemployment, inflation and public policy. (BBUE-405)
Class 4, Credit 4 (offered upon demand)

BBUE-554 Seminar in Economics
Registration #0103-554
Investigation of advanced problems and policies in economics. Emphasis is on student reports and papers. (Permission of instructor)
Class 4, Credit 4

Finance

BBUF-441 Financial Management
Registration #0104-441
A management oriented approach to the finance functions of a corporation. The application of decision making techniques and the analysis of existing legal and economic constraints on the financial manager. An introduction to the basic models and concepts relative to working capital management, capital budgeting, cost of capital and risk analysis. (GSSE-301, 302 and BBUA-210)
Class 4, Credit 4

BBUF-502 Money and Capital Markets
Registration #0104-502
Description and analysis of the money and capital markets, including underwriting and the placement of new issues and the functioning of the secondary markets. This will include U.S. governments, tax exempt securities and corporate issues as well as the short term money markets. (BBUE-381)
Class 4, Credit 4 (offered upon demand)

BBUF-503 Financial Problems
Registration #0104-503
An examination of problems encountered in many areas of corporate finance. The emphasis is on analytical and decision making techniques used to develop acceptable solutions. The case approach is used extensively. (BBUF-441)
Class 4, Credit 4

BBUF-504 International Finance
Registration #0104-504
This course is concerned with the monetary aspects of international economic relations. It deals with the following topics: the balance of payments, foreign exchange rates and markets, gold standard, flexible exchange rates system, international capital movements, exchange restrictions, and international monetary experience. (BBUE-381)
Class 4, Credit 4 (offered upon demand)
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Registration Code</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBUF-507</td>
<td>Security Analysis</td>
<td>#0104-507</td>
<td>The course is introductory and provides background in the field of securities investment. It is both descriptive and analytical in nature. The course covers the securities markets, types of issues, the historical investment perspective, and the valuation of different types of securities. (BBUF-441) Class 4, Credit 4</td>
</tr>
<tr>
<td>BBUF-508</td>
<td>Portfolio Management</td>
<td>#0104-508</td>
<td>This course deals with the considerations involved in the construction and management of securities portfolios. The emphasis is on the requirements of the institutional investor, the examination of the efficient market hypothesis, modern portfolio theory, and the valuation of investment results. (BBUF-507) Class 4, Credit 4</td>
</tr>
<tr>
<td>BBUF-510</td>
<td>Financial Institutions</td>
<td>#0104-510</td>
<td>Analysis of the different kinds of financial institutions such as commercial banks, savings institutions, insurance companies, pension funds, and others. It will cover their operations and relationships with the economic system. (BBUE-381) Class 4, Credit 4</td>
</tr>
<tr>
<td>BBUF-554</td>
<td>Seminar in Finance</td>
<td>#0104-554</td>
<td>A seminar covering current policies and problems in financial management, and/or securities and security markets. (Permission of instructor) Class 4, Credit 4 (maximum 12 hours credit)</td>
</tr>
<tr>
<td>BBUF-552</td>
<td>Advertising</td>
<td>#0105-552</td>
<td>The role of advertising as a vital function of the marketing field. Material will be studied from the point of view of the manner in which advertising contributes to the marketing mix, rather than from the creative aspects of production and copy. (BBUM-263) Class 4, Credit 4</td>
</tr>
<tr>
<td>BBUF-553</td>
<td>Sales Management</td>
<td>#0105-553</td>
<td>The course emphasizes the sales function of marketing management. It centers around the problems managers face in the direction, control, and supervision of sales activities. (BBUM-263) Class 4, Credit 4</td>
</tr>
<tr>
<td>BBUF-554</td>
<td>Seminar in Marketing</td>
<td>#0105-554</td>
<td>The objective of this course is to enable the student to bring together interests, learnings and experiences obtained in previous marketing courses. Specific course content will vary. (Permission of instructor) Class 4, Credit 4 (maximum 12 hours credit)</td>
</tr>
<tr>
<td>BBUB-351</td>
<td>Comparative Marketing</td>
<td>#0105-351, -352</td>
<td>Analysis of the different kinds of financial institutions such as commercial banks, savings institutions, insurance companies, pension funds, and others. It will cover their operations and relationships with the economic system. (BBUE-381) Class 4, Credit 4</td>
</tr>
<tr>
<td>BBUB-352</td>
<td>Mathematics I, II</td>
<td>#0106-290</td>
<td>A review of the fundamental concepts and operations of algebra that are necessary for BBUB-291 and other quantitative courses. Topics include relations and functions, rational expressions and equations, special products and factoring, linear and quadratic equations, systems of linear equations, powers and roots, and logarithms. Class Variable, Credit 4</td>
</tr>
<tr>
<td>BBUB-353</td>
<td>Statistics I, II</td>
<td>#0106-351, -352</td>
<td>The mathematical background required for the increasing use of quantitative methods in management. Topics include coordinate geometry, functional relationships, and the fundamental concepts and methods of differential and integral calculus. Class 4, Credit 4</td>
</tr>
<tr>
<td>BBUB-354</td>
<td>Statistics III</td>
<td>#0106-353</td>
<td>Introduces the student to the techniques of rational decision making under conditions of uncertainty and variability. The problem of determining the optimal amount of sampling is also considered. (BBUQ-352 or permission of instructor) Class 4, Credit 4</td>
</tr>
</tbody>
</table>
School of Food, Hotel and Tourism Management

Dietetics

**BFAD-213**  
Registration #0107-213  
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 2, Credit 4  
Practicum in hospital by arrangement

**BFAD-214**  
Registration #0107-214  
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 2, Credit 4  
Practicum in hospital by arrangement

**BFAD-314**  
Registration #0107-314  
Survey of micro-organisms of importance to the food industry; emphasis on causes and prevention of food spoilage and poisoning. Responsibilities of administrative dietitians to provide and establish safe working conditions and policies; discussion of current problems confronting the hospitals as a result of recent legislative developments as they relate to safety and health.  
Class 2, Credit 4  
Practicum in hospital by arrangement

**BFAb-402**  
Registration #0107-402  
Introductory dietetics course for students to interact and communicate with a representative sampling of the various categories of personnel in the general field of dietetics to study all major components of a total system in which a registered dietitian might function.  
Class 1, Credit 4  
Clinical hours by arrangement

**BFAD-519**  
Registration #0107-519  
Principles of learning: behavioral objectives, motivation, perception, evaluation, guidance, teaching methods and audiovisual techniques; development of a teaching/learning unit for a specific group.  
Class 4, Credit 4

**IJCG-704**  
Registration #0604-704  
Principles of communication and learning applied to educational programs; study of individual differences, perception, motivation, guidance and evaluation in basic concepts of education; use of television, visual equipment, and teaching materials for training programs for hospital employees.  
Class 4, Credit 4  
Practicum in hospital by arrangement

**BFAD-525**, **526**  
Registration #0107-525, 526  
Biological metabolism and interrelationships of nutrients, enzymes, and other biochemical substances in humans. Etiology, symptoms, treatment, and prevention of nutritional diseases; evaluation of nutritional diseases; evaluation of nutritional status, role of the diet and dietetics in metabolic gastro-intestinal, renal, musculoskeletal, cardiac, endocrine, febrile, and other diseases.  
BFAD-525 Class 5, Credit 5  
BFAD-526 Class 4, Credit 4

**BFAD-535**  
Registration #0107-535  
Study of the nutrition research; reading in scientific literature; evaluation of nutrition information and education in the local community, the nation, and the world; development of a research project, written and oral presentation of report.  
Class 2, Credit 4  
Clinical hours by arrangement

**BBUQ-410**  
Quantitative Methods I  
Fundamental mathematical principles and techniques used in management decision making. Topics include Cartesian coordinates and graphs; algebraic, exponential and logarithmic analysis; partial derivatives and applications; introduction to integral calculus.  
Class 4, Credit 4

**BBUQ-411**  
Quantitative Methods II  
Statistics for transfer students. A review of statistics covering descriptive statistics, probability, probability distribution, sampling, estimation, significance testing, and regression and correlation analysis.  
Class 4, Credit 4

**BFAD-550**  
Community Nutrition  
Registration #0107-550  
Survey of current nutrition problems in the community. Survey of agencies involved in giving nutrition information to the public and/or nutritional care to groups. An independent study project involving nutrition care in a clinical facility in the community is required. Assignments are arranged by the instructor.  
Class 2, Credit 4  
Clinical hours by arrangement

**BFAD-551**  
Management of Food Systems  
Registration #0107-551  
Principles of management in organizational structure, supervision and evaluation of employee performance, and use of computers in food management; the functions of an administrative dietitian in planning, organizing, directing, coordinating, and controlling dietetic activities.  
Class 1, Credit 4  
Practicum in hospital by arrangement

**BFAD-552**  
Geriatric Nutrition  
Registration #0107-552  
A course in applied geriatric nutrition. It includes the nutritional needs for the healthy aged person and addresses the nutritional needs caused by chronic health, psychological, economic and environmental problems. Students will be introduced to nutritional programs designed to help meet some of the problems of the aged person.  
Class 2, Credit 2

**BFAF-400**  
Tourist Enterprises  
A course designed to provide students an understanding of the planning, development, managing, design, marketing and operations of tourist and recreational enterprises. Student will additionally select specific recreational areas to analyze the unique planning and development strategies associated with each type of enterprise. See course BAFH-401, -405 for specific enterprises.  
Class 4, Credit 4

**BFAD-560**, **561**  
Clinical Dietetics I & II  
Registration #0107-560, 561  
An intensive integrated study and application of advanced nutrition and diet therapy theories and principles. The course is structured to integrate class lectures (BFAD-560) with clinical experience (BFAD-561) in a hospital setting. Designed for senior students in the Coordinated Dietetics Program.  
BFAD-560 Class 4, Credit 4  
BFAD-561 Clinical Hours by Arrangement, Credit 4

**BFAD-562**, **563**  
Clinical Dietetics III & IV  
Registration #0107-562, 563  
A continuation of BFAD-560, -561 in the succeeding quarter with the clinical experience being conducted in the hospital.  
BFAD-562 Class 4, Credit 4  
BFAD-563 Clinical Hours by Arrangement, Credit 6

**Food, Hotel and Tourism Management**

**BFAH-400**  
Ski Resort Management  
Registration #0111-400  
The development, marketing and management of ski resorts.  
Class 1, Credit 1

**BFAH-402**  
Marina Management  
Registration #0111-402  
The development, marketing and management of marinas.  
Class 1, Credit 1

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**BBUQ-410 Registration #0106-410**  
Quantitative Methods I  
Fundamental mathematical principles and techniques used in management decision making. Topics include Cartesian coordinates and graphs; algebraic, exponential and logarithmic analysis; partial derivatives and applications; introduction to integral calculus.  
Class 4, Credit 4

**BBUQ-411 Registration #0106-411**  
Quantitative Methods II  
Statistics for transfer students. A review of statistics covering descriptive statistics, probability, probability distribution, sampling, estimation, significance testing, and regression and correlation analysis.  
Class 4, Credit 4

**BFAD-535 Registration #0107-535**  
Nutrition Seminar  
Study of the nutrition research; reading in scientific literature; evaluation of nutrition information and education in the local community, the nation, and the world; development of a research project, written and oral presentation of report. (BFAD-213, BFAD-526 and senior standing)  
Credit Variable

**BFAD-550 Registration #0107-550**  
Community Nutrition  
Class 2, Credit 4  
Clinical hours by arrangement

**BFAD-551 Registration #0107-551**  
Management of Food Systems  
Class 1, Credit 4  
Practicum in hospital by arrangement

**BFAD-552 Registration #0107-552**  
Geriatric Nutrition  
Class 2, Credit 2

**BFAD-560, 561 Registration #0107-560, 561**  
Clinical Dietetics I & II  
An intensive integrated study and application of advanced nutrition and diet therapy theories and principles. The course is structured to integrate class lectures (BFAD-560) with clinical experience (BFAD-561) in a hospital setting. Designed for senior students in the Coordinated Dietetics Program.  
BFAD-560 Class 4, Credit 4  
BFAD-561 Clinical Hours by Arrangement, Credit 4

**BFAD-562, 563 Registration #0107-562, 563**  
Clinical Dietetics III & IV  
A continuation of BFAD-560, -561 in the succeeding quarter with the clinical experience being conducted in the hospital.  
BFAD-562 Class 4, Credit 4  
BFAD-563 Clinical Hours by Arrangement, Credit 6

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**BFAD-213 Registration #0107-213**  
Nutrition Principles  
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
The School of Retailing

BRER-211 Retail Organization and Management
Registration #0109-211
This course provides an introduction to the management concepts applicable to a retail operation or store. Areas of emphasis include store location, store design and layout, store organization, merchandise management (buying, assortment, classification, and control), and customer relations. The functions of retailing in society are introduced and a perspective laid for all additional courses.
Class 4, Credit 4

BRER-212 Retail Merchandising
Registration #0109-212
A study of the concepts and techniques of merchandise management. Specific emphasis is placed on the quantitative tools and skills utilized in operating statement analysis, allocation of merchandise investment, inventory control, stock turn, markup and pricing, and the planning of sales, stocks, and open-to-buy. (BRER-211)
Class 4, Credit 4

BRER-300 Retail Career Seminar
Registration #0109-300
A fundamental course to assist the student in establishing a sound basis for profiting by the Co-op work experience and making career decisions. Major areas covered are: self awareness and aptitude testing, resume and letter writing techniques, sources of job opportunities, and interviewing procedures.
Class 1, Credit 1

BRER-410 Retail Sales Promotion
Registration #0109-410
The study of the overall sales promotion functions in a retail environment. Includes the planning, analysis, and evaluation of alternative promotional activities in terms of media selection, budgeting, copywriting, layout. The full promotional mix employed by typical retailers, including newspapers, broadcast, display, specialty advertising, and in store promotions is analyzed and evaluated. (BRER-211)
Class 4, Credit 4
Graduate Business Courses

Business Administration Courses

Accounting Group

BBUA-701 Financial Accounting
Registration #0101-701
An introduction to financial accounting. Topics covered will include financial statements, transaction analysis; accounting for revenues, costs, and expenses; accounting for assets, liabilities and owner’s equity; measurement; and the use of financial statements.
Credit 4 (offered each year)

BBUA-702 Cost and Managerial Accounting
Registration #0101-702
The uses of cost data and reports for managerial decision making. Includes problems and procedures relating to job order, process, and standard cost systems with special attention to problems of overhead distribution. The planning process, the control process and analytical processes are considered in detail. (BBUA-701)
Credit 4 (offered each year)

BBUA-704 Accounting Theory I
Registration #0101-704
A comprehensive exposure at an intermediate level to accounting theory and practice. Emphasis is placed on applying underlying accounting theory to complex accounting problems. The effects of alternative methods are considered throughout the course. (BBUA-701)
Credit 4 (offered each year)

BBUA-705 Accounting Theory II
Registration #0101-705
Continuation of Accounting Theory I with emphasis on liabilities, equity, long-term debt and special reporting problems. Included here is the Statement of Changes in Financial Position, pensions, leases, and accounting for changes in the price level. (BBUA-704)
Credit 4 (offered each year)

BBUA-707 Advanced Accounting and Theory
Registration #0101-707
Analysis and evaluation of current accounting thought relating to the nature, measurement and reporting of business income and financial position; concepts of income; attention to special areas relating to consolidated statements, partnerships, consignments and installment sales. (BBUA-705)
Credit 4 (offered each year)

BBUA-708 Auditing
Registration #0101-708
The theory and practice of auditing examined; critical study of auditing procedures and standards in the light of current practice; measurement and reliance of internal control covered by case studies; modern auditing techniques by statistical sampling and electronic data processing applications. (BBUA-705)
Credit 4 (offered each year)

BBUA-709 Basic Taxation Accounting
Registration #0101-709
Study of federal income taxation of individuals. Income tax and accounting concepts affecting revenues and deductions are compared, including concepts of gross income, basis, recognition of gain and loss, capital asset transactions, exemptions and deductions. (BBUA-701)
Credit 4 (offered each year)

BBUA-712 Seminar in Accounting
Registration #0101-712
Course content will differ by instructor and quarter. Topics covered: taxation, international accounting and accounting for non-profit organizations. (Permission of instructor)
Credit 4 (offered upon sufficient demand)

BBUA-810 Advanced Taxation Accounting
Registration #0101-810
A study of federal income taxation as it relates to corporate tax planning; reorganization, merger, and liquidation; partnership, estates, trusts, and gifts. Problems of the special corporation—Subchapter S, Personal Holding Company—will be examined. Tax planning for the individual, tax shelters, estate and gift taxes are studied and discussed. Emphasis will be on the need for tax planning in the complex business or personal situation. (BBUA-709 or admission to MS in accounting)
Credit 4 (offered each year)

BBUA-811 Auditing Theory
Registration #0101-811
Advanced course in auditing where classical auditing cases, uses of computer and statistical accounting techniques, current official auditing pronouncements and changes in legal and ethical considerations are fully explored. (BBUA-708 or admission to the MS in accounting)...
Credit 4 (offered each year)

BBUA-812 Accountancy Seminar
Registration #0101-812
A variety of advanced accounting topics covered, depending on the instructor. Topics included would be: CPA problems, SEC accounting, small business accounting, internal auditing. (BBUA-705 or admission to the MS in accounting)
Credit 4 (offered each year)

BBUA-813 Financial Accounting Theory
Registration #0101-813
An advanced course in financial accounting that examines the basic assumptions, principles and postulates upon which current practice rests, and alternative theories of valuation and measurement. Critical analysis of the historical cost model and the several major current value models is the main emphasis throughout discussions of financial statements and their individual components. (BBUA-707 or admission to the MS in accountancy)
Credit 4 (offered each year)

Business Group

BBUB-740 Organizational Behavior
Registration #0102-740
Organization analysis through the study of individual and group behaviors within organizations. The implications of studies from psychology and social psychology are stressed. Topics include motivation, leadership, group dynamics, conflict, communication, stress, and individual and group development.
Credit 4 (offered each year)
BBUB-741  Organization and Management
Registration #0102-741
Develops the analyses of organizations by studying the systems and subsystems that make up the organization. These systems include the technological, structural and managerial subsystems as well as the environmental suprasystem. Included are topics such as organization effectiveness and organization development. (BBUB-740)
Credit 4 (offered each year)

BBUB-742  Business and Society
Registration #0102-742
A study of the impact on the manager of the needs, demands and restrictions posed by employees, government, the consumer and other environmental forces. The course examines possible managerial responses within the framework of several definitions of “social responsibility.” (Foundation Courses)
Credit 4 (offered upon sufficient demand)

BBUB-743  Operations Management
Registration #0102-743
An analytical approach to the theory and application of operations management. Combines quantitative models and qualitative considerations relating to forecasting, inventory management, quality control, and queuing analysis. Statistical reasoning and computer utilization are basic tools in problem solution. (BBUQ-780, 782)
Credit 4 (offered each year)

BBUB-746  Management Development
Registration #0102-746
Concepts of career development; overview of present individual and group procedures; implications of current technological development for training, replacement, and advancement. (BBUB-741)
Credit 4 (offered each year)

BBUB-747  Systems Administration
Registration #0102-747
General systems theory applied to the management of business systems. Topics covered include philosophy of systems, design, analysis and control of systems, cybernetics, project management, reliability, and human factors. (Foundation Courses)
Credit 4 (offered upon sufficient demand)

BBUB-748  Labor/Management Problems
Registration #0102-748
Problems in labor/management relations as they influence managerial decision making. Topics may include collective bargaining, conflicts and agreements between labor and management, and contemporary issues. From the perspective of labor/management structure, concepts are developed concerning market forces, unionism and labor laws as they influence wage levels and wage structure. (BBUB-740, BBUB-745)
Credit 4 (offered each year)

BBUB-750  Personnel Systems
Registration #0102-750
This course introduces the concept of personnel systems and allows a detailed examination of the systems' different elements. The student will become acquainted with current theory and research in behavioral sciences. The course also allows the student to integrate theory with practical application through exercises and class projects dealing with problems in personnel selection, placement, training and evaluation (BBUB-740, BBUQ-782)
Credit 4 (offered each year)

BBUB-751  Legal Environment of Business
Registration #0102-751
An introduction to legal principles and their relationship to business practices, including the background and sources of law, law enforcement agencies and procedures. Topical cases and examples are used as a guide to the observation of legal requirements and the legal forces which influence business and accounting decisions. (Foundation courses).
Credit 4 (offered each year)

BBUB-752  Comparative Organizations
Registration #0102-752
A course providing a critical evaluation of a wide range of current management theory and research concerned with organizations of all types; public and private, profit and non-profit. Appropriateness of the body of knowledge for managing different types of organizations is a primary concern. Focus on comparative analysis of a variety of organizations to understand differences and similarities and to determine whether research and theory can be generalized across organizations. Particular emphasis is placed on non-profit organizations. (BBUB-741)
Credit 4 (offered each year)

BBUB-753  Small Business Administration
Registration #0102-753
A course providing students with the opportunity to act in a consulting capacity with a given business firm. Under an arrangement with the Small Business Administration and working with faculty, teams of students provide management consulting to small businesses. (BBUA-702, BBUF-721, BBUM-761)
Credit 4 (offered each year)

BBUB-758  Seminar in Management
Registration #0102-758
This course will take on different content depending on the instructor and quarter when offered. Topics that may be covered include management thought, systems theory and application, and behavioral aspects of management. Specific content for a particular quarter will be announced prior to the course offering. (Permission of instructor)
Credit 4 (offered each year)

BBUB-759  Integrated Business Analysis
Registration #0102-759
A course intended to give experience in combining theory and practice gained in other course work. This integrative exposure is achieved by solving complex and interrelated business policy problems that cut across the several functional areas of marketing, production, finance and personnel. The course is aimed at the formulation and implementation of business policy as viewed by top management. The case method is used extensively. (All other core courses plus two electives preferred)
Credit 4 (offered each year)

BBUB-770  Business Research Methods
Registration #0102-770
Research as a basis for policy building, planning, control and operation of the business enterprise. Concepts, tools, sources, methods, and applications are covered. Procurement and evaluation of data for business use from government and private sources. Introduces the use of multivariate techniques as a means for data reduction and the analysis of complex data bases. (Foundation courses, BBUQ-782; BBUM-761 preferred)
Credit 4 (offered each year)

BBUB-771, 772  Research Option
Registration #0102-771, 772
A practicum or thesis alternative permitting the student to confront a real management problem. Requirements include steps from design to completed management report. (Core courses and one of the following: BBUB-770, BBUF-723, BBUQ-784)
Credit 4 or 8 (option to be developed with selected faculty)

BBUB-790  Information Systems
Registration #0102-790
The concepts and techniques for the design and implementation of a computer-based management information system are studied. Topics include systems theory, the generation and collection of data, the transformation of information, and the economics of information. (BBUB-743)
Credit 4 (offered upon sufficient demand)

BBUB-799  Independent Study
Registration #0102-799
A supervised investigation and report within a business area of professional interest. The exact content should be contained in a proposal for review, acceptance, and assignment to an appropriate faculty member, who will provide supervision and evaluation. Appropriateness to written career objectives and availability of faculty will be included in the review and considerations for acceptance. (Foundation and appropriate Core Courses plus permission of dean)
Credit 1-4 (variable) (offered subject to review)

Finance and Economics Group

BBUF-721  Financial Management I
Registration #0104-721
Critical examination of the financial elements and systems of the firm. The emphasis is on asset management to include valuation theory and analysis, cost of capital, current asset management, and capital budgeting. Portfolio approaches to security and project selection and management. (BBUA-701, BBUQ-781 & 782; BBUB-745)
Credit 4 (offered each year)

BBUF-722  Financial Management II
Registration #0104-722
Liability and equity management receive primary emphasis; to include short and intermediate term financing, long term financing leases, capital structure, dividend policy, and bankruptcy and reorganization. Theory and application approaches are shared. (BBUF-721)
Credit 4 (offered each year)
BBUF-723 Theory of Finance and Research
Registration #0104-723
This course involves a study of the current literature and most recent development relating to the theories of investment and valuation, cost of capital, risk and dividend policy. Also considered are specific areas of application and the policy implications of the theories studied. (BBUF-722, BBUF-767)
Credit 4 (offered each year)

BBUF 724 Problems in Financial Management
Registration #0104-724
This course is designed to give the student greater depth in the basic concepts of financial management and greater facility in using the analytical techniques. Extensive use will be made of case material. Problem types to be considered include liquid asset management, capital budgeting, security valuation, methods of financing and dividend policy. (BBUF-723)
Credit 4 (offered each year)

BBUF-725 Securities and Investment Analysis
Registration #0104-725
Study of securities and various investment media and their markets. Analysis of investment values based on financial and other data. Consider factors such as return growth, and risk. (BBUF-722)
Credit 4 (offered each year)

BBUF-729 Seminar in Finance
Registration #0104-729
This course will take on different content depending on the instructor and quarter when offered. Topics that may be covered are: financial models, financial analysis techniques, financial institutions and capital markets. Specific content for a particular quarter will be announced prior to course offering. (Permission of instructor)
Credit 4 (offered upon sufficient demand)

BBUF-745 Economic Environment of American Business
Registration #0104-745
Nature of the business firm; theory of demand, costs and prices; competition and monopoly; production function and the marginal productivity theory of distribution; saving and investment; the determination of the level of income; Federal Reserve operations; fiscal and monetary policies. (BBUQ-780)
Credit 4 (offered each year)

BBUF-757 Seminar in Economics
Registration #0104-757
Content will differ depending on the quarter and instructor. Topics that may be covered include international finance, monetary theory, labor economics and market structure. (Permission of instructor)
Credit 4 (offered each year)

BBUF-765 Managerial Economics
Registration #0104-765
Analysis of the economic conditions facing the firm. Topics include: demand and cost analyses, resource utilization, pricing, market structure, and other selected topics. (BBUF-745, BBUA-702, BBUF-743 recommended)
Credit 4 (offered each year)

BBUF-767 Advanced Microeconomic Theory
Registration #0104-767
An advanced study of the fundamental economic principles underlying the nature of a business firm. Topics include: theories of demand and revenue; theory of costs and production analysis in both the short-run and the long-run; equilibrium of demand and supply and efficiency of competition; market structures and their characteristics; pricing and output under perfect competition, monopoly, pure competition, imperfect competition, and oligopoly; resource allocation and product distribution. Business applications are given along with the exposition of the theory. (Foundation courses)
Credit 4 (offered each year)

BBUF-768 Advanced Macroeconomic Theory
Registration #0104-768
An advanced study of the fluctuations and growth of economic activity in a modern complex society. Topics include measuring macroeconomic activity; modeling economic activity; macroeconomic foundations in macroeconomic theory (the labor, the commodity, the money, and the bond markets); a parallel discussion of the complete classical and Keynesian macroeconomic models; recent criticism of the two models; the general equilibrium; the phenomena of inflation and unemployment and the way business can forecast them; the impact of fiscal and monetary growth; reality and macroeconomic disequilibrium; and wage-price policies. (Foundation courses)
Credit 4 (offered each year)

BBUF-769 Seminar in Marketing
Registration #0104-769
This course will take on different content depending on the instructor and quarter when offered. Topics that may be covered are: marketing models, marketing channels, articulation with top marketing executives, and marketing positioning. Specific content for a particular quarter will be announced prior to course offering. (Permission of instructor)
Credit 4 (offered each year)

BBUF-770 Quantitative Analysis
Registration #0104-770
An introduction to quantitative approaches to decision making. Topics covered include linear programming, decision theory, computer simulation, and calculus-based solution procedures. The emphasis is not on the technicalities per se, but rather on showing how quantitative approaches can be used to contribute to a better decision making process. (BBUQ-781 or concurrent registration)
Credit 4 (offered each year)

Marketing Group

BBUF-761 Marketing Concepts
Registration #0105-761
Critical examination of the marketing system as a whole; functional relationships performed by various institutions such as manufacturers, brokers, wholesalers, and retailers. Analysis of costs, strategies and techniques related to the marketing system. Both behavioral and quantitative aspects of marketing are considered. (Foundation courses)
Credit 4 (offered each year)

BBUF-762 Advanced Marketing Management
Registration #0105-762
Advanced study of selected problems that face marketing managers concerned with promotion, place, price, and product. Material centers on staff marketing functions. Research topics unique to the field of marketing are covered. (BBUF-761)
Credit 4 (offered each year)

BBUF-763 Consumer Behavior
Registration #0105-763
A study of the market in terms of the psychological and socio-economic determinations of buying behaviors, including current trends in purchasing power and population movements. (BBUF-761)
Credit 4 (offered each year)

BBUF-764 Marketing Logistics
Registration #0105-764
The study of an integrated system for the distribution of products from producer to consumer. The emphasis is on the physical flow of goods both between and within marketing institutions. Specific topics covered are unit geographic location, internal product flow, inter-unit transportation, and warehousing. (BBUF-761)
Credit 4 (offered upon sufficient demand)

BBUF-765 Sales Management
Registration #0105-765
An examination of selling and sales management as they pervade both the marketing process and the management communications process. Topics covered relate to building and managing an effective sales force and to selling philosophy and techniques creating managerial “win-win” situations with both superiors and subordinates. (BBUF-761)
Credit 4 (offered each year)

BBUF-766 International Management
Registration #0105-766
A study of the differences in market arrangements as well as in the legal, cultural, and economic factors found in foreign countries. Topics included are planning and organizing for international marketing operations, forecasting and analysis; inter-relationships with other functions; and product, pricing, promotion, and channel strategy. (BBUF-761)
Credit 4 (offered upon sufficient demand)

BBUF-767 Marketing Communications
Registration #0105-767
A study of inter-relationships of three communications mix functions: public relations, advertising, and sales promotion. Topics covered will center on the use of these functions in the development of models for persuasive communications and their inter-relationships with other elements of the marketing mix. (BBUF-761)
Credit 4 (offered each year)

Quantitative Group

BBUQ-780 Quantitative Analysis
Registration #0106-780
An introduction to quantitative approaches to decision making. Topics covered include linear programming, decision theory, computer simulation, and calculus-based solution procedures. The emphasis is not on the technicalities per se, but rather on showing how quantitative approaches can be used to contribute to a better decision making process. (BBUQ-781 or concurrent registration)
Credit 4 (offered each year)
BBUQ-782 Statistical Analysis I
A study of probability and statistics including discrete and continuous probabiility distributions, sampling distributions, point estimation, and interval estimation. Applications are made to the managerial decision making situation. The use of SPSS in analyzing data will be introduced. (Knowledge of undergraduate algebra is presumed)
Credit 4 (offered each year)

Registration #0106-782

BBUQ-783 Statistical Analysis II
A continuation of topics from classical statistics including hypothesis testing, nonparametric tests, analysis of variance, regression and correlation analysis. All students will analyze several data sets using SPSS. (BBUQ-781)
Credit 4 (offered each year)

Registration #0106-784

BBUQ-784 Decision Analysis
An introduction to decision analysis for the manager. Emphasis will be on structuring the problem in terms of alternatives possible, decision attributes, and operational constraints; quantifying the manager's judgments as probabilities; assessing the utility of the manager's preferences; analyzing the problem via evaluation of the alternatives and checking the sensitivity of the solution(s). Single and multiple attribute cases under certainty will be covered. (BBUQ-782)
Credit 4 (offered upon sufficient demand)

BBUQ-785 Applied Regression Analysis
The primary objective of this course is to teach the student how to effectively utilize a variety of data analysis techniques commonly referred to as regression analysis. Emphasis will be placed on model formulation and analysis. All students will be required to analyze several large data sets using SPSS. Relevant theory will be introduced to enable the student to pursue further study in data analysis. (BBUQ-782)
Credit 4 (offered each year)

Registration #0106-786

BBUQ-786 Mathematical Programming
An in-depth investigation of several mathematical programming techniques with an emphasis upon model development and the decision making process. Specific topics include linear programming, goal programming, and integer programming. (BBUQ-780)
Credit 4 (offered upon sufficient demand)

Registration #0106-788

BBUQ-788 Survey Design and Sampling
The following topics in survey design and sampling are covered: questionnaire development; types of sampling techniques; determination of sample size; methods for increasing the response rate; interpretation of results and report preparation. Students will be required to design a questionnaire, administer it, and analyze the results. (BBUQ-782)
Credit 4 (offered upon sufficient demand)

Registration #0106-789

BBUQ-789 Simulation
An introduction to the various uses of simulation as a management tool for decision making. Models of varying levels of sophistication employing simulation programming languages are constructed. (BBUQ-782)
Credit 4 (offered upon sufficient demand)

BBUQ-793 Business Forecasting Methods
An introduction to quantitative and qualitative forecasting methods and their use in business forecasting. The student will be taught how to recognize which forecasting procedure to use based upon an analysis of problem characteristics. A significant part of the course will involve analyzing several data sets using a set of interactive forecasting or econometric programs such as SIBYL/RUNNER and TSP. (BBUQ-785 or permission of the instructor)
Credit 4 (offered each year)

Registration #0106-793

BBUQ-794 Multivariate Methods in Business
An introduction to the use of multivariate techniques, other than multiple regression analysis, and their use in analyzing business data. The major objective will be to demonstrate the proper use of a variety of multivariate techniques for large-scale data sets. Students will be required to use a standard statistical package (SPSS, BMDP, TSP) to carry out the analytical procedures. A major emphasis is placed on the interpretation of analytic output in terms of the decision making situation underlying the problem being investigated. (BBUA-770)
Credit 4 (offered each year)

Registration #0106-794

BBUQ-795 Seminar in Decision Sciences
This course will focus on different content depending on the instructor and quarter when offered. Topics which may be covered are: multivariate analysis, simulation, operations research, linear programming and Bayesian techniques. Specific content for a particular quarter will be announced prior to course offering. (Permission of instructor)
Credit 4 (offered each year)

Registration #0106-795

Human Services Group

BBUH-701 Economic Environment of Human Services
Studies of the macroeconomic forces impacting the agency environments, such as funding and service populations, and the microeconomic concepts which can be used to aid agency resource allocation decisions and in the analysis of alternate agency policies. Topics include national income concepts and policies and economic demand for services and benefit/cost considerations. (BBUQ-781)
Credit 4 (offered each year)

Registration #0115-701

BBUH-711 Law and the Administrative Process
Practices, problems, and issues in the implementation of public policy. Civil law, regulation, and statutes affecting contracts, internal and external publics, employee welfare, and fiduciary responsibilities. The exercise of governmental power and control over administrative action. Specific legal areas such as rule making, licensing, adjudication, and judicial review will be examined. (BBUH-701, BBUH-712)
Credit 4 (offered each year)

Registration #0115-711

BBUH-721 Organization and Management in Criminal Justice
Considerations of organization, management, and planning as tools of the administrator with emphasis on bureaucracy, authority, power, decision making, and tactics and strategies of effective management. Special consideration will be given to the problems of management in criminal justice agencies, law enforcement agencies, and correctional institutions. (BBUH-741)
Credit 4 (offered upon demand)

Registration #0115-721

BBUH-722 Administration in the Social Work Setting
Application of administrative skills and methods applicable to the social worker, with attention to the needs determined by the non-profit organizational structure. Topics include areas of administration and management concerns, planning, development, the various supervisory roles, personnel, evaluation, and special concerns arising from funding considerations. (BBUH-741)
Credit 4 (offered on demand)

Registration #0115-722

BBUH-731 Intervention in the Community
Methods of agency intervention in specific problem areas, identified as needed by the community, with focus on the role of management. Covers approaches to community intervention with special attention focused on such problems areas as crime, poverty, health, mental health, education, cultural resources, and population conflict. Issues will regard the manner in which agencies formulate Interventive strategies and implementation, particularly as the process involves the management role. (BBUA-712)
Credit 4 (offered each year)

Registration #0115-731

BBUH-732 Cooperation and Conflict
Establishing working relationships between various providers of services and the resolution of system conflict. Topics to be covered include: the development of conflict between and within agencies, the evolution of a cooperative system of services, incompatible interest groups, competition among providers, problems of limited funding, and problems associated with the growth or decline of services. Emphasis is placed on the manager in the resolution of conflict. (BBUB-741, BBUH-712)
Credit 4 (offered each year)

Registration #0115-732
BBUH-733 Interpersonal Skills
Registration #0115-733
The development of skills related to leadership, group dynamics, public relations, and aspects of personal growth. Self-awareness for the person in a managerial role will be stressed, particularly as this involves interaction with colleagues both within and outside the agency of employment. Management styles will be analyzed for strengths and weaknesses to develop an increased awareness of the particular characteristics leading towards beneficial managerial outcomes. (BBUB-740)
Credit 4 (offered each year)

BBUH-734 Deviance, Conformity, and Criminal Behavior
Registration #0115-734
A study of the social and psychological factors identified with the genesis of specific social pathologies which are exhibited by groups and individuals. The course presents an analysis of the various forms of deviance including deviance from professional rules and norms; deviance from expected interaction patterns and traditional areas of deviance such as crime, alcoholism, mental illness, homosexuality, prostitution, counter culture, and revolutionary activities; methods of social reaction to deviance. (Foundation Courses)
Credit 4 (offered each year)

BBUH-735 Special Populations
Registration #0115-735
The needs of special populations such as the elderly, youth, ethnic minorities, women, the educationally disadvantaged, poor, and others. The course will address the particular considerations relevant to programming for these specific populations. Historical considerations will be raised. (Foundation Courses)
Credit 4 (offered each year)

College of Continuing Education
Graduate Courses in Applied and Mathematical Statistics

CTAM-711 Fundamentals of Statistics I
Registration #0240-711
For those taking statistics for the first time. Covers the statistical methods used most in industry, business and research. Essential for all scientists, engineers, and administrators.
Topics: organizing observed data for analysis and insight; learning to understand probability as the science of the uncertain; concepts of practical use of the Central Limit Theorem. (Consent of the department).
Credit 3 (offered each quarter)

CTAM-712 Fundamentals of Statistics II
Registration #0240-712
Continuation of CTAM-711
Topics: concepts and strategies of statistical inference for making decisions about a population on the basis of sample evidence; tests for independence and for adequacy of a proposed probability model; learning how to separate total variability of a system into identifiable components through analysis of variance; regression and correlation models for studying the relationship of a response variable to one or more predictor variables.
(All standard statistical tests) (CTAM-711 or equivalent.)
Credit 3 (offered each quarter)

CTAM-721 Quality Control: Control Charts
Registration #0240-721
A practical course designed to give depth to practicing quality control personnel.
Topics: statistical measures; theory, construction, and application of control charts for variables and for attributes; computerization procedures for control charts; tolerances, specifications, and process capability studies; basic concepts of total quality control, and management of the quality control function. (Consent of the department.)
Credit 3 (offered in Fall and Spring Quarters)

CTAM-731 Quality Control; Acceptance Sampling
Registration #0240-731
Investigation of modern acceptance sampling techniques with emphasis on industrial application.
Topics: single, double, multiple, and sequential techniques for attributes sampling; variables sampling; techniques for sampling continuous production. The course highlights Dodge-Romig plans, Military Standard plans, and recent contributions from the literature (Consent of the department.)
Credit 3 (offered in Winter and Summer Quarters)

CTAM-751 Introduction to Decision Processes
Registration #0240-751
A first course in statistical decision theory featuring concrete situations and realistic problems.
Topics: basic statistical ideas; how to make the best decision prior to sampling, after sampling, sequentially; optimum managerial strategies, practical applications. (Consent of department)
Credit 3 (offered in Fall Quarter)

CTAM-761 Reliability
Registration #0240-761
A methods course in reliability practices; what a reliability engineer must know about reliability prediction, estimation, analysis, demonstration, and other reliability activities. Covers most methods presently being used in industry.
Topics: applications of normal, binomial, exponential, and Weibull graphs to reliability problems; hazard plotting; reliability confidence limits and risks; strength and stress models; reliability safety margins, truncated and censored life tests; sequential test plans; Bayesian test programs. (CTAM-712 or equivalent)
Credit 3 (offered in Spring Quarter)
CTAM-801 Design of Experiments I
Registration #0240-801
How you design and analyze experiments in any subject matter area; What you do and why.
Topics: basic statistical concepts, scientific experimentation, completely randomized design, randomized complete block design, nested and split plot designs. Practical applications to civil engineering, pharmacy, aircraft, agronomy, photoscience, genetics, psychology, and advertising. (CTAM-712 or equivalent.)
Credit 3 (offered in Winter, Spring and Summer Quarters)

CTAM-802 Design of Experiments II
Registration #0240-802
Continuation of CTAM-801
Topics: factorial experiments; fractional, three level, mixed; response surface exploration. Practical applications to: medical areas, alloys, highway engineering, plastics, metallurgy, animal nutrition, sociology, industrial and electrical engineering. (CTAM-801.)
Credit 3 (offered in Fall, Spring, and Summer Quarters)

CTAM-812 Theory of Statistics I
Registration #0240-821
Provides a sound theoretical basis for continuing study and reading in statistics.
Topics: constructs and applications of mathematical probability; discrete and continuous distribution functions for a single variable and for the multivariate case; expected value and moment generating functions; special continuous distributions. (Consent of department)
Credit 3 (offered in Fall Quarter)

CTAM-822 Theory of Statistics II
Registration #0240-822
Continuation Of CTAM-821
Topics: Supporting theory for, and derivation of, sampling distribution models; applications and related material. Point estimation theory and applications, the multivariate normal probability model, its properties and applications; interval estimation theory and applications.
Credit 3 (offered in Winter Quarter)

CTAM-830 Multivariate Analysis
Registration #0240-831
A methods course dealing with the general relationship problem. Topics: the matrix approach to simple and multiple linear regression; analysis of residuals; dummy variables; orthogonal models; computational techniques. (CTAM-802 or equivalent.)
Credit 3 (offered in Spring Quarter)

CTAM-831 Multivariate Analysis II
Registration #0240-831
A continuation of CTAM-830, this course covers the use of advanced multivariate techniques. Topics include Principal Component analysis, cluster analysis, multi-dimensional contingency tables, discrete discriminant analysis, multi-dimensional scaling, and regression with errors in the independent variables. Practical applications will be emphasized. (CTAM-830)
Credit 3 (offered in Summer only)

CTAM-841 Regression Analysis I
Registration #0240-841
A methods course dealing with the general relationship problem. Topics: the matrix approach to simple and multiple linear regression; analysis of residuals; dummy variables; orthogonal models; computational techniques. (CTAM-802 or equivalent.)
Credit 3 (offered in Winter Quarter)

CTAM-842 Regression Analysis II
Registration #0240-842
A continuation of CTAM-841
Topics: selection of best linear models; regression applied to analysis of variance problems; nonlinear estimation and model building. (CTAM-841 or equivalent.)
Credit 3 (offered in Spring Quarter)

CTAM-851 Nonparametric Statistics
Registration #0240-851
Distribution-free testing and estimation techniques with emphasis on applications.
Topics: sign tests; Kolmogorov-Smirnov statistics; run tests; Wilcoxon-Mann-Whitney test; Chi-Square tests; rank correlation; rank order tests; quick tests. (CTAM-712 or equivalent.)
Credit 3 (offered in Fall, Spring, and Summer Quarters)

CTAM-853 Managerial Decision Making
Registration #0240-853
Continuation of CTAM-751, statistical decision analysis for management.
Topics: utilities; how to make the best decision (but not necessarily the right one); normal and best Bayesian theory; many action problems; optimal sample size; decision diagrams. Applications to marketing; oil drilling, portfolio selection; quality control; production; and research programs. (CTAM-751 or equivalent.)
Credit 3 (offered in Winter Quarter)

CTAM-871 Sampling Theory and Applications
Registration #0240-871
An introduction to sample surveys in many fields of applications with emphasis on practical aspects.
Topics: review of basic concepts, sampling problem elements; sampling; random, stratified, ratio, cluster, systematic, two-stage cluster; wild life populations, questionnaires, sample sizes. (CTAM-712 or equivalent.)
Credit 3 (offered in Winter and Summer Quarters)

CTAM-881 Bayesian Statistics
Registration #0240-881
Bayesian Statistics
Probability as a degree of belief; how we learn; the applications of Bayesian principles to: estimation of failure rates, revising odds, testing precise hypotheses, finding credible regions, tests of significance and goodness of fit from Bayesian point of view; handling several variables; straightline analysis. A potpourri of applications; reliability, acceptance sampling, decision-making etc. (CTAM-712 or equivalent.)
Credit 3 (offered in Fall Quarter)

CTAM-886 Sample Size Determination
Registration #0240-886
The question most often asked of an industrial statistician is "What size sample should I take?" This course answers that question for a wide variety of practical investigational projects. Techniques for the full use of the optimal sample evidence are also offered. (CTAM-712 or equivalent.)
Credit 3 (offered in Summer Quarter)

CT AM-891, 892, 893 Special Topics in Applied Statistics
Registration #0240-891 -892 -893
Special Topics in Applied Statistics
This course provides for the presentation of subject matter of important specialized value in the field of applied and mathematical statistics not offered as a regular part of the statistics program. (Consent of the department.)
Credit 3/Qtr. (offered upon sufficient demand; usually in Fall Quarter)

CT AM-895 Statistics Seminar
Registration #0240-895
For students working for the MS degree in applied and mathematical statistics who use a research project and thesis for three, six or nine credits. (Consent of the department.)
Credit 3 (offered each quarter)

CTAM-896, 897, 898 Thesis
Registration #0240-896 -897 -898
Thesis
This course or sequence of courses, provides for one or more quarters of independent study and research activity. This course may be used by other departments at RIT (or other colleges) to provide special training in statistics for students who desire an independent study program in partial fulfillment of graduate degree requirements. (Consent of all departments involved.)
Credit 3 (offered each quarter)
This course is actually divided into two parts. The first part is an introduction on the graphical description rather than on drafting methods.

Required Courses

EECC-341 Introduction to Digital Systems for Computer Engineering Students
A study of the organisation and design of a classical digital computer system including instruction fetch, decode, and execution. This course will study the combinational and sequential SSI, MSI, and LSI components used in the construction of simple CPUs and other digital systems. Analytical and design techniques used in creating digital subsystems will be discussed. (Working knowledge of some representative assembly language)
Class 3, Lab., 2, Credit 4 (F)

EECC-655 Real-Time Computation
Principles and applied problems in real-time computation and process control using microprocessors as laboratory hardware. Topics include interrupt handling, multi-tasking concepts, process scheduling, response time considerations for interrupt driven and polled I/O and elements of computer communications.
Class 3, Lab., 3, Credit 4 (F, W)

EECC-660 Interface Electronics and Logic
Introduction to some common transducers, transformations from raw measured quantity to transducer output. Instrumentation amplifiers, analog switching for applications in multiplexors and sample and hold circuits. The analog to digital and digital to analog conversions processes. Analysis and synthesis of sequential machines using asynchronous and synchronous discrete logic as well as programmed logic. (EEE-643)
Class 3, Lab., 3, Credit 4 (S, Sr)

Technical Electives

EECC-731 Advanced Computer Architecture
Class 4, Credit 4 (S)

EECC-733 Fault-Tolerant Computer Systems
Formal models and concepts in fault diagnosis. Test generation and minimisation redundant and self-checking systems. Fault tolerant hardware and software based computer systems. (Switching Theory HCSS-400 or EEE-650 or EEE-760, or Computer Architecture HCSS-520 or T20)
Class 4, Credit 4 (S)

Electrical Engineering

Required Courses and Scheduled Technical Electives

The following courses are required of electrical engineering students and are offered at least once a year.

EEE-201 Introduction to Electrical Engineering
This course is actually divided into two parts. The first part is an introduction to electrical engineering. It consists of a 3 hr./week lecture-laboratory dealing with various facets of electrical engineering. Each week a topic is discussed with a section of students followed immediately by "hands on" experience in the laboratory.

The second part consists of a 2 hr./week graphics laboratory which stresses elementary graphical communication techniques. The accent here is on the graphical description rather than on drafting methods.
Class 3, Lab., 2, Credit 4 (Fall Qtr.)

EEE-340 Introduction to Digital Systems
Registration #0301-340
This course will survey digital circuits and systems from the viewpoint of a user. It will describe these circuits’ operations and typical uses in terms of the external connections made to the commercially available circuit packages. As an example of circuit interconnection, the organisation of a digital computer is discussed in some detail. The electrical principles normally covered in engineering physics courses are assumed but not any prior knowledge of electronics.
Class 4, Credit 4 (Fall and Winter Quarter)

EEE-351, 352, 353 Circuit Analysis I, II, III
Registration #0301-351, -352, -353
Basic circuit laws, network theorems, RLC circuits and their responses. Sinusoidal analysis, complex notation, phasors and power. The concept of complex frequency. Special topics including magnetically coupled circuits, two-port networks, and network topology. (SMAM-253, SPSP-207 and concurrent with SMAM-305, 306) (Prerequisite for EEEE-353: EEEE-352, and EEEE-430 or concurrent registration in EEEE-430)
Class 3, Lab., 3, Credit 4
EEE-351 (Spring and Summer Quarter)
EEE-352 (Fall and Winter Quarter)
EEE-353 (Spring and Summer Quarter)

EEE-430 Linear Systems
Registration #0301-430
An introductory course in linear systems stressing applications of the Fourier and Laplace transforms, input-output characteristics of linear networks will be emphasized through the treatment of transfer functions and convolution integrals. The interdependence between time and frequency response will be treated extensively. The notions of system realizability and stability will be considered. (EEE-353 concurrently)
Class 4, Credit 4 (Spring and Summer Quarter)

EEE-441, 442 Electronics I, II
Registration #0301-441, -442
Solid-state electronic devices, their external characteristics and models. Analysis of electronic circuits for rectification, amplification, instrumentation and control. Introduction to electronic circuit design. (EEE-352 concurrently)
Class 3, Lab., 3, Credit 4
EEE-441 (Fall and Winter Quarter)
EEE-442 (Spring and Summer Quarter)

EEE-461, 462 Electrical Engineering I, II
Registration #0301-461, -462
A course for non-electrical engineering majors. Circuit analysis, electronics, switching circuits, logic and the elements of communication. (SPSP-207, SMAM-306)
EEE-461 Class 3, Lab., 3, Credit 4 (Winter and Spring Quarter)
EEE-462 Class 3, Lab., 3, Credit 4 (Fall and Winter Quarter)

EEE-471, 472 Electromagnetic Fields I, II
Registration #0301-471, -472
EEE-471 Class 4, Credit 4 (Fall and Winter Quarter)
EEE-472 Class 3, Lab., 3, Credit 4 (Spring and Summer Quarter)

EEE-531 Electromechanical Energy Conversion
Registration #0301-531
A development of the basic relationships of field energy, magnetic force, torque and generated voltage in an electromechanical device and expansion of these fundamentals into an understanding of the operational characteristics of the electrical machine. (EEE-353)
Class 3, Lab., 3, Credit 4 (Fall and Winter Quarter)

EEE-590 Thesis
Registration #0301-590
A research or development project will be carried out under the general supervision of a staff member. The project need not be of the “state of the art” type. A reasonable problem of theoretical and/or experimental investigation will be acceptable as a thesis topic.
Credit 4
EEE-613 Introduction to Automatic Controls
Registration #0301-613
A one-quarter study of linear control systems and their physical behavior including stability and transient response. This is approached through the classical methods of the LaPlace domain; Routh’s Criterion, Nyquist, Bode and Nichols charts and root locus. Lead and lag compensators are introduced using these tools. Analog computation techniques are studied and used, in laboratories, as a means of verifying the analysis and design of complex systems. (EEE-430, SMAM-420)
Class 3, Lab. 3, Credit 4 (Spring and Summer Quarter)

EEE-634 Introduction to Communications
Registration #0301-634
Review of linear systems as applied to communication signal processing. Non-linear devices in communication systems. Introduction to the Fourier transform and its role in spectral analysis of signals and systems. Introduction to amplitude modulation—DSB-SC, AM, SSB, NSB and their applications. Introduction to frequency and phase modulation techniques. Noise theory and the role of noise in communications systems. (SMAM-351, EEEE-430)
Class 4, Credit 4 (Fall and Winter Quarter)

EEE-643 Digital Electronics
Registration #0301-643
The objective of this course is to teach students how to analyze digital electronic circuits. Topics include: transistors in the saturation, active, and cutoff regions; logic families; and the concepts of logic gates and logic families in the saturation and triode regions. The following logic families are covered in considerable detail: RTL, PL, DTL, TTL, ECL, CMOS, NMOS, and PMOS. A discussion of the applications and characteristics of analog switches concludes the course. This course is a prerequisite for EEEE-665. (EEE-340, 352, 442, SMAM-306)
Class 3, Lab. 3, Credit 4 (Fall and Winter Quarter)

EEE-645 Special Semiconductors
Registration #0301-645
The study of a variety of semiconductors generally used for purposes other than signal processing. Included are thyristors and their control devices, various optoelectronic elements, voltage regulator ICs and special MOS devices. Applications are stresses and a comprehensive design exercise is included. (EEE-643)
Class 3, Lab. 3, Credit 4 (Fall and Winter Quarter)

EEE-650 Introduction to Logic and Switching
Registration #0301-650
This is a course on the logical design of digital systems. Topics include: switching elements, switching (Boolean) algebra, Karnaugh maps and applications. Multiplexers, NAND-NOR networks encoders, decoders, ROM’s, Sequential circuits, flip-flops, counters, shift registers, RAM’s. Additional topics such as logic networks using shift registers, arithmetic logic unit may also be covered. The emphasis on the course will be on the logic design using available logic gates and packages rather than on the electronic circuitry of the logic components. (EEE-643 desired)
Class 4, Credit 4 (Spring Quarter)

EEE-665 Microcomputer Systems I
Registration #0301-665
This is an introductory course dealing with the structure and operation of microcomputers. It includes descriptions of computer number systems and computer architecture and analyses the major parts of a computer including the CPU, memory and I/O structure. Computer instruction sets and addressing methods are discussed and then applied to the machine language programming of computers. Software and hardware aspects of input/output are discussed along with consideration of special I/O chips. The course concludes with discussions of subroutines and stack operations. Most discussions are based upon the Motorola 6800 and Intel 8085 microprocessors. Lab sessions are an integral part of the course. (EEE-643, or consent of instructor and ICSP-220)
Class 3, Lab. 3, Credit 4 (Summer and Fall Quarter)

EEE-666 Microcomputer Systems II
Registration #0301-666
This course will cover the effective application of microprocessors in the design of digital systems. It will develop an understanding of assembly language programming and hardware design techniques. The role of macro-assemblers, editors, linking loaders, and other software aids used in microcomputer development systems to produce efficient modular code will be covered. Several aspects of hardware/software organisation of input/output programs will be considered including interrupts and direct memory access. The use of special LSI interface devices to connect a microcomputer with peripheral devices such as AID and DIA converters, CRT terminals, floppy disks, etc. will be studied. Laboratory sessions will be used to provide experience in the use of software development systems, microcircuits emulators, and logic analysers in developing and testing a microcomputer design. (EEE-665)
Class 3, Lab. 3, Credit 4 (Winter and Spring Quarter)

EEE-670 Introduction to Microelectronics
Registration #0301-670
Hybrid and monolithic microelectronic technology; processes in thick film and thin film circuit fabrication; complementary nature of monolithic and film circuits; impact of fabrication, testing and quality control on microcircuit design. (EEE-442)
Class 4, Credit 4 (Summer and Fall Quarter)

EEE-671 Hybrid Microelectronic Design
Registration #0301-671
An electronic design course utilising the medium of thick film hybrid technology. Functional electronic modules will be designed, produced and tested, from original specifications to finished package, with students performing all steps. (EEE-670) / Class 3, Lab. 3, Credit 4 (Spring Quarter)

EEE-679 Active and Passive Filters
Registration #0301-679
The first half of this course deals with the filter transfer functions, poles and zeros and the concepts of filter amplitude and phase response. Butterworth, Chebyshev and elliptic filters are considered as well as low-pass/high-pass and low-pass/band-pass transformations. The second half of the course deals with methods of practical filter design with emphasis placed on active, operational filters. (EEE-430)
Class 4, Credit 4

EEE-693 Digital Data Communications
Registration #0301-693
A course on the principles and practice of modern data communications systems. Topics covered include pulse amplitude modulation, frequency shift keying, phase-shift keying, pulse code modulation, digital error control, and fundamentals of system design. (EEE-634, SMAM-351)
Class 4, Credit 4 (Spring Quarter)

Technical Elective Courses Offered Upon Sufficient Demand

EEE-532 Electrical Machines I
Registration #0301-532
The design and operating characteristics, both static and dynamic, of transformers and synchronous and induction machines. (EEE-531)
Class 3, Lab. 3, Credit 4

EEE-535 Introduction to Power Electronics
Registration #0301-535
This course provides an introduction to the theory of thyristor circuits with emphasis on applications. The course builds upon the theory of static switching, SCR characteristics, triggering and communication. This leads the way to the study of controlled and uncontrolled rectification and inversion, AC and DC line control and frequency conversion using thyristors. The laboratory is an integral part of the course where the experiments complement the classroom lectures by providing exposure to the device characteristics, testing and measuring techniques and various thyristor systems (EEE-441, EEEE-631 or concurrent registration for EEEE-631)
Class 3, Lab. 3, Credit 4

EEE-536 Motor Application and Control
Registration #0301-536
A review of the speed-torque characteristics of DC and AC motors. A study of the characteristics of mechanical loads and the transient response of electromechanical systems. A review of thyristor characteristics and the design of solid state motor control systems. (EEE-430, 531)
Class 3, Lab. 3, Credit 4

EEE-614 Design of Control Systems
Registration #0301-614
This course builds upon the classical analysis techniques introduced in EEEE-613. Practical experimental and mathematical approaches to modeling the plant are developed. Stability criteria are developed and compensation techniques for continuous systems are discussed. Bode and root locus design techniques are discussed and used. The use of the digital computer as a design aid is stressed. An introduction to sampled data systems is given and the design of software compensation for digital controllers, based on s-plane and w-plane analysis, is discussed. (EEE-613)
Class 3, Lab. 1, Credit 4

EEE-621 Transmission Propagation and Waves
Registration #0301-621
(Applied Electromagnetic Theory)
A course in guided and unguided wave propagation: transmission lines, wave guides, antennas, antenna arrays, radio-frequency, and optical interference and diffraction; aperture effects and beam-forming. (EEE-471, 472)
Class 3, Lab. 3, Credit 4
EEE-672 Optical Devices and Systems
Registration #0301-672
An introductory applied optics course designed not only to familiarise and review optical fundamentals but to introduce state of the art concepts and applications. Fundamental aspects of laser operation, lens system analysis, optical modulation, optical detection, and noise problems associated with optical components will be discussed. Applications to fiber optic, integrated optic, and solar systems will be considered. A demonstration lab complements course activities. (SPSP-314, 315; EEEE-471, 472—concurrent)
Class 3, Lab. 3, Credit 4

EEE-674 Fiber Optics: Theory and Application
Registration #0301-674
To familiarise the engineer with the basic concepts involved in dealing with an ever-expanding field of applied optics, called fiber optics. Fundamentals as well as design applications will be discussed: light wave characteristics; fiberoptical waveguide fundamentals and selection; fiber optical coupling. Source and detector characteristics and selection will be considered. Examples of fiber systems employed by various organisations will be analysed. A project lab assignment will be selected and will complement course content. (EEE-672)
Class 3, Lab. 3, Credit 4

EEE-675 Analog/Hybrid Computation
Registration #0301-575
An introduction to the concepts of digital logic as applied to analog simulation and computation. This will include the basic concepts of iterative analog computation, hybrid computation, interface hardware and software, and hybrid computer applications. Instruction and practice will be provided in the techniques of programming and operating the DES-30/TR48 analog/hybrid computer. (EEE-613)
Class 4, Credit 4

EEE-676 I.C. Processing Laboratory
Registration #0301-676
This is a laboratory course designed to introduce the student to integrated circuit processing. The following topics will be investigated: safety, vacuum technology and evaporation of metals, artwork generation, photoreduction, photore sist technology, wafer characterisation, wafer cleaning, metal semiconductor fabrication, diffusion, solar cell fabrication, MOS transistor fabrication, wire bonding and packaging. Each laboratory exercise requires extensive preparation on the part of the student, in the form of research, reading, computations and device design. (EEE-670)
Class 2, Lab. 6, Credit 4

EEE-677 Digital Filters and Signal Processing
Registration #0301-677
This course deals with the analysis and design of systems which are discrete in nature. General topics include difference equation description of discrete systems, definition of linearity, impulse response and 7-Transform analysis. Digital signal processing topics will include the definition and design of digital filters and the use of Fast Fourier Transforms (FFT) in signal processing. The effects of quantisation errors in digital computations will be considered. Digital processing will be related to analog processing through the sampling theorem and a discussion of the methods of sampling, A/D and D/A conversion. Class projects will deal with digital filter design and implementation using microcomputer hardware (EEE-430 and consent of instructor)
Class 4, Credit 4

EEE-687 Power System Analysis
Registration #0301-687
An introductory course dealing with basic power network concepts; matrix transformations and the use of the digital computer to solve them; parameters of power system equipment; the symmetrical component approach for handling balanced and unbalanced faults; load flow studies and the numerical techniques for solving them; and an introduction to system stability. (EEE-531)
Class 4, Credit 4

EEE-695 Introduction to Audio Engineering
Registration #0301-695
A course based on topics from dynamics, acoustics and audio systems. Topics include: electro-mechanical equivalents, plane and spherical acoustic waves, radiators and resonators, loudspeaker systems, equalisation in recording and playback, and an introduction to the application of digital techniques to audio. (EEE-430, EEEE-442, EEEE-472 or suitable equivalents)
Class 4, Credit 4

EEE-696 Communication Circuit Design
Registration #0301-696
Design and operation of representative circuits used in radio systems, oscillators, directional couplers, bandpass filters, matching networks, phase-locked loops and antennas. A project type laboratory and computer simulation problem are included. (EEE-442, EEEE-634, EEEE-472)
Class 3, Lab. 3, Credit 4

Graduate Courses in Electrical Engineering

EEE-723 Semiconductor Physics
EEE-724 Physics of Semiconductor Devices I
EEE-725 Physics of Semiconductor Devices II
EEE-726 Analog 1C Design
EEE-727 VLSI Design
EEE-728 1C Op Amps
EEE-744 Advanced Microprocessor Systems Design
EEE-745 Topics in Digital Systems Design -I
EEE-746 Topics in Digital Systems Design - II
EEE-747 Topics in Switching Theory
EEE-754 Analytical Techniques I
EEE-755 Analytical Techniques II
EEE-756 Analytical Techniques III
EEE-757 Network Theory
EEE-760 Practical R&D Management
EEE-761 Modern Control Theory
EEE-762 Nonlinear Control Systems
EEE-763 Stochastic Estimation and Control
EEE-764 Digital Control Systems
EEE-765 Optimal Control
EEE-767 Thyristors and Power Control
EEE-772 Special Topics in Electrical Engineering
EEE-773 Special Topics in Electrical Engineering
EEE-774 Special Topics in Electrical Engineering
EEE-775 Optical Engineering I
EEE-776 Optical Engineering II
EEE-777 Electro-Optics
EEE-778 Fiber Optics
EEE-779 Digital Image Processing
EEE-780 Independent Study
EEE-781 Electromagnetic Fields
EEE-782 Boundary Value Problems
EEE-783 Antennas and Antenna Systems
EEE-784 Advanced Electromagnetic Engineering
EEE-785 Special Topics in Electromagnetic Theory
EEE-786 Microwave Devices
EEE-787 Radar Engineering
EEE-790 Random Signals and Noise
EEE-791 Topics in Signal Analysis and Processing
EEE-792 Advanced Topics in Signal Analysis
EEE-793 Error Detecting and Error Correcting Codes
EEE-794 Information Theory
EEE-800 Graduate Paper (5 credits)
EEE-890 Thesis (6-12 credits)

EENG-790 Engineering Internship
Registration #0302-790
This course number is used by students in the master of engineering degree program for earning internship credits. The actual number of credits is to be determined by the student's faculty advisor and subject to approval of the Graduate Committee of the College of Engineering.
Credit variable
Industrial Engineering

The following courses are required of Industrial Engineering students and are offered at least once a year.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
<th>Prerequisites</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EIEI-201</td>
<td>Introduction to Industrial Engineering</td>
<td>A first course in industrial engineering for freshmen. The course describes what engineering is, what current and projected opportunities exist for engineers. The course material is concerned with the general principals of engineering design.</td>
<td>(F)</td>
<td>Class 3, Lab. 1, Credit 4</td>
</tr>
<tr>
<td>EIEI-202</td>
<td>Computing for Industrial Engineers</td>
<td>A first course in computer programming for engineers and in particular industrial engineers. The course involves extensive development of programming skills required in the engineering disciplines.</td>
<td>(W)</td>
<td>Class 4, Credit 4</td>
</tr>
<tr>
<td>EIEI-401</td>
<td>Introduction to Operations Research</td>
<td>An introduction to the methodology of mathematical problem formulation. Investigation of mathematical programming techniques including linear programming and special types of linear programming problems such as the transportation and assignment algorithms.</td>
<td>(SMAM-308 or consent of instructor)</td>
<td>Class 4, Credit 4</td>
</tr>
<tr>
<td>EIEI-402</td>
<td>Introduction to Operations Research II</td>
<td>A survey of elementary mathematical models within the field of systems and industrial engineering. Areas of study include queueing theory, network analysis, and inventory theory.</td>
<td>(SMAM-351, SMAM-306)</td>
<td>Class 4, Credit 4</td>
</tr>
<tr>
<td>EIEI-415</td>
<td>Human Factors I, II</td>
<td>A survey of human factors from 1) physiological constraints of the human; 2) behavioral/psychological characteristics of the human; and 3) the psychomotor skills ability of the human. Emphasis is placed on practical applications of each area.</td>
<td>(SMAM-352 or consent of instructor)</td>
<td>Class 3, Lab. 2, Credit 4</td>
</tr>
<tr>
<td>EIEI-420</td>
<td>Work Measurement and Analysis I</td>
<td>Methods of measuring and analysing work, human capabilities, micromotion, electromotion study, process and operation analysis. Emphasis placed on methods of operation analysis as applied to the design and evaluation of man-machine systems.</td>
<td>(F)</td>
<td>Class 3, Lab. 2, Credit 4</td>
</tr>
<tr>
<td>EIEI-422</td>
<td>Systems &amp; Facilities Planning</td>
<td>A basic course in plant layout. Topics covered include project-quantity analysis, flow of materials, relationship charts, activity charts, material handling systems, and factors influencing the layout design. The course includes basic drafting application as well as state of the art computer aided layout design.</td>
<td>(EIEI-401 or consent of instructor)</td>
<td>Class 3, Lab. 2, Credit 4</td>
</tr>
<tr>
<td>EIEI-481</td>
<td>Management Theory and Practice</td>
<td>Development of the fundamental principles of the industrial enterprise. Internal organisation as well as general economic conditions are considered. Emphasis is placed on the role of behavioral science.</td>
<td>(Sp)</td>
<td>Class 4, Credit 4</td>
</tr>
<tr>
<td>EIEI-503</td>
<td>Simulation</td>
<td>A first course in simulation emphasizing the role of the computer in developing simulation models. The GASP IV simulation language is emphasised.</td>
<td>(EIEI-202, SMAM-351 or equivalent)</td>
<td>Class 4, Credit 4</td>
</tr>
</tbody>
</table>

The following courses can be used as professional electives within industrial engineering and are offered subject to sufficient demand. You should consult with your advisor for advice on professional electives outside of the industrial engineering discipline.

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<tr>
<td>EIEI-450</td>
<td>Applied Human Factors Design of Experiments</td>
<td>An applied approach to the problem of how one goes about running a study or experiment in human factors.</td>
<td>(EIEI-511 or consent of instructor)</td>
<td>Class 4, Credit 4</td>
</tr>
<tr>
<td>EIEI-482</td>
<td>Production Control I</td>
<td>A basic course in production control emphasising the systems approach. Topics covered include forecasting, mathematical inventory models, material requirements planning and scheduling including PERT.</td>
<td>(EIEI-511 or consent of instructor)</td>
<td>Class 4, Credit 4</td>
</tr>
<tr>
<td>EIEI-483</td>
<td>Production Control II</td>
<td>A design course in production control. Each student is asked to design, test, and implement a complete production control system for an operating plant.</td>
<td>(EIEI-482)</td>
<td>Class 4, Credit 4</td>
</tr>
<tr>
<td>EIEI-504</td>
<td>Introduction to Operations Research III</td>
<td>A course intended to provide an integrated view of advanced programming techniques and their applications to industrial problems. Selected topics might include a working knowledge of PGERT, QGERT, etc.</td>
<td>(EIEI-401,402 or consent of instructor)</td>
<td>Class 4, Credit 4</td>
</tr>
<tr>
<td>EIEI-512</td>
<td>Reliability</td>
<td>Concepts of reliability, basic failure laws, reliability measurement, structural analysis reliability; repair problems, surveillance problems, maintenance problem.</td>
<td>(EIEI-510, 511 or consent of instructor)</td>
<td>Class 4, Credit 4</td>
</tr>
<tr>
<td>EIEI-540</td>
<td>Introduction to Operations Research IV</td>
<td>An introduction to some advanced topics in operations research and industrial engineering. Areas of study may include game theory, Markov chains and their applications, decision analysis, network analysis.</td>
<td>(5th year I.E. standing or consent of instructor)</td>
<td>Class 4, Credit 4</td>
</tr>
</tbody>
</table>
EIEI-545 Techniques of Systems Engineering
Registration #0303-545
LaPlace, Fourier and 7 transforms; transform methods for solving differential, difference and differential-difference equations; feedback networks; classical optimization techniques; search techniques; theory of graphs. (5th year I.E. standing or consent of instructor)
Class 4, Credit 4

EIEI-550 Safety Engineering
Registration #0303-550
To acquaint students with practical aspects of safety engineering. Students will acquire a working knowledge of legal and technical aspects of safety. Recent developments in this area will be stressed, such as OSHA, Consumer Product Safety Commission, and the Federal Highway Safety Act. Students will also be exposed to research methodology and ways of evaluating safety programs and related research Reference sources will be outlined.
Class 4, Credit 4

EIEI-599 Independent Study
Registration #0303-599
A supervised investigation within an industrial engineering area of student interest. (Consent)
Class variable, Credit variable

Graduate Courses

The following courses are recommended as part of the Master of Engineering program in Industrial Engineering and Engineering Management. They are offered on sufficient demand.

EIEI-620 Engineering Economy
Registration #0303-620
Time value of money, methods of comparing alternatives, depreciation and depletion, income tax consideration, replacement, retirement and obsolescence, and capital budgeting.
Credit 4

EIEI-715, 716 Statistical Analysis for Engineers I & II
Registration #0303-715, -716
A basic two-quarter course in probability and statistics designed to give the student a foundation for further study in areas such as design of experiments, stochastic systems, and simulation
Credit 4

The following courses can be used as part of the Master of Engineering program in Industrial Engineering and Engineering Management. The courses are generally offered in alternating years and/or as demand dictates

EIEI-601 Value Analysis
Registration #0303-601
This course examines the nature and measurement of value. The concept and construction of a value index representing average value is related Numerical estimation methods such as ranking, pair comparison, magnitude estimation, and criteria analysis are explained and used to measure the value of diverse items. The methods used are applicable to the study of a wide variety of problems and have special utility in engineering design studies.
Credit 4

EI EI-701 Principles of Operations Reasearch I
Registration #0303-701
Applied linear programming. Computational techniques for solving constrained optimization problems. Linear programming, the Simplex method and variations, duality and sensitivity testing.
Credit 4

EIEI-702 Mathematical Programming
Registration #0303-702
Application of non-linear programming techniques. Classical optimization techniques; quadratic, stochastic, integer programming and dynamic programming. Applications to industry. (EIEI-701)
Credit 4

Survey of Operations Research
Registration #0303-705
A survey course designed to introduce the student to such topics as waiting line analysis, inventory, scheduling, replacement, and simulation. This course is intended to present an integrated view of the field of operations research to students who will take more specialized courses as well as those in other disciplines desiring only a limited exposure to the field.

EIEI-710 Systems Simulation
Registration #0303-710
Methods of modeling and simulating man-machine systems. Model validation, design of simulation experiments, variance reduction techniques, random number generation and distribution generation are discussed However, emphasis is placed on the G.P.S.S. simulation language.
Credit 4

EIEI-718 Inventory Design
Registration #0303-718
Overview of inventory problems. Single period models under risk and uncertainty, dynamic models under certainty, dynamic models under risk and uncertainty. Forecasting, inventory system analysis
Credit 4

EIEI-720 Production Control
Registration #0303-720
A systems approach to the design of production control operations. Investigation of forecasting, operations planning, inventory control, and scheduling. Case studies and the design of actual production systems is encouraged.
Credit 4

EIEI-723 Facilities Planning
Registration #0303-723
Principles of plant layout and material handling. Topics covered include criterion selection, cost elements, the layout design process, SLP, computer-aided plant layout and quantitative plant layout and material handling techniques relating to operations research.
Credit 4

EIEI-725 Technological Forecasting
Registration #0303-725
Technological forecasting is concerned with the Delphi method, SOON charts, trend extrapolation, relevancy trees, cross input analysis, internally consistent scenarios, and decision matrices. The course will provide a thorough introduction to the basic concepts and techniques of technological forecasting
Credit 4

EIEI-730 Biotechnology and Human Factotfe I
Registration #0303-730
Credit 4

EIEI-731 Biotechnology and Human Factors II
Registration #0303-731
Effect of mechanical and physical environment on: physiology, behavior, performance of man. Design considerations to protect man against environmental effects (thermal environment, noise, vibration, acceleration, light, altitude).
Credit 4

EIEI-732 Biotechnology and Human Factors III
Registration #0303-732
Theoretical fundamentals of human body mechanics. Development and applications of biomechanics and biomechanical models. Kinematics of the link system of the body and extremity joints.
Credit 4

EIEI-733 Biotechnology and Human Factors IV
Registration #0303-733
Measurements of human performance. Functions that man performs in man-machine systems. Techniques to quantify man’s behavior at work.
Credit 4

EIEI-734 Systems Safety Engineering
Registration #0303-734
Credit 4

Special courses related to a particular student's interest can be arranged via the following course:

EIEI-771, 772, 773, 774 Special Topics in Industrial Engineering
Registration #0303-771, -772, -773, -774
This is a variable credit, variable topics course which can be in the form of regular courses or independent study under faculty supervision.
Credit variable (maximum 4 per course number)
Mechanical Engineering

Required and elective courses that are offered at least once a year.

**EMEM-201** Introduction to Mechanical Engineering Graphics  
Registration #0304-201  
This course is designed to introduce the student to the engineering profession in general and also to develop skills in engineering graphical communication sufficient to meet industrial standards. The course is intended for students with little or no background in engineering drawing. Students having two years of engineering graphics or drawing in school or equivalent may take a qualifying examination to exempt this course.

Class 2, Lab. 4, Credit 4 (F, W)

**EMEM-331** Mechanics I  
Registration #0301-331  
For students majoring in computer, electrical and industrial engineering. Statics and introduction to strength of materials, vector algebra, Newton’s laws, the principle of transmissibility of forces, couples, centroids, trusses, frames, machines, internal force and moment diagrams for beams, and friction. Axial stresses and strains, statically indeterminate problems, thin-walled pressure vessels, direct shear, and torsion. (SPSP-205; Corequisite: SMAM-253)

Class 4, Credit 4 (F, W)

**EMEM-332** Mechanics II  
Registration #0304-332  
Additional topics in strength of materials and dynamics; stresses and deflections associated with beams in bending; kinematics and kinetics of particles and rigid bodies in one and two dimensions, work-energy methods, and principles of impulse and momentum. (EMEM-331)

Class 4, Credit 4 (W, Sp)

**EMEM-336** Statics  
Registration #0304-336  
This basic course treats the equilibrium of 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 Newton’s laws. (SPSP-205; Corequisite: SMAM-253)

Class 4, Credit 4 (F)

**EMEM-337** Strength of Materials I  
Registration #0304-337  
This basic course in statics of deformable bodies integrates the mathematical subjects of calculus and differential equations with the fundamental physical considerations which govern the mechanics of deformable solids in equilibrium. Topics covered include stress and strain, Hooke’s Law, axial loading, torsion, and bending stresses and deflections. (EMEM-336)

Class 3, Lab/Rec 2, Credit 4 (F, W)

**EMEM-338** Strength of Materials II  
Registration #0304-338  
A continuation of Strength of Materials I to include pressure vessels, superposition of stresses, transformation of stress, Mohr’s Circle, failure theories, energy techniques, and column theory. (EMEM-337)

Class 3, Lab/Rec 2, Credit 4 (Sp, Su, F*)

**EMEM-340** Engineering Communications I  
Registration #0304-340  
The objective of this course is to study advanced engineering graphics. The laboratory sessions are devoted to working drawings, shop processes, mechanical elements, tolerances and fits, assembly and detail drawings, and an introduction to computer graphics. (Second year standing) (EMEM-201 or equivalent)

Class 1, Lab. 2, Credit 2 (W)

**EMEM-341** Engineering Communications II  
Registration #0304-341  
The objective of this course is to provide an introduction to Fortran programming. Topics covered include terminal and batch processing, input-output statements, arithmetic and logical IF statements, implicit and explicit DO loops and subroutines.

Class 2, Credit 2 (W)

**EMEM-343** Materials Processing  
Registration #0304-343  
A study of the application of machine tools and fabrication processes to engineering materials in the manufacture of products. Topics covered include such metal fabrication processes as cutting, forming, casting, and welding. Plastics are covered from the standpoint of thermosetting and thermo plastic processing.

Class 3, Lab. 3, Credit 4 (F, W)

**EMEM-344** Materials Science  
Registration #0304-344  
A study of the properties of metallic, organic, and ceramic materials as related to structural imperfections, atom movements, and phase changes. The intent of the course is to develop a basic understanding of the structure of materials and to study the behavior of materials in service environments. (SCH2-208)

Class 3, Lab. 2, Credit 4 (W, Sp)

**EMEM-413** Thermodynamics I  
Registration #0304-413  
A basic course that introduces the mathematical theory of thermodynamics via a series of classical experiments. After the complete first law analysis of air standard engines and refrigerators (Carnot, ’Otto, Diesel, etc.), the Clausius and Kelvin statements of the second law are correlated with the concept of entropy. Both real and reversible processes are studied on the pressure vs. specific volume and the temperature vs. entropy coordinate systems. (SMAM-306, EMEM-336)

Class 4, Credit 4 (F, W)

**EMEM-414** Thermodynamics II  
Registration #0304-414  
The second thermodynamics course begins with a study of phase space and the properties of real gases, liquids and solids. Using a control volume analysis, we use the basic fluid properties, the first and second law of thermodynamics to study and design gas turbine power plants, steam power, steam power plants, and vapor compression refrigeration systems. The properties of gaseous mixtures and combustion shall also be considered. (EMEM-413)

Class 3, Lab/Rec 2, Credit 4 (W*, Sp, Su)

**EMEM-415** Fluid Mechanics I  
Registration #0304-415  
Physical characteristics of a fluid: density, stress, pressure viscosity, temperature, vapor pressure, compressibility. Fluid statics: hydrostatic pressure at a point, pressure field in a static liquid, manometry, forces on submerged surfaces, buoyancy, the model atmosphere. Flow fields and fundamental laws: the flux vector, systems, control volumes, conservation of mass in integral form, one-dimensional channel flow, the continuity equation, integral forms of the first law of thermodynamics and Newton’s second law, some applications. Flow of a real fluid and dimensional analysis; real fluid behavior, laminar and turbulent flow, dimensionless products, similitude, model studies. Incompressible flow in pipes: friction factor and the Moody diagram, pressure drop in full developed pipe flow, minor losses, single path line problems (SMAM-308, EMEM-413)

Class 3, Lab/Rec 2, Credit 4 (Sp, Su)

**EMEM-431** Thermodynamics  
Registration #0304-431  
A basic course in thermodynamics for electrical engineering students. Applications of the first and second law to closed and open systems; elementary heat transfer considerations.

Class 4, Credit 4 (Sp, Su, F)

**EMEM-437** Introduction to Machine Design  
Registration #0304-437  
The analysis and theory of machine design and applications to systems design problems; particular emphasis is placed on the design and analysis of machine elements. (EMEM-338)

Class 4, Credit 4 (F, W)

*Extended Day Schedule*
A basic course in the fundamentals of kinematics and kinetics of single-particle motion in one, two, and three dimensions. Vector algebra is reviewed and vector calculus is used to define the derivative of a unit vector in rotating coordinate systems. Newton's second law of motion is introduced, along with the review of "the free body diagram," to generate the differential equations of motion of particles. The differential equations of motion are solved by using classical methods. Variations of Newton's second law of motion, such as the work and energy technique and the impulse and momentum technique, are introduced and applied to various two-dimensional problems. Two-body collisions (impact) are defined, and the equations relating the velocities of the two particles before and after impact are derived. Kepler's three laws of planetary motion are used to derive Newton's Universal Law of Gravitation. The central force-field problem is thus defined, and problems involving satellite motion of satellites about the Earth are solved. (EMEM-336, SMAM-308)

One laboratory period per week is devoted to the introduction and use of the analog computer as a tool in the design of systems. The problems placed on the analog computer are those discussed in the lecture/recitation periods. (EMEM-543)

Class 3, Lab 2, Credit 4 (Sp, Su, F*)

This course involves development in the student of a pragmatic approach to solving engineering problems requiring numerical solution. Included are the formulation of mathematical models of the problems, a study of numerical procedures suitable for their solution, the development of computer programs to carry out the procedures, and the analysis of the results. Problems will be taken from the student's background in solid body mechanics and thermodynamics. Extensive use of the computer is required. (EMEM-341, or equivalent computer experience, and third year standing.)

Class 4, Credit 4 (Sp, Su)

This is a basic course in the fundamentals of fluid transfer by conduction, convection and radiation together with application to typical engineering systems. Topics covered include one-dimensional steady state and transient heat conduction, radiation between black bodies and grey bodies, correlation of data for forced and natural convection, and an introduction to heat exchanger design. (EMEM-413, EMEM-415)

Class 4, Credit 4 (Sp, Su)

A course in experimental methods, with laboratory experiments and lectures on the underlying theory. Topics considered are design of experiments, experimental error and error analysis including some statistical analysis of data, calibration of equipment, presentation of results in engineering reports. The theory and use of measuring devices for the determination of strain, pressure, temperature, flow rate, vibration, etc., and transient response are covered. In addition to standard laboratory exercises and experiments, an original experiment to measure a particular physical phenomenon is to be designed and implemented by the student either individually or in a small group. (Fourth-year standing)

Class 2, Lab. 4, Credit 4 (Sp, Su)

This is a basic course in the fundamentals of heat transfer by conduction, convection and radiation together with application to typical engineering systems. Topics covered include one-dimensional steady state and transient heat conduction, radiation between black bodies and grey bodies, correlation of data for forced and natural convection, and an introduction to heat exchanger design. (EMEM-413, EMEM-415)

Class 4, Credit 4 (F, W)

A continuation of incompressible flow through pipes and ducts as first considered in Fluid Mechanics I, including an analysis of the Poiseuille and Couette flow. Flow measurement using obstruction meters. Boundary layer concepts, von Karman momentum integral equation and the special case of laminar and turbulent boundary layer for a flat plate. Flow about immersed bodies, concepts of lift and drag, circulation. One-dimensional compressible flow: topics include review of thermodynamic fundamentals, isentropic stagnation quantities, converging-diverging nozzles and normal shock waves (EMEM-415)

Class 3, Lab/Rec 2, Credit 4 (F, W)

The equations of motion for a single particle are applied to systems of particles to define Euler's first and second laws of motion relative to the motion of a system of particles. Then a very special system of particles is defined, the rigid system (rigid body), and Euler's first and second laws of motion are derived for the rigid body. The mass moment of inertia for the rigid body is defined with respect to Cartesian coordinates. The kinematics and kinetics of rigid body motion are developed for two and three-dimensional motion. Rotating coordinate systems are used. Vector algebra and vector calculus are used. SI units are used throughout the course.

One laboratory period per week is devoted to the introduction and use of the analog computer. The analog flow diagram using the dimensionless computer variable is defined and used in all problems. Lumped parameter systems made up masses, springs, and dashpots are analyzed by classical methods and by using the analog computer. The laboratory introduces the vibrations of single particle systems. (EMEM-439)

Class 3, Lab/Rec 2, Credit 4 (F, W, Sp*)

A basic course in the dynamics of physical systems (vibrations). Singularity functions are defined and introduced in detail. The unit doublet, the unit step, the unit ramp, and the unit parabolic functions are used to force various second order systems. The sinusoidal function is also used. The response to these inputs of various systems with various degrees of freedom are drawn in detail in the classroom as well as in the accompanying laboratory. The root locus method is introduced by using phasors, and the Bode plots are introduced and drawn. The black diagram is used as a means of describing system elements. Classical analogs are used to show the analogous properties of lumped parameter electrical, mechanical, thermal, and fluid systems.

One laboratory period per week is devoted to extend the use of the analog computer as a tool in the design of systems. The problems placed on the analog computer are those discussed in the lecture/recitation periods. (EMEM-543)

Class 3, Lab 2, Credit 4 (Sp, Su, F*)

This course studies analytic and numerical solutions to multi-variable problems, heat conduction, convective heat transfer over complex geometries, pool boiling, and condensation of pure substances. Also covered is radiative heat transfer with wavelength dependent characteristics as well as heat exchanger design by LMTD and effectiveness NTU methods. (EMEM-514, EMEM-440)

Class 4, Credit 4 (Sp, Su)

The conservation laws, Newton's second law, the second law of thermodynamics and appropriate equations of state are used to study water turbines, gas turbines, steam turbines, compressors, and centrifugal pumps. Dimensional analysis and empirical data are also used and studied. The student is expected to write a design-oriented term paper (EMEM-415)

Class 4, Credit 4 (F, W)

This course involves development in the student of a pragmatic approach to engineering design with particular emphasis in the area of thermal-fluid science. The course highlights basic design philosophy illustrated by examples from existing designs to enable the student to undertake an open-ended design problem. Engineering principles and computer analysis will be used in practical design problems such as heating systems, cooling systems, power plants, etc. (EMEM-414, EMEM-514, EMEM-516)

Class 4, Credit 4 (Sp)

The course treats the fundamentals of design of machinery. Topics include complete cycle dynamic analysis of mechanisms, graphical kinematics, the method of virtual work applied to dynamical systems, cam design and balancing. The digital computer and the ETA plotter are used. (EMEM-439)

Class 4, Credit 4 (F, W)

*Extended Day Schedule
EMEM-694 Stress Analysis
Registration #0304-694
Experiments and lectures on topics in stress analysis; non-symmetric bending, composite beams, curved beams, thick-walled cylinders, torsion, stress concentrations, plastic behavior, contact stresses; complex stresses; experimental verification of the theories of failure; energy methods; experiments with strain gages, photoelasticity applications, and brittle coatings. (EMEM-437)
Class 4, Credit 4 (Sp, Su)

EMEM-601 Alternative Energy Sources
Registration #0304-601
Emphasis on the technical aspects of solar and wind energy. Wind characteristics and site analysis, aerodynamics of horizontal and vertical axis rotors, and the economics of wind power. Fundamentals of solar radiation, solar hot water heating and solar space heating, and the economics of solar utilisation. Included, but to a lesser extent, are tidal power, wave power, geothermal energy, ocean thermal gradient, and energy from waste. Individual term projects are required (EMEM-514)
Class 4, Credit 4 (F, W)

EMEM-620 Introduction to Optimum Design
Registration #0304-620
Introduction to some basic optimisation techniques for engineering design with emphasis on real applications in the work of mechanical design synthesis. Topics covered include: basic theory and techniques for optimisation of engineering designs, with emphasis on the method of optimum design, method of linear programming, method of Lagrangian multipliers, and the use of digital computers. Summary comparison of various optimisation techniques. Many real problems and industrial examples are covered. An introduction to system design, and the optimal design of a torsion bar for a vehicle suspension system.
A knowledge of the fields of differential and integral calculus, physics, digital computation programming, statics and dynamics of rigid bodies, and mechanics of materials is needed. (EMEM-440, EMEM-543)
Class 4, Credit 4 (T.B.A.)

EMEM-625 Creative Design of Mechanical Devices and Assemblages
Registration #0304-625
Purpose of the course is to study basic problems of creative design, to present explicit techniques for simulating creative action in the work of mechanical design synthesis, and to illustrate applications of the same in real problems settings by industrial examples. Topics covered include: basic techniques for stimulating creative action, with specific emphasis on the systematics of linkages, the logical building block approach, synthesis by implication from goals of optimal design, and synthesis with mechanical circuit diagrams. For each topic, basic theory is presented along with many industrial examples of application, including a description of patents received where applicable. Also covered are decision table techniques for selecting the optimum configuration.
An elementary knowledge of force equilibrium, kinematics of rigid bodies, physics, and a basic interest in the synthesis of new devices in mechanical engineering design is assumed. (EMEM-543)
Class 4, Credit 4 (T.B.A.)

EMEM-658 Engineering Vibrations
Registration #0304-658
A design-oriented course in mechanical vibrations and noise control with emphasis on design applications and instrumentation. Free and forced vibrations of one-degree of freedom systems are covered including machinery unbalance and isolation. Fourier Analysis, numerical and experimental analysis and design methods. Modal analysis of multi-degree of freedom systems is introduced. Industrial acoustics and noise control techniques are also covered. In addition to laboratory exercises in each area of vibration, a design project is assigned. (EMEM-544)
Class 3, Lab. 2, Credit 4 (F, W)

EMEM-660 Refrigeration and Air Conditioning
Registration #0304-660
A basic course in the principles and the applications of refrigeration and air conditioning involving mechanical vapor compression and absorption refrigeration cycles, associated hardware, psychrometrics solar radiation, heat transmission in buildings, and thermodynamic design of air conditioning systems. Students are expected to do a design project. (EMEM-514)
Class 4, Credit 4 (T.B.A.)

EMEM-679 Dynamics of Physical Systems II
Registration #0304-679
A continuation of EMEM-544. Review of systems analyses and block diagrams. Introduction to the Laplace transform (one-sided negative transform) and its use in stating transfer functions. Stability criteria using Bode plots. Design of systems using root-locus method. Some real control systems will be discussed and analysed.
One laboratory every other week is devoted to using the analog computer as a tool in the stability criteria of real systems. Each student will be required to undertake a project involving the design, analysis, and fabrication of a device incorporating control and feedback principles. (EMEM-544)
Class 3, Lab. 2, Credit 4 (T.B.A.)

EMEM-680 Advanced Thermodynamics
Registration #0304-680
This course involves an indepth study of the second law of thermodynamics and its consequences. The course further deals with thermodynamics of reacting and non-reacting mixtures, chemical equilibrium, thermochemistry, Nernst theorem, and Onsager relations. (EMEM-414)
Class 4, Credit 4 (T.B.A.)

EMEM-685 Advanced Strength of Materials
Registration #0304-685
Statically indeterminate problems for beams; frames; continuous beams; beams of variable cross section, reinforced-concrete beams; beams on elastic foundation; stability of columns; plastic deformation in bending and torsion; limit analysis; energy methods with applications to beams, curved bars, and frames; rotating disks; introduction to bending of plates. (EMEM-338)
Class 4, Credit 4 (T.B.A.)

EMEM-687 Engineering Economy
Registration #0304-687
An engineering approach to deal with the economic aspects of proposed engineering designs and/or in-service engineering installations. Also considered are economic factors in the operation of systems and equipment, such as: cash flow, rate of return, present worth, future worth, valuation and depreciation, and benefit cost analysis.
Class 4, Credit 4 (T.B.A.)

EMEM-689 Patent Law and Protection
Registration #0304-689
A study of protection of intellectual property including study of patent rights, inventions, procedures for obtaining patents as well as a study of the law and drafting techniques of patents and their claims. Insights to invention protection and legal ramifications of inventor’s and attorney’s activities will be included.
Class 4, Credit 4 (T.B.A.)

EMEM-650 Gas Dynamics
Registration #0304-650
An advanced course in fluid mechanics covering topics such as introduction to continuum mechanics, small disturbances in ideal, compressible, inviscid media; one-dimensional isentropic flow; and normal shock waves. (EMEM-415)
Class 4, Credit 4 (T.B.A.)

EMEM-651 Viscous Flow
Registration #0304-651
An advanced course in fluid mechanics covering topics such as introduction to continuum mechanics; some exact solutions to the Navier-Stokes equation; boundary layer concepts; and introduction to turbulent flow. (EMEM-415)
Class 4, Credit 4 (T.B.A.)

EMEM-669 Introduction to Water Pollution
Registration #0304-669
Water supply requirements and waste water volumes; transportation and waste water systems; physical, chemical and biological processes for treatment of waste water and sludges, unit processes hydraulics and design of sewers; reuse of water.
Class 4, Credit 4 (T.B.A.)
EMEM-690 Environment and the Engineer
Registration #0304-690
This course will study the role of engineers in society and in particular their responsibility in the analysis and solution of the problems facing the environment in an increasingly technological society. Problems and case histories will be studied. The “case study” viewpoint will include such things as air, water, and noise pollution, thermal pollution, and the effects of population growth. The course will include field trips, outside expert speakers, and each student will be expected to participate in an in-depth study of one problem of particular interest to him or her and to submit a formal report to the class. Use of the digital and analog computing facilities as a systems simulation tool will be encouraged.
Class 4, Credit 4 (T.B.A.)

Graduate Courses

EMEM-692* Analysis for Engineers
Registration #0304-692*
Partial differentiation, chain rule, and total differential; multiple integration and manipulation of multiple integrals; linear constant coefficient ordinary differential equations; vector algebra and differentiation of vectors or complex variables.
Credit 4 (F)

EMEM-693* Thermo Fluid System Analysis
Registration #0304-693*
Thermodynamic properties and processes, ideal and real gas, vapors and gases; laws of thermodynamics and selected power cycles; fluid statics; control volume and conservation of mass, momentum and energy; complex variables.
Credit 4 (T.B.A.)

EMEM-697* Applied Mechanics System Analysis
Registration #0304-697*
Methods currently employed in component and system analysis of the static and dynamic behavior of rigid and elastic bodies. The topics will include a review and advanced studies of vector statics and dynamics of rigid and elastic bodies and systems.
Credit 4 (T.B.A.)

EMEM-812 Theory of Plates and Shells
Registration #0304-812
Theory of thin plates for small deflections. Rectangular and circular plates with various boundary conditions, elliptic and triangular plates. Membrane theory of shells, cylindrical shells, pressure vessels, shells of revolution. (EMEM-685 or equivalent)
Credit 4 (T.B.A.)

EMEM-815 Experimental Stress Analysis
Registration #0304-815
Experimental methods of analysis of structural machine members, including strain gages and instrumentation, photoelastic methods, brittle coating, Moiré fringe method, holographic techniques; and the hydrodynamic, electrical, and membrane analogs. Laboratory tests of models. (EMEM-694 or equivalent)
Credit 4 (T.B.A.)

EMEM-816 Finite Elements
Registration #0304-816
Development of theory from variational principles. Two-dimensional applications to elastic continua, considering plane stress, plane strain, and axisymmetric loading examples. Problem-solving sessions using RIT computer. Applications in structural mechanics, considering beam elements, plate elements, and shell elements. Utilisation of these elements in solving specific structural problems. Introduction to three-dimensional stress analysis. Features of large general-purpose computer programs. (EMEM-694 or equivalent)
Credit 4 (T.B.A.)

EMEM-821 Vibration Theory and Applications
Registration #0304-821
Credit 4 (T.B.A.)

EMEM-828, 829 Special Topics in Applied Mechanics
Registration #0304-828, -829
An opportunity for the advanced student to undertake an independent investigation in the area of applied mechanics. Assistance will be given only when the student requests it. The project may be a comprehensive literature investigation, theoretical study, or an investigation involving laboratory experiment.
Credit variable (maximum of 4 credits/quarter)

EMEM-833 Heat Exchanger Design
Registration #0304-833
The course covers analytical models for forced convection through tubes and over surfaces, experimental correlations for the Nusselt number and pressure drop; design of single and multiple pass shell and tube heat exchangers; compact, baffled, direct contact, plate, and fluid-bed heat exchangers; radiators, recuperators, and regenerators. (EMEM-514)
Credit 4 (T.B.A.)

EMEM-845 Turbomachinery
Registration #0304-845
One-dimensional analysis of centrifugal pumps, water turbines, and axial flow turbines and compressors. Emphasis on blending the application of physical principles, dimensional analysis, and empirical data to design turbomachines. (EMEM-516)
Credit 4 (T.B.A.)

EMEM-848, 849 Special Topics in Thermo Fluid Systems
Registration #0304-848, -849
An opportunity for the advanced student to undertake an independent investigation in the area of thermo fluid systems. Assistance will be given only when the student requests it. The project may be a comprehensive literature investigation, a theoretical study, or an investigation involving laboratory experiment.
Credit variable (maximum of 4 credits/quarter)

EMEM-858, 859 Special Topics in Systems Analysis
Registration #0304-858, -859
An opportunity for the advanced student to undertake an independent investigation in the area of systems analysis. Assistance will be given only when the student requests it. The project may be a comprehensive literature investigation, a theoretical study, or an investigation involving laboratory experiment.
Credit variable (maximum of 4 credits/quarter)

EMEM-862 Solid Wastes Engineering
Registration #0304-862
A study of the collection, processing, disposal and reuse of solid wastes of municipal, industrial, and agricultural origin. A discussion of the basic design parameters of landfills, burning, and processing solid wastes. A presentation of considerations of importance to the development of workable regional and municipal management systems.
Credit 4 (T.B.A.)

EMEM-871 Mathematics for Engineers
Registration #0304-871
Vector calculus, directional derivative, gradient, divergence, curl, Gauss, Green and Stokes Theorem, solutions to ordinary differential equations using the method of Frobenius, and Laplace transforms, and an introduction to complex numbers. (SMAM-308, EMEM-692, or equivalent)
Credit 4 (W)

EMEM-872 Mechanics
Registration #0304-872
Advanced dynamics and vibrations are emphasised. Newtonian vector mechanics and energy formulations are applied to two- and three-dimensional problems of single and multi-degree of freedom. The concepts of Virtual Work, Hamilton’s Principle, and Lagrange’s equations are covered. The vibration of discrete multi-mass systems includes the formulation and eigenvalue solutions by computer, and the method of finite elements are included. The vibration of continuous systems and discrete modeling is introduced (SMAM-308 or EMEM-692 and EMEM-543)
Credit 4 (Sp)

*These courses are provided for students who have been out of school for a number of years and feel it necessary to review or update their educational background.
EMEM-873  Heat Transfer  
Registration #0304-873  
Formulation of the heat conduction equation, solution of the one-dimensional, unsteady heat conduction equation by separation of variables: Sturm-Liouville system, orthogonal functions, generalised Fourier series, Bessel functions. Solution of the two-dimensional, steady heat conduction equation; Cartesian and cylindrical geometry. (SMAM-308, EMEM-514)  
Credit 4 (W)

EMEM-874  Numerical Methods  
Registration #0304-874  
The course emphasises the use of digital computers for obtaining solutions to practical engineering problems through numerical techniques. Algebraic and transcendental equations, systems of linear algebraic equations using matrix manipulations and iterative methods, numerical integration and differentiation, ordinary differential equations including initial value and boundary value problems, partial differential equations including elliptic, parabolic, and hyperbolic with stability analysis. Extensive use of the computer will be required. (Graduate standing and experience in the use of digital computers)  
Credit 4 (F)

EMEM-875  Instrumentation and Experimental Analysis  
Registration #0304-875  
Various displacement, strain, velocity, acceleration, pressure transducers will be discussed along with the associated electronic equipment and recorders to measure and record the variables. A laboratory session will be substituted in place of class when experiments are assigned. The static and dynamic characteristics of the instruments will be obtained as these instruments are mathematically modeled and subjected to impulse, step and ramp frequency functions of time. (Graduate standing)  
Credit 4 (W)

EMEM-876  Engineering Materials  
Registration #0304-876  
Review of the physical metallurgy, effects of alloying elements in steel, corrosion, fatigue, fracture, high and low temperature behavior, plastics, welding. (EMEM-344)  
Credit 4 (R)

EMEM-890  Research and Thesis Guidance  
Registration #0304-890  
In conference with a thesis advisor, a topic is decided on, and either a theoretical or laboratory type research program is carried out. Periodic progress reports and final written thesis with oral examination  
Credit variable (maximum 12 credits total) (F, W, Sp, Su)

Courses will be offered in the following areas if there is sufficient demand

- Introduction to Continuum Mechanics
- Theory of Elasticity
- Energy Methods in Mechanics
- Advanced Finite Elements
- Analytical Mechanics
- Advanced Vibration Theory
- Lubrication
- Advanced Heat Transfer
- Thermodynamics
- Statistical Thermodynamics
- Fluid Dynamics
- Gas Dynamics
- Automatic Control Systems
- Optimal Control Systems Design
- Thermal Stresses
- Solid Waste Management

Microelectronic Engineering

AMCR-210  Introduction to Microelectronics  
Registration #0005-210  
This course will provide the student with introductory and career information about the profession of microelectronic engineering.  
Class 1, Lab. 2, Credit 2

AMCR-340  Integrated Circuit Technology  
Registration #0005-340  
An introduction to circuit technology and the physics, chemistry and metallurgy of processing with an emphasis on photolithography. The laboratory will emphasize safety, laboratory techniques, processes and evaluation.  
Class 1, Lab. 2, Credit 2

AMCR-440  Linear Systems  
Registration #0005-440  
A study of time and spatial transform methods important to electrical and optical systems.  
Class 4, Credit 4

AMCR-530  Electromagnetic Fields I  
Registration #0005-530  
A study of electrostatics and magnetostatics important to the understanding of physics of semiconductor devices and microelectronic processing.  
Class 4, Credit 4

AMCR-540  Electromagnetic Fields II  
Registration #0005-540  
A study of time varying electromagnetic fields important to optical and electronic systems. Topics include Maxwell’s equations, wave equations, electromagnetic propagation in free space and guided structures. Concepts of reflection, transmission, and matching.  
Class 3, Lab. 3, Credit 4

AMCR-560  Device Physics  
Registration #0005-560  
A basic course dealing with the physics of semiconductor devices. Topics include physics of semiconductor materials, metal-semiconductor contacts, PN junctions, bipolar transistors, MOS structures and IGFET transistors.  
Class 4, Credit 4

AMCR-630  Microelectronic Chemistry IV  
Registration #0005-630  
A selection of topics from physical and plasma chemistry important to the understanding of integrated circuit processing.  
Class 3, Lab. 3, Credit 4

AMCR-640  Microelectronics  
Registration #0005-640  
An intermediate level course in the study of integrated circuit processing.  
Class 4, Credit 4

AMCR-650  Integrated Circuit Processing Lab  
Registration #0005-650  
A laboratory course in which the student builds an integrated circuit. The Integrated Circuit Facility is the laboratory for this course.  
Class 1, Lab. 9, Credit 4

AMCR-660  Seminar/Research  
Registration #0005-660  
An investigation of a problem in microelectronic processing. Seminars by experts from the various phases of the microelectronic industry.  
Class 1, Lab. 3, Credit 2
College of Fine and Applied Arts

School of Art and Design

Beginning September 1982, the Communication Design program name has been changed to Graphic Design, and Environmental Design has been changed to Industrial and Interior Design.

FADD-311, 312, 313  Industrial and Interior Design
Registration #0403-311, -312, -313
An elective offering basic instruction and involvement in industrial and interior design projects.
311 - Industrial Design
312 - Interior Design
313 - Package/Exhibit Design
Lab. 6, Credit 3 (offered each year)

FADD-320  Graphic Visualization
Registration #0403-320
Graphic visualization techniques for the development and presentation of concepts for three-dimensional designs. Familiarization with various media in developing and improving graphic communication skills to the designer.
Lab. 6, Credit 3 (offered each year)

FADD-401, -402, -403  Industrial and Interior Design
Registration #0403-401, -402, -403
The acquisition of a technical and theoretical base in industrial and interior design. Application of communicative and problem solving skills to comprehensive design projects involving form.
401 - Package/Exhibit Design
402 - Product Design/Materials and Processes
403 - Interior Design/Environmental Control
Lab. 12, Credit 6 (offered each year)

FADD-411, -412, -413  Design Applications
Registration #0403-411, -412, -413
An elective that provides projects in industrial design, display interiors, and packaging, developed through visuals, materials and processes.
Lab. 6, Credit 3 (offered each year)

FADD-501, 502, 503  Industrial and Interior Design
Registration #0403-501, -502, -503
The application of design methods and skills to professional level projects in either industrial or interior design depending on individual choice. Partial concentration in:
501 - Furniture Design
502 - Design Methods
503 - Professional Practice
Lab. 18, Credit 9 (offered each year)

FADD-511, 512, 513  Design Applications
Registration #0403-511, -512, -513
An elective that provides additional emphasis on professional procedures, functions, structure and processes as they apply to the design environment.
Lab. 6, Credit 3 (offered each year)

FADF-201, 202, 203  Design (Crafts Majors)
Registration #0404-201, -202, -203
The elements of design and color and their structural relationship as applied to problems in three dimensions.
Lab. 6, Credit 3 (offered each year)

FADF-205, 206, 207  Creative Sources
Registration #0404-205, -206, -207
This course is designed to make students aware of their environment, their physical being and their experiences as tools for creative problem solving. This will be accomplished through lectures, individual and group assignments and demonstrations.
Class 1, Lab. 1, Credit 3 (offered each year)

FADF-210, 211, 212  Drawing
Registration #0404-210, -211, -212
A basic foundation in drawing as a form of creative expression. Through the use of organic and inorganic materials attention is given to individual response to "seeing" as interspersed with all sensory conditioning. The figure is utilized in the analysis of action, structure, and gesture through quick sketches.
Lab. 9, Credit 4 (offered each year)

FADF-221, 222, 223  Photo Design I
Registration #0404-221, -222, -223
The elements of design and color and their structural use as related to problems in two- and three-dimensional applications (One hour lecture)
Lab. 3, Credit 2 (offered each year)
FADF-231, 232, 233  
Registration #0404-231, 232, 233  
The elements of design and color and their structural relationship as applied to problems in two dimensions.  
Lab. 6, Credit 3 (offered each year)

FADF-241, 242, 243  
Registration #0404-241, -242, -243  
The elements of design and color and their structural relationship as applied to problems in three dimensions  
Lab. 6, Credit 3 (offered each year) V

FADF-261, 262, 263  
Drawing (Crafts Majors)  
Registration #0404-261, -262, -263  
Drawing in a variety of media. Introduction to line form, and color as elements of pictorial expression Organic and inorganic materials are used.  
Lab. 6, Credit 3 (offered each year)

FADF-321, 322, 323  
Photo Design II  
Registration #0404-321, -322, -323  
Emphasis upon problems which are related to visual phenomena, fundamentals, and communications. (One hour lecture)  
Lab. 3, Credit 2 (offered each year)

FADF-313  
Medical Illustration Carbon Dust Technique  
Registration #0404-313  
(Introduction to carbon dust illustration techniques. Beginning sequence of illustrative techniques leading to mastery of medical illustration Emphasis upon a professional approach)  
Lab. 6, Credit 3 (offered each year)

FADF-320  
Color  
Registration #0405-320  
One-quarter course dealing with the examination of basic color phenomena by visual comparison. Study the differences between light and pigment. Class problems exploring such relationships as intensity, vibration, temperature, after-image, spatial effects and image-ground distortion  
Class 3, Lab. 3, Credit 3 (offered each year)

FADF-321, 322, 333  
Illustration  
Registration #0405-321, -322, -333  
One-quarter course exploring the art of illustrators; their relation to audience, publishers, and media. Studio problems will develop and expand basic concepts of illustration. Studio sessions will be devoted to illustrative problems that reflect the class study for that period. Class critiques at appropriate times.  
Class 3, Lab. 3, Credit 3 (offered each year)

FADF-401, 402, 403  
Painting (Junior Major)  
Registration #0405-401, -402, -403  
Beginning sequence of advanced painting leading to major course of study in the fine arts. Formal values in painting related to individual expression in studio production. Examination and exploration of concepts underlying contemporary art in study sessions directed by the fine art staff. Drawing incorporated into studio procedure. (FADF-301, 302, 303)  
Lab. 12, Credit 6 (offered each year)

FADF-411, 412, 413  
Painting  
Registration #0405-411, -412, -413  
An elective providing the opportunity for exploration of personal expression through a painting medium.  
Lab. 6, Credit 3 (offered each year)

FADF-421, 422, 423  
Medical Illustration Applications  
Registration #0405-421, -422, -423  
Development of range and mastery of medical illustration techniques. Laboratory sessions scheduled in bi-medical illustration. (Lab orientation sessions to be scheduled in operating room facilities.)  
Lab. 6, Credit 5 (offered each year)  
Lab. 12, Credit 8, Winter, Spring (offered each year)

FADF-501, 502, 503  
Painting (Senior Major)  
Registration #0405-501, -502, -503  
Second year of advanced painting completing a major course of study in the fine arts. Concentrated studio production focused upon individual creative solutions. Staff directed sessions examining the relation of the artist to his or her culture and society. Drawing incorporated into studio procedure. (FADF-401, 402, 403)  
Lab. 18, Credit 9 (offered each year)

FADF-511, 512, 513  
Painting  
Registration #0405-511, -512, -513  
An elective that provides further exploration of personal expressive styles through a painting media.  
Lab. 6, Credit 3 (offered each year)

FADF-531, 532, 533  
Advanced Medical Illustration  
Registration #0405-531, -532, -533  
(Advanced medical illustration techniques. Graphic design related to illustrative and photographic practice. Lab sessions to be scheduled in operating room facilities. Jointly sponsored between RIT and the University of Rochester.)  
Lab. 18, Credit 6 (offered each year)

FADR-401, 402, 403  
Printmaking  
Registration #0406-401, -402, -403  
(Junior Major)  
Development of printmaking techniques through personal statements in lithography, etching and relief printing (FADF-301, 302, 303)  
Lab. 12, Credit 6 (offered each year)

FADR-411, 412, 413  
Printmaking  
Registration #0406-411, -412, -413  
An elective providing the opportunity to explore personal statements through lithography, etching and relief (one per quarter)  
Lab. 6, Credit 3 (offered each year)

FADR-501, 502, 503  
Printmaking  
Registration #0406-501, -502, -503  
(Senior Major)  
Continuation of third year printmaking, expanding to technical involvement in paper making and non-silver photo techniques in etching and lithography. Opportunity is presented for involvement in developing a more concentrated and personal art form through any singular technique or any combination. A limited edition portfolio project is developed with the participation of all students. (FADR-401, 402, 403)  
Lab. 18, Credit 9 (offered each year)

FADR-511, 512, 513  
Printmaking  
Registration #0406-511, -512, -513  
An elective that provides further exploration of printmaking with emphasis on personal statement.  
Lab. 6, Credit 3 (offered each year)

FADS-411,412,413  
Sculpture  
Registration #0407-411, -412, -413  
The course develops formal sculptural concepts through a variety of processes and materials. Studio practice involving work in paper, wood, fabrics, metal, stone, clay, and plastics. This course is offered on the sophomore, junior, and senior level.  
Lab. 6, Credit 3 (offered each year)

School for American Craftsmen

FSCC-200  
Ceramics Materials and Processes  
Registration #0409-200  
(Freshman Major)  
Sequential course for three quarters providing fundamentals of the preparation and use of clay. Methods of fabrication from hand building to wheel-thrown wares, application of glazes. Stacking and firing of kilns. Ceramic Sculpture. The organization of the ceramic shop, with planning for efficient production. Survey of pottery.  
Lab. 15, Credit 5 (offered each year)

FSCC-251, 252, 253  
Ceramics Elective I  
Registration #0409-251, -252, -253  
An elementary course in design and techniques in ceramics. Hand built pottery and primitive firing techniques.  
Lab. 6, Credit 3 (offered each year)
FSCF-300 Ceramics Materials and Processes
Registration #0409-300 (Sophomore Major)
Sequential course for three quarters providing intensive work on individual clay and glaze problems. Designing for production and production problems. Mold-making, slip casting, jiggering and decorative techniques.
Lab. 15, Credit 5 (offered each year)

FSCF-350 Contemporary Art
Registration #0410-350
A study of the art of India, China, and Japan in the area of painting, printmaking, sculpture, architecture and the crafts with emphasis on their implications for contemporary artists/designer and craftsmen.
Class 3, Credit 3 (offered each year)

FSCF-360 18th & 19th Century Art
Registration #0410-360
The development of the arts in these two centuries in the areas of painting, printmaking, sculpture, architecture, and the crafts with emphasis on their influence of 20th century styles and focusing on their impact on the artist/craftsman/designer.
Class 3 Credit 3 (offered each year)

FSCF-370 20th Century Art
Registration #0410-370
The development of the arts in the 20th century in the areas of painting, printmaking, sculpture, architecture, and the crafts with focus on their impact on the artist/craftsman/designer.
Class 3, Credit 3 (offered each year)

FSCF-380 Asian Art
Registration #0410-380
Class 3, Credit 3 (offered each year)

FSCF-390 Selected Topics
Registration #0410-390
Considers special art historical themes, areas, and topics not covered in regular courses.
Class 3, Credit 3 (offered each year)

FSCC-300 Ceramics Materials and Processes
Registration #0409-300 (Sophomore Major)
Sequential course for three quarters. Summary of kiln types, fuels, and construction. Materials and sources of supply. Development of bodies and glazes for specific purposes. Problems requiring new uses, adaptations, and applications. Independent study, papers, reports.
Lab. 15, Credit 5 (offered each year)

FSCC-351, 352, 353 Ceramics Craft Elective II
Registration #0409-351, -352, -353
An elective course providing an opportunity for more advanced study in ceramics. Wheel and hand built pottery, along with glaze information, will be studied.
Lab. 6, Credit 3 (offered each year)

FSCC-400 Ceramics Materials and Processes
Registration #0409-400 (Junior Major)
Sequential course for three quarters. Summary of kiln types, fuels, and construction. Materials and sources of supply. Development of bodies and glazes for specific purposes. Problems requiring new uses, adaptations, and applications. Independent study, papers, reports.
Lab. 15, Credit 5 (offered each year)

FSCC-500 Ceramics Techniques and Thesis
Registration #0409-500 (Senior Major)
Sequential course for three quarters, treating problems related to ceramic production culminating in a research and thesis project.
Lab. 24, Credit 8 (offered each year)

FSCF-225, 226, 227 Art and Civilization
Registration #0410-225, -226, -227
Survey of the history of art from prehistory to the present, with particular attention given to the social and cultural backgrounds of art production and to the relationship between the arts: architecture, sculpture, painting, and decorative arts and crafts. Lectures, independent study, discussion groups, assigned gallery visits, papers, reports.
Class 3, Credit 3 (offered each year)

FSCF-300 History of Design
Registration #0410-300
Explores the historical precedents of two and three dimensional design including fine arts, industrial, graphic and environmental design. The course will provide a foundation for individual decisions on planning and designing to complement and enhance present and future environments.
Class 3, Credit 3 (offered each year)

FSCF-310 History of Crafts
Registration #0410-310
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 craftsmen.
Class 3, Credit 3 (offered each year)

FSCF-320 History of Art Criticism
Registration #0410-320
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) with direct applications to the life and work of the artist and craftsman/designer.
Class 3, Credit 3 (offered each year)

FSCF-330 Philosophy in Art
Registration #0410-330
Traces the historical changes that art has undergone. Traces the interaction between philosophic thought and artistic styles throughout art history.
Explores art as a reflection of human values.
Class 3, Credit 3 (offered each year)

FSCF-340 Man and His Symbols
Registration #0410-340
A concentration study of symbols, legends, and myths in the visual arts with emphasis on symbol making for communication.
Class 3, Credit 3 (offered each year)

FSCF-390 Selected Topics
Registration #0410-390
Class 3, Credit 3 (offered each year)

FSCG-200 Glass Materials and Processes
Registration #0411 -200 (Freshman Major)
Sequential course for three quarters, treating the organization and construction of the glass studio, including the design and fabrication of furnaces, annealing ovens, burners, tools, and grinding equipment. The function and care of hand and machine glassworking tools. An analysis of glass as a material: its history, chemical makeup, intrinsic qualities, and potential. Fundamental techniques of glass fabrication, including gathering, marvering, and blowing the bubble; blockmaking; jacking; and puntying the piece.
Lab. 15, Credit 5 (offered each year)

FSCG-251, 252, 253 Glass Elective I
Registration #0411-251, -252, -253
Practical experience with furnace glass blowing is the main topic of this elective course. A portion of the course is a basic survey of the history, chemistry, techniques and technical aspects of glass.
Lab. 6, Credit 5 (offered each year)

FSCG-300 Glass Materials and Processes
Registration #0411-300 (Sophomore Major)
Sequential course for three quarters, providing an analysis and discussion of glass design and problems of fabrication. Intensive work on assigned production problems. An introduction to the use of cold working techniques: slump molds, lamination, non-glass surface decoration, etching, sand blasting, grinding, etc. The use of and maintenance of equipment, research projects, papers, and reports.
Lab. 15, Credit 5 (offered each year)

FSCG-351, 352, 353 Glass Elective II
Registration #0411-351, -352, -353
Prerequisite glass elective 251 or 252 or 253. This course provides an opportunity for more advanced work in both hot and cold glass. Emphasis is placed upon individual expression with glass involving slumping, casting, blowing, cutting, polishing or sculptural construction.
Lab. 6, Credit 3 (offered each year)

FSCG-400 Glass Materials and Processes
Registration #0411-400 (Junior Major)
Sequential course for three quarters, introducing glass materials and their source of supply. An introduction to the mixing of batch glass. The formulation of various glass batches with an in-depth analysis of color and fuming techniques. The development of special glass batches for unique and specific purposes. At this stage the student will have developed a personal direction and rapport with glass.
Lab. 15, Credit 5 (offered each year)
FSCG-500 Glass Techniques and Thesis Registration #0411-500 (Senior Major)
Sequential course for three quarters, introducing problems related to glass fabrication, culminating in a research and thesis project. The student is expected to organize and present an exhibition of his or her work in a manner to reflect a continuity and growth of style.
Lab. 24, Credit 8 (offered each year)

FSCG-520 Stained Glass Registration #0411-520
This elective teaches the basics to stained glass designing, cutting, soldering, leading, glazing and other fabrication techniques.
Lab. 6, Credit 3 (offered each year)

FSCT-200 Textile Materials and Processes Registration #0413-200 (Freshman Major)
Lab. 15, Credit 5 (offered each year)

FSCT-251, 252, 253 Textile Elective I Registration #0413-251, -252, -253
A basic course in design and techniques in textiles. Each quarter a different area of study is undertaken in basketry, stitchery and other non-loom processes.
Lab. 6, Credit 3 (offered each year)

FSCT-300 Textile Materials and Processes Registration #0413-300 (Sophomore Major)
Sequential course for three quarters, providing an analysis of fabrics. Advanced pattern drafting. Study and analysis of fibers. Advanced techniques of weaving, with related problems in design. Continued experience in sample warps and yardage weaving. Practice in the use of various types of eight- to ten-harness looms. Experiments and research with novelty fibers. Independent study, papers, reports.
Lab. 24, Credit 8 (offered each year)

FSCT-351, 352, 353 Textile Elective II Registration #0413-351, -352, -353
An elective course providing an opportunity for more advanced study in textiles. Each quarter a different area of study is undertaken in printing, basketry, non-loom, stitchery or tapestry.
Lab. 6, Credit 3 (offered each year)

FSCT-400 Textile Materials and Processes Registration #0413-400 (Junior Major)
Sequential course for three quarters, providing an analysis of new developments in fabrics both handwoven and power-loomed, and their appropriate use. The design of fabrics within specific price ranges, and for specific uses. Independent study, papers, reports.
Lab. 15, Credit 5 (offered each year)

FSCT-500 Textile Techniques and Thesis Registration #0413-500 (Senior Major)
Sequential course for three quarters, allowing each student, with the approval of the instructors, either to specialize in one branch of wood-working or to develop a particular design trend. This culminates during the final quarter in the completion of a thesis project.
Lab. 24, Credit 8 (offered each year)
Graduate Courses

School of Art and Design

Beginning September 1982, the Communication Design program name has been changed to Graphic Design, and Environmental Design has been changed to Industrial and Interior Design.

Courses for the education concentration of the MST program are offered through the College of General Studies, and course descriptions are given under that heading with a GS call number.

Art Education

FADA-701, 702 (MST) Methods and Materials in Art Education
Registration #0401-701, -702 (Major)
Intensive study of curriculum in terms of teaching materials for both studio and appreciation aspects of elementary, early secondary and high school art education. Includes studio and elementary school teaching experience.
Class 2, Lab. 9, Credit 5 (offered every year-Fall, Winter)

FADA-820 (MST) Seminar in Art Education
Registration #0401-820 (Major)
Evaluation and study of the practice teaching experience. Discussion of the professional role of the art teacher in terms of professional associations, supervision, teacher training, and research. A final project on some intensively studied aspect of art education is required.
Lab. 25, Credit 3 (offered every year-Spring)

FADA-860 (MST) Practice Teaching in Art
Registration #0401-860 (Major)
A seven-week full-time practice teaching experience in secondary school, including professional duties of the art teacher in humanities courses, publication advising, audiovisual work, and supervision. Supplements the studio-theoretical education. Meets the state education requirements.
Credit 9 (offered every year-Spring)

Graphic Design

Beginning September 1982, the Communication Design program name has been changed to Graphic Design, and Environmental Design has been changed to Industrial and Interior Design.

FADC-750 (elective, minor) Graphic Design
Registration #0402-750 (Major)
Advanced creative problem solving experiences in graphic design imagery. Professional problems in visual techniques for communication media. Media Center facility available for extension of studio problems.
Lab. 6, Credit 3 (offered every quarter)

FADC-780 Graphic Design
Registration #0402-780 (Major)
Advanced creative problem-solving experiences relating to graphic design imagery. Formal design values are emphasized and utilized in communications applications. Studio involvement is directed toward the solution of individual, group and assigned graphic design problems. Specification of the program is developed in accordance with the professional goal of the individual student and work leading toward the master's thesis. Media Center facilities are available for application of studio imagery.
Lab. 9-27, Credit 3-9 (offered every quarter)

Industrial and Interior Design

FADD-750 (elective, minor) Industrial and Interior Design
Registration #0403-750 (Major)
The reasoned application of theoretical and practical background to advanced projects in industrial and interior design.
Lab. 6, Credit 3 (offered every quarter)

FADD-780 Industrial and Interior Design
Registration #0403-780 (Major)
Selected projects in industrial or interior design which allow individual application of design methodology and technical skills toward professional goals. Selection of the projects is directed at providing an adequate background for development of the master's thesis.
Lab. 9-27, Credit 3-9 (offered every quarter)

Painting

FADP-750 (elective, minor) Painting
Registration #0405-750 (Major)
The study of the techniques and concepts of present day painting and its relation to the great sweep of the painting of the past for those who intend to paint and to teach.
Lab. 6, Credit 3 (offered every quarter)

Printmaking

FADR-750 (elective, minor) Printmaking
Registration #0406-750 (Major)
Advanced techniques in etching, lithography and woodcutting, as well as in many experimental areas including color processes, photo-etching, photolithography, paper making and combination printing. Students are expected to develop along independent lines, and direction is offered in contemporary thought and concept. The emphasis is toward developing a complete respect for the printmaking craft and profession.
Lab. 6, Credit 3 (offered every quarter)

Sculpture

FADS-750 Sculpture
Registration #0407-750 (Major)
Sculptural concepts are approached through a variety of processes and materials. The studio work is executed in paper, wood, fabrics, metal, stone, clay and plastics.
Lab. 6, Credit 3 (offered each year)

Medical Illustration

FADM-781 Medical Illustration Topics
Registration #0408-781 (MFA Major)
This is an introductory course, designed to acquaint the illustration student with art techniques commonly used in medical illustration, and with the medical library and audio-visual television supporting milieu in which the medical illustrator works.
Lab. 6, Credit 3 (offered each year)

FADM-782 Medical Illustration Graphics
Registration #0408-782 (MFA Major)
A course emphasizing the use of titles, animation, charts and graphs, schematics, and illustrative procedures as vehicles for meeting instructional and communicative needs. Students will learn the various techniques available and will apply those techniques to needs presented, culminating in a personal project dealing with "real world" contingencies.
Lab. 6, Credit 3 (offered each year)

FADM-783 Medical Illustration Surgical I
Registration #0408-783 (MFA Major)
Students will apply their knowledge of anatomy to illustrating operative procedures. Emphasis will be placed on techniques for surgical illustration and situations wherein those techniques are appropriated. Students will learn to simplify and highlight complex procedures. Finally, they will select illustrative techniques best suited for reproduction in medical journals, texts, motion pictures and television.
Lab. 6, Credit 3 (offered each year)
FADM-784 Medical Illustration Surgical II
Registration #0408-784 (MFA Major)
A continuation of Surgical Illustration I, wherein students: work and communicate closely with the surgeon. Interpret medical terminology and recognize relevant issues and problems affecting the illustration. Develop an analysis of theoretical concepts when planning, executing, and evaluating surgical illustrations for the doctor and the publisher.
Lab. 6, Credit 3 (offered each year)

FADM-785 Medical Illustration Exhibits and Design
Registration #0408-785 (MFA Majors)
Students will learn to plan cost-analyze, and construct three dimensional illustrations for in-house presentation or for traveling displays. Practical experience will be given in the problems of collaborating with clients, select appropriate display techniques and modes, and developing a manageable display.
Lab. 6, Credit 3 (offered each year)

PPHB-781 Medical Illustration Photography
See description under School of Photography (MFA Major)

Graduate Courses

School for American Craftsmen

Ceramics and Ceramic Sculpture

FSCC-750 (elective, minor) Ceramics and Ceramic Sculpture
Registration #0409-750
Basic instruction and experience in ceramic design, fabrication and production of ceramic forms is undertaken. This study provides ceramic technology and terminology and gives experience with clays along with fundamental forming techniques. The development of design awareness is encouraged through lectures and critiques.
Lab. 6, Credit 3 (offered each quarter)

FSCC-780 Ceramics and Ceramic Sculpture
Registration #0409-780 (Major)
A program structured on the basis of individual needs, interests and background preparation as they may be determined through faculty counseling.
There will be a strengthening of ceramic techniques, design fundamentals and encouragement of personal ceramic expression. The student will be encouraged to evaluate new techniques, materials and concepts. This sequence leads to the master's thesis, suggested by the student and approved by the faculty.
Lab. 9-27, Credit 3 (offered each quarter)

Glass

FSCG-720 (elective minor) Stained Glass
Registration #0411-720
This elective explores stained glass designing, cutting, soldering, foiling, leading, glazing, and other fabrication techniques.
Lab. 6, Credit 3 (offered each year)

FSCG-750 (elective, minor) Glass
Registration #0411-750
Various techniques in both cold and hot glass will be considered: casting, slumping, faceting, blowing, cutting, electroplating, lamp working, enameling, and sculptural construction.
Lab. 6, Credit 3 (offered each quarter)

FSCG-780 Glass
Registration #0411*780 (Major)
The study and manipulation of hot glass, including refinement of traditional and innovation of new techniques will be undertaken: design, cold glass, sagging, slumping, casting, industrial and studio glass lines, cooper wheel and stone engraving along with glass technology and history. The program is structured on individual needs, interests and background preparation as they may be determined through faculty counseling. This sequence leads to the master's thesis, suggested by the student and approved by the faculty.
Lab. 9-27, Credit 3-9 (offered every quarter)

Metalcrafts and Jewelry

FSCM-750 (elective, minor) Metalcrafts and Jewelry
Registration #0412-750 (Major)
This is the study and manipulation of metals for hollow ware/jewelry. Design sensitivity and concepts are approached through the raising, forming and planishing or casting, forging, and fabricating techniques.
Lab. 6, Credit 3 (offered every quarter)

Weaving and Textile Design

FSCT-750 (elective, minor) Weaving and Textile Design
Registration #0413-750 (Major)
This is the study and appreciation of weaving and textile techniques, soft sculpture, off loom weaving and printing. Design approaches are stressed.
Lab. 6, Credit 3 (offered every quarter)

Woodworking and Furniture Design

FSCW-750 (elective, minor) Woodworking and Furniture Design
Registration #0414-750 (Major)
This is a course in woodworking techniques and procedures. It enables the student to gain design competency through wood and an individual solution to wood projects based on suggested needs.
Lab. 6, Credit 3 (offered every quarter)

FSCW-780 Woodworking and Furniture Design
Registration #0414-780 (Major)
A program structured on the basis of individual needs, interests and background preparation as they may be determined through faculty counseling. Design concepts are compliments to the techniques. This sequence leads to the master's thesis, suggested by the student and approved by the faculty.
Lab. 9-27, Credit 3-9 (offered every quarter)

Thesis

FSC (C, G, M, T, or W)-890 Research and Thesis Guidance
Registration #04(09, 11, 12, 13 or 14)-890 (Major MFA only)
Research and presentation of an acceptable thesis with a focus on technique, design, production, or a combination of these approved by the faculty. The thesis subject will be chosen by the candidates with the approval of the faculty advisor. The thesis will include a written summation or report of the research.
Lab. 27, Credit 3-12 (offered every quarter)
College of General Studies

Criminal Justice

GCJC-201 Fundamentals of the Criminal Justice System
Registration #0501-201
The principles of the criminal justice system; administration and management within various agencies, including the relationship of the police to the courts; the courts to the probation, correction and parole functions. Consideration will also be given to specific problems within the branches of the criminal justice system.
Class 3, Credit 4 (offered annually)

GCJC-203 Criminology
Registration #0501-203
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 fundamental aspects of the social control of crime.
Class 3, Credit 4 (offered annually)

GCJC-204 Introduction to Public Administration
Registration #0501-204
This course presents the principles of management and organizational theory as they relate to public agencies in general, and criminal justice agencies in particular. Case studies, as well as descriptive information concerning the classic issues involved in the administering of public institutions, will be offered to the student. (GCJC-201)
Class 3, Credit 4 (offered annually)

GCJC-206 Administrative Concepts in Law Enforcement
Registration #0501-206
The course is intended to provide the student with an overview of the fundamental concepts of organization and administration, and to provide the criteria and/or standards by which municipal police agencies may be evaluated or improved administratively. (GCJC-203) (GCJC-303)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-207 Corrections
Registration #0501-207
The course is designed to introduce the student to the basic organizations of the correctional system, their functions and performance. Prisons and jails, as well as probation and parole agencies, will be discussed within the context of historical and contemporary philosophy. Attention will also be 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 will be surveyed. (GCJC-201)
Class 3, Credit 4 (offered annually)

GCJC-301 Fundamental Concepts of Criminal Law
Registration #0501-301
The subject matter of this course consists of an introduction to the fundamental principles upon which substantive criminal law is based. The basic characteristics and requirements of criminal conduct are examined. Included in the scope of this course are the following topics: the nature of criminal conduct, the meaning of criminal mens rea, the requirement of concurrence between action and intent, and the requirement of legal causation. The elements of the principal defenses to criminal liability, such as insanity, entrapment, and self-defense, are also discussed. (GCJC-201)
Class 3, Credit 4 (offered annually)

GCJC-302 Organized Crime
Registration #0501-302
This course provides a critical assessment of the structures of organized crime, its historical development, and the areas in which organized crime operates. Special emphasis will be placed upon how the character of organized crime has changed during the last thirty years, including the movement of organized crime into a variety of legitimate business enterprises. In addition, current enforcement strategies will be studied and evaluated (GCJC-201, 203)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-303 The Social and Historical Origins of the Various Police Systems, Police Culture, Role and Career
Registration #0501-303
This course examines the relationship between the police and the community, police organization and community control mechanisms, (GCJC-201)
Class 3, Credit 4 (offered annually)

GCJC-304 The Judicial Process
Registration #0501-304
This course is designed to provide the student with a fundamental understanding of the various procedural steps involved from the time a person is charged with a criminal offense up to the time of sentencing. This course examines both federal and state criminal judicial systems, their functions and operations, their similarities and differences, and their impact upon the accused and the victim. (GCJC-201)
Class 3, Credit 4 (offered annually)

GCJC-306 Introduction to Para-Legals
Registration #0501-306
The course deals with criminal and civil law, matrimonial law, legal research, counseling, problem solving techniques, and lawyers’ ethics as well as a study of community resources available to assist the client. (GCJC-201)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-307 Investigative Techniques
Registration #0501-307
The course examines the investigative function and process in the public and private sectors, which would include the history and theory of criminal investigation, crime scene searches, collection and presentation of physical evidence, the obtaining of testimony and confessions, scientific laboratory methods and the admissibility of evidence in a court of law. (GCJC-303)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-309 Juvenile Justice
Registration #0501-309
The philosophical, historical and operational aspects of the juvenile justice system; evaluation of the social and personal factors related to juvenile delinquency; the role of police, the courts, corrections and community programs in delinquency prevention, control and treatment. (GCJC-201)
Class 3, Credit 4 (offered annually)

GCJC-401 Scientific Methodology
Registration #0501-401
A survey and analysis of the uses of statistics and social research methods, with special reference to utilization of data from the field of criminal justice. The first part examines the basic techniques in social research. Attention is given to methods of collecting, analyzing and interpreting statistical data, and to the use of statistics in the development of research designs; the second part of the course covers descriptive statistics, as well as discussion of the probabilistic nature of all such systems and the elements of data evaluation employed.
Class 3, Credit 4 (offered annually)

GCJC-403, 404 Field Experience I & II
Registration #0501-403, 404
This course is an internship practicum for preservice criminal justice students. The course is designed to give the intern experience through participation in a criminal justice or other appropriate agency in the public or private sector. The closely supervised intern will acquire professional skills while learning organization, programs, and methods. (See Student Handbook)
Class variable, Credit 5 each (offered annually)

GCJC-405 Major Issues in the Criminal Justice System
Registration #0501-405
This course is designed as an advanced seminar which will focus on contemporary issues and topics not otherwise distinctly incorporated in established criminal justice courses. As a seminar the course will concentrate on student discussion and interaction surrounding required readings on topics such as political/official deviance, crime in the streets, issues in the prosecution/court system, deterrence, and female criminality. Topics may vary from offering to offering.
Class 3, Credit 4 (offered on sufficient demand)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-408 Constitutional Law
Registration #0501-408
This course has been designed to provide the student with a basic understanding of the constitutional principles frequently encountered in the criminal justice profession. Landmark court decisions, relating to due process, equal protection, unlawful arrest, unreasonable search and seizure, compulsory self-incrimination, the assignment of counsel and fair trial guarantees are discussed and critically evaluated. (GCJC-201, 301)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-409 Legal Rights of Convicted Offenders
Registration #0501-409
This course is designed to present 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. The course is 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, which deals with convicted offenders, may find this course useful.
Class 3, Credit 4 (offered on sufficient demand)

GCJC-410 Correctional Administration
Registration #0501-410
This course presents the history and development of the principles of management and organizational theory as they developed in the field of corrections. This developmental evaluation is followed by a presentation of certain principles and philosophies concerning agency administration which have proved effective in business, industry, and many elements of government, with the intention of discussing their applicability to prisons, probation, parole, and other community correctional programs. (GCJC-201, 207)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-411 Seminar in Corrections
Registration #0501-411
This course is a sequel to Corrections. It presents a critical evaluation of the contemporary correctional programs in the United States. Programs discussed include: jails, prisons, probation, parole, half-way houses, study release, work release, prison furloughs and various community-based correctional techniques. Emphasis is placed upon the theories of penology and rehabilitation, which provide direction to the correction system today, and the theoretical positions which may affect the future corrections. (GCJC-201, 207)
Class 3, Credit 4 (offered annually)

GCJC-412 Social Control of Deviant Behavior
Registration #0501-412
Designed as a professional elective for criminal justice majors interested in studying the major themes explaining the phenomena of deviance; how it is created, and labeled through the process of definition and social sanction. Emphasis will be on that type of behavior which elicits societal response in the form of criminal or civil action and on deviance from the perspective of the deviant who may be placed under some form of legalized social control. (GCJC-201, 203)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-413 Civil Disobedience and Criminal Justice
Registration #0501-413
A survey of the philosophy and history of civil disobedience, civil sedition as a political tactic, differentiation between civil disobedience and "ordinary crime," civil disobedience and "non-criminal," civil disobedience within the criminal justice system, and the role of riot commissions. (GCJC-201, 203)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-505 White Collar Crime
Registration #0501-505
An examination of the extent and character of white collar crime, with special emphasis upon business and professional deviance. (GCJC-201, 203)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-506 Evidence
Registration #0501-506
This course is designed to provide the student with an awareness of what types of evidence are admitted in a criminal trial. The course 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. The course 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. (GCJC-201)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-510 Counseling in the Criminal Justice System
Registration #0501-510
This course is designed to instruct the student in the various, accepted contemporary dynamics of interviewing and counseling criminal justice and related human service agencies. Issues to be discussed will revolve around counseling and supervision strategies and conflicts among agencies, between administrators and staff, and between staff and clients. This course will present both the practical and theoretical aspects of these issues as well as devote attention to surveying prospective counseling strategies for accomplishing desired behavioral change. (GCJC-201)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-511 Alternatives to Incarceration
Registration #0501-511
The course 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, half-way houses, work-release, study-release, prison furloughs, pre-trial 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 non-traditional programs are typically included in the course (GCJC-207) (GCJC-411)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-512 Minority Groups and the Criminal Justice System
Registration #0501-512
The course will examine the role traditionally attributed to the members of minority groups as criminals and analyze their interaction with the criminal justice system. Heavily relying on the conflict perspective, the course will review the literature on the creation of laws, the breaking of laws, and the processing of minority members in the criminal justice system (GCJC-201, 203)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-514 Planning and Change in the Criminal Justice System
Registration #0501-514
It is the objective of this offering to expose the student to issues of planning within the criminal justice system. Police, courts and corrections will be discussed, in view of current and proposed changes. The planning of change will be emphasized with regard to organizational issues. In addition, attention will be given to surveying various strategies for accomplishing change. This course is designed to give the advanced student the opportunity to intensively scrutinize the prospective shape of the criminal justice system (GCJC-203) (GCJC-401)
Class 3, Credit 4 (offered annually)

GCJC-516 Court Administration
Registration #0501-516
A course designed to explore the management aspects of the court and court process. There is a focus on the structure of the several levels of court that typically exist in modern urban America. Related to this structure are the various other criminal justice agencies that interact with the court at various stages of the process. In addition, operational problems such as the bail process, record keeping, jury service and selection methods, and calendar management will receive significant attention.
Class 3, Credit 4 (offered on sufficient demand)

GCJC-517 Comparative Criminal Law
Registration #0501-517
The course examines, in a comparative analysis, the criminal systems and the penal methods of Europe and the United States. Major emphasis will be given to the issues of intent, criminal responsibility, individual and public interests, purposes and modes of prevention, retribution and punishment, methods of trial, punishment and pardon. (GCJC-201)
Class 3, Credit 4 (offered on sufficient demand)
GCJC-518 Police/Community Relations  
Registration #0501-518  
Police-public contact; uses of the communications media in projecting the police image; responsibilities of police in dealing effectively with minority groups, civil rights, civil disorder, and public protection. An exploration of the role and function of the police in intergroup relations. (GCJC-303)  
Class 3, Credit 4 (offered on sufficient demand)

GCJC-520 Sentencing Process  
Registration #0501-520  
This course is intended to provide the student with a broad overview of the law of sentencing and the alternatives presently available in this area. Emphasis will be placed on the traditional methods of punishment now available in the courts, including, but not necessarily restricted to: fines, imprison-ment, probation and suspended sentences. The course will also look to the power of the court in exercising its discretion in the sentencing process. (GCJC-201, 207, 304)  
Class 3, Credit 4 (offered on sufficient demand)

GCJC-522 Victimless Crime and the Law  
Registration #0501-522  
The course is designed to familiarize the student with many of the implications and ramifications of efforts to control “victimless” crimes. Course discussions concentrate on the illegal activity associated with prostitution, gambling, homosexuality, drug use and pornography. In this course the student will explore the moral, legal and practical consequences of legalizing such activities as examined and evaluated. (GCJC-201, 203, 301)  
Class 3, Credit 4 (offered on sufficient demand)

GCJC-523 Crime and Violence  
Registration #0501-523  
The course will analyze the causes of the outbreak and rapid increase of violent and criminal trends in the world as the most serious realities of the 20th century. Primarily, emphasis will be given to the interdependence between socioeconomic instability and crime, underdevelopment and crime, urban crisis and social mobility, unequal opportunities and racial strife. The course will transcend the national boundaries of America and will focus on crime, violence, and urban crisis in other parts of the world. The course will be a comparative study of America’s and the world’s problems of violence, crime and urban crisis. (GCJC-201)  
Class 3, Credit 4 (offered on sufficient demand)

GCJC-525 Institutional Security  
Registration #0501-525  
The course focuses on the special security problems of such public and private institutions, such as hospitals, nursing homes, hotels, airports and banks. The development and implementation of appropriate security controls and safety measures for employees, clients, and the public are examined. (GCJC-201)  
Class 3, Credit 4 (offered on sufficient demand)

GCJC-526 Seminar in Law Enforcement  
Registration #0501-526  
A critical analysis of some of the current issues, problems and concerns in the area of law enforcement; emphasis on basic police functions as it relates to the courts, corrections and the community. Conflicts between theory and practice are examined and analyzed, and future trends in law enforcement will be explored. (GCJC-303)  
Class 3, Credit 4 (offered annually)

GCJC-527 Advanced Criminal Law  
Registration #0501-527  
The course will investigate assumptions and concepts of criminal law. The course will emphasize major crimes against the person and major crimes relating to property (GCJC-201, 203, 301)  
Class 3, Credit 4 (offered on sufficient demand)

GCJC-528 Etiology of Crime  
Registration #0501-528  
This course is a comprehensive survey of the sociological, psychological, and psychiatric views of the etiology of crime and other forms of deviant behavior. Emphasis is placed on the sociological forms of explanation, the traditional perspective, and the review of theories of criminality and crime. (GCJC-201, 203)  
Class 3, Credit 4 (offered annually)

GCJC-529 Physical Security and Safety  
Registration #0501-529  
The course examines, through survey techniques, the complex problems confronting business and industry in the protection of assets. The use of electronic and non-electronic anti-intrusion systems and other hardware is examined and evaluated. Safety and accident prevention, health hazard prevention methods, and fire prevention and control, also are examined. (GCJC-201)  
Class 3, Credit 4 (offered annually)

GCJC-530 Women and Crime  
Registration #0501-530  
This course deals with women as criminal offenders and women as victims of crime in the past, present, and future. It will focus mainly upon women as criminals, including theories about women in crime, types of crimes committed, patterns of criminality, and the treatment of women within the criminal justice system. Special attention will be given to a discussion and analysis of the changing role of women in crime.  
Class 3, Credit 4 (offered annually)

GCJC-531 Emergency and Disaster Planning  
Registration #0501-531  
The course is designed to define the role of security in natural and man-made disasters. Flood, earthquakes, fire, labor disturbances, sabotage, bomb and bomb threats, extortion, executive protection, civil strife, war and terrorism will be examined, with emphasis upon formulating plans and methods to effectively deal with these events.  
Class 3, Credit 4 (offered on sufficient demand)

GCJC-532 Retail Security  
Registration #0501-532  
This course provides an analysis of major security problems found within retail operations. Subjects examined include internal and external theft prevention and detection, shoplifting techniques, the use of undercover personnel and shopping services, security audit, and training of security and non-security personnel.Warehousing and cargo controls are examined. Emphasis will be placed upon methods, techniques, and programs to protect assets.  
Class 3, Credit 4 (offered on sufficient demand)

GCJC-533, 534 Field Research I & II  
Registration #0501-533, 534  
This course is part of the preservice criminal justice student's internship. The course provides the intern student with an opportunity to conduct research while working in a criminal justice or other appropriate agency in the public or private sector. The student, with the guidance of his or her faculty supervisor, must complete a scholarly paper based upon the intern's research on critical issues and problem-solving approaches. (See Student Handbook)  
Class variable, Credit 4 each (offered annually)

GCJC-535, 536 Security Management  
Registration #0501-535, 536  
This course will focus on the management skills required in the security function and the corresponding administrative, legal and technical problems. Emphasis will be given to purchasing, cost benefit analysis, proprietary versus contract guard forces, personnel management and the relationship between security and non-security employees, and security awareness training programs.  
Class 3, Credit 4 (offered on sufficient demand)

GGJC-536 Seminar in Security  
Registration #0501-536  
This course, designed for seniors completing criminal justice degree requirements with a concentration in security, will focus on critical issues, problems, and concerns in the area of security that are not otherwise covered directly or in depth in established security courses. Topics are expected to vary from offering to offering.  
Class 3, Credit 4 (offered on sufficient demand)

GCJC-537 Legal Aspects of Security  
Registration #0501-537  
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 Wilfull Torts including: false arrest and imprisonment; nuisance; defamation; and invasion of privacy.  
Class 3, Credit 4 (offered on sufficient demand)
Social Work

Core Courses

GSWS-210 The Professional Social Work Role
Registration #0516-210
Designed to assist students in making decisions regarding their careers in social work. The course covers basic exercises for developing self-awareness and professional self-assessment, explores various fields of social work and helps students begin to build their concepts of social work as a profession.
Class 3, Credit 4

GSWS-211 Social Welfare: Structure and Function
Registration #0516-211
Examines the provision of social services in four major fields of social welfare: public welfare, traditional voluntary agencies, voluntary social movements and the legal system. Course will also explore organization theory as it applies to the structure of these services, as well as major patterns and sources of funding. (Introduction to Economics; GSWS-302, or concurrent)
Class 3, Credit 4

GSWS-215 The Family From a Social Work Perspective
Registration #0516-215
This course is designed to give the social work student a basic understanding of the family. The course will emphasize the various approaches to intervention with the contemporary American family, including its structure, functions and the interaction and roles of family members both within the family and between family and society. (GSSP-210, 203)
Class 3, Credit 4

GSWS-302 Social Welfare: History
Registration #0516-302
Designed to explore social welfare institutions and processes and their history, philosophy and relationship to other social institutions in the United States. Emphasis is on the role of social work in various interrelated social work institutions.
Class 3, Credit 4

GSWS-315 Assessing Community Needs
Registration #0516-315
A study of assessment techniques for identifying the strengths and weaknesses of services provided within a community. Attention will be given to programs for minority groups, the disabled, elderly, youth, persons with mental health problems, and other special populations. (Second year standing)
Class 3, Credit 4

GSWS-356 Group Theory in Social Work
Registration #0516-356
This course covers the theoretical foundations of group dynamics and group behavior within the context of social work. Such concepts as types of groups (prevention, rehabilitation), group development, composition, group processes (problem solving, decision-making, affection), programming, leadership, communication, structure, and modes of intervention are covered. The course provides the knowledge base for the later development of practice skills in working with groups. (Second year standing)
Class 3, Credit 4

GSWS-411 Interviewing and the Helping Relationship
Registration #0516-411 (Methods I)
Methods of Social Work is a three-course sequence offered concurrently with laboratory or field experience. Methods of Social Work stresses the basic principles and skills of a generic approach to social work practice, emphasizing the differential use of social work techniques (e.g., interviewing skills, assessment, problem-solving) and Interventive skills in a variety of client systems.
Through lectures, discussions, readings, lab simulations and case analysis, it is the overall objective of the sequence to provide the student with the knowledge, skill and self-awareness for beginning professional social work practice. The development of this knowledge, skill and awareness is seen as a progressive process underlying and underpinning the three-course sequence. (GSWS-210, 211, 302, 315, 356 or concurrent)
Class 4, Lab, 4, Credit 4

GSWS-412 Assessment and Problem Solving
Registration #0516-412 (Methods II)
See GSWS-411 (GSWS-411, concurrent with GSWS-421 and GSWS-433)
Class 3, Credit 4

GSWS-413 Intervention Strategies
Registration #0516-413 (Methods III)
See GSWS-411 (GSWS-412,421 and 433; concurrent with GSWS-422 and 434)
Class 3, Credit 4

GSWS-421 Field Instruction I
Registration #0516-421
Field instruction I and II comprise a 20-week, 30 hr./week supervised field placement. Under the guidance of an instructor, the student is placed in a cooperating social, governmental or education agency in order that he or she may gain firsthand experience with its organization, programs and client assignments. Closely supervised work at the agency is supplemented by seminars designed to integrate theory and practice. (GSWS-411, concurrent with GSWS-412 and 433)
Field 300, Credit 5

GSWS-422 Field Instruction II
Registration #0516-422
See GSWS-421. (GSWS-412,421 and 433; concurrent with GSWS-413 and 434)
Field 300, Credit 5

GCJC-540 Field Experience
Registration #0501-540
This course is an internship practicum for preservice criminal justice students. The course is designed to give the intern student first-hand experience observing and participating in a criminal justice or other appropriate agency in the public and private sector. The closely supervised student intern will acquire professional skills while learning organization, programs, and methods. At the end of the internship each student intern, also, will participate in an intensive one-week seminar which will serve as an additional learning experience, providing the student with an opportunity to share the knowledge and insights of his/her practicum with his/her peers and the faculty supervisor.
Class variable, Credit 8 (Must be taken in conjunction with #0501-541). (See Student Handbook)

GCJC-541 Field Research
Registration #0501-541
This course is a part of the preservice criminal justice student's internship. The course provides the intern student with an opportunity to conduct research while working in a criminal justice or other appropriate agency in the public or private sector. The student intern, with the guidance of his or her faculty supervisor, must complete a scholarly paper based upon the intern's research on critical issues and problem-solving approaches.
Class variable, Credit 4 (See #0501-540)

GCJC-542 Field Research Techniques
Registration #0501-542
This course will focus on developing the students' abilities to evaluate, and analyze data from field settings with special emphasis on the use of qualitative research techniques such as observation, interviewing, content analysis, etc. Students will also have the opportunity to become acquainted with the various computer facilities at RIT as well as the use of the "microcomputer." (Through various projects which will emphasize data collection techniques through an experiential, hands-on approach as well as through lecture, demonstration and discussion.) Students will acquire the skills necessary to conduct social science research in field settings. (GCJC-401)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-599 Independent Study
Registration #0501-599
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 annually)
GSWS-433 The Supervisory Process
Registration #0516-433
A seminar taken during the first term of field placement. Topics include staff structure, work distribution, the responsibilities of supervisor and supervisee, the ethics of supervision, and professional growth. Students will focus on the supervisory processes within their field placement agencies. (GSWS-411, concurrent with GSWS-412, 421)
Class 2, Credit 4

GSWS-434 Managing Community Services
Registration #0516-434
A seminar taken during the second term of field placement. Topics include special management concerns of public and private not-for-profit organizations, the relationship of management to effective service delivery, and the relationship of the individual social worker to management and decision making. Students will discuss these issues by exploring the management procedures of their field placement agencies. (GSWS-412, 421 and 433; concurrent with GSWS-413, 422)
Class 2, Credit 4

GSWS-532 Professional Issues
Registration #0516-532
For social work students who have completed field experience. Examines the profession of social work and the values in social work practice, as stated in the Code of Ethics. Current practice issues of the profession such as licensure, third-party payments and other topics will also be examined. (GSWS-413, 422 and 434)
Class 3, Credit 4

GSWS-533 Social Welfare: Policy & Planning
Registration #0516-533
For social work students who have completed field experience. Course will explore the development of social welfare services as it proceeds from the determination of social need through program design to implementation. Concepts of policy process, large system change, and grant and proposal writing are considered. (GSWS-413, 422 and 434)
Class 3, Credit 4

GSWS-535 Senior Research
Registration #0516-535
For social work students who have completed field experience. The seminar is directly related to the projects that students are working on and consists of weekly presentations developed around individual student's needs for help and supervision. Students will present current data on their projects, process, as well as participate in a helping process with other class members. (GSWS-312, 413, 422, and 434)
Class 3, Credit 4

Social Work Electives

GSWS-212 Self-Awareness in the Helping Role
Registration #0516-212
This course helps to develop students' helping skills in essentially three broad areas: 1) Skills in noticing or observing; 2) Observing one's professional use of self in the helping relationship and evaluating the appropriateness of such behavior; 3) Observing the client and evaluating the effect one's response has on him/her.

Students are expected and required to increase their awareness skills, and this course offers a unified learning experience where students can concentrate on the theory and practice of awareness skills. (GSWS-210)
Class 3, Credit 4

GSWS-213 Gerontology
Registration #0516-213
An introductory study of the second half of the life span with a design to increase understanding of the processes of social accommodation, socialization and social change of the aged as they interact with the community and others (GSPP-210)
Class 3, Credit 4

GSWS-214 Drug Abuse
Registration #0516-214
This course is designed to familiarize the social work student with the many varieties of dry drugs, drug abuse, drugs and the social scene. Emphasis is placed on a variety of treatment modalities to be used by the social worker when working with drug abusers
Class 3, Credit 4

GSWS-313 Sexism and Sexual Identity in Social Work Practice
Registration #0516-313
This course is designed to sensitize social-work students to sexism as it occurs in contemporary culture. The course will focus on gender identity and specific problems and issues related to the worker-client relationship.
Class 3, Credit 4

GSWS-314 The Social Worker as Advocate
Registration #0516-314
This course will examine the role of social workers in advocating with and on behalf of clients and others in their efforts to negotiate or bring about needed change in institutions or policies of our society. Discussion of the forces in the social, economic and political environment today that directly affect poverty, racism and related urban crises will be related to examining techniques for achieving change.
Class 3, Credit 4

GSWS-320 Alcoholism Disability:
Physiology and Psychology
Registration #0516-320
This course presents the chemistry of alcohol and its effect on the body and mind as well as signs, symptoms, addiction and withdrawal. The study of normal and abnormal personality development and the psychological and social mechanisms of alcohol use and alcoholism in our society are emphasized.
Class 3, Credit 4

GSWS-321 Alcoholism: Interventive Skills and Techniques
Registration #0516-321
Teaches a variety of interventive skills to those giving care to alcoholics, their families and communities. Emphasis is on the method of use of these skills. Role play, video tape and case study will be included. (Second-year standing)
Class 3, Credit 4

GSWS-322 Alcoholism: Rehabilitation Modalities
Registration #0516-322
The course analyzes symptoms and diagnosis of the alcoholic and current methods of rehabilitation. Explores structure, function and use of community resources (Second-year standing)
Class 3, Credit 4

GSWS-323 Alcoholism: Supervision in an
Alcoholism Setting
Registration #0516-323
Presentation of current supervisory methods and principles with emphasis on their use in agencies serving the alcohol abuser (Second-year standing)
Class 3, Credit 4

GSWS-330 Rural Social Services
Registration #0516-330
The course will identify the historical development, cultural makeup, family life styles and work habits of the nation's migrant population and the rural poor. The course will examine and critically analyze the differences between the migrants and the rural poor and compare them to the characteristics of the urban poor found in contemporary American cities. The manner by which governmental policies and service-delivery systems directed to the rural areas reflect the economic, political, and social conditions during which they are developed will be subjects of concern. The skills of generic rural social work vis-a-vis urban social techniques will also be discussed
Class 3, Credit 4

GSWS-340 Fundamentals of Deafness
Registration #0516-340
The purpose of this course is to provide the student with a basic understanding of deafness. This overview includes an historical perspective, techniques and tools for diagnosis and remediation, philosophies and communication as well as the impact on the social, psychological, and vocational development of the individual as a result of deafness
Class 3, Credit 4

GSWS-341 Psychosocial Implications of Deafness
Registration #0516-341
The purpose of this course is to provide the student with an indepth examination of the psychosocial implications of deafness for the individual. The various systems with which the deaf individual interacts, as well as within which s/he interacts, will be examined for their relevance to the development and functioning of the individual. We will also examine how the individual and these systems impact and influence each other. These systems will include family, school, service delivery systems and society. (GSWS-340)
Class 3, Credit 4
GSWS-342 Intervention Strategies with the Deaf  
Registration #0516-342  
The purpose of this course is to build skills in applying the knowledge base (developed in the prerequisite courses) to case situations. Students demonstrate collection and recognition of pertinent information, and development and implementation of appropriate intervention plans. Legal and political issues as well as methods of assessing local resource networks are considered. Professional roles and intervention goals are discussed as they relate to interfacing systems, including individual, family, school, medical, mental health, rehabilitation, and employment. (GSWS-340, 341)  
Class 3, Credit 4

GSWS-357 Mental Health and Mental Illness from a Social Work Perspective  
Registration #0516-357  
This course is designed to give social-work students a basic understanding of mental health, mental illness and mental retardation from a social-work perspective. The role of the social worker in working with mentally ill and mentally retarded individuals and their families will be included. Students will also be given a general understanding of our current mental hygiene systems. (GSWS-210, GSSP-210)  
Class 3, Credit 4

GSWS-360 Social Work with the Disabled  
Registration #0516-360  
This course provides an examination of the psychosocial aspects of disabilities. The course stresses the effects of disability on the individual's development and functioning and the attendant stress on the family and society in attempts to respond to their needs. Interventive strategies and critical times for intervention by the social worker are examined.  
Class 3, Credit 4

GSWS-370 Protective Services  
Registration #0516-370  
"If the only tool you have is a hammer, then you tend to treat every problem as if it were a nail." The same statement reversed, "If you see your problem as a nail, then the only tool you can use is a hammer," is especially relevant to child abuse and neglect, as efforts to solve the problem are often hampered by our perceptions of what the problem is. Emerging from the above statement, the design of this course centers around an examination of the concepts and knowledge based prevalent in the field of child abuse and neglect. Topics will include: definition of abuse and neglect, an historical perspective, possible causes and effects of abuse, intervention strategies, statutes and legislation, prevention approaches child abuse services in New York State, provision of service (role of social worker), and what the future concerns are in this problem area.  
Class 3, Credit 4

GSWS-380 Social Work and the Law  
Registration #0516-380  
The main purpose of the legal orientation of this course is to provide the student with the opportunity to develop a workable vocabulary and understanding of some of the basic legislative processes and law that effect the practice of social work. Concentration will necessarily center around significant issues and points of law that have in the past, and still do impact the delivery of services (Junior standing)  
Class 3, Credit 4

GSWS-431 Social Work Management  
Registration #0516-431  
Management of a social work agency is a complex and multi-faceted position. This course focuses on many of the knowledge, attitudes and skill areas required of a manager. These include the traditional management skills, their relationship to the non-profit sector and the unique requirements of management in the not-for-profit sector.  
Class 3, Credit 4

GSWS-432 Supervision in Social Work  
Registration #0516-432  
This course identifies and teaches the supervisory skills required in social work and related agencies. Different methods and techniques are explored. Role play and video tape are used  
Class 3, Credit 4

GSWS-455 Contemporary Issues in Social Work  
Registration #0516-455  
This course is designed to offer students an opportunity to examine and discuss contemporary issues in the field of social work. Course content will vary from quarter to quarter dependent on current issues and student interest areas. Areas related to expressed student interest, faculty expertise and developments in the field will be examined. Specific readings will be assigned with classroom discussions, special speakers, films, field trips or role plays included depending on the nature of the issues being addressed  
Class 3, Credit 4
General Studies Courses

Language and Literature

GLLC-220 English Composition
Registration #0502-220
This course develops the language skills needed to write effectively. It should be taken in the freshman year.
Class 3, Credit 4 (offered quarterly)

GLLC-421 German I
Registration #0502-421
This course will introduce students with no prior exposure to the language to some control of modern German. A strong emphasis is placed on speaking and reading skills. Besides language, students will also study contemporary life and culture in the German-speaking countries. Although this is the first course of a three-course sequence, the course may be taken separately.
Class 4, Credit 4 (offered annually)

GLLC-422 German II
Registration #0502-422
This course is designed to give students further control of natural, modern German. A strong emphasis is placed on speaking and reading skills. Besides language, students will also study contemporary life and culture in the German-speaking countries. Although this is the second course of a three-course sequence, the course may be taken separately. (0502-421 or equivalent)
Class 4, Credit 4 (offered annually)

GLLC-423 German III
Registration #0502-423
This course is designed to give students more advanced control of natural, modern German. A strong emphasis is placed on speaking and reading skills. Besides language, students will also study contemporary life and culture in the German-speaking countries. Although this is the last course of a three-course sequence, the course may be taken separately. (0502-422 or equivalent)
Class 4, Credit 4 (offered annually)

GLLC-431 Spanish I
Registration #0502-431
This course will introduce students with no prior exposure to the language to some control of modern Spanish. A strong emphasis is placed on speaking and reading skills. Besides language, students will also study contemporary life and culture in Spanish-speaking countries.
Class 3, Credit 4 (offered annually)

GLLC-432 Spanish II
Registration #0502-432
This course is designed to give students further control of modern Spanish. A strong emphasis is placed on speaking and reading skills. Besides language, students will also study contemporary life and culture in Spanish-speaking countries. Although this is the second course of a three-course sequence, the course may be taken separately. (0502-431 or equivalent)
Class 3, Credit 4 (offered annually)

GLLC-433 Spanish III
Registration #0502-433
This course is designed to give students more advanced control of modern Spanish. Besides language, students will also study contemporary life and culture in Spanish-speaking countries. Although this is the last course of a three-course sequence, the course may be taken separately. (0502-432 or equivalent)
Class 3, Credit 4 (offered annually)

GLLC-440 Human Communication
Registration #0502-440
Human Communication is an overview of the field of communication, including the contexts of interpersonal, group, mass, and public communication. This course is part of the Language Concentration and may not be taken as an elective. (0502-220 or equivalent)
Class 3, Credit 4 (offered annually)

GLLC-441 Small Group Communication
Registration #0502-441
Practice in analysis of a variety of small group discussion techniques focusing on phenomena such as processes of interaction, decision making, norms structure and development, membership, and theory of group development. This course is part of the Language Concentration and may not be taken as an elective. (0502-220 or equivalent)
Class 4, Credit 4 (offered annually)
GLLC-553  Creative Interpretation in Sign Language
Registration #0502-553
Creative approaches to the interpretation of selected literary classics (prose, poetry, fiction, drama) through the visual medium of sign (sign language and sign-mime).
Class 3, Credit 4 (offered annually)

GLLL-483  Hinduism and Buddhism
Registration #0504-483
The course presents the religious experience from the viewpoints of two major Eastern Religions: Hinduism and Buddhism. Drawing upon these traditions, the course examines the psychological and philosophical dimensions of the religious experience. This course is part of the Perspectives on Religion Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GLLL-441  The Art of Poetry
Registration #0504-441
This course emphasizes the enjoyment and study of poetry with primary attention to major poetry in English. This course is part of the Literature Concentration and may also be taken as an elective. (0504-332 or equivalent)
Class 3, Credit 4 (offered annually)

GLLL-442  The Short Story
Registration #0504-442
The course is a study of a collection of short stories with critical commentary in order to provide source materials on the nature and development of this genre. This course is part of the Literature Concentration and may also be taken as an elective. (0504-332 or equivalent)
Class 3, Credit 4 (offered annually)

GLLL-444  Film as Literature
Registration #0504-444
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. The course is a non-technical, non-chronological study of film with a balance of roughly 50% literature and 50% film. This course is part of the Literature Concentration and may not be taken as an elective. (0504-332 or equivalent)
Class 3, Credit 4 (offered annually)

GLLL-440  Western Drama/Theatre
Registration #0504-440
The Western Drama/Theatre course studies Drama as a genre and Theatre as a performing art. Intensive study of at least one major playwright or period complements a general survey of Drama/Theatre from Ancient Greece to Modern Broadway. This course is part of the Literature Concentration and may also be taken as an elective. (0504-332 or equivalent)
Class 3, Credit 4 (offered annually)

GLLL-443  The Novel
Registration #0504-443
The Novel course provides 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. This course is part of the Literature Concentration and may also be taken as an elective. (0504-332 or equivalent)
Class 3, Credit 4 (offered annually)

GLLL-484  Religion and Literature
Registration #0504-484
A literature course which explores the complexity and variety of man's personal religious quest and its conflicts as these are portrayed by writers from biblical times to our own day. The literature will be supplemented by readings from such disciplines as psychology, philosophy, history and theology. This course is part of the Perspectives on Religion Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GLLL-501  Speculative Fiction
Registration #0504-501
Speculative Fiction is a survey course in contemporary literature presenting conjectural views of man, his world, his society and his beliefs.
Class 3, Credit 4 (offered annually)

GLLL-503  Great World Drama
Registration #0504-503
A chronological survey of the major periods of theatrical evolution, with emphasis on the physical theatre and production techniques which influenced the playwrights' works within respective periods.
Class 3, Credit 4 (offered annually)

GLLL-504  Shakespeare: Comedy and History
Registration #0504-504
Several of Shakespeare's comedy and history plays are read and analyzed to reveal their literary excellence and their theatrical power.
Class 3, Credit 4 (offered annually)

GLLL-505  The American Spirit in Literature
Registration #0504-505
A survey of the development of American philosophy (political and social) through the study of selected works from the colonial period to the 19th century. Particular attention will be given to the ideas of the writers under consideration and their effect on modern American philosophy.
Class 3, Credit 4 (offered annually)

GLLL-506  Literary Symbolism in Short Fiction
Registration #0504-506
Emphasis is on defining literary symbolism and in recognizing this device when it is employed in literary works, with special attention given to the accurate interpretation of symbolic works.
Class 3, Credit 4 (offered annually)

GLLL-515  Contemporary American Novel
Registration #0504-515
The course will cover American fiction written after World War II. Works by contemporary American writers such as Ellison, Mailer, Bellow, and Updike will be examined, with special emphasis being placed on these writers' relation to contemporary American culture.
Class 3, Credit 4 (offered annually)

GLLL-516  Literature and Society
Registration #0504-516
Selected works by writers such as Sophocles, Dante, Dickens, Camus and Vonnegut, as important works of art that reflect the human condition and implicitly prophesy against particular evils in attitudes or institutions of their times.
Class 3, Credit 4 (offered annually)

GLLL-517  Literature of the Bible
Registration #0504-517
A close and rapid reading of selected Old and New Testament books to show the range and variety of literary genres and styles in the Bible.
Class 3, Credit 4 (offered occasionally)

GLLL-522  Mark Twain and the American Dream
Registration #0504-522
Focus will be on the bitter-comic writings of the last part of Twain's career and his various "escapades."
Class 3, Credit 4 (offered annually)

GLLL-524  Contemporary Film
Registration #0504-524
A study of contemporary world films, to be drawn from those presently showing in the Rochester area (theaters, television, film festivals). Emphasis will be on both technical and aesthetic aspects of the films.
Class 3, Credit 4 (offered annually)
GLLL-527  Shakespeare: Tragedy and Romance  
Registration #0504-527  
A generous sample of Shakespeare's tragedy and romance plays is investigated to reveal their literary excellence and their theatrical power.  
Class 3, Credit 4 (offered annually)

GLLL-528  Great World Novels  
Registration #0504-528  
A careful reading and analysis of novels selected from the best examples of the genre. The novels are selected to exhibit a wide range of techniques of narration, methods of characterization, and approaches to plot construction.  
Class 3, Credit 4 (offered occasionally)

GLLL-531  American Literature of the 1920's and 1930's  
Registration #0504-531  
A study of American writers of the 20th century with particular attention to the beginnings of realism, naturalism and symbolism.  
Class 3, Credit 4 (offered annually)

GLLL-535  Technology in American Literature  
Registration #0504-535  
A study of 19th and 20th century short fiction and novels criticizing the impact of technology upon society.  
Class 3, Credit 4 (offered annually)

GLLL-536  Short Fiction  
Registration #0504-536  
The short story as a particular form of literature: definition, characteristics and aims.  
Class 3, Credit 4 (offered annually)

GLLL-538  The Nightmare of Technology: Studies in 19th Century British Writing  
Registration #0504-538  
Study of British prose and poetry on the effects of industrialism and the social problems in 19th century England.  
Class 3, Credit 4 (offered alternate years)

GLLL-539  The Romantic Vision  
Registration #0504-539  
A survey of 19th century European prose and poetry (primarily British) with particular attention paid to the collapse of the Romantic vision, and its gradual absorption into the aesthetic and decadent literary traditions of late nineteenth century European literature.  
Class 3, Credit 4 (offered alternate years)

GLLL-542  Literature of Violence  
Registration #0504-542  
An evaluation of the promoting forces, the types, and the effects of violence as it occurs in literary themes from different periods and backgrounds.  
Class 3, Credit 4 (offered annually)

GLLL-545  Deaf Studies in Literature  
Registration #0504-545  
A study of the literature of deafness, with special emphasis on literary works which identify and illuminate "the deaf experience."  
Class 3, Credit 4 (offered annually)

GLLL-546  Philosophy of Justice  
Registration #0504-546  
Examination of dissent and private conscience in collision with the claims of order and stability in a democratic society.  
Class 3, Credit 4 (offered annually)

GLLL-548  Modern Poetry  
Registration #0504-548  
A close examination of poems of important English and American poets of the 19th and 20th centuries, including several living poets  
Class 3, Credit 4 (offered annually)

GLLL-550  Jonathan Swift and the Age of Satire  
Registration #0504-550  
Vicious satirical writings of Jonathan and other early 18th century authors (Alexander Pope, John Dryden) will be read and analyzed, focusing on the intrigue and scandals marking the political and religious environment of the age  
Class 3, Credit 4 (offered alternate years)

GLLL-551  World Literature in English  
Registration #0504-551  
The course will cover short stories and novels written in English by Australian, African, Asian, and West Indian authors. The selection will be discussed against the background of the social, political, and cultural milieu in which the authors worked.  
Class 3, Credit 4 (offered alternate years)

GLLL-552  Milton: Literature of Revolution  
Registration #0504-552  
John Milton, the author of Paradise Lost, was the English Commonwealth's foremost propagandist and defender of regicide. His major works will be read and analyzed, focusing both on their literary brilliance and how they reflect the religious, moral, political, and philosophical turmoil of the 17th century.  
Class 3, Credit 4 (offered occasionally)

GLLL-556  Athens & Rome: The First Moderns  
Registration #0504-556  
A trip to the beginnings of our culture and an exploration of the first artistic expressions of "modern" sensibility, primarily through reading of the chief authors of Classical Greece and Rome.  
Class 3, Credit 4 (offered occasionally)

GLLL-560  The Epic  
Registration #0504-560  
A critical examination of certain films as an integral part of modern culture.  
Class 3, Credit 4 (offered annually)

GLLL-561  Rites of Passage  
Registration #0504-561  
An introduction to music as a fine art. The course is designed to develop skills in listening, evaluation, and analysis through an examination of music's forms, constituent elements, and stylistic and historical development.  
Class 3, Credit 4 (offered annually)

GLLL-563  Myth, Legend, Folklore  
Registration #0504-563  
Scholarly investigation into the rationale, origins and sources of myths, legends and folklore of the western world and the affect these primary forms have had on our literature.  
Class 3, Credit 4 (offered annually)

GLLL-564  The Epic  
Registration #0504-564  
Advanced study of great representative works in the epic mode  
Class 3, Credit 4 (offered annually)

GLLL-565  Chaucer and His Times  
Registration #0504-565  
A generous sample of Shakespeare's tragedy and romance plays is investigated to reveal their literary excellence and their theatrical power.  
Class 3, Credit 4 (offered annually)
GSHF-440 The Arts and Craft Movement in the United States
Registration #0505-440
A historical and sociological study of the crafts and design from the industrial Revolution to the present, tracing their stylistic and cultural changes, the changing roles of the craftsman/artist and their relationship to technology. This course is part of the American Artistic Experience Concentration and may also be taken as an elective. (0505-213 or 0505-214 or 0505-215 or equivalent)
Class 3, Credit 4 (offered annually)

GSHF-441 American Architecture
Registration #0505-441
A survey of American Architecture from the seventeenth century to the present. Stress will be placed on a visual as well as a historical and social analysis. This course is part of the American Artistic Experience Concentration and may also be taken as an elective. (0505-213 or 0505-214 or 0505-215 or equivalent)
Class 3, Credit 4 (offered annually)

GSHF-442 Music in the United States
Registration #0505-442
A survey of music in the United States from the time of European colonisation to the present. Particular emphasis will be placed upon the question of what makes music distinctively “American.” This course is part of the American Artistic Experience Concentration and may also be taken as an elective. (0505-213 or 0505-214 or 0505-215 or equivalent)
Class 3, Credit 4 (offered annually)

GSHF-443 Images of American Life
Registration #0505-443
This course examines images of American life in the 19th and 20th century in the visual arts, particularly photography, to analyse and evaluate the influences of American political, social and cultural events on imagery and perception. This course is part of the American Artistic Experience Concentration and may also be taken as an elective. (0505-213 or 0505-214 or 0505-215 or equivalent)
Class 3, Credit 4 (offered annually)

GSHF-444 American Film
Registration #0505-444
This course will develop an understanding of theories, styles and trends in American film through a historical and sociological study of the medium. This course is part of the American Artistic Experience concentration and may also be taken as an elective (0505-213 or 0505-214 or 0505-215 or equivalent)
Class 3, Credit 4 (offered annually)

GSHF-445 Issues in American Art
Registration #0505-445
The purpose of this course is to offer the student a comprehensive overview of American attitudes and philosophies as they have shaped and been embodied in our artistic heritage. Emphasis will be placed on American art from 1850 to the present. This course is part of the American Artistic Experience Concentration and may also be taken as an elective. (0505-213 or 0505-214 or equivalent)
Class 3, Credit 4 (offered annually)

GSHF-480 Women and the Visual Arts
Registration #0505-480
This course examines the image of women in the visual arts and the role of women as image makers. Major topics to be covered 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 men, women’s images and the issues of their relationship to the images made by men, the nude and pornography, history of women as artists, selected women artists and their work, relation of their work to the art of their period, current issues and status of women artists. This course is part of the Women's Studies Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSHF-509 Impressionism to Analytical Cubism
Registration #0505-509
This course deals with the historical and stylistic aspects of the avant-garde painters of the second half of the nineteenth century and the first decade of the twentieth century. It traces the struggles of these artists to break away from the traditional forms of expression and to attain a new vision of reality.
Class 3, Credit 4 (offered annually)

GSHF-510 Picasso
Registration #0505-510
An investigation into modern man's struggle to preserve his identity in our fast developing technological world as reflected in the vitality and diversity of today's visual arts. Differences and similarities with art forms of earlier eras and other cultures will also be discussed.
Class 3, Credit 4 (offered annually)

GSHF-512 Master Drawings Since the Renaissance
Registration #0505-512
A study of drawings from the 15th to the 20th century, including the work by Leonardo da Vinci, Michelangelo, Durer, Rembrandt and Picasso.
Class 3, Credit 4 (offered occasionally)

GSHF-513 Oriental Art
Registration #0505-513
A survey outlining the development of art in India, China and Japan and examining the philosophical circumstances that distinguish Eastern traditions.
Class 3, Credit 4 (offered occasionally)

GSHF-514 Cubism to the Present
Registration #0505-514
An investigation into modern man's struggle to preserve his identity in our fast developing technological world as reflected in the vitality and diversity of today's visual arts. Differences and similarities with art forms of earlier eras and other cultures will also be discussed.
Class 3, Credit 4 (offered annually)

GSHF-519 Rembrandt Van Rijn: His Art and Times
Registration #0505-519
A study of the life, art and times of the Baroque master. Emphasis will be placed on his stylistic evolution, his relation to his society and to the Baroque style, and on his humanistic world view.
Class 3, Credit 4 (offered annually)

GSHF-520 Picasso
Registration #0505-520
The life and work of one of the most influential artists of our century.
Class 3, Credit 4 (offered annually)

GSHF-525 Major Symphonies
Registration #0505-525
A non-specialised humanistic approach to the understanding of the people, ideas and times during which major musical compositions were created.
Class 3, Credit 4 (offered occasionally)

GSHF-526 Twentieth Century Music
Registration #0505-526
A survey of major 20th century composers and their works Emphasis will be placed on the development of music in the classical tradition, experimental music and ja".
Class 3, Credit 4 (offered annually)

GSHF-527 Orchestral Music
Registration #0505-527
Examination of selected orchestral works from the 18th to the 20th century with emphasis on listening and stylistic analysis. Works by Bach, Beethoven, Brahms, Tchaikovsky, Stravinsky, Bartok, and others.
Class 3, Credit 4 (offered occasionally)

GSHF-528 Romanticism in Music
Registration #0505-528
A survey of music written during the Romantic Period (19th century), including later trends — Impressionism (Debussy, Ravel) and Neo-classicism (Satie, Stravinsky). Genres include orchestral music, chamber music, piano, song, ballet, and opera. Representative composers are Chopin, Brahms, Wagner, and Tchaikovsky.
Class 3, Credit 4 (offered occasionally)

GSHF-529 Visual Interpretation of the Drama
Registration #0505-529
Study of the visual components in a play from the point of view of a theatrical designer. Plays from various countries and time periods will be studied in order to develop skill in interpreting character, literary style and dramatic structure and techniques for communicating this understanding to an audience through stage designs. Students will be expected to master the content of a selected group of plays as well as increase their ability to find visual equivalents through which to render their understanding.
Class 3, Credit 4 (offered occasionally)
An analysis of social events and intellectual movements in Europe since the Renaissance style, with special attention paid to how they represent stylistic continuity and stylistic change.

Class 3, Credit 4 (offered annually)

GSHH-304 Renaissance and Baroque Art Registration #0505-304
This course will examine the development of painting and sculpture in Europe between 1420 and 1700. Emphasis will be placed on the evolution of a Renaissance style and the manifestation of it in the work of individual artists. Mannerism and Baroque art will be analyzed from the viewpoint of the Renaissance style, with special attention paid to how they represent stylistic continuity and stylistic change.

Class 3, Credit 4 (offered occasionally)

GSHH-301 History: Modern American Registration #0507-301
This course examines the political, social, cultural, and economic development of the American people in the modern period. Studies the United States in its foreign relations.

Class 3, Credit 4 (offered quarterly)

GSHH-302 History: Modern European Registration #0507-302
An examination of social, economic, political and intellectual movements of Europe from the Modern Period to the Twentieth Century, which played major roles in shaping our contemporary world.

Class 3, Credit 4 (offered quarterly)

GSHH-440 United States: Its People and Its Institution Registration #0507-440
This course will examine the American people, their society and their culture, in relation to the nation's institutions: government, courts, business, labor and political and private associations. The interplay between the American people and the institutions which structure their lives sheds light on the dynamic forces which shape American history and help to explain the present. Instead of detailing day-to-day chronology, this study will highlight the sweep of major trends and movements over longer periods of the American experience. This course is part of the History Concentration and may not be taken as an elective. (0507-301 or 0507-302 or equivalent)

Class 3, Credit 4 (offered annually)

GSHH-441 20th Century American Diplomatic History Registration #0507-441
An examination of the major events and forces which shaped American diplomacy from the opening years of the twentieth century to the immediate post World War II era. This course is part of the History Concentration and may also be taken as an elective. (0507-301 or 0507-302 or equivalent)

Class 3, Credit 4 (offered annually)

GSHH-442 The Contemporary Middle East Registration #0507-442
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 twentieth century. This course is part of the History Concentration and also the International Relations Concentration and may also be taken as an elective. (0507-301 or 0507-302 or equivalent for the History Concentration; 0513-211 or 0513-215 or equivalent for the International Relations Concentration)

Class 3, Credit 4 (offered annually)

GSHH-443 European Social and Intellectual Registration #0507-443
An analysis of social events and intellectual movements in Europe since 1600. This course is part of the History Concentration and may also be taken as an elective. (0507-301 or 0507-302 or equivalent)

Class 3, Credit 4 (offered annually)

GSHH-444 European Diplomatic History, 1871 -1939 Registration #0507-444
The course seeks to investigate the origins of the First and Second World Wars with special emphasis on the diplomacy of the European Great Powers. This course is part of the History Concentration and may also be taken as an elective. (0507-301 or 0507-302 or equivalent)

Class 3, Credit 4 (offered annually)

GSHH-445 Modern Latin America Registration #0507-445
This course surveys the historical development of the Hispanic and Portuguese areas of the Americas from independence to the mid-twentieth 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. This course is part of the History Concentration and may also be taken as an elective. (0507-301 or 0507-302 or equivalent)

Class 3, Credit 4 (offered annually)

GSHH-480 History of American Women Registration #0507-480
A history of women in North America from the colonial period to the present. Concentrates on the social, political, cultural, diplomatic and economic history of women in the United States and Canada. This course is part of the Women's Studies Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

GSHH-482 Christianity in the West Registration #0507-482
This course traces the development of Christian thought in the broad historical context of Western Civilization. It concentrates on major movements and outstanding personalities. The history of Christian thought is examined against the background of economic, political, social and intellectual currents. The study sheds light on both the conflicts within and the criticisms from outside the Christian tradition. This course is part of the Perspectives on Religion Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

GSHH-508 History of England Registration #0507-508
A political and constitutional history of England from the Anglo-Saxon period to the present.

Class 3, Credit 4 (offered on sufficient demand)

GSHH-514 Race and Society Registration #0507-514
A social, historical, political, religious and anthropological appraisal of the factors which have produced the differences between social appearances and social attainments of the world's population.

Class 3, Credit 4 (offered alternate years)

GSHH-516 The Middle Ages and the Rise of Europe Registration #0507-516
The Medieval society and its political, religious, economic, and social problems and achievements will be analyzed as the foundation and the cradle of our modern society.

Class 3, Credit 4 (offered annually)

GSHH-518 The Advance of Communism Registration #0507-518
An examination of the expansion of Communism from Marx up to the present time: an analysis of the basic ideas of Marxism, of the rise of communist parties and regimes in West and East Europe, in China and southeast Asia, in Africa, and on the American continent.

Class 3, Credit 4 (offered annually)

GSHH-519 United States-Latin America Diplomatic Relations Registration #0507-519
The emphasis in this course will be on analyzing the United States' relations with Latin America from independence to the present.

Class 3, Credit 4 (offered annually)

GSHH-520 Crime, Violence and Urban Crisis Registration #0507-520
The course will analyze the causes of the outbreak and rapid increase of violent and criminal trends in the world as the most serious realities of the 20th century.

Class 3, Credit 4 (offered annually)
GSHH-523 Religion in Society
Registration #0507-523
This course will examine religion in the West—Christianity, Judaism and
atheism—as an integral and interrelated aspect of the totality of society.
Class 3, Credit 4 (offered annually)

GSHH-524 The Italian-American Experience
Registration #0507-524
Examines the history and culture of the Italian-Americans from the colonial
period to the present.
Class 3, Credit 4 (offered annually)

GSHH-525 Culture and Counterculture in Historical Perspective
Registration #0507-525
This course will examine the cultural, social, political and economic conflicts
which were prominent during the 1960's in America and around the world.
Class 3, Credit 4 (offered occasionally)

GSHH-526 The United States and The Third World
Registration #0507-526
One of the dominant features of the 20th century has been the revolution of
rising expectations in the countries of the Third World. This course will study
the underlying causes of these revolutions and the reaction of the United
States government to this revolutionary ferment in Latin America, Asia, and
Africa.
Class 3, Credit 4 (offered annually)

GSHH-528 History of Popular Culture in America
Registration #0507-528
A study of selected special social and cultural issues and topics in American
history from the colonial period to the present, focusing as well on the leading
persons.
Class 3, Credit 4 (offered annually)

GSHH-529 Military History
Registration #0507-529
An analysis of the causes and nature of war.
Class 3, Credit 4 (offered on sufficient demand)

GSHH-530 19th Century American Diplomatic History
Registration #0507-530
An examination of American diplomacy from the early years of American
independence to the emergence of the United States as a world power The
War of 1812, Monroe Doctrine, and Manifest Destiny are among the topics
considered.
Class 3, Credit 4 (offered annually)

GSHH-531 The Black Experience in America
Registration #0507-531
This course explores the history of blacks in America and treats it primarily
from a social and cultural perspective.
Class 3, Credit 4 (offered annually)

GSHH-532 Civil Liberties in American History
Registration #0507-532
The course will teach the history of civil liberties in America. Emphasis will be
placed on analyzing Supreme Court cases that explain the current state of
civil liberties. This is a companion course to GSHH-538, Social Justice and
the Constitution in American History.
Class 3, Credit 4 (offered annually)

GSHH-533 China, Russia and the United States
Registration #0507-533
Since 1949
This course is a follow-up of the other two courses on Russia and on the
advance of Communism.
Class 3, Credit 4 (offered annually)

GSHH-536 History of Mexico
Registration #0507-537
The historical development of Mexico including the colonial period, indepen­
dence movement, the liberal-conservative class, and the revolution of 1910.
Class 3, Credit 4 (offered alternate years)

GSHH-537 Russia: Imperial and Communist
Registration #0507-537
An analysis of the last century of Czarist Russia and of the Communist
Regime. Emphasis will be placed on the agricultural, social, industrial, eco­
nomic, and political situation.
Class 3, Credit 4 (offered occasionally)

GSHH-538 Social Justice and the Constitution in American History
Registration #0507-538
The course will analyze how well the constitution has met the social and
political expectations of citizens. Emphasis will be placed on analyzing
Supreme Court cases that explain the current state of social justice. This is a
companion course to GSHH-532, Civil Liberties in American History.
Class 3, Credit 4 (offered annually)

GSHH-540 Selected Problems in Black History
Registration #0507-540
A seminar approach to the thought of key black leaders (Washington, Gar­
ev, King) and the study of the civil rights and black power movements.
Class 3, Credit 4 (offered occasionally)

GSHH-541 Modern Germany
Registration #0507-541
A study of Germany in the 19th and 20th centuries.
Class 3, Credit 4 (offered annually)

GSHH-543 20th Century European Diplomatic History
Registration #0507-543
The course seeks to appraise the crisis of diplomacy, and the quest for a
higher level of political organization in Europe in the age of mass democracies,
totalitarianism and competing political ideologies.
Class 3, Credit 4 (offered annually)

GSHH-544 19th Century European Diplomatic History
Registration #0507-544
The course focuses on the relations of the European Great Powers, their
rivalries and national jealousies which ultimately resulted in the first total
war in the history of humanity.
Class 3, Credit 4 (offered annually)

GSHH-545 Revolutionary Leaders in Latin America
Registration #0507-545
In this course three movements will be studied: the rise of Juan Peron in
Argentina in the 1940's; Fidel Castro's revolution in Cuba; and Salvador
Allende's electoral victory in Chile in 1970. By studying these three "revolu­
tionary" movements, it is hoped that the student will come to an understand­
ing of the historical perspective and nature of the social discontent in Latin
America.
Class 3, Credit 4 (offered annually)

GSHH-546 The Immigrant in American History
Registration #0507-546
This course traces the history of the Irish, Germans, Jews, and Polish in the
United States.
Class 3, Credit 4 (offered occasionally)

GSHH-547 History of Social Discrimination
Registration #0507-547
A study of the discriminatory practices, present and historical, found in the
United States. To include the cultural values and problems of acculturation
for the American Indian, Black, Puerto Rican, Chicano, Asian, women, and
religious groups, with emphasis on its implications to social work.
Class 3, Credit 4 (offered annually)

GSHH-550 The Ascent of Man
Registration #0507-550
The course is a multi-disciplinary study-in societal, historical, technological
and scientific perspectives—of biological and cultural adaptation; natural
and genetic evolution; cosmological and physical relations; matter, ele­
ments, and energy; human behavior and the environment, among others.
The course is based on the television series The Ascent of Man, created and
narrated by Jacob Bronowski.
Class 3, Credit 4 (offered annually)

GSHH-556 Origins of the Cold War, 1917-1947
Registration #0507-556
An historical appraisal of the developing conflicts between classical liberal
economics and the mercantilism of romantic nationalist states from the
1870's through 1947. The roles of the British Foreign Office, the French
Foreign Office, the Weimar Republic, and Hitler's Germany, as opposed to
the Soviet Union, are traced and appraised. Eventual assumption of leader­
ship of this policy by the United States, during the war within the war (1943-
45) is examined and related to the development of the Cold War as recog­
nized by the general public by 1947.
Class 3, Credit 4 (offered annually)
GSHN-567 Technology in American History
Registration #0507-567
An examination of the cultural context of American technology and its influence on American social, economic, political, and cultural institutions.
Class 3, Credit 4 (offered occasionally)

GSHN-211 Science, Technology and Values
Registration #0508-211
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 been affected by our values. 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.
Class 3, Credit 4 (offered quarterly)

GSHN-440 History of Science
Registration #0508-440
This course presents a study of the origins, nature, and development of Western science, and its social, economic, and cultural context. This course is part of the Social Impacts of Science and Technology Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSHN-441 Science and Technology Policy
Registration #0508-441
This course will examine 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. This course is part of the Social Impacts of Science and Technology Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSHN-442 History of American Technology
Registration #0508-442
This course presents an examination of the cultural context of American technology and its influence on American social, economic, political, and cultural institutions. This course is part of the Social Impacts of Science and Technology Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSHN-443 Face of the Land
Registration #0508-443
This course is a case study in the relationship of technology and society, focusing on the interaction of land, people and technology. By considering the natural landforms of the United States and other countries as appropriate, students will 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. This course is part of the Social Impacts of Science and Technology Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSHN-444 Social Consequences of Technology
Registration #0508-444
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 will study several interactions between technology and the world in which we live. We will investigate how various technologies developed and compare the expected effects of the new technologies with the actual results. This course is part of the Social Impacts of Science and Technology and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSHN-481 Man, Nature and Technology
Registration #0508-481
This course seeks to make students aware of the environmental consequences of modern technology by investigating to what degree various technological systems conflict with basic ecological principles. This course is part of the Environmental Studies Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSHN-482 Energy and the Environment
Registration #0508-482
In this course we will look at the current situation, its environmental implications, and try to determine how we got here, why we got here, and where we may be able to go in the next 20-50 years. We will look at the nature, uses, and relative importance of our sources of energy, high technology and low or appropriate technology, hard energy paths and soft energy paths. We will look especially at the role of government policy in the energy area. This course is part of the Environmental Studies Concentration and may not be taken as an elective.
Class 3, Credit 4 (offered annually)

GSHN-483 Environmental Values
Registration #0508-483
We seek to identify, interpret, and trace the values associated with concern for the environment, and the factors that induced change in these values. Concern with the environment is not a new concept; its history reaches to ancient times, but the values related to this concern have drastically changed. Understanding environmental values helps one become a better prepared participant in the environmental decision making. This course is part of the Environmental Studies Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSHN-503 Technology and the Individual
Registration #0508-503
A study of the effects on the life of the individual due to the acceleration of technological change.
Class 3, Credit 4 (offered occasionally)

GSHP-210 Philosophy: Selected Issues
Registration #0509-210
An introduction to some of the major problems, methods and insights of philosophy with readings from both classical and contemporary sources.
Class 3, Credit 4 (offered quarterly)

GSHP-211 Philosophy: Ethics
Registration #0509-211
An introduction to moral philosophy through an analysis, comparison and evaluation of some main theories that have been offered as systematic ways of making moral decisions, and through discussions of contemporary moral problems.
Class 3, Credit 4 (offered quarterly)

GSHP-213 Philosophy: Critical Thinking
Registration #0509-213
An introduction to philosophical analysis, especially as it may be applied in contexts other than professional philosophy.
Class 3, Credit 4 (offered quarterly)

GSHP-483 The Biblical Tradition
Registration #0509-483
An examination of Judaism and Christianity as they are presented in the Old and New Testaments. This course is part of the Perspectives on Religion Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSHP-440 Philosophy of Religion
Registration #0508-440
A critical examination of a number of important issues connected with religion. These include the nature of religion itself, the existence of God, the problem of evil, and questions about the language we use when we talk and write about religion. This course is part of the Philosophy Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)
This course will introduce the student to philosophical problems centering on the nature, extent and justification of law. By means of the readings, assignments and class discussions, the student will acquire a philosophical background for the understanding and evaluation of some fundamental and recurring questions about the law and people's relationship to it.

Class 3, Credit 4 (offered alternate years)

GSSA-483 The Anthropology of Religion

This course is designed to provide students with a basic understanding of how religion operates as an integral part of any society. In order to demonstrate this, the institution of religion will be studied from a cross-cultural, anthropological perspective. Emphasis will be on understanding how values in different societies are expressed and operating as part of the Perspectives of Religion Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

GSSA-501 Anthropological Research Methods: Explorations in Subcultural Diversity

This course is designed to expose students from a variety of backgrounds to an alternative means of understanding human behavior through the methods of the cultural anthropologist and to demonstrate that variations in cultural patterning exist in our presumably homogenous society. The primary emphasis in the course will be on involving students in the actual observation of human behavior and collection of data in a subculture of their own selection in the Rochester area.

Class 3, Credit 4 (offered occasionally)

GSSE-210 Introduction to Economics

This course is designed to introduce the student to basic economic concepts and methods of analysis. Application of these concepts and methods of analysis to the contemporary economic issues of the U.S. and other countries will be emphasized. Topics of primary interest will include: economic methodology, the economizing problem, economic foundations of capitalism, supply and demand, different market structures, national income accounting, the role of government in the economy, the banking system in the U.S. and the role of money, unemployment, inflation, government stabilizing policies, public goods, and externalities.

Class 3, Credit 4 (offered quarterly)

GSSE-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 secondary education, higher education, distribution of income and wealth, poverty and income maintenance, manpower planning, and microeconomic analysis of the work/leisure decision. This course is part of the Economics Concentration and may also be taken as an elective. (0511-210 or 0511-301 & 0511-302 or equivalent)

Class 3, Credit 4 (offered annually)

GSSE-442 Contemporary International Economic Problems

This course aims to prepare the student to deal with foreign exchange market, international trade decisions, the macroeconomics effects of trade on domestic economics, and the effects of domestic business fluctuations on international trade and finance of each country. Though the course is basically a theory course in economics, the applied aspects of international trade and finance are emphasized. This course is part of the Economics Concentration and may also be taken as an elective. (0511-210 or 0511-301 & 0511-302 or equivalent)

Class 3, Credit 4 (offered annually)

GSSE-443 Current American Macroeconomic Problems

This course is an in-depth analysis of selected macroeconomic problems such as economic growth, inflation, and business cycles. The primary focus is consideration of current macroeconomic theory and policy application in the context of the U.S. economic problems, e.g., tax-based incomes policies, wage-price controls. This course is part of the Economics Concentration and may also be taken as an elective. (0511-210 or 0511-301 & 0511-302 or equivalent)

Class 3, Credit 4 (offered annually)

GSSE-444 Public Finance

This course is 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. This course is part of the Economics Concentration and may also be taken as an elective. (0511-210 or 0511-301 & 0511-302 or equivalent)

Class 3, Credit 4 (offered annually)
GSSE-445 Survey of Economic Thought
Registration #0511-445
This course is a survey of the various schools of thought which 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. This course is part of the Economics Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSSE-480 The Economic Role of Women
Registration #0511-480
This course is intended to analyze the economic role of women in today's society. This analysis includes the economic role of women in labor force, as owners of other factors of production, and in business decision making process. The impact of 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. This course is part of the Women's Studies Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSSE-481 Environmental Economics
Registration #0511-481
The course will examine 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. This course is part of the Environmental Studies Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSSM-440 International Relations
Registration #0513-440
This course critically examines fundamental elements of Soviet foreign policy since its inception. Special emphasis will be given to geopolitical and ideological aspects of Soviet national interests as well as analyses of the mechanics of foreign policy formulation and its implementation with respect to the United States, Western and Eastern Europe, China, the Third World and the Middle East. This course is part of the International Relations Concentration and may also be taken as an elective. (0513-211 or 0513-215 or equivalent)
Class 3, Credit 4 (offered annually)

GSSM-445 Foreign Policy of the Soviet Union
Registration #0513-445
This course is an examination of the origins and evolution of the Cold War with the major emphasis upon the Soviet-American rivalry in the post World War II era. This course is part of the International Relations Concentration and may also be taken as an elective. (0513-211 or 0513-215 or equivalent)
Class 3, Credit 4 (offered annually)

GSSM-450 State and Local Politics
Registration #0513-540
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. It will illustrate differences in state governments by comparing other states to New York, and will use the Rochester area for comparisons with local governments found elsewhere. This course is part of the American Politics Concentration and may also be taken as an elective. (0513-211 or 0513-215 or equivalent)
Class 3, Credit 4 (offered annually)

GSSM-451 The Legislative Process
Registration #0513-451
This course examines the role of the legislature in the U.S. political process. The primary emphasis will be the study of the U.S. Congress, but some attention will also be directed to state legislatures. Topics to be studied include elections, party organization, committees, interest group activities, and executive-legislative relations. This course is part of the American Politics Concentration and may also be taken as an elective. (0513-211 or 0513-215 or equivalent)
Class 3, Credit 4 (offered annually)

GSSM-452 The American Presidency
Registration #0513-452
This course is a study of the role of the presidency in the American Political System. Among the topics to be 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. This course is part of the American Politics Concentration and may also be taken as an elective. (0513-211 or 0513-215 or equivalent)
Class 3, Credit 4 (offered annually)

GSSM-453 American Foreign Policy
Registration #0513-453
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. This course is part of the American Politics Concentration and may also be taken as an elective. (0513-211 or 0513-215 or equivalent)
Class 3, Credit 4 (offered annually)

GSSM-504 Twentieth Century America
Registration #0513-504
An examination of the major political, social, and economic developments affecting the United States in the 20th century. Emphasis will be placed upon the reactions of the various presidential administrations to conditions in both the domestic and foreign fields.
Class 3, Credit 4 (offered annually)

GSSM-510 Comparative Policies
Registration #0513-510
This course is designed to provide a mode of analysis for the study of political systems. There will be a basic overview of such nations as the United States, Great Britain, France, the Federal Republic of Germany, and the Soviet Union, although relevant examples of other nations will be presented when warranted. A study of each nation's governmental process and political culture will be emphasized.
Class 3, Credit 4 (offered annually)
GSSP-480 Psychology of Women
Registration #0514-480
This course 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. This course is part of the Women's Studies Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSSP-483 Social Psychology of Religion
Registration #0514-483
This course examines religions as cultures which, like other “ways of life,” face the task of attracting or creating new members, maintaining their loyalty, providing them with a coherent world view and satisfying their basic needs. It will examine the way religions use education, ritual, rewards, punishment, symbols and other mechanisms of social control and cohesion for- mation to build and nurture their flocks. In addition it will examine the ways in which religious organizations and their individual members reconcile conflicts between religious and secular norms, world views, loyalties and problemsolving strategies. Finally it will suggest how psychological processes such as identity formation, attribution, self actualization, brainwashing, conflict, denial, projection, and repression may be applied and misapplied in efforts to understand religious belief and behavior. This course is part of the Perspectives on Religion Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSSP-501 Industrial Psychology
Registration #0514-501
Consideration of principles, application and current research in industrial psychology, with particular reference to personnel selection, training, motivation, morale, performance appraisal, leadership and communication.
Class 3, Credit 4 (offered annually)

GSSP-503 Abnormal Personality
Registration #0514-503
Description and theories of the nature and development of behavioral disorders. Contemporary treatment procedures will also be discussed.
Class 3, Credit 4 (offered annually)

GSSP-504 Attitude Formation and Persuasion Techniques
Registration #0514-504
The course will focus on current theories of attitude formation, and seek to apply them to contemporary events to achieve an understanding of how those who wish to shape or change attitudes do so.
Class 3, Credit 4 (offered annually)

GSSP-508 Psychology of Learning
Registration #0514-508
Studies the learning process, which includes memory and learning. Interprets many theoretical positions that have evolved in the study of the psychology of learning and shows application of findings on memory and learning.
Class 3, Credit 4 (offered annually)

GSSP-509 Psychology of Perception
Registration #0514-509
A study of methods and research findings primarily in the field of visual perception together with an evaluation of theoretical interpretations.
Class 3, Credit 4 (offered annually)

GSSP-510 Social Psychology
Registration #0514-510
The course will attempt to give 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.
Class 3, Credit 4 (offered annually)

GSSP-511 Humanistic Psychology: An Introduction
Registration #0514-511
Sometimes called “the new psychology.” Based on the assumption that each individual has inherent powers of growth towards self-realization. Emphasis on conscious awareness, perception, meaningfulness, and uniqueness in human experience.
Class 3, Credit 4 (offered annually)

GSSP-512 Psychology of Personality
Registration #0514-512
A consideration of theories of personality classification and development.
Class 3, Credit 4 (offered annually)

GSSP-513 Psychology of Motivation
Registration #0514-513
The nature and development of motive and emotion and the role of these processes in adjustment. Covers concepts and theories of motivation.
Class 3, Credit 4 (offered annually)
GSSS-441 The Changing American Family
Registration #0515-441
This sociology course examines contemporary patterns in the courtship, marital and family systems of the United States with special reference to gender role definitions, participation in the workplace and variations in social class. This course is part of the American Society in Transition Concentration and may also be taken as an elective. (0515-210)
Class 3, Credit 4 (offered annually)

GSSS-442 The Urban Experience
Registration #0515-442
This sociology course analyzes social and spatial characteristics of cities and considers reasons for urban development, ecological factors, types and networks of settlements, and urbanism as a way of life. It also examines the issues of neighborhoods, subareas, "ghetto" enclaves, metropolitan regions, urban social and political structures, problems, services, and regions, urban social and political structures, problems, services, and planning.
This course is part of the American Society in Transition Concentration and may also be taken as an elective. (0515-210)
Class 3, Credit 4 (offered annually)

GSSS-480 Women in Contemporary U.S. Society
Registration #0515-480
This sociology course will examine three major social institutions which shape the lives of women in contemporary U.S. society: the family, the workplace, and political structure. This course is part of the Women's Studies Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSSS-502 Contemporary Social Problems
Registration #0515-202
Essential sociological insights necessary for an understanding of social problems. The principal aim of this course is to develop an understanding of the multiple factors involved in the development and amelioration (remedial actions) of social problems. These will be viewed primarily on the American scene although extending both into history and the future. Conflicts of values (and goals and interests) are analyzed along with signs of social disorganization and change and various personal deviations.
Class 3, Credit 4 (offered annually)

GSSS-504 Intergroup Relations: American Racial and Ethnic Minorities
Registration #0515-504
A sociological analysis of relations between ethnic, racial, and religious groups.
Class 3, Credit 4 (offered occasionally)

GSSS-505 Juvenile Delinquency
Registration #0515-505
Problems of juvenile delinquency in the United States: etiology, extent, and significance of the problem. This course features an in-depth study of family court as its procedures as well as modern methods of prevention, treatment and control.
Class 3, Credit 4 (offered annually)

GSSS-511 Population & Society
Registration #0515-511
Study of demographic variables of mortality, fertility, and migration as they affect the rise and quality of population.
Class 3, Credit 4 (offered annually)

GSSS-512 Urbanization: Urban Man and Society
Registration #0515-512
The social and spatial characteristics of cities are analyzed; encompassing such topics as the reason for urban development, ecological factors, types and networks of settlements, and urbanism as a way of life.
Class 3, Credit 4 (offered annually)
This course will analyze the structural properties, group processes and social meanings of work. Work, like all other social realities, is studied as a product wrought out of social relationships.

Class 3, Credit 4 (offered annually)

Service Courses

Service courses are required courses offered by the College of General Studies for specific professional departments. These courses may not be taken as general studies electives.

GSSS-517 Sociology of Deviant Behavior
Registration #0515-517
Examination of conditions under which deviance develops and changes over time. Study of individual deviance, deviant subcultures, and the transformation of a deviant identity.
Class 3, Credit 4 (offered annually)

GSSS-519 Women’s Studies: Selected Topics
Registration #0515-519
An analysis of selected factors that contribute to our understanding of the present status of women.
Class 3, Credit 4 (offered annually)

GSSS-520 Educational Sociology
Registration #0515-520
The development of sociological and socio-psychological types of knowledge that have relevance for or logical connections to educational practices. This course will be based on substantive material about social phenomena making up the social order in which the educational systems are operating and by which they are influenced.
Class 3, Credit 4 (offered occasionally)

GSSS-521 Sociological Seminar
Registration #0515-521
A course of minimum procedural as well as substantive structure which approaches matters of contemporary concern from a sociological perspective.
Class 3, Credit 4 (offered annually)

GSSS-522 Medical Sociology
Registration #0515-522
This course is a survey of the sociological aspects of health and illness. Some areas of study will be the definition, causes (etiology) and cure of disease in various societies and social groups.
Class 3, Credit 4 (offered annually)

GSSS-524 Applied Sociology
Registration #0515-524
This course is an effort to provide the student with useful sociological knowledge applicable to solutions of practical problems. The inventory of problems is not fixed beforehand, and the specific course content reflects the problems either already encountered by students or very likely to represent a significant portion of their anticipated professional concern upon graduation. (Admission with instructor’s approval only)
Class 3, Credit 4 (offered annually)

GSSS-525 Sociology of Work
Registration #0515-525
This course will analyze the structural properties, group processes and social meanings of work. Work, like all other social realities, is studied as a product wrought out of social relationships.
Class 3, Credit 4 (offered annually)

GSSS-526 Hispanic Culture
Registration #0515-526
This course will portray objectively the life of Mexican-Americans, Puerto Ricans and other Spanish-speaking groups and the problems of assimilation into a predominantly Anglo-American society.
Class 3, Credit 4 (offered annually)

GSSS-527 Black Culture
Registration #0515-527
This course is designed to analyze past, present and future social policies, programs and practices from their actual effects and predictable effects on Black people. These analyses and solutions will include particular emphasis on how the Black community has been forced to develop mechanisms for coping with the debilitating effects of poverty, environmental deprivation, and institutional racism. The course is designed to present a systematic means of facilitating change in people’s attitudes and behaviors.
Class 3, Credit 4 (offered annually)

GSSS-531 Marriage
Registration #0515-531
Contemporary trends in courtship patterns, male-female relationships and marital systems.
Class 3, Credit 4 (offered annually)

GSSS-569 Human Sexuality
Registration #0515-569
An overview of various aspects of human sexuality including basic physiology, sex roles, sexual myths, legal and social issues, pre-marital and marital sexual behavior, and alternate sexual behavior.
Class 3, Credit 4 (offered annually)

Open Elective or Independent Study
The student has the freedom to select any course within the Institute to create an independent study project subject to the approval of the student’s dean or department chairperson, the faculty sponsor and the dean of the College of General Studies. An independent study course enables the interested student and his or her faculty sponsor to coordinate their efforts on subject and topics that range beyond the normal sequence of course selections. The student may, for example, participate in a volunteer community human service experience.
Credit variable (offered annually)

Graduate Courses

GSSS-519 Women’s Studies: Selected Topics
Registration #0515-519
An analysis of selected factors that contribute to our understanding of the present status of women.
Class 3, Credit 4 (offered annually)

GSSS-520 Educational Sociology
Registration #0515-520
The development of sociological and socio-psychological types of knowledge that have relevance for or logical connections to educational practices. This course will be based on substantive material about social phenomena making up the social order in which the educational systems are operating and by which they are influenced.
Class 3, Credit 4 (offered occasionally)

GSSS-521 Sociological Seminar
Registration #0515-521
A course of minimum procedural as well as substantive structure which approaches matters of contemporary concern from a sociological perspective.
Class 3, Credit 4 (offered annually)

GSSS-522 Medical Sociology
Registration #0515-522
This course is a survey of the sociological aspects of health and illness. Some areas of study will be the definition, causes (etiology) and cure of disease in various societies and social groups.
Class 3, Credit 4 (offered annually)

GSSS-524 Applied Sociology
Registration #0515-524
This course is an effort to provide the student with useful sociological knowledge applicable to solutions of practical problems. The inventory of problems is not fixed beforehand, and the specific course content reflects the problems either already encountered by students or very likely to represent a significant portion of their anticipated professional concern upon graduation. (Admission with instructor’s approval only)
Class 3, Credit 4 (offered annually)

GSSS-525 Sociology of Work
Registration #0515-525
This course will analyze the structural properties, group processes and social meanings of work. Work, like all other social realities, is studied as a product wrought out of social relationships.
Class 3, Credit 4 (offered annually)

GSSS-526 Hispanic Culture
Registration #0515-526
This course will portray objectively the life of Mexican-Americans, Puerto Ricans and other Spanish-speaking groups and the problems of assimilation into a predominantly Anglo-American society.
Class 3, Credit 4 (offered annually)

GSSS-527 Black Culture
Registration #0515-527
This course is designed to analyze past, present and future social policies, programs and practices from their actual effects and predictable effects on Black people. These analyses and solutions will include particular emphasis on how the Black community has been forced to develop mechanisms for coping with the debilitating effects of poverty, environmental deprivation, and institutional racism. The course is designed to present a systematic means of facilitating change in people’s attitudes and behaviors.
Class 3, Credit 4 (offered annually)

GSSS-531 Marriage
Registration #0515-531
Contemporary trends in courtship patterns, male-female relationships and marital systems.
Class 3, Credit 4 (offered annually)
GSHF-702  Film History and Criticism  
Registration #0505-702  
A critical examination of key aspects of film criticism and of the develop-
ment of film as an art. The emphasis of the course will be historical, with
the development of cinema being traced through major films by important
directors. There will be an opportunity to pursue individual interests.
Class 3, Credit 4 (offered occasionally)

GSHF-703  American Architecture  
Registration #0505-703  
An examination of American architecture from the 17th century to the pre-
sent designed for the graduate level of study. Emphasis will be placed on
American building art in the late 19th and 20th centuries.
Class 3, Credit 5 (offered occasionally)

GSHF-705  Theories of Aesthetics and Art Criticism  
Registration #0505-705  
A course for the art-oriented graduate student centering on the student's
search for a supportable and reliable basis for making value judgments
about works of art as well as introducing the student to major concepts in
aesthetics.
Class 3, Credit 4 (offered occasionally)

GSHF-707  Cubism to the Present  
Registration #0505-707  
Cubism as a way of seeing and as an expression of 20th century thinking. Diff-
ferences and similarities with art forms of earlier eras and other cultures will
be discussed.
Class 3, Credit 5 (offered occasionally)

GSHF-708  Oriental Art  
Registration #0505-708  
A seminar exploring the philosophical and cultural perspectives underlying
traditional Far Eastern art as a prelude to examining selected topics in
Indian, Chinese and Japanese art. Emphasis will be placed on the applica-
tion of research techniques and critical methods to an individually selected
area of interest which may serve as a foundation for continuing study.
Class 3, Credit 5 (offered occasionally)

GSHF-711  20th Century American Art  
Registration #0505-711  
An investigation of American art from the Civil War to the present. Emphasis
will be placed on the visual arts but many references will be made to music
and architecture.
Class 3, Credit 5 (offered occasionally)

GSHF-712  Arts and Crafts in Tribal Societies  
Registration #0505-712  
A study of the function of "primitive" art and the techniques of its production,
including the use of clay, stone, fibers, bark, wood, bronze, gold, etc. Hair
styling, body painting and scarification will also be discussed.
Class 3, Credit 5 (offered occasionally)

GSHF-713  Contemporary Issues in Art  
Registration #0505-713  
This course offers the graduate art student the opportunity to investigate
those aspects of 20th century art that question the very nature of art and the
role of the artist in today's and tomorrow's society.
Class 3, Credit 5 (offered occasionally)

GSHF-714  Art: Vision and Concept  
Registration #0505-714  
Though the course will develop chronologically from the Renaissance to the
present, emphasis will be placed on a close analysis of (1) selected works of
art, including paintings, sculpture and architecture, and (2) the development
of the unique oeuvre of selected artists. Topics chosen for study will be lim-
ited in number but treated in depth. Topical choices will be based on richness
and import of the formal and/or conceptual content embodied therein.
Some background in the history of art is helpful but not necessary.
Class 3, Credit 5 (offered occasionally)

GSHF-715  Picasso  
Registration #0505-715  
The impact of Picasso and his circle on 20th century art. Their affinities with
modern scientific and philosophical attitudes will also be discussed.
Class 3, Credit 5 (offered occasionally)
College of Graphic Arts and Photography

School of Photographic Arts and Sciences

All courses in the School of Photographic Arts and Sciences will be offered at least once annually, except as noted.

Biomedical Photography

PHPB-201, 202, 203 Biomedical Photography I
Registration #0901-201, -202, -203
Basic photography program for biomedical photographers with emphasis on theory, craftsmanship and visual communication. Patient photography, close-up and other photography as a foundation for future biomedical photography.
Class 4, Lab. 8, Credit 6/Qtr.

PHPB-211 Survey of Biomedical Photography
Registration #0901-211
Career opportunities, typical biomedical photography settings, types of photography performed. Ethical, professional, and personal relationships with patient, physicians, research and staff personnel.
Class 1, Credit 1 (Spring Quarter only)

PHPB-301, 302, 303 Biomedical Photography II
Registration #0901-301, -302, -303
Further study and practice of theory and principles used in biomedical photography, including photomacrography, photomicrography, hospital photography techniques, infrared and ultraviolet light, biological field studies.
Class 2, Lab. 10, Credit 5/Qtr.

PHPB-331, 332, 333 Preparation of Biomedical Visuals
Registration #0901-331, -332, -333
Study of basic principles of effective visual communication and design. Student will produce slide and slide/tape presentations and exhibition displays.
Lab. F-4, W-4, S-6, Credit 3/Qtr.

PHPB-402 Advanced Photography in Biomedical Communications
Registration #0901-402
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 which are similar to those encountered in biomedical and research institutes.
Class 2, Lab. 4, Credit 4

PHPB-413 Biomedical AV Design and Production
Registration #0901-413
Design, creation, and presentation of 35mm slide and 35mm slide/tape productions as applied to medical and scientific needs. Planning, researching, scripting, production, revision, evaluation. Multiple projector uses. Multiple screen uses. Lap dissolve; programming; graphics; eclectic combination of music, words, and images.
Class 2, Lab. 4, Credit 4

PHPB-501, 502, 503 Senior Thesis Production
Registration #0901-501, -502, -503
An investigation, planning, organization and production of an audiovisual presentation, a learning package or an informational program for a biomedical communications client.
Class 2, Lab. 8, Credit 4/Qtr.

PHPB-551, 552, 553 Special Topics in Photography
Registration #0901-551, -552, -553
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

PPHB-599 Independent Study
Registration #0901-599
A student proposed advanced project sponsored by an instructor. Approval of the proposal by the department chairperson and the director of the school. Available to upper level students with a G.P.A. of 3.0 or greater.
Credit variable

PHPB-781 Medical Illustration Advanced Photography
Registration #0901 -781
This two-semester course is designed for the medical illustration profession. It involves the study of the production of medical illustrations used by contemporary medical illustrators. Students review basic photography techniques including film selection, exposure determination and copying. They explore a variety of specialized photographic techniques such as surgical photography, ophthalmic photography and photomicrography. Assignments are performed in the laboratory and studio as well as in hospital environments, including the surgical suite and the morgue. (Undergraduate photography courses in RIT Medical Illustration or equivalent)
Lab. 4, Lecture 2, Credit 3/Qtr. (offered each year)

Film and Television

PPHF-207 Introduction to Film Making
Registration #0902-207
A basic course for novices. Emphasis is on film making and the use of the medium as an interpretive and expressive form. There is no restriction on the choice of style or content. Learning will take place in a communal, participatory environment so that ideas can be shared and the medium experienced as a total, integrated process.
Short films by contemporary film makers will be screened to familiarize students with the diversity and potential of the medium.
A minimum of two independent film making projects are required of each student. One of these includes the use of sound.
Super 8 equipment and facilities are provided by RIT. Students are responsible for film and processing costs, 1' inch recording tape and editing incidentals. Approximate cost to students is $50.00 for the quarter.
Class, Lab., Studio, 7 hours, Credit 3

PPHF-208 Introduction to Film Making II
Registration #0902-208
An exploration of the diverse contemporary forms used to interpret and express subject matter in film. This course provides an opportunity for the student to make films which exploit traditional and experimental uses of camera, editing, sound, and attitudes toward subject matter. Although complete films can be attempted, the primary objective will be to create short film experiments.
Short films by film makers from the past and present will be screened to familiarize students with the diversity and potential of the medium.
Super 8 equipment and facilities are provided by RIT. Students are responsible for film and processing costs, 1' inch recording tape and editing incidentals. Approximate cost to students is $50.00 for the quarter. (Introduction to Film Making)
Class, Lab., Studio, 7 hours, Credit 3

PPHF-209 Basic Television Production
Registration #0902-209
This is an overview course designed to familiarize students with the entire television production process. Emphasis is placed on design of graphics for television, shooting film and slides which conform to video system limitations and operation of the film-chain. Topics covered include basic visualization, camera operation, portable video equipment, studio production techniques and set design. Limited hands-on experiences include half inch portable systems, "real time" studio production, limited studio electronic assembly techniques and video art techniques. (Permission of the Art and Design Department/SPAS. No previous media experience required)
Lab and lecture required. Class 3 hrs., Lab. 4 hrs. (Spring quarter only)
Class 3, Credit 3

PPHF-301 Conceptual Film Production
Registration #0902-301
A fundamental course in Conceptual Film Production. Film making as a means of interpretation and expression. Film as a medium of communication, as a structural unity, the main elements of structure, organizational principles with special application to the conceptual film form. A combined theoretical-practical approach to the dynamics of the film medium. The student is expected to demonstrate the techniques in film assignments. Production will be in non-sync (Super 8) format. Students furnish film processing; equipment is furnished by the department. Elective to all undergraduate 3rd and 4th year Photographic Illustration or Professional Photography students, and other students by special permission.
Class 2, Lab. 6, Credit 4
PPHG-302 Narrative Film Production
Registration #0902-302
A fundamental course in straight Narrative Film Production. Film making as a means of interpretation and expression with emphasis on the narrative but not to the exclusion of the conceptual film form. Application of the elements of structure and organizational principles appropriate to the main area of emphasis. A combined theoretical-practical approach to the dynamics of the film medium. The student is expected to demonstrate technical and theoretical knowledge of the film making process through a series of film assignments. Production will be in non-sync (Super 8) format. Students furnish film and processing; equipment is furnished by the department. (PPHF-301 or a satisfactory equivalent or by permission of instructor)
Class 2, Lab. 6, Credit 4

PPHF-303 Fiction and Dramatic Short Film Production
Registration #0902-303
A fundamental course in Fiction and Dramatic Short Film Production. Film making as a process of interpretation and expression with an emphasis in the narrative form as applied to fiction and dramatic short films. Included will be the non-fictional narrative and conceptual film form. Application of the elements of structure are organizational principles appropriate to the main area of emphasis. A combined theoretical-practical approach to the dynamics of the film medium. The student is expected to demonstrate technical and theoretical knowledge of the film making process through a series of film assignments. Production will be in non-sync (Super 8) format. Students furnish film and processing; equipment is furnished by the department. (PPHF-302 or a satisfactory equivalent)
Class 2, Lab. 6, Credit 4

PPHF-407, 408, 409 Film History
Registration #0902-407, -408, -409
Survey of developments in film from the early beginnings to the present. Objective is to explore the uses of the medium within a historical, cultural and theoretical context. Each quarter will emphasize a different film form: 407 fiction feature, 408 documentary, 409 experimental and animation. No prerequisites. Admission during any quarter of the academic year.
Class 3, Credit 3/Qtr.

PPHF-411 Visualization and Commercial Film Production
Registration #0902-411
A general review of professional production methods and the theory and practice of visualizing an expressive film continuity. Basic synchronous sound recording is included. (PPHF-303 or permission of the instructor)
Class 2, Lab. 6, Credit 4

PPHF-412 Film Planning and Studio Operations
Registration #0902-412
Introduction to studio crew work and editing systems for professional film. Budgeting and an elementary view of the economics of production are also included. Film writing is introduced and related to production planning (PPHF-411 or permission of the instructor)
Class 2, Lab. 6, Credit 4

PPHF-413 Film Project with Sound
Registration #0902-413
A short (5-10 min. suggested) film is produced by student teams. Advanced sound editing, sound mixing and A&B roll conforming are included; Cameras, lighting and editing equipment are provided but students are expected to provide sensitized goods and processing.
Class 2, Lab. 6, Credit 4

PPHF-417 Portable Video Production
Registration #0902-417
A rigorous "hands-on" introduction to both the practical-technical and aesthetic considerations of portable video production. The emphasis is on single system shooting and post production editing. This includes visual continuity, storyboarding, graphic design, camerawork, portable lighting, sound work and off-line insert editing. Lectures cover the conceptualization, how the electronic image is formed, displayed and recorded, audio mixing and editing. In-class critiques, outside readings and viewings supplement the production experience.
Class 2, Lab 4, Credit 4

PPHF-418 Studio and Documentary Video
Registration #0902-418
An introduction to studio "real time" television. Acquiring skills in pre-production planning, scriptwriting, staging, lighting, studio producing and directing skills. Lectures include broadcast history, rating, cable and satellite television, the viewing and discussion of several commercial and independent productions and a tour of a local broadcast affiliate. In addition to individual studio productions and a "lab" news show, each student is also expected to refine the skills learned in the first quarter by producing an independent mini-documentary due at the end of the quarter (417 or permission of instructor)
Class 2, Lab. 4, Credit 4

PPHF-419 Advanced Video Production
Registration #0902-419
Lab work explores television remotes, advanced studio lighting, the still and motion picture interface, the technical limits of the video image, advanced editing, video art and image processing. Lectures include production budgeting, Public Broadcasting, copyright, the job market, educational/industrial television, experimental video and computer interfacing. The major spring project, a final "portfolio production", concludes the broad based three quarter program. (417 and 418)
Class 2, Lab. 4, Credit 4

PPHF-421, 422 Writing for Film and Television
Registration #0902-421, -422
This course explores the writing of non-fiction and fiction for theatrical and non-theatrical films, and television. Experience in the writing of fiction concentrates on the elements of dramatic construction. The exploration of non-fictional writing examines information gathering techniques and methods of investigation. Both non-fiction and fiction are treated as expository, story-telling forms. Students are responsible for writing film or television scripts on subjects of their own choosing and for completing several brief written exercises in areas such as character, dialogue, the interview, suspense, and plot. Although this course is designed primarily to meet the needs of film and television majors, it is not restricted to those students.
Class 2, Lab. 3, Credit 3 (Winter and Spring quarter)

PPHF-424, 425, 426 Animation and Graphic Film Production
Registration #0902-424, -425, -426
An introduction to the techniques and practice of graphic and animated film production. This course provides training and practical experience in a wide variety of approaches to single frame motion picture production. Students produce a number of short film exercises utilizing both existing and original artwork. Some techniques covered in the course are: optical printer, direct modification of the film surface, cell, ink, and paint animation, and kinestasis. Screenings of professionally made films will illustrate each technique. In the third quarter students produce a short animated film with sound using techniques of their own choosing. Proficiency in drawing is not required. No prerequisites. (Fall, Winter, Spring)
Class 3, Lab. 2, Credit 4

PPHF-520 Sound Recording
Registration #0902-520
Specialized information and work in sound. To give information and lab work beyond the regular course. To encourage the beginning of vocational level work in sound. Each student prepares a mixed sound track to professional quality standards.
Class 2, Credit 2

PPHF-521 Visualization for Film and Television
Registration #0902-521
A basic course in the mechanics and aesthetics of visualization for film and television. Emphasis is on editing, camera, and subject dynamics and their interrelationship. Combined theoretical-practical approach to the development of visual images for film and television.
Class 2, Credit 2

PPHF-522 Film Directing
Registration #0902-522
An in-depth penetration into the role of the film director as a specialization and a profession in the film making process. Included will be the related organic nature of the structure and function of the film crew and the film; the emerging role of the contemporary director; the categorization of the roles of the film crew; the director's relationship to each category; the director as a creative artist; viewing of films of famous directors and observation of a director in action. (PPHF-303, 413, 419 or equivalents)
Class 2, Credit 2
A program in basic photography with emphasis on craftsmanship, theory, variability, quality control, and photographic effects. An independent study project is required.

Class 2, Lab. 1, Credit 3/Qtr.

Professional Photographic Illustration

PPHL-300 Photography II, BFA Transfer

A concentrated 10-week summer course for students entering the transfer program in photographic illustration. Students must have had previous photographic experience, design and an AAS degree (or its equivalent) from another institution. All selections will be verified by portfolio. This course is designed for exclusive admission into the complete 3rd/4th year BFA program.

Credit 18

PPHL-301, 302, 303 History and Aesthetics of Photography

Covering the history and aesthetics of photography from 1839 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 their particular period, i.e., daguerreotypes, calotypes, ambrotypes, etc. Student projects are designed to illuminate phases of photographic history best understood by personal visual exploration.

Class 3, Credit 3/Qtr.

PPHL-311, 312, 313 BFA Photography II

This related group of courses is currently required of all second-year photography students. Emphasis is placed on a unified learning experience which serves as a further cognitive foundation to upperclass study. One course is a study of large-format photography in black and white; another is a study of color photography, with laboratory practice; the other is a study of studio photography with emphasis on electronic flash lighting. Combined, these courses will assist in making a selection of one of the four areas of concentration offered to upperclass degree candidates. (PPHG-200 or PPHG-203)

Class 3, Lab. 9, Credit 6/Qtr.

PPHL-401, 402, 403 Photography As a Fine Art I

The major emphasis is placed on the individual's learning to identify and articulate personal response to his environment through the medium of photography. Students design their own projects and work under the guidance of the professor. Traditional silver, as well as non-silver printing techniques, may be utilized. (PPHL-303)

Class 2, Lab. 8*, Credit 4/Qtr.

PPHL-411, 412, 413 Photожournalism I

A journalistic photography for mass media publication with emphasis on the development of specialized skills in projects dealing with various aspects of reportage and all related editorial problems from caption writing, law and history, to organizational structures, printing processes, layout and design. Special emphasis is placed on the story as a total concept from inception to finished layout. Research and origination of material as well as the study of publications is explored. (PPHL-313)

Class 2, Lab. 8, Credit 4/Qtr.

PPHL-421, 422, 423 Nature Photography

A course designed to help students become more concerned and visually aware of the natural environment. This is accomplished principally by direct involvement through study and photography of major natural forms. The student also acquires valuable basic understanding of the natural world, special photographic techniques and a broader concept of people's attitudes toward and impact on their environment. (PPHG-203)

Class 2, Lab. 8*, Credit 4/Qtr.

PPHL-431, 432, 433 Illustration Photography I

Advanced and extended study of the making of photographs in the studio and on location. Emphasis is on the growth of the imagination and aesthetic aspects of creating illusions. Investigation into the photographic medium as a means of communicating ideas. The development of individual vision and self expression through the disciplines of photography, both in black-and-white and color images. (PPHL-311, 312, 313)

Class 2, Lab. 8*, Credit 4/Qtr.
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<td>PPHL-437, 438, 439</td>
<td>Visual Communications Workshop</td>
<td>#0904-437, -438, -439</td>
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<td>PPHL-440</td>
<td>News Writing and News Reporting</td>
<td>#0904-440</td>
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<tr>
<td>PPHL-460</td>
<td>A seminar approach offered on demand when adequate numbers of students and faculty desire to investigate specialized topics not normally covered in the standard curriculum. Emphasis will be on development of awareness of the other arts. Students will also be introduced to the practical applications of photography in their own work. Credit 4 (offered every other term).</td>
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<tr>
<td>PPHL-501, 502, 503</td>
<td>Photography as a Fine Art II Registration #0904-501, -502, -503</td>
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<td>PPHL-511, 512, 513</td>
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<td>PPHL-599</td>
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<td>PPHM-201, 202, 203</td>
<td>Basic Principles of Photography</td>
<td>#0905-201, -202, -203</td>
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<tr>
<td>PPHM-204</td>
<td>Orientation to Production Photographic Processing and Finishing Management Lab Prior to having to assume responsibility for the facilities, equipment, practices and procedures of the processing and finishing management lab, students will be introduced to the practical applications of photography in their own work. Credit 4 (spring only).</td>
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<tr>
<td>PPHM-300</td>
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<td>Production Processing and Finishing Management</td>
<td>#0905-301, -302, -303</td>
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<td>PPHM-310</td>
<td>Survey of Production Processing and Finishing</td>
<td>#0905-310</td>
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<td>PPHM-320, 321</td>
<td>Mechanics of Photographic Processing and Finishing</td>
<td>#0905-320, -321</td>
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<td>PPHM-401, 402, 403</td>
<td>Photographic Process Control</td>
<td>#0905-401, -402, -403</td>
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<tr>
<td>PPHM-410, 411, 412</td>
<td>Training and Supervision of Photographic Processing and Finishing Laboratory Personnel</td>
<td>#0905-410, -411, -412</td>
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*Lab hours may not be scheduled and are to be completed in available time.
PPHM-501, 502, 503 Senior Seminar in Production Processing
Registration #0905-501,-502,-503 and Finishing Management
This course is designed to help the photo management student make last minute preparations for entering the world of work. Procedures for obtaining employment, i.e., preparing resumes, taking interviews, plant visitations, etc., will be covered in detail. Information on the latest business practices and procedures will be discussed in depth as well as the current condition of the processing and finishing market. Prerequisites: senior standing.

Class three times a quarter for three quarters. Credit 1

PPHM-506 Theory of Corrective Color Printing
Registration #0905-506
A study of characteristics of color negatives as they relate to corrective color printing. Theory and methods of color and density correction will be presented. The attributes of high, low and variable correction levels will be discussed. Various approaches to automatic classification will be studied. The students will be introduced to matrix control of color printing as utilized in digital computer controlled printing equipments. (PPHM-301, 302)

Class 2, Credit 2 (Spring only)

PPHM-511, 512, 513 Advanced Production Processing
Registration #0905-511, -512, -513 and Finishing
This course taken during the last year of study provides the student with an opportunity to study in depth, on an independent basis, those areas of processing and finishing which the student finds most interesting. This course may also be used to strengthen those areas of interest in which the student feels a weakness. (PPHM-303)

Lab. 12, Credit 4/Qtr.

PPHM-520 Operation, Care and Maintenance of Photofinishing Equipment
Registration #0905-520
This course will provide the student with an opportunity to gain a thorough understanding of the mechanical, optical, and electrical aspects of the major pieces of photofinishing equipment. This course will employ the latest techniques in programmed learning, demonstrative hands-on experience, and lectures so that the student will be able to operate and perform basic care and maintenance on major pieces of processing and finishing equipment. Broad principles learned here will be applicable over a wide range of equipment. (PPHM-Senior standing)

Lab. 3, Credit 1 (Winter only)

TECHNICAL PHOTOGRAPHY (PPH): At the time this catalog was developed, the new technical photography program was awaiting state approval. For more information please contact Dr. Les Stroebel, School of Photographic Arts and Sciences, Rochester Institute of Technology, P.O. Box 9867, Rochester, N.Y. 14623.

Professional Photography

PPHP-301, 302, 303 Photography II
Registration #0906-301, -302, -303
Advanced applied photography in black-and-white and color with emphasis on craftsmanship, problem solving, and visual communications. Further emphasis is placed on the development of the student’s ability to apply creative thinking and contemporary techniques in executing meaningful and effective professional photographs for a wide variety of media and utilization. (PPHP-203)

PPHP-311, 312, 313 Basic Color
Registration #0906-311, -312, -313
Color photographic image-making based on the study of color principles, color vision and color photographic material and processes. Part of this course is a visual design workshop which explores what constitutes an effective color scheme in composition, awareness, perception and sensitivity. Color transparencies are emphasized in the design workshop, and practices in negative-positive printing, negative analysis, interative making, transparency duplicating, and the use of special processing techniques are used to emphasize theory. (PPHP-213)

Class 2, Lab. 4 Credit 3/Qtr.

PPHP-395 Photo Electronic Workshop
Registration #0906—395
Introductory hands-on course covering basic electronic and computer devices particularly useful in photographic applications. The emphasis is on learning to read circuits, to understand the basic electronic symbols and principles, to learn to make printed circuit boards. Using assembly techniques such as soldering, wire wrap, and proto board to construct a few projects of the student's choice from an available list which includes: light meters, flash meters, slave triggers, sound triggers, timers, intervalometer, basic electronic flash, counters and time delays, etc.

Class 4, Credit 3

PPHP-408 Scientific and Technical Applications of Photography
Registration #0906-408
An introduction into the field of photography as it applies to technical problems solving. Event timing, photo sensing, visible and invisible radiation recording are presented in class and laboratory projects. (PPHP-303, PPHP or PPHL-313)

Class 2, Lab. 8, Credit 4

PPHP-409 Corporate and Special Interest Publications
Registration #0906-409
A survey of this type of publication with particular emphasis on the photographic problems involved. Skill building assignments to improve competence and an introduction into the problems of the art director, editor, printer, layout person, and writer form the basis on the course content. (PPHP-303, PPHP or PPHL-313)

Class 2, Lab. 8, Credit 4

PPHP-421, 422, 423 Advertising Photography
Registration #0906-421, -422, -423
A course built strictly to the standards of professional photography. Only those students who seriously aspire to be professional craftsmen should enroll. The assignments are specific and vary from strictly commercial to advertising illustration. In addition, the student is encouraged to specialize in the direction of his or her own natural ability and interests. Approximately 2/3 of the photography will be in color. (PPHP-303 and PPHP-313, PPHL-313)

Class 2, Lab. 7*, Credit 4/Qtr.

PPHP-431 Forensic Photography
Registration #0906-431
The use of photography in forensic application for business and industry, surveillance, photographic evidence, forgery detection, safety. (PPHP-203)

Class 2, Lab. 6, Credit 4 (Spring only - on sufficient demand)

PPHP-441, 442, 443 Advanced Color Printing
Registration #0906-441, -442, -443
This course is designed to give the student an advanced study in color techniques and theory in relation to quality and creative use of photographic materials. The student may choose a section for intensive study such as the dye transfer process, quality control methods in printing and processing and special masking. PPHP-313 or equivalent is required. (Permission of the instructor)

Lecture 1, Lab. 6, Credit 4/Qtr.

PPHP-461 Micrographics
Registration #0906-461
A one-quarter course designed to acquaint the professional photography student with a career in the micrographic industry. It is directed to familiarize the student with microimaging techniques and materials utilized in microfilm production situations as well as in media production situations where the creation and reproduction of illustrative imagery is of prime importance. (PPHP-303)

Class 1, Lab. 5, Credit 4 (offered on sufficient demand)

PPHP-501, 502, 503 Industrial Photography Seminar
Registration #0906-501, -502, -503
Depending on the student's interest, the course is subdivided into two areas of emphasis.

(a) Instrumentation; a continuation of PFHP-408 to a greater depth on a seminar basis. (PPHP-408 or permission of the instructor)

(b) Corporate and Special Interest Publications; a continuation (PPHP-409 or permission of the instructor)

Class 2, Lab. 3, Studio 5, Credit 4/Qtr.

PPHP-521, 522, 523 Advanced Color Seminar
Registration #0906-521, -522, -523
This course offers the student an opportunity to work relatively independently to complete majors in advertising, architectural, illustration photography or portraiture. Individual growth and the development of personal style are stressed. The student is assisted in preparing a portfolio of professional photographs. Only those students who seriously aspire to be professional craftsmen should enroll. The assignments are specific and vary from strictly commercial to advertising illustration. In addition, the student is encouraged to specialize in the direction of his or her own natural ability and interests. Approximately 2/3 of the photography will be in color. (PPHP-303 and PPHP or PPHL-313)

Class 3, Lab. 4, Credit 4/Qtr.

*Lab hours may not be scheduled and are to be completed in available time.
PPHP-541 Basic Portrait Photography
Registration #0906-541
Introduction to basic professional portraiture, the study of the art of lighting (indoors and outdoors), posing, composition, makeup, camera techniques, mounting and communication. (PPHP-303, PPHP-313 or PPHL-313)
Lecture 3, Lab. 2, Credit 4 (Fall, Winter, Spring)

PPHP-542 Advanced Portrait Photography
Registration #0906-542
Introduction to color harmony, use of "props," backgrounds, vignetting, candid wedding, bridal portraiture, full lengths, groups, multiple exposure, business procedures, sales, pricing, and public relations. (PPHP-541)
Lecture 3, Lab. 2, Credit 4 (Winter only)

PPHP-543 Contemporary Portrait Photography
Registration #0906-543
The study of the finer arts of lighting and posing, the classical approach to portraiture, environmental portraiture on location or in the studio, mood in portraiture, coordinating clothing, props, and backgrounds for pleasing results in both low and high key portraiture.
Lecture 3, Lab. 2, Credit 4 (Spring only)

PPHP-551, 552, 553 Special Topics in Photography
Registration #0906-551, -552, -553
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. (PPHP-303)
Credit Variable

PPHP-561, 562 Perceptual Principles for Photographers
Registration #0906-561, -562
An introductory course into the ways we select and organize pictorial information based primarily on gestalt principals. The emphasis is not on the technical aspects of the photographic process (the medium) but rather on the communicative aspects (the message). (No prerequisites)
4 Qtr. Cr.

PPHP-599 Independent Study
Registration #0906-599
A student proposed advanced project sponsored by an instructor. Approval of the proposal by the department chairperson and the director of the school. Available to upper level students with a G.P.A of 3.0 or greater.
Credit Variable

Photographic Science and Instrumentation
The two courses, PPHS-200 and PPHS-210, are special intensive summer courses designed for students transferring into the Photographic Science and Instrumental Program at the third year level, and for others who desire a background in photographic science and instrumentation at an introductory engineering level. Students normally take both courses concurrently.

PPHS-200 Fundamentals of Photographic Science I
Registration #0907-200
An intensive course presenting the subject matter normally taken by photographic science and instrumentation students during their second year. Topics include the basic physics and chemistry of photo-sensitive systems, characteristics of radiation, introduction to sensitometry and tone reproduction, and applied photography. (Permission of the department)
Credit 9 (Summer only)

PPHS-201, 202, 203 Photography for Scientists and Engineers
Registration #0907-201, -202, -203
An introduction to the theory and applications of radiation-sensitive materials and systems. Physical properties of photographic materials, characteristics of radiation, sensitometric properties of photo-sensitive materials processing chemistry, and fundamentals of black-and-white and color photography.
Class 3, Lab. 3, Credit 4/Qtr.

PPHS-210 Fundamentals of Photographic Science II
Registration #0907-210
An intensive course presenting the subject matter normally taken by photographic science and instrumentation students during their second year. Topics include the chemistry and physics of black-and-white and color materials and processes as a continuation of topics covered in PPHS-200. (Permission of the department and PPHS-200 or PPHS-203)
Credit 9 (Summer only)

PPHS-303 Photographic Instrumentation
Registration #0907-303
Introduction to the use of photographic recording methods to obtain space and time information from object fields; principles for selection of camera, lens parameters, recording material and recording rate; the use of time and space references to facilitate date retrieval. (PPHS-203)
Class 2, Lab. 6, Credit 4

PPHS-312 Applied Processing
Registration #0907-312
Problems in applied processing and the application of analytical chemical techniques to the control of black-and-white and color processing solutions. Processing faults, and image restoration, trouble shooting, archival permanence, ecology and processing machine operation. Statistical techniques application to machine control. (SCHG-206, PPHS-203)
Class 2, Lab. 6, Credit 4

PPHS-313 Color Systems
Registration #0907-313
Introduction to color and color imaging systems; systems of color specification; additive and subtractive trichromatic systems of color recording and reproduction; the technology of color photography; sensitometry and densitometry of color materials; introduction to graphic reproduction and electronic systems. Laboratory work in the exposure and evaluation of color photographic materials. (SMAM-305, PPHS-201 through PPHS-312)
Class 3, Lab. 3, Credit 4

PPHS-401 Radiometry
Registration #0907-401
The course serves as an introduction to the physics of light, its generation, propagation, absorption and measurement. This is combined with an introduction to the human visual process, to general photometry and radiometry, to light sources and to light receivers. (SMAM-205, SPSP-313, PPHS-311)
Class 3, Lab. 6, Credit 5

PPHS-402 Image Microstructure
Registration #0907-402
Introduction to image formation and structure; mathematical models for spread functions of image-forming elements and detectors; superposition and convolution; noise; sinusoidal response functions; figures of merit; characteristics of instruments used for small-scale image measurements. Laboratory work in microdensitometry and subjective image evaluation. (SMAM-305, PPHS-203, SPSP-313)
Class 3, Lab. 5, Credit 5

PPHS-404 Introduction to Scientific Research
Registration #0907-404
A course for third-year students in photographic science and instrumentation designed as preparation for the fourth-year research project. Project selection and the use of scientific literature; preparation of proposals; research notebooks; patents; considerations in data collection and analysis; written and oral presentations. (Third-year status in Photographic Science and Instrumentation or permission of the instructor)
Class 2, Credit 2/Qtr.

PPHS-411 Statistical Inference
Registration #0907-411
Hypothesis testing, confidence intervals, and sample size for variables; introduction to analysis of variance and regression analysis.
Class 2, Lab. 2, Credit 3

PPHS-412 Design of Experiments
Registration #0907-412
Basic designs for experiments, objectives, conclusions, error estimation, data analysis; continuation of analysis of variance and regression analysis; response surfaces and factorials.
Class 2, Lab. 2, Credit 3

PPHS-413 Statistical Quality Control
Registration #0907-413
Basic probability, control charts, sampling plans, power and O.C. curves, and modern applications of product and process control.
Class 2, Lab. 2, Credit 3

PPHS-421, 422, 423 Photographic Chemistry
Registration #0907-421, -422, -423
The chemistry and photographic properties of photographic emulsions and developer solutions at the intermediate level; topics in physical, organic, and analytical chemistry necessary to the continued study of photographic science. (PPHS-312, SCHG-207)
Class 3, Lab. 3, Credit 4/Qtr.
PPHS-501, 502, 503 Registration #0907-501, -502, -503
An investigation of a problem in photographic science of engineering including planning and execution of experiments, statistical data analysis, and reporting results orally and in a written paper. (PPHS-404, 413)
Class 2, Lab. 2 (Fall)
Class 2, Lab., 6, Credit 4 (Winter and Spring)

PPHS-511, 512, 513 Optical Instrumentation Registration #0907-511, -512, -513
Principles of geometrical and physical optics, image evaluation, optical instruments, and instrumentation. (SMAM-306, SPSP-313, PPHS-303)
Class 3, Credit 3/Qtr.

PPHS-521, 522, 523 Image Systems and Evaluation Registration #0907-521, -522, -523
An analytical approach to analysis and evaluation of photo-optical and other images recording systems; objective and subjective evaluation techniques and their correlation. The use of convolution, correlation, autocorrelation, and Fourier methods in the analysis of the image recording systems. Laboratory work in the design of photo-optical systems. (PPHS-402, SMAM-305, SPSP-313)
Class 2, Lab. 6, Credit 4 (Fall)
Class 2, Credit 2 (Winter and Spring)

PPHS-531, 532, 533 Theory of the Photographic Process Registration #0907-531, -532, -533
An advanced course in photographic theory: sensitivity, emulsions, latent image, and processing of both black-and-white and color materials; chemistry and physics of selected non-silver and other non-conventional processes (PPHS-423, SPSP-313)
Class 3, Credit 3/Qtr.

PPHS-551, 552, 553 Special Topics in Photographic Science Registration #0907-551, -552, -553
Topics of special interest, varying from quarter to quarter, selected from the field of photographic science and not currently offered in the Division's curriculum. Specific topics are announced in advance. (Not offered each quarter) Consult staff chairman of the Photographic Science Division
Class, Credit: variable

PPHS-599 Independent Study Registration #0907-599
Faculty directed study of appropriate topics on a tutorial basis. Approval of the proposal by the staff chairman of the Photographic Science Division required.
Class, Credit: variable

PPHS-600 Principles of Photographic Science Registration #0907-600
A course intended for students who have completed their undergraduate programs in engineering or the sciences and who desire to prepare themselves for entry into the graduate program in photographic science and instrumentation or who desire a working knowledge of photographic science at an undergraduate level. It is an intensive course, assuming working knowledge of undergraduate mathematics, physics and chemistry. Course topics include radiation and radiometry, properties of radiation-sensitive materials, chemistry of photographic processing, sensitometry, tone reproduction, principles of color measurement, color photographic systems, image microstructure, and photographic instruments. The course includes both lectures and the laboratory work. (Registration requires consent of the graduate coordinator.)
Credit 15 (Summer only)
(Not applicable to the 45 required graduate credits in the photographic science and instrumentation graduate program)

PPHS-601, 602, 603 Principles of Photographic Science Registration #0907-601, -602, -603
Equivalent to PPHS-600, but offered in the evening and Saturdays during the regular fall, winter, and spring Quarters. (Preliminary admission to the MS program in Photographic Science or consent of graduate coordinator. Not offered every year. Consult coordinator of photographic science graduate program.)
Credit 5/Qtr.
(Not applicable to 45 required graduate credits)

Master of Fine Arts in Photography

PPHG-701, 702, 703 History and Aesthetics of Photography Registration #0903-701, -702, -703
An intensive inquiry into the history and aesthetics of photography to the present. Some of the areas of exploration: the rise and development of portrait, architectural and landscape photography in the 19th and 20th centuries; a survey of old and recent processes and how they affect the image-making of their particular period; exploring new frontiers; the photographers of the geological and geographical U.S. Surveys and NASA moonscapes; ‘straight’ photography vs. pictorialism: 135 year battle; the document and Robert Frank’s ‘Americans’ and the evolution of color photography.
Credit 3/Qtr.

PPHG-705, 706, 707 Student/Faculty Seminar Registration #0903-705, -706, -707
An all-purpose weekly meeting to facilitate communication among members of the MFA community and to introduce them to the resources available on the campus and in the community.
Credit 1/Qtr.

PPHG-720, 721, 722 Photographic Workshop Registration #0903-720, -721, -722
Each faculty member offers a different opportunity for students to explore the multiplicity of ways that photography can be used as a vehicle for expression and for communication. Visual research, group critiques, seminars, field trips, studio and laboratory practice are used.
Credit 4/Qtr.

PPHG-725, 726, 727 Photography Core Registration #0903-725, -726, -727
Major emphasis is placed on the individual’s learning to generate and intensify his or her personal statement through photography. Some of the projects are assigned while others are selected by the candidate.
Credit 4/Qtr.

PPHG-730, 731, 732 Cinematography Registration #0903-730, -731, -732
Film making workshop. Individually planned studies in cinematography, as determined by faculty-student consultation, group critiques, seminars, studio and laboratory practice, field trips.
Credit 3-9/Qtr.

PPHG-740, 741, 742 Photographic Museum Practice Registration #0903-740, -741, -742
Museum internship workshop, still or motion picture; research, assigned projects, seminars in history, function and administration of museums, with emphasis on photographic curatorial duties; practice in exhibition planning and development; field trips. This cannot be selected as a minor concentration.
Credit 3-9/Qtr.

PPHG-750, 751, 752 Special Topics Workshop Registration #0903-750, -751, -752
Advanced topics of current or special interest designed to broaden and intensify the student's ability to use photography as a means of communication and expression.
Credit 3-9/Qtr.

PPHG-755 Applied Sensitometry Registration #0903-755
This course presents relevant sensitometry and photographic theory, principles and practices in a manner sensitive to the background and needs of a fine art photographer.
Credit 4/Qtr.

PPHG-756 Zone System Principles Registration #0903-756
The application of selected sensitometric and perceptual principles to the understanding and practice of Zone System techniques for calibration and visualization.
Credit 4

PPHG-760 Reception & Photography Registration #0903-760
An advanced course which provides an applied psychological framework for the ways we select, code, organize, store, retrieve and interpret visual images and explores how photographs relate to art and perception.
Credit 4 (offered on sufficient demand)
School of Printing

All School of Printing courses are offered at least once annually, except as noted.

Management Courses

PPRM-201 Introduction to Technical Writing
Registration #0910-201
Basic approach to fundamentals of modern technical writing; review of English and writing skills; consideration of principles, techniques, form and style.
Class 3, Credit 3

PPRM-210 Financial Controls I
Registration #0910-210
An introductory course in current estimating practices; the development of hourly costs and production rate standards; costs of materials and outside services; one-color offset press and flat sheet bindery operations; introduction to flat sheet imposition and pre-planning techniques; obtaining and interpreting specifications; design and use of estimating forms; pricing for a profit margin preparing the quotation. (PPRT-311, PPRM-210)
Class 4, Credit 4

PPRM-401 Estimating I
Registration #0910-401
Continuing study of sheet-fed offset lithography estimating; multi-color offset presses and signature-related bindery operations; “signature” imposition; camera, layout, stripping and plate processing production standards; phototypesetting and mechanical artwork costs; color separations and the costs associated with process color printing; finishing operations; the application of the computer to estimating procedures. (PPRM-301, PPRM-401, PPRT-312)
Class 4, Credit 4

PPRM-402 Estimating II
Registration #0910-402

PPRM-403 Printing Production Management I
Registration #0910-403
Examines the non-technological functions of production as components of a system, emphasizing organisational alternatives relating to human factors. Includes such topics as organisation, systems approach, decision making, production planning and control, purchasing, inventory control, quality control, methods analysis, work measurement. Some simple analytical models based on graphs or elementary algebra are introduced.
Class 3, Credit 3
Printers employ certain analytical models that can be used practically in an ordi-

dary printing company. Includes such topics as decision theory, probability

corcepts, mathematical modeling, break-even and economic-order analy-

sis under conditions of certainty and uncertainty, linear programming using computer, Markov chains, waiting line analysis, game theory, simulation. These topics are considered from conceptual and problem solving view-

points without emphasis on mathematics beyond college algebra.
Class 4, Credit 4

PPRM-502
Financial Controls II
Registration #0910-502
Cost accounting systems; measurement and allocation of manufacturing and non-manufacturing costs; uses of full cost information; differential accounting and alternative choice decisions; capital investment decisions; budget preparation, standard cost, variance analysis and the management control process. (PPRM-210)
Class 4, Credit 4

PPRM-506
Business Law
Registration #0910-506
Elements of the laws of contracts, agency, sales, negotiable instruments, partnerships, corporations, taxes, insurance, libel, copyright, and other laws pertaining to business, printing and publishing.
Class 3, Credit 3

PPRM-507
Computer Estimating Workshop
Registration #0910-507
The design and writing of computer estimating algorithms; use of a full-scale computer estimating system; estimating for web-fed offset presses; estimat-
ing for non-lithographic printing processes; business forms and book manu-

facturing industries practices; addressing, mailing and order fulfillment; pre-

planning and break-even analysis; techniques for competitive estimating and pricing. (PPRM-402 and ability to program in BASIC required)
Class 4, Credit 4

PPRM-509
Economics of Production Management
Registration #0910-509
Intended as a seminar in management for seniors, this course combines readings in managerial economics with case studies, most of which de-

scribe real printing company situations involving price, product or equipment decisions. Students analyze situations; prepare, present and defend argu-
mments for specific course of action. The student will find it helpful but not mandatory to have completed courses in Financial Controls I & II, Printing Production Management I & II, Principles of Economics.
Class 4, Credit 4

PPRM-510
Personnel Relations II
Registration #0910-510
Advanced study of employer-employee relationships, introduction to major management concepts as they relate to the printing field. Management functions and organization theory are considered in the light of behavioral science. Supervisory practices are analyzed. (PPRM-502)
Class 4, Credit 4

PPRM-511
Labor Relations in Graphic Arts
Registration #0910-511
History and background for organized labor movement; makeup and char-

acteristics of the contemporary labor force; collective bargaining and its effects on wages, hours, and conditions of work; the process of negotiating, administering, interpreting, applying, and enforcing the labor-management contract within the graphic arts area of the modern industrial society
Class 4, Credit 4

PPRM-512
Collective Bargaining in the Graphic Arts
Registration #0910-512
A study of the strategies and tactics of collective bargaining as applied to the graphic arts. Wage issues, fringe issues, and such concepts as seniority, discipline, grievance procedures, and managerial prerogatives are consi-

dered.
Class 3, Credit 3 (offered every other year)

PPRM-513
Sales in the Graphic Arts
Registration #0910-513
Explores economic, psychological and sociological bases of selling, with emphasis on customer and salesman interplay as well as techniques and practices of creative salesmanship in graphic arts companies. This course aims at benefiting both students considering a career in sales and those who will otherwise work with salesmen, either by supporting their company’s salesmen in plant action or by buying from outside salesmen.
Class 4, Credit 4

PPRM-514
Newspaper Management
Registration #0910-514
Consideration of personnel, organization, finance, maintenance, advertis-
ing, circulation, and other sources of revenue as they pertain to the metro-
politan press; problems and practices of plant supervision.
Class 4, Credit 4

PPRM-515
Legal Problems of Printing
Registration #0910-515
Review of U.S. Constitutional law decisions as they relate to the unique rights granted the graphic arts industry. Cases cover Article I, Section 8, and the First Amendment plus the limitations of libel, obscenity, privacy and state and federal relations.
Class 4, Credit 4

PPRM-516
Marketing in the Graphic Arts
Registration #0910-516
Primarily from a printing industry viewpoint, the class explores the marketing concepts (organizing a team to find out what customers want to buy and then produce it at a profit). Students examine marketing functions and consider alternative ways to perform them in various company situations.
Class 4, Credit 4

PPRM-518
Purchasing in the Graphic Arts
Registration #0910-518
Role of the purchasing agent in the printing plant. Methods of procurement, purchasing policies and sources of supply. Characteristics of paper, ink, sensitized materials and other graphic arts supplies. Inventory control, economic order quantity, role of trade shops, make or buy decisions, blanket orders, consignment agreements, capital investment decisions and the pur-

chase order as a legal document.
Class 4, Credit 3

PPRM-551
Special Topics-Printing
Registration #0910-551
A management, or management related, course used to present and inves-
tigate special topics not normally covered in the curriculum on a "one-time" basis. Guest lecturers such as industry leaders as well as regular faculty are used to conduct this course. Subject to be covered is announced in advance.
Credit varies/Otr.

PPRM-590
Senior Seminar
Registration #0910-590
Student selects and develops, with approval from a faculty sponsor, an independent study project of his or her own design. Project and amount of credit assigned must have final approval from the director of the School of Printing. (Generally seniors with qualifying grade point average)
Credit 1 to 5

Technical Courses

PPRT-200
Introduction to Printing
Registration #0911-200
For packaging science students; study of different printing processes; ana-

lysis of process advantages and disadvantages relative to a variety of applica-

tions; examination of procedures for each process, from design through finished product; practice of basic operations necessary for the production of a simple package printing job.
Class 2, Lab. 3, Credit 3

PPRT-201
Typography I
Registration #0911-201
Conventional rules of good traditional typography are reviewed through familiarization with basic terminology, type classification and typeface recognition; course includes lectures and laboratory exercises.
Class 2, Lab. 3, Credit 3
PPRT-202 Composition Technology
Registration #0911-202
A study of the use, operation, and application of machine principles and mechanisms as related to hot metal and phototypeset printing; laboratory projects in setting composition photographically and in hot metal; utilization of various tape systems.
Class 2, Lab. 3, Credit 3

PPRT-203 Layout and Printing Design
Registration #0911-203
Practical application of theory relating to typography and idea development in solving printing design problems. Introduction of basic artistic techniques for rendering. Application of requirements and principles of layout design as applied to commercial printing and advertising. Analyzing alphabetiques, pictorial, and related graphics and their interpretation into printing tasks and procedures.
Class 2, Lab. 3, Credit 3

PPRT-204 Relief Press
Registration #0911-204
An introduction into the theory and practices used in printing from relief image plates. Letterpress operations are covered when applicable or related to flexographic printing. Emphasis is placed on the elements of flexography from art work through plates, inks and presswork. Printing is done on a wide variety of substrates. General study of trends and applications of the relief printing process is advanced.
Class 2, Lab. 3, Credit 3

PPRT-205 Gravure Printing
Registration #0911-205
Introductory course designed to survey the gravure printing process and the study of related information regarding applications, techniques, equipment, materials and supplies. The course is conducted by means of lectures, class discussions, demonstrations and supervised laboratory exercises using a 4-color Champlain Web Press.
Class 2, Lab. 3, Credit 3

PPRT-206 Reproduction Photography
Registration #0911-206
A basic course in the fundamental principles, procedures, techniques, and applications of the photographic process as it is related to the production of film negatives or film positives for the major printing processes.
Class 2, Lab. 3, Credit 3

PPRT-207 Printing Plates
Registration #0911-207
An introductory course in the principles and practices of platemaking for letterpress, flexographic, planographic, and gravure printing processes. It covers a survey of major printing processes with emphasis on their plate characteristics and platemaking requirements; important physical as well as chemical properties that are applicable to the plate image-forming process; laboratory work that deals with plate processing variables; also an introduction to recent developments in printing plate technology.
Class 2, Lab. 3, Credit 3

PPRT-208 Lithographic Press
Registration #0911-208
An introductory study of the principles and methods of offset presswork; press functions; operations and care of presses; exercises in running simple jobs.
Class 2, Lab. 3, Credit 3

PPRT-209 Screen Printing
Registration #0911-209
Theory and practice of screen printing covering areas such as preparation of positives, frames, fabrics, stretching of fabrics, stencil methods, fillers, squeezing, inks, presses, and dryers; a study of some of the economic aspects of screen printing and its place in the total concept of graphic arts.
Class 2, Lab. 3, Credit 3

PPRT-210 Newspaper Presses
Registration #0911-210
An introduction to major presses used to produce both weekly and daily newspapers. Letterpress and offset presses will be considered, along with gravure presses used for the production of newspaper supplements.
Class 2, Lab. 3, Credit 3

PPRT-213 Principles of Copy Preparation
Registration #0911-213
A basic course involving theory of camera copy requirements through lecture, examples and project work. Includes projects in black and white and color, register, veloxes, silhouettes cropping, "window," etc. Lectures cover all aspects of copy. Directed to those who do not require the depth of involvement given in PPRT-313.
Class 2, Lab. 3, Credit 3

PPRT-301 Typography II
Registration #0911-301
Emphasis is put upon finished typographic problems. Topics included in lecture are typographic movements, design concepts, analysis of current typographic practices, private presses, and bookmaking. The lab work is designed to present interesting and challenging problems to the serious student of typography. (PPRT-201)
Class 2, Lab. 6, Credit 4

PPRT-302 Composition Systems
Registration #0911-302
Detailed study of photocomposition with emphasis on systems approach; introduction to use of computers in composing rooms, and operation of specialized equipment. (PPRT-202)
Class 2, Lab. 3, Credit 3

PPRT-303 Layout and Printing Design
Registration #0911-303
Typical printing design problems with emphasis on typographic arrangements, pictorial arrangement with consideration of production follow-through. Includes design of complete booklet dummy and other commercial items for black-and-white and color reproduction from roughs to comprehensive layout.
Class 2, Lab. 6, Credit 4

PPRT-304 Advanced Relief Press
Registration #0911-304
A study of pressroom problems in letterpress printing on cylinder press equipment; commercial forms, single and multi-color work; makeready system; operation and care of equipment. (PPRT-204)
Class 2, Lab. 6, Credit 4

PPRT-306 Tone Reproduction Photography
Registration #0911-306
The photographic processes as they relate to the measurement and reproduction of tones for the major printing processes. The emphasis will be on the scientific analysis of a complete system of halftone sensitometry and process control. (PPRT-206)
Class 2, Lab. 3, Credit 3

PPRT-308 Lithographic Press Problems
Registration #0911-308
An advanced course in the theory, practice, and problems of offset presswork; development of technical knowledge of materials and equipment; practice in running multicolor work. (PPRT-208)
Class 2, Lab. 6, Credit 4

PPRT-309 Advanced Screen Printing
Registration #0911-309
Further study of the theory and practice of screen printing covering areas such as experiments with fabrics or screens; stencil forming materials and the effects these have on finished product. Further study into the inks and substrates that are common to the screen printer. Introduction to and running of automatic cylinder screen printing press and container press capable of printing cylindrical, conical and flat objects. (PPRT-209)
Class 2, Lab. 3, Credit 3

PPRT-310 Advanced Image Carriers
Registration #0911-310
Advanced study of technological requirements involved in producing letterpress and flexographic plates and gravure cylinders. Chemical, mechanical and electronic processes are discussed and illustrated in lectures. Extensive laboratory project work is devoted to molded rubber platemaking for flexography, photopolymer plates for both letterpress and flexography and both flat plate and cylinder imaging for gravure.
Class 2, Lab. 6, Credit 4
PPRT-311  Imposition and Finishing  
Registration #0911-311
  Printing production planning to correlate pre-press and post-press operations. Topics include preparing layouts, forms and a study of how they are affected by various bindery operations. Laboratory experiments include the operation of modern bindery equipment, evaluation and application of adhesives, binding materials and book performance testing. Several projects are followed through from design, signature layout to a finished product, including a gold stamped, hardcover bound book.
  Class 2, Lab. 3, Credit 3

PPRT-312  Image Assembly  
Registration #0911-312
  An introductory course covering the basic and specialized procedures of film assembly for black and white and color work. The course covers work with contact and duplicating room-light films. Striping of line, halftone, and complementary flats is discussed and practiced. Fake color and process color stripping as well as spreads and chokes purposes, methods and projects given. Electronic and automated prepress imaging is presented in form of slides and discussion.
  Class 2, Lab. 3, Credit 3

PPRT-313  Copy Preparation  
Registration #0911-313
  Preparation of copy for camera; working from layouts, making analysis of requirements; paste-up techniques, methods of pre-separation mechanica­als, use of photographic and typographic copy, relation to production steps in follow-up for offset platemaking and photo-engraving; proper instruc­tional specification writing. (PPRT-203)
  Class 2, Lab. 6, Credit 4

PPRT-314  Flexography  
Registration #0911-314
  A study of the theory and practice of flexographic printing; uses and develop­ment of flexography; plate and ink requirements; press principles and operation; experiments in printing on a wide variety of surfaces. (PPRT-204)
  Class 2, Lab. 6, Credit 4

PPRT-315  Ink and Color  
Registration #0911-315
  Theory of light and color; basic theory of process color and correction; use of color comparator and spectrophotometer; the study of color systems and color matching systems; theory and application of various ink systems; prac­tice in standard ink mixing and color matching emphasizing offset and letter­press processes; correlation of ink properties with applications; emphasis on relationship of ink to paper and press; study of ink problems and their cor­rection.
  Class 2, Lab. 3, Credit 4

PPRT-317  Calligraphic Forms  
Registration #0911-317
  An introduction to the basics of calligraphy; exercises in use of broadedge pen to develop primary forms of italic and Chancery Cursive letter styles and skills in rapid writing; consideration of historical origins of letters, use of bas­ic tools, understanding of methods and disciplines stressed.
  Class 2, Lab. 3, Credit 3

PPRT-319  Newspaper Design  
Registration #0911-319
  A study of the methods of designing modern newspaper pages; a look at a variety of front page design methods as well as inside pages; placement of editorial content and ads; problems involved in designing section pages and special pages and editions; the standard format vs. the tabloid format; page sizes, column widths, and space between columns.
  Class 2, Lab. 3, Credit 3

PPRT-320  Newspaper Production  
Registration #0911-320
  A study of the methods of producing a newspaper by the use of photocom­position systems and the offset process. Students organize a staff, design a newspaper, set type, paste up paper, go to camera, make plates and go to press.
  Class 2, Lab. 3, Credit 3

PPRT-321  Web Offset  
Registration #0911-321
  An analytical study of the technological development in web offset; empha­sis on the interrelationship of procedures, materials, and engineer; practical laboratory projects on a commercial four-unit perfecting web offset press. (PPRT-208)
  Class 2, Lab. 3, Credit 3

PPRT-322  Circulation and Mailrooms  
Registration #0911-322
  A study of the organization and functions of newspaper circulation depart­ments. An overview of equipment and techniques used in modern newspaper mailrooms.
  Class 3, Credit 3

PPRT-323  Newspaper Color  
Registration #0911-323
  A study of the basic theory, materials and methods used in the graphic arts for the reproduction of color for newspaper.
  Class 2, Lab. 3, Credit 3

PPRT-324  Newspaper Composition  
Registration #0911-324
  A study of composition techniques used in the publishing of weekly and daily newspapers, with emphasis on the systems approach to newspaper produc­tion.
  Class 2, Lab. 3, Credit 3

PPRT-329  Introduction to Book Design  
Registration #0911-329
  A course intended to give the student an understanding of how a book designer functions within a book publishing firm. Emphasis is placed upon the many factors involved in book design decisions, including the important relationship between book design and book production in producing a read­able, functional book. (PPRT-301, PPRT-303, or instructor's approval) (Every other year)
  Class 2, Lab. 3, Credit 3

PPRT-330  Newspaper Production II  
Registration #0911-330
  The production of a newspaper by photocomposition methods and the offset­set process. A continuation of PPRT-320 Newspaper Production I in more depth, with special emphasis on presswork on the Goss Community Offset Press. Also, emphasis will be made on the use of color in newspaper produc­tion. (PPRT-320)
  Class 2, Lab. 3, Credit 3

PPRT-333  Introduction to Book Production  
Registration #0911-333
  This course is designed to introduce the student to the many-faceted role of the production manager in a book publishing firm. Production's role throughout the publishing cycle from manuscript to bound books is exam­ined, and detailed emphasis is placed upon determining production and purchasing requirements for producing a variety of books, including trade books, textbooks, juveniles and special editions.
  Class 2, Lab. 3, Credit 3

PPRT-335  The Printed Book in America  
Registration #0911-335
  This course traces the main currents in the development of the printed book in America by closely examining the books themselves. In addition, close study of the lives and works of the great printers, their equipment and avail­able technology, and their aesthetic viewpoints is undertaken to determine their impact on their own times and their relevance for today. Classes are held in the Melbert B. Cary, Jr., Graphic Arts Collection.
  Class 3, Credit 3

PPRT-337  Art of the Printed Book 1455-1955  
Registration #0911-337
  This course presents masterpieces of the printer's art from the past five cen­turies. The lives and works of great European printers from Gutenberg to Mardersteig are examined, and their historical impact on Western civiliza­tion discussed with a view toward determining new perspectives for today's graphic artisan and book printer. Classes are held in the Melbert B. Cary, Jr. Graphic Arts Collection.
  Class 3, Credit 3

PPRT-401  Typographic Workshop  
Registration #0911-401
  Allows the student to create and solve a typographic problem of his own choice. Complete freedom is given and experimentation is encouraged, giv­ing the student the opportunity to meet his own objectives and satisfaction. The project or projects that the student chooses should be of significant interest to warrant taking this course. (PPRT-301)
  Class 2, Lab. 6, Credit 4
Class 2, Lab. 3, Credit 3

PPRT-402 Applications of Electronics to Graphic Arts
Registration #0911-402
A basic course in the fundamentals of electricity and electronics covering DC, AC and semiconductors. Theory and application are combined as major topics and studied, implicating numerous graphic arts machines and devices. Students will perform laboratory experiments using basic electronic components and instruments.
Class 2, Lab. 3, Credit 3

PPRT-403 Layout and Printing Design
Registration #0911-403
A project course with design problems which involves students in converting their designs into the actual camera copy, trying various media, learning to identify art techniques and printing processes; more individualized approaches emphasized, more advanced principles applied. (PPRT-303)
Class 2, Lab. 3, Credit 3

PPRT-406 Color Separation Photography
Registration #0911-406
Color separation and color correction methods in the graphic arts industry; color theory, masking requirements, tone reproduction for color, color proofing systems, electronic scanners.
Class 2, Lab. 3, Credit 3

PPRT-410 Introduction to Paper
Registration #0911-410
This course begins with a discussion of papermaking fibers, pulping procedures, papermaking machines, and proceeds to show how they affect paper properties and printing characteristics. Laboratory experiences include making paper from various raw materials, physical and optical testing of paper and paper identification.
Class 3, Lab. 2, Credit 3

PPRT-500 Quality Control in the Graphic Arts
Registration #0911-500
A study of the methods and instrumentation necessary to produce a product consistent with the appropriate quality level. Topics will include process variability, waste reduction, problem analysis, materials testing, process control, process optimization, and quality assurance.
Prerequisite: Students should have completed all required 200 level technical courses in the School of Printing or have consent of the instructor.
Class 3, Credit 3

PPRT-501 Development of Printing Types
Registration #0911-501
Present-day typefaces studied with relationship to their historical development and current usage; type classification and nomenclature.
Class 3, Credit 3

PPRT-506 Advanced Color Reproduction
Registration #0911-506
Further study of color measurement and color reproduction. The emphasis will be on the analysis of a color reproduction system using such tools as color measurement instrumentation, visual color evaluation, color tone reproduction, and process control. (PPRT-406)
Class 2, Lab. 3, Credit 3

PPRT-551 Special Topics-Printing
Registration #0911-551
This course presents and investigates technological topics which normally are not covered in the regular curriculum on a one-time basis. Guest lecturers such as industry leaders as well as regular faculty are used to conduct this course. Topics to be covered are announced in advance.
Credit varies/Qtr.

PPRT-591 Reproduction Photography
Registration #0911-591
An intensive course designed to enable photography students to gain a basic understanding of the various printing processes, the application of photography to each, with an emphasis on problems involved in obtaining optimum tone and color reproduction of their photographs.
Class 2, Lab. 3, Credit 3

PPRT-592 Printing Plates
Registration #0911-592
A specialized course for photography students to develop understanding of various imaging methods and characteristics, processing steps, applications, and major problems of platemaking.
Class 2, Lab. 3, Credit 3

PPRT-593 Printing Presses-Lithographic
Registration #0911-593
Course offered for photography students; theory and practice of the methods of planographic processes.
Class 2, Lab. 3, Credit 3

PPRT-594 Printing Presses-Screen
Registration #0911-594
Course offered for photography students; theory and practice of the methods of screen processes.
Class 2, Lab. 3, Credit 3

Graduate Courses

Master of Science in Printing

PPRM-704 Design of Experiments
Registration #0911-704
Analysis of variance, components of variance, crossed vs. nested experiments, studying individual effects, introduction to matrix algebra, regression analysis, planning experiments from a statistical point of view, basic experimental designs, factorial experiments, fractional factorials, determination of optimum conditions, introduction to nonparametrics and quality control concepts (as time allows).
Credit 5

PPRT-705 Introduction to Systems Analysis
Registration #0911-705
Problems of systems analysis in printing operations for the highest quality product at the minimal cost including optimal floor designs and methods of study. (PPRM-301)
Credit 4

PPRT-702 Graphic Reproduction Theory
Registration #0911-702
Analysis of the basic theories of graphic reproduction and study of the principles underlying prevalent and proposed printing processes; special topics such as classification and description of the various light-sensitive systems as applied to the graphic arts, ink transfer theory, present and proposed systems of printing based on electrostatics; electrolysis, magnetism and lasers; study of hybrid systems and the significance and application of interdisciplinary methods.
Credit 4

PPRT-703 Statistical Inference
Registration #0911-703
Descriptive statistics, patterns of variability, measures of variability, working with the normal curve, tests of hypotheses for means, tests of hypotheses for variance, internal estimates for means, internal estimates for variance, sample size for variables, introduction to analysis of variance, and applications of applied statistics to graphic arts.
Credit 5

PPRT-704 Analysis of Variance
Registration #0911-704
Analysis of variance, components of variance, crossed vs. nested experiments, studying individual effects, introduction to matrix algebra, regression analysis, planning experiments from a statistical point of view, basic experimental designs, factorial experiments, fractional factorials, determination of optimum conditions, introduction to nonparametrics and quality control concepts (as time allows).
Credit 5

PPRT-708 Introduction to Systems Analysis
Registration #0911-708
Problems of systems analysis in printing operations for the highest quality product at the minimal cost including optimal floor designs and methods of study. (PPRM-301)
Credit 4
PPRT-709  Trends in Printing Technology
Registration #0911-709
A study of the forces which have influenced the development of printing with emphasis upon the technological factors involved; examinations of the relationships of aesthetics and craft concepts to modern industrial techniques. Credit 4

PPRT-711  Tone and Color Analysis
Registration #0911-711
Methods of instrumentation necessary for the evaluation and process control of printed tone and color and the photographic intermediate images required for the photomechanical reproduction of tone and color. Credit 4

PPRT-850  Research Projects
Registration #0911-850
Individual research projects in which independent data is collected by the student, followed by analysis and evaluation. A comprehensive written report is required. Consent of advisor is required. Credit variable

PPRT-890  Research and Thesis Guidance
Registration #0911-890
An experimental survey of a problem area in the graphic arts. Credit variable

PPRT-713  Photo Typography Procedures
Registration #0908-713
An introductory course in the basic tenets of traditional typography. Areas that will be covered are: terminology, style, copyfitting, point systems, legibility, initials and typeface recognition. Laboratory demonstrations will be given to illustrate the theoretical areas covered in the lectures. Emphasis is placed on photo composition and the systems approach. Credit 4

PPRT- Ink, Color and Substrates
Registration #0911-
A study of the physics of light and color, basic color theory, color measurements and color systems. Included are applications of color theory to the graphic arts. The chemistry and physics of ink and substrates, and their interaction, are covered. Emphasis is given to the problem of ink, color and substrates in each printing process.

College of Science

NOTE: Quarter offered follows course description in parenthesis: F-Fall; W-Winter; S-Spring; SR Summer

NOTE: From time to time special courses may be offered in the Contemporary Sciences series, e.g., Environmental Geology, Oceanography, etc

Biology

SBIB-550  Biology Seminar
Registration #1001-550
Written and oral reports and their discussion by class members covering topics of current interest in the biological sciences. (40 quarter hours in biology and successful completion of the departmental writing requirement)
Class 2, Credit 2 (W, S)

SBIB-559  Special Topics-Biology
Registration #1001-559
Advanced courses which are of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary course and have specified prerequisites, contact hours, and examination procedures
Class variable, Credit variable (offered every quarter)

SBIB-599  Independent Study-Biology
Registration #1001-599
Faculty directed study of appropriate topics on a tutorial basis. This course will generally be used to enable an individual to pursue studies of existing knowledge available in the literature (one year of general biology)
Class variable, Credit variable (Offered every quarter)

Molecular & Cellular Biology

SBIC-320  Histology
Registration #1002-320
Detailed study of the structure and function of normal and abnormal vertebrate tissue, (one year of general biology)
Class 2, Lab. 4, Credit 4 (F-alternate years)

SBIC-402  Immunology
Registration #1002-402
Investigation of the basic concepts of immunology (antigens, antibodies, immunologic specificity, antibody synthesis, and cell-mediated immunity) and the applications of immunology to infectious diseases, allergic reactions, transplantations, tumors, autoimmune diseases, immunosuppressive drugs and tolerance, (one year of general biology, one year of organic chemistry)
Class 3, Credit 3 (F-every year, W-alternate years)

SBIC-412  Immunology Laboratory
Registration #1002-412
Laboratory work to complement the lectures in Immunology (SBIC-402). Each student experiences a variety of techniques (including use of laboratory animals) used in immunological research and clinical laboratories.
Lab. 3, Credit 1 (F-every year, W-alternate years)

SBIC-403  Cell Physiology
Registration #1002-403
Functional cytology, cellular water and electrolyte homeostasis, exchange of materials across cell membranes, regulation of cellular metabolism and control of cell growth, (one year of general biology, one year of organic chemistry)
Class 3, Lab. 3, Credit 4 (E)

SBIC-404  Introductory Microbiology
Registration #1002-404
Principles of anatomy, biochemistry, genetics, taxonomy, ecology of viruses, bacteria, molds, algae, and protozoa. Useful and harmful activities. Basic laboratory techniques, microscopy, staining, counting, identifying, (one year of general biology, one year of organic chemistry)
Class 3, Lab 4, Credit 5 (F, SR)
### General Biology Laboratory

**SBIG-205, 206, 207**

Laboratory work to complement the lecture material of General Biology (SBIG-201, 202, 203). The experiments are designed to illustrate concepts, develop laboratory skills and techniques, and improve ability to make, record and interpret observations. (Corequisite SBIG-201, 202, 203)

- Lab. 3, Credit 1 (F-205, W*-06, S-207)

### Microbiology in Health and Disease

**SBIG-210**

An introduction to microorganisms, their relationship to the environment and human health, and the causes, prevention and treatment of infectious diseases. (one year of high school biology or equivalent)

- Class 3, Credit 3 or Class 3, Rec. 1, Credit 4 (F, S)

### Human Biology I

**SBIG-211**

A general study of human anatomy and physiology. This course includes discussions of cellular biology, histology and the skeletal system. Recitations for social work students emphasize common disease states and their treatments. Recitations for industrial engineering students include discussions of biodynamic and biomechanical characteristics of organ systems as well as cardiovascular and respiratory physiology

- Class 3, Credit 3, or Class 3, Rec. 1, Credit 4 (W)

### Microbiology in Health & Disease Laboratory

**SBIG-220**

Laboratory culturing handling and identification of microorganisms with special emphasis on the relationship of bacteria to food handling and preservation, the production of food products by bacteria, and the prevention of food-borne diseases. (Corequisite SBIG-210)

- Lab. 3, Credit 1 (F, S)

### Human Biology Laboratory

**SBIG-221**

Laboratory for dietetic and medical illustration students complements the lecture material of SBIG-211. Experiments are designed to illustrate the dynamic characteristics of cells, tissues and organ systems.

- Lab. 3, Credit 1 (W)

### Human Biology Laboratory

**SBIG-222**

Laboratory for dietetic and medical illustration students complements the lecture material of SBIG-212. Experiments are designed to illustrate the dynamic anatomy and physiology of major organ systems.

- Lab. 3, Credit 1 (S)

### Contemporary Science-Biology

**SBIG-289**

A study in various biological topics relevant to contemporary problems of society. Topics may include population biology, pollution, disease control, human heredity, contagious diseases, marine biology, bioethics.

- Class 4, Credit 4 (F, W, S)

### Medical Genetics

**SBIG-315**

A survey of selected human variations and disease of medical importance, with emphasis on the underlying genetic principles. (SBIG-203, or equivalent)

- Class 2, Credit 2 (W)

### Enviromental Microbiology

**SBIG-440**

Microorganisms in water and sewage, biological and medical aspects; methods for detection, isolation, and enumeration. Treatment methods for eliminating and controlling harmful organisms

- Class 3, Lab 2, Credit 4 (S, SR)
SBIO-310 Organismal Biology
Invertebrate Zoology
Registration #1006-301
Biology of invertebrate animals with reference to classification, structure, function, and ecology, (one year of general biology or permission of instructor)
Class 3, Lab. 3, Credit 4 (F-alternate years)

SBIO-302 Vertebrate Zoology
Registration #1006-302
Morphology, physiology, behavior, classification, and ecology of chordates. (one year of general biology)
Class 3, Lab. 3, Credit 4 (F-alternate years)

SBIO-303 Comparative Vertebrate Anatomy
Registration #1006-303
A comparative study of the organ systems of representative members of the vertebrates with emphasis on structural changes which occur during evolution. (one year of general biology)
Class 3, Lab. 3, Credit 4 (S)

SBIO-304 Botany
Registration #1006-304
Distribution of the major groups of plants and their adaptations to their particular environment, (one year of general biology or permission of the instructor)
Class 3, Lab. 3, Credit 4 (F, W)

SBIO-305 Physiology and Anatomy
Registration #1006-305
An integrated systems approach to cellular, nerve, muscle and circulatory physiology. Laboratory exercises include detailed studies of the human skeletal and muscular systems, (one year of general biology, SCHG-217 or permission of instructor)
Class 3, Lab. 3, Credit 4 (W)

SBIO-306 Physiology and Anatomy
Registration #1006-306
Integrated systems approach to renal, respiratory and gastrointestinal physiology, metabolism and endocrinology. Laboratory exercises include studies of kidney function, lung performance, neuroanatomy and gastrointestinal anatomy and physiology. (SBIO-305)
Class 3, Lab. 3, Credit 4 (S)

SBIO-410 Plant Physiology
Registration #1006-410
Physiological phenomena in the growth and development of higher plants. Water relationships, photosynthesis, translocation, mineral nutrition, growth hormonal control and reproduction, (one year of general biology, one year of organic chemistry)
Class 3, Lab. 3, Credit 4 (S)

SBIO-411 Systematic Botany
Registration #1006-411
Study of diversity existing in vascular plants. Its origin and its organization into a hierarchy of categories, orders, and families. Laboratory experience in collection, identification, and study of vascular plants with special emphasis on local flora. Practice in use of manuals and interpretation of morphological characters. (SBIO-304)
Class 3, Lab. 3, Credit 4 (F-alternate years)

SBIO-412 Parasitology
Registration #1006-412
Structure, life cycle, and control of human parasites. Emphasis on forms of diagnostic importance, (one year of general biology)
Class 3, Lab 3, Credit 4 (alternates W/S)

SBIO-413 Comparative Animal Physiology
Registration #1006-413
A comparative study of the physiological mechanisms of the animal kingdom. An interpretation of the physiological variations in terms of evolutionary significance, morphological variation and ecological conditions, (one year of general biology, one year of organic chemistry)
Class 3, Lab. 3, Credit 4 (alternates F/W)

SBIO-705 Advanced Physiology
Registration #1006-705
An in-depth study of the functions of the human body. Both the chemical and physical factors of normal physiology will be studied along with the modified functions that are a result of disease (SBIO-305, 306, SCHB-602, SCHB-603)
Class 3, Credit 3 (F-alternate years)

SBIO-720 Introduction to Pharmacology
Registration #1006-720
The chemical properties, metabolism and excretion of drugs and their effects on physiological systems such as cardiovascular, renal, gastrointestinal, respiratory, endocrine, and central nervous system. Antimicrobial and cancer chemotherapeutic agents will also be discussed. (SBIO-305, 306 and permission of the instructor)
Class 3, Credit 3 (alternates F/W)

SBIO-721 Pharmacology Laboratory
Registration #1006-721
Laboratory work to accompany SBIO-720. Experiments relate to principles discussed in corresponding lectures.
Lab. 3, Credit 1 (alternates F/W)

SBIO-740 General Toxicology
Registration #1006-740
The study of the science of poisons (the harmful actions of chemicals on biological tissue) through the examination of biological and chemical mechanisms, their implications for biological systems, and detection. (Physiology, Anatomy, Organic Chemistry or permission of the instructor. Genetics recommended. Laboratory a co-requisite for biology majors)
Class 3, Credit 3 (alternates W/S)

SBIO-741 General Toxicology Laboratory
Registration #1006-741
Laboratory work to accompany the lectures in General Toxicology. (Corequisite SBIO-741)
Lab 3, Credit 1 (alternates W/S)

SBIT-320 Laboratory Animal Techniques
Registration #1007-320
A course designed to prepare the student for small animal handling, biological administrations and preparations, minor surgery and autopsies. (Major status and permission of the instructor)
Class 1, Lab. 3*, Credit 3 (W, S)

SBIT-430 Radiation Biology
Registration #1007-430
Effects of radiation upon living tissue, both harmful and beneficial. Morphological changes, genetic effects, and pathological changes in both plant and animal tissues. Use of radioisotopes in plant and animal research. (Minimum of 20 credits in biological science)
Class 2, Lab. 6, Credit 4 (F)

SBIT-431 Histological Techniques
Registration #1007-431
Preparation of plant and animal tissues for slide mounts. Techniques in paraffin and frozen sectioning. Sectioning on the rotary and sliding microtomes and multiple staining techniques, (one year of general biology)
Class 1, Lab 4, Credit 3 (F-alternate years)

SBIT-460 Introduction to Electron Microscopy
Registration #1007-460
An introduction to the theory and practice of transmission and scanning electron microscopy. Laboratory experience includes preparation of selected biological specimens, operation of a transmission electron microscope, and basic black-and-white electron micrograph preparation. This course is designed for those students who may not desire or need the comprehensive training in electron microscopy provided by SBIT-481, 482, 483.
Class 1, Lab. 6, Credit 3 (S, SR)

SBIT-481 Electron Microscopy-Instrumentation
Registration #1007-481
A comprehensive lecture/laboratory course in the operation, maintenance and performance testing of medium resolution transmission and scanning electron microscopes. Basic black-and-white electron micrograph preparation techniques are also covered. This is the first course in a comprehensive three-quarter sequence in electron microscopy, (one year of general biology or equivalent, or permission of the instructor.)
Class 1, Lab. 6, Credit 3 (F)

SBIT-482 Electron Microscopy-Specimen Preparation
Registration #1007-482
A comprehensive lecture/laboratory course covering all of the routine techniques for preparation of particulate and non-particulate specimens for transmission and scanning electron microscopy. (SBIT-460 or SBIT-481)
Class 1, Lab. 6, Credit 3 (W)
SBIT-483 Advanced Electron Microscopy
Registration #1007-482
Medical and industrial applications of transmission and scanning electron microscopy; x-ray analysis; advanced specimen preparation techniques; design and supervision of an EM facility; individual EM projects; certification (SBIT-482)
Class 1, Lab. 6, Credit 3 (S)

SBIT-541, 542, 543 Biology Research
Registration #1007-541, -542, -543
Faculty directed projects or research usually involving original field or laboratory work encompassing a period of at least two quarters. Final results are presented in written and oral formats. (Third-year status with a GPA of 2.5 in science and mathematics courses, and consent of faculty).
Class variable, Credit variable

SBIT-730 Topics in Radiation Biology
Registration #1007-730
A study of the biological effects of ionizing radiation, and uses in the medical and biological laboratory. Emphasis will be placed upon dosages and responses. (SBIT-430 or permission of instructor)
Class 3, Lab. 3, Credit 4 (S)

### Chemistry

SCHA-261, 262, 263 Introduction to Chemical Analysis
Registration #1008-261,-262,-263
An introduction to qualitative and quantitative analysis. Introduction to the chemistry of inorganic ions by qualitative analysis. Classical methods of gravimetric analysis and titration analysis based on acid-base, precipitation, oxidation-reduction and complex formation as well as non-aqueous solvent reactions. Acid-base reactions, introduction to electro-chemical techniques, and fundamentals of spectroscopy are stressed. Equilibrium concepts and statistical evaluation of results are incorporated.
Class 2, Lab. 5, Credit 3 (261-F, 262-W, 263-S)

SCHA-311 Analytical Chemistry-Instrumental Analysis
Registration #1008-311
Elementary treatment of instrumental theory and techniques; properties of light; ultraviolet, visible, and infrared spectrophotometry; atomic and molecular fluorescence, emission spectroscopy; flame photometry. SCHA-318 is a corequisite. (SCHA-212)
Class 3, Credit 3 (offered every year) (F, W)

SCHA-312 Analytical Chemistry-Separations
Registration #1008-312
Inorganic and organic separations; Raoult and Henry Laws; phase rules; distillation; extraction; absorption and surface effects; electrophoresis, chromatography including gas, liquid, column, paper, thin layer, and ion exchange. (SCHA-212)
Class 3, Credit 3 (offered every year) (S, SR)

SCHA-318 Instrumental Analysis Lab
Registration #1008-318
Lab accompanying SCHA-311. Quantitative and qualitative experiments in ultraviolet, visible, and infrared spectrophotometry, molecular fluorescence and flame atomic absorption spectrophotometry. SCHA-311 is a corequisite (SCHA-212)
Lab. 4, Credit 1 (offered every year) (F, W)

SCHA-319 Separations Lab
Registration #1008-319
Lab accompanying SCHA-312. Experiments with chemical separation techniques including distillations, extractions, and a variety of chromatographic methods (thin layer, paper, ion exchange, gas, gel filtration). Laboratory report writing is emphasized.
Lab. 4, Credit 1 (offered every year) (S, SR)

SCHB-234 Biochemistry
Registration #1009-234
Introduction to biological chemistry. An in-depth survey of the molecular organization, physiological functions and bio-energetics principles of the molecular components of cells: amino acids, proteins, enzymes, carbohydrates, lipids, and nucleic acids. Emphasis is on the structure-function relationships, solution behavior, and metabolism of biomolecules. (SCHO-233)
Class 4, Credit 4 (offered every year) (F)

SCHC-200 Chemical Safety
Registration #1010-200
Discussion and demonstration of protective devices and equipment; techniques for safety handling chemicals, glassware, and performing chemical reactions. Emphasis on flammable solvents, explosives, cryogens, and toxic materials; radiation hazards; storage of chemicals; waste disposal.
Class 1, Credit 0 (offered every year) (F)

SCHC-201 Chemical Literature
Registration #1010-201
A survey of the techniques used to monitor the chemical literature. Chemical Abstracts, Science Citation index and Beilstein are covered. Technical writing is required. The structure and development of journals, theses, monographs, reviews and textbooks are covered. (SCHC-211, -212)
Class 2, Credit 2 (offered every year) (W, S)

SCHC-211.212 General Chemistry
Registration #1010-211, -212
For science and photonics majors and others who desire an in-depth study of general chemistry. Atomic structure and chemical bonding; thermodynamics and equilibrium; chemical equations and chemical analysis; gases; acids and bases; oxidation-reduction; chemical kinetics. Course stresses problem solving applications of chemical principles.
Class 3, Credit 3 (offered every year) (211-F, 212-W)

SCHC-230 Introduction to Co-op
Registration #1010-230
Exploration of co-operative education opportunities; practice in writing letters of application; resume writing, and interviewing procedures.
Class 1, Credit 0 (offered every year) (F, W)

SCHC-402 Introduction to Research
Registration #1010-402
Introduction to laboratory research projects of interest to chemistry faculty members. Students desiring to pursue active undergraduate research will investigate research opportunities with faculty members. Preparation and presentation of a research proposal in this course is a prerequisite to participation in research. (SCHO-431, SCHP-441)
Class 1, Credit 0 (offered every year) (F, W)

SCHC-541, 542, 543 Chemistry Research
Registration #1010-541, -542, -543
Faculty directed student projects or research usually involving laboratory work and/or calculations that could be considered of an original nature. (SCHA-402)
Class variable, Credit variable (offered every year) (F, W, S, SR)

SCHC-599 Independent Study-Chemistry
Registration #1010-599
Faculty directed study of appropriate topics on a tutorial basis. This course will generally be used to enable an individual to pursue studies of existing knowledge available in the literature.
Class variable, Credit variable (offered every year)

SCHG-201 General Chemistry
Registration #1011-201
One quarter survey of general chemistry for non-science majors, e.g., Dietetics and other Health Related Professions majors.
Class 3, Credit 3 (offered every year) (F)

SCHG-202 Organic Chemistry
Registration #1011-202
One quarter survey of the fundamentals of organic chemistry that are essential to an understanding of biological molecules and biochemistry. (SCHG-201 or equivalent)
Class 3, Credit 3 (offered every year) (W)

SCHG-203.204 Biochemistry
Registration #1011-203, -204
A two-quarter survey of biochemistry for non-science majors, e.g., dietetics and other health related professions. (SCHG-202)
Class 4, Credit 4 (offered every year) (203-S, 204-F)

SCHG-205, 206, 207 Chemical Principles Laboratory
Registration #1011-205, -206, -207
A laboratory course for photoscience, mathematics, and physics majors who are taking general chemistry (SCHA-211, 212) and introduction to Organic Chemistry (SCHO-230) concurrently. Laboratory experiments are designed to complement the lecture material in these courses.
Lab. 3, Credit 1 (offered every year) (205-F, 206-W, 207-S)
SCHG-208, 209  
**College Chemistry**  
Registration #1011-208, -209  
For engineering students. The concepts of energy and the work function are discussed in terms of industrial chemical processes. Topics include applications of the gas laws, equilibrium theory, nuclear and electrochemistry, thermodynamics, and modern instrumental methods of structure analysis.  
Class 3, Credit 3 (offered every year) (208-F, W; 209-S)

SCHG-221  
**General Chemistry Laboratory**  
Registration #1011-221  
Laboratory course to accompany SCHG-201. Emphasis on introduction to methods of chemical analysis, qualitative and quantitative techniques.  
Lab. 3, Credit 1 (offered every year) (F)

SCHG-222  
**Organic Chemistry Laboratory**  
Registration #1011-222  
Laboratory course to accompany SCHG-202. Emphasis is on representative examples of typical organic techniques and synthesis. (SCHG-221 or equivalent)  
Lab. 3, Credit 1 (offered every year) (W)

SCHG-215, 216, 217  
**General and Analytical Chemistry**  
Registration #1011-215, -216, -217  
Principles of chemistry presented for students in medical technology and the life sciences.  
Class 3, Credit 3 (offered every year) (215-F, 216-W, 217-S)

SCHG-225, 226, 227  
**General and Analytical Chemistry Laboratory**  
Registration #1011-225, -226, -227  
Laboratory sequence to accompany SCHG-215, 216, 217. Experiments in inorganic chemistry, separation techniques and quantitative analysis.  
(225-F, Lab. 3, Credit 1)  
(226-W, Lab. 3, Credit 1)  
(227-S, Lab. 6, Credit 2)  
(offerd every year)

SCHG-271  
**Chemistry of Water**  
Registration #1011-271  
Basic training in general chemistry assuming no prior experience, concentrating on those aspects important to the field of water conservation. Lab­oratory work trains the student in volumetric analysis.  
Class 3, Lab. 3, Credit 4 (offered every year) (F, W)

SCHG-272  
**Chemistry of Water**  
Registration #1011-272  
Chemistry of organics, metals, construction materials, radioactive and other environmental pollutants, and other substances related to water analysis. Laboratory practice in water analysis, including use of instrumentation.  
Class 2, Lab. 3, Credit 3 (offered every year) (S, SR)

SCHG-281, 282, 283  
**General Chemistry**  
Registration #1011-281, -282, -283  
For printing students. Aspects of general chemistry of widest applicability to graphic arts technology; first quarter includes definitions of terms, basic concepts and laws; second quarter devoted to properties of solutions and organic materials; third quarter deals with applications in ink, paper, photo­lithographic processes and other topics as time allows.  
Class 3, Lab. 2, Credit 4 (offered every year) (281-F, 282-W, 283-S)

SCHG-289  
**Contemporary Science-Chemistry**  
Registration #1011-289**  
This course examines a broad range of contemporary scientific topics with a chemical basis. These include nuclear power, alternative energy sources, nuclear wastes and nuclear safety. The biological effects of radiation, nuclear medicine, recombinant DNA, and medicinal drugs are also covered.  
Class 4, Credit 4 (F, W, S)

SCHO-230  
**Introduction to Organic Chemistry**  
Registration #1013-230  
Introduction to the structure and reactivities of organic molecules for physical science majors. An overview of the structure, nomenclature, bonding, and reactivity of the various functional groups. Chemistry of alkenes, alkenes, aliphatic, and aromatic molecules. (SCHC-212 or permission of instructor) (S)  
Class 3, Credit 3 (offered every year)

SCHO-231, 232  
**Organic Chemistry**  
Registration #1013-231, -232  
Survey of the structure, names, reactions, and synthesis of the major functional groups. Mechanisms of main classes of reactions are discussed. (SCHG-216, SCHC-212, or SCHG-209)  
Class 3, Credit 3 (offered every year) (231-F, 232-W)

SCHO-233  
**Organic Chemistry**  
Registration #1013-233  
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. (SCHO-232)  
Class 3, Credit 3 (offered every year) (S)

SCHO-235, 236, 237  
**Organic Chemistry Lab**  
Registration #1013-235, -236, -237  
Laboratory work emphasizes techniques, preparations, and analyses. SCHO-237 emphasizes reactions and properties of biomonomers and polymers. To be taken concurrently with SCHO-231, -232, -233.  
Lab. 3, Credit 1 (offered every year) (235-F, 236-W, 237-S)

SCHO-431, 432, 433  
**Organic Chemistry**  
Registration #1013-431, -432, -433  
A rigorous survey of the reactions of all major functional groups. Confor­mational Analysis, Stereochemistry and Spectral (IR, NMR) analysis are also covered. Prior coursework in Organic Chemistry is required. (SCHO-23C or its equivalent)  
Class 2, Credit 2 (offered every year) (431-S, SR/432-F, W, 433-S, SR)

SCHO-435, 436  
**Preparative Organic Chemistry**  
Registration #1013-435, -436  
Synthesis of organic compounds utilizing a variety of laboratory techniques. Purification techniques and spectral characterization will be routinely used. (SCHO-230) (431 should be taken concurrently with SCHO-435 and SCHO-432 with SCHO-436)  
Lab. 6, Credit 2 (offered every year) (435-S, SR, 436-F, W)

SCHP-441  
**Physical Chemistry I**  
Registration #1014-441  
Review of the thermodynamic laws; criteria for equilibrium and spontaneity; chemical equilibrium; phase rule; equilibrium in ideal and non-ideal solutions; electrochemistry. (SCHP-340)  
Class 3, Credit 3 (offered every year) (F, W)

SCHP-442  
**Physical Chemistry II**  
Registration #1014-442  
Introduction to quantum mechanics and spectroscopy; radioactivity; Planck’s radiation law; photoelectric effect; the Bohr atom; DeBroglie, Schrodinger, and Heisenberg theories; eigenvalue/eigenvector problems; variation and perturbation theory; quantum statistics; Heitler-London theory of covalent bonds; selection rules and spectroscopy.  
Class 3, Credit 3 (offered every year) (F, W)

SCHP-443  
**Physical Chemistry III**  
Registration #1014-443  
Kinetic molecular theory; transport properties of gases; chemical kinetics; surface chemistry; photochemical kinetics; irreversible processes in solution. (SCHP-441)  
Class 3, Credit 3 (offered every year) (S, SR)

SCHP-445  
**Physical Chemistry Laboratory I**  
Registration #1014-445  
Introduction to physical chemistry laboratory; chemical thermodynamics and equilibrium (SCHP-441 should be taken concurrently).  
Lab. 3, Credit 1 (offered every year) (S, SR)
This course is designed to introduce and train each student in small scale SCHT-309 Glassblowing Techniques

Lab. 4, Credit 1 (offered every year) (F, SR)

SCCH-899 Independent Study-Chemistry

Graduate Courses

SCHA-711 Instrumental Analysis
Registration #1008-711
Theory, applications and limitations of instrumental methods in qualitative, quantitative, and structural analysis. Topics covered include fluorescence and phosphorescence, Raman, mass spectrometry, nuclear magnetic resonance, X-ray and radiochemistry, and electrochemistry. (SCHA-312)
Class 3, Credit 3 (offered every year) (F, W)

SCHA-720 Instrumental Analysis Lab
Registration #1008-720
Lab accompanying SCHA-711. Experiments include A.A., fluorimetry, coulo-
metry, 'C and 'H NMR, polarography. Assignments depend on student background.
Lab. 6, Credit 2 (offered every year) (F, W)

SCHB-702 Biochemistry
Registration #1009-702
Introduction to biological chemistry. Chemical structures, reactions and physiological functions of molecular components of cells: amino acids, sugars, lipids, nucleotides and selected biopolymers. Solution behavior, catalytic properties and structure of proteins and enzymes. (SCHO-433 and SCHP-443 or -742)
Class 3, Credit 3 (offered every year) (F, W)

SCHB-703 Biochemistry-Metabolism
Registration #1009-703
Bioenergetics principles; catabolism of carbohydrates, fatty acids and amino acids; photosynthesis, biosynthesis of carbohydrates, lipids, and nitrogenous compounds; active transport; metabolic diseases. (SCHB-702)
Class 3, Credit 3 (offered every year) (F, W)

SCHB-704 Biochemistry-Nucleic Acids
Registration #1009-704
and Molecular Genetics
The biochemistry of inheritance, expression of genetic information, protein biosynthesis, differentiation, viral and bacterial infection and the “origin of life” (SCHB-702)
Class 3, Credit 3 (offered every year) (S)

SCHC-772 Special Topics
Registration #1010-772
Advanced courses which are of current interest and/or logical continuations of the course already being offered. These courses should be structured as ordinary courses and should have specified prerequisites, contact hours, and examination procedures.
Class variable, Credit variable (offered every year)

SCHC-859 External Research
Registration #1010-859
Industrial internship research.
Credit 1-16 (offered every year)

SCHC-870 Chemistry Seminar
Registration #1010-870
Credit 1 (offered every year)

SCHC-879 Research and Thesis Guidance
Registration #1010-879
Hours and credits to be arranged. Chemical research in a field chosen by the candidate, subject to approval of the department head and advisor.
Credit variable (offered every year)

SCHC-899 Independent Study-Chemistry
Registration #1010-899
Credit variable (offered every year)

SCHI-762 Inorganic Chemistry
Registration #1012-762
The properties and structures of the elements and their compounds in relation to electronic and stereoechemical configurations; acid-base theories; non-aqueous solvents (SCHO-433 and SCHP-442)
Class 3, Credit 3 (offered every year) (S, SR)

SCHI-763 Inorganic Chemistry
Registration #1012-763
Transition metal coordination chemistry; lanthanides and actinides; organo-
metallic compounds and special topics. (SCHO-433 and SCHP-442)
Class 3, Credit 3 (offered every year) (F, W)

SCHP-446 Physical Chemistry Laboratory II
Registration #1014-446
Experiments in the application of quantum chemistry, atomic and molecular spectroscopy, and in radioactivity measurements. (SCHP-442 should be taken concurrently)
Lab. 3, Credit 1 (offered every year) (F, W)

SCHP-447 Physical Chemistry Laboratory III
Registration #1014-447
Laboratory experiments in chemical dynamics. (SCHP-443 should be taken concurrently)
Lab. 3, Credit 1 (offered every year) (S, SR)

SCHT-241 Chem Tec I (General)
Registration #1015-241
Safety in the chemical laboratory, toxicity of chemicals, use of compressed gases, laboratory notebooks, separation techniques, paper and gas chromato-
metry, properties of gases and their measurement, common units and conversion factors, weighing techniques, density of solids and liquids, che-
neumal equilibrium, visible spectrophotometry, ionic and covalent bonding.
Class 3, Lab. 9, Credit 6 (offered every year) (F)

SCHT-242 Chem Tec II (Analytical)
Registration #1015-242
Periodicity and chemical properties. Qualitative detection of common metallic and non-metallic ions. Sampling techniques and sample prepara-
tion. Quantitative analysis by gravimetric and titrimetric procedures—acid base and redox. Measurement of pH.
Class 3, Lab. 9, Credit 6 (offered every year) (W, S)

SCHT-243 Chem Tec III (Organic)
Registration #1015-243
Techniques of handling organic compounds; recrystallization and melting points, distillation, extraction. Refractive index and optical activity. Reac-
tions of functional group classes. Infra-red spectrophotometry.
Class 3, Lab. 9, Credit 6 (offered every year) (SR, F)

SCHT-244 Chem Tec IV (Organic)
Registration #1015-244
Continuation of classes and reactions of organic compounds, synthetic techniques, vacuum distillation, gas chromatography, and NMR spectroscop-
y
Class 3, Lab. 9, Credit 6 (offered every year) (W, S)

SCHT-305 Chemical Specialty (Spectrometry)
Registration #1015-305
Quantitative analysis including trace analysis by spectroscopic methods involving visible, ultra-violet, atomic absorption, flame photometric and luminescent instrumentation. Techniques of sample preparation, instrument construction and operation, spectral measurement and interpretation are utilized.
Class 2, Lab. 6, Credit 4 (offered every year) (SR, F)

SCHT-306 Chemistry Specialty
Registration #1015-306
The final academic quarter of the Chem Tech curriculum is designed so that students are given the opportunity to develop more definite options as to their own individual goals. The student may elect to branch-off into one of three areas of specialization: advanced instrumental techniques, the develop-
ment of synthetic techniques in organic chemistry and polymer technolo-
gy
Class 2, Lab. 6, Credit 4 (offered every year) (W, S)

SCHT-307, 308 Research Familiarization
Registration #1015-307, 308
A chemical technician does exploratory work following general directions with little or no formal supervision and is often encouraged to innovate after consultation with his or her supervising chemist or engineer. In this context each student will have the opportunity to work alongside one of our faculty or graduate students and perform a number of tasks related to the progress of a research operation. The choice of a faculty supervisor is left to the stu-
dent. (SCHC-402)
Credit variable (offered every year) (307-F, SR), ( 308-W, S)

SCHT-309 Glassblowing Techniques
Registration #1015-309
This course is designed to introduce and train each student in small scale scientific glassblowing techniques. Proficiency will be developed in rod manipulation, ring seals, construction of apparatus,, annealing, use of a simple lathe and hand-torch work.
Lab. 4, Credit 2 (offered every year) (F, SR)
SCHO-730  Chemical Toxicology
Registration #1013-730
Xenobiotic mechanism, chemical carcinogenesis, drug-induced toxicity, environmental and genetic toxicology, teratology and bioassay/biometrics. (SCHO-433)
Class 3, Credit 3 (offered upon sufficient request)

SCHO-736  Spectrometric Chemical Identification of Organic Compounds
Registration #1013-736
Theory and application of proton and carbon nuclear magnetic resonance, infrared, mass spectrometry, and ultraviolet spectra as applied to organic structure determination. (SCHO-433)
Class 3, Credit 3 (offered every year)

SCHP-737  Advanced Organic Chemistry
Registration #1013-737
Several of the following advanced topics in organic chemistry are covered: polyfunctional compounds, modern synthetic methods, stereochemistry, conformational analysis, free radical reactions, natural products, new synthetic reagents. (SCHO-433)
Class 3, Credit 3 (offered every year)

SCHP-739  Advanced Organic Chemistry
Registration #1013-739
Selected topics in physical organic chemistry including: techniques for elucidation of mechanism (kinetic, linear free energy relationships, isotope effects), molecular orbital theory, electrocyclic reactions, (SCHO-433 and SCHP-443.)
Class 3, Credit 3 (offered every year)

SCHO-832  Stereochemistry
Registration #1013-832
Advanced treatment of steric relationships and stereoisomerism in organic compounds. (SCHO-433, SCHP-443)
Class 3, Credit 3 (offered upon sufficient request)

SCHO-833  Heterocyclic Chemistry
Registration #1013-833
The preparation, properties, and reactions of heterocyclic systems, especially heteroaromatic rings. (SCHO-433)
Class 3, Credit 3 (offered upon sufficient request)

SCHO-835  Organic Chemistry of Polymers
Registration #1013-835
Introduction to the chemistry of synthetic, high molecular weight polymers and a survey of their diverse structures and properties. Mechanisms of condensation, free radical and ionic polymerization. (SCHO-433).
Class 3, Credit 3 (offered in alternate years)

SCHP-741  Chemical Thermodynamics
Registration #1014-741
A study of the basic fundamentals of thermodynamics and their use in deriving the interrelationships of thermodynamic functions. Thermodynamic properties of gases will be calculated based on spectroscopic data. (SCHP-443 and SMAM-307)
Class 3, Credit 3 (offered every year)

SCHP-742  Survey of Physical Chemistry
Registration #1014-742
This course will present principles of physical chemistry to students who have an interest in the health related sciences. Molecular structures, thermodynamics and kinetics will be discussed with a view to their biological applications. (SCHG-217, SCHG-323)
Class 3, Credit 3 (offered upon sufficient request) Not acceptable for M.S. in Chemistry.

SCHP-743  Chemical Kinetics
Registration #1014-743
Methods of investigating the kinetics of chemical reactions and the theories used to interpret their results. Focus on homogeneous reactions in gas and liquid phases. Discussions of references from recent chemical literature. (SCHP-443)
Class 3, Credit 3 (offered alternate years)
SMAM-251, 252, 253

Calculus I, II, III
Registration #1016-251 - 252 - 253

A standard first course in calculus 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. The subject matter is divided as follows:

251: Two-dimensional analytic geometry, functions, limits, the derivative and its formulas, applications of the derivative, introduction to anti-differentiation.

252: The transcendental functions, anti-derivatives by various methods, the definite integral with applications to area, work, etc., numerical integration.

253: Parametric equations, polar coordinates, improper integrals, indeterminate forms, sequences, series, Taylor series.

Class 4, Credit 4 (offered every year) (251 - F, W; 252-W, S; 253-S, F)

SMAM-265

Foundations of Discrete Mathematics
Registration #1016-265

A study of several discrete mathematics topics with careful attention given to the underlying concepts and development. Topics include: logic, proofs, switching circuits, sets, Well-Ordering Principle, Mathematical Induction Theorem, relations, equivalence classes, functions, one-to-one, onto, permutations, discrete function, counting principles, combinations, elementary probability, two-dimensional geometric linear programming.

Class 4, Credit 4 (offered every year) (S)

SMAM-289

Contemporary Science-Mathematics
Registration #1016-289**

A basic survey of mathematical structures as well as an introduction to prob-lem solving. Topics will be chosen from foundations of mathematics, algebra, topology, number theory, graph theory, and probability theory. These structures will be examined as they occur naturally in modern settings.

Class 4, Credit 4 (offered every year) (F, W, S)

SMAM-305

Calculus IV
Registration #1016-305

A continuation of SMAM-253 treating 3-dimensional analytic geometry and vector algebra, partial derivatives, multiple integrals, and applications. (SMAM-253)

Class 4, Credit 4 (offered every year) (F, W, SR)

SMAM-306

Differential Equations I
Registration #1016-306

A first course. Solutions in closed form for common types of first order equations, applications to a variety of physical problems, second order linear equations, methods of undetermined coefficients and variation of parameters, independence and the Wronskian, applications to vibrating systems, numerical techniques, Runge-Kutta, more applications, power series solutions. (SMAM-305)

Class 4, Credit 4 (offered every year) (W, S)

SMAM-307

Differential Equations II
Registration #1016-307

Topics will include: power series solutions to ordinary differential equations about ordinary and regular singular points; Legendre's equation; Bessel's equation; the hypergeometric equation; Picard's theorem with its proof; solution techniques for systems of linear differential equations; and the Laplace transform along with its application to the solution of differential equations. (SMAM-306)

Class 4, Credit 4 (offered every year) (S)

SMAM-309

Elementary Statistics
Registration #1016-309

Handling of statistical data; measures of central tendency and dispersion; sample space; events; probability and its basic laws; conditional probability; basic rules of counting; binomial, geometric, Poisson and normal distributions; sampling distributions; estimation of mean; T-distributions; testing of hypotheses concerning the mean and difference between means, use of chi-square in testing statistical independence and in estimating variability. (SMAM-203 or equivalent)

NOTE: This course may not be taken for credit if credit is to be earned in SMAM-319.

Class 4, Credit 4 (offered every year) (W, S)

SMAM-318

Boundary Value Problems
Registration #1016-318

This course includes: power series solutions of ordinary differential equations, about ordinary and regular singular points; Bessel's equation; Legendre's equation; Sturm-Liouville theory; Fourier series; and the solution of the wave equation, heat equation and Laplace's equation in rectangular and polar coordinates. (SMAM-306)

Class 4, Credit 4 (offered every year) (S)

SMAM-319

Data Analysis •
Registration #1016-319

This course will study the statistical principles of presenting and interpreting data. Topics to be covered will include: patterns of variability; histograms; populations and samples; the Normal distribution; confidence intervals; hypothesis testing; and correlations. (SMAM-304 or equivalent)

NOTE: This course may not be taken for credit if credit is to be earned in SMAM-309.

Class 4, Credit 4 (offered every year) (F, W)

SMAM-320

Quality Control
Registration #1016-320

This course will investigate the application of data analysis techniques to the control of processes. It will also include an introduction to probability and the applications of the binomial, Poisson, and hypergeometric distributions to the construction of sampling plans. (SMAM-319)

Class 4, Credit 4 (offered upon sufficient request)

SMAM-328

Engineering Mathematics
Registration #1016-328

This course provides introductions to matrix algebra and vector calculus. Topics will 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, with discussion of their importance in engineering analysis. (SMAM-204 or equivalent)

NOTE: This course may not be taken for credit if credit is to be earned in SMAM-410 or SMAM-431.

Class 4, Credit 4 (offered every year) (S, SR)

SMAM-331

Probability
Registration #1016-331

Discrete and continuous probability models; random variables; probability density and distribution functions; mathematical expectation; measures of central tendency and dispersion; central limit theorem. (SMAM-253, co-requisite: SMAM-305)

Class 4, Credit 4 (offered every year) (F, S, SR)

SMAM-352

Applied Statistics I
Registration #1016-352

Basic statistical concepts; sampling theory; hypothesis testing; simple linear regression. (SMAM-351)

Class 4, Credit 4 (W, S)

SMAM-353

Applied Statistics II
Registration #1016-353

Continuation of material begun in SMAM-352. Analysis of variance; introduction to multiple regression; non-parametric statistics. Introduction to the use of statistical software packages. Other topics, such as quality control, as time permits. (SMAM-352)

Class 4, Credit 4

SMAM-354

Introduction to Regression Analysis
Registration #1016-354

A study of basic regression techniques with applications to the type of problems encountered in real-world situations; an introduction to the use of statistical software packages for performing regression analysis. The topics include: simple linear regression; residual analysis; two variable multiple regression; the matrix approach to these topics; other models; and selecting the "best" regression equation. (SMAM-353 and 431 (or 328) or equivalents)

Class 4, Credit 4 (offered upon sufficient request)

SMAM-355

Design of Experiments
Registration #1016-355

A study of the design of experiments including factorial experiments, and a study of the relevant analysis of variance. In particular, single factor, two factor and three factor analysis of variance will be studied, as will their derivations from the general linear model. Statistical software will be utilized for projects. (SMAM-353 and 431 (or 328) or equivalents)

Class 4, Credit 4 (offered upon sufficient request)

SMAM-361

Mathematical Modeling
Registration #1016-361

The course will emphasize problem solving, formulation of the mathematical model from physical considerations, solution of the mathematical problem, testing the model and interpretation of results. Problems will be selected from the physical sciences, engineering, economics. (SMAM-352, SMAM-306)

Class 4, Credit 4 (offered every year) (S)
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Registration</th>
<th>Class Credit</th>
<th>Notes</th>
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<tbody>
<tr>
<td>SMAM-365</td>
<td>Combinatorial Mathematics</td>
<td>#1016-365</td>
<td>Class 4, Credit 4 (offered every year)</td>
<td>F</td>
</tr>
<tr>
<td>SMAM-410</td>
<td>Advanced Calculus</td>
<td>#1016-410</td>
<td>Class 4, Credit 4 (offered every year)</td>
<td>(SMAM-265 or permission of instructor)</td>
</tr>
<tr>
<td>SMAM-411,412</td>
<td>Real Variables</td>
<td>#1016-411,412</td>
<td>Class 4, Credit 4 (offered every year)</td>
<td>(SMAM-305 and either SMAM-265 or permission of instructor)</td>
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<tr>
<td>SMAM-420</td>
<td>Complex Variables</td>
<td>#1016-420</td>
<td>Class 4, Credit 4 (offered every year)</td>
<td>(F, W, S, SR)</td>
</tr>
<tr>
<td>SMAM-431</td>
<td>Matrix Algebra</td>
<td>#1016-431</td>
<td>Class 4, Credit 4 (offered every year)</td>
<td>(F, W)</td>
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<tr>
<td>SMAM-432</td>
<td>Linear Algebra</td>
<td>#1016-432</td>
<td>Class 4, Credit 4 (offered every year)</td>
<td>(F, W, S)</td>
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<tr>
<td>SMAM-465</td>
<td>Linear Programming</td>
<td>#1016-465</td>
<td>Class 4, Credit 4 (offered upon sufficient request)</td>
<td>(SMAM-432)</td>
</tr>
<tr>
<td>SMAM-466</td>
<td>Integer Programming</td>
<td>#1016-466</td>
<td>Class 4, Credit 4 (offered upon sufficient request)</td>
<td>(SMAM-465)</td>
</tr>
<tr>
<td>SMAM-467</td>
<td>Theory of Graphs and Networks</td>
<td>#1016-467</td>
<td>Class 4, Credit 4 (offered upon sufficient request)</td>
<td>(SMAM-265 or permission of instructor)</td>
</tr>
<tr>
<td>SMAM-501,502</td>
<td>Advanced Differential Equations</td>
<td>#1016-501,502</td>
<td>Class 4, Credit 4 (offered upon sufficient request)</td>
<td>(SMAM-265)</td>
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<tr>
<td>SMAM-511,512</td>
<td>Numerical Analysis</td>
<td>#1016-511,512</td>
<td>Class 4, Credit 4 (offered every year)</td>
<td>(F, W, S, SR)</td>
</tr>
<tr>
<td>SMAM-521,522</td>
<td>Probability Theory</td>
<td>#1016-521,522</td>
<td>Class 4, Credit 4 (offered upon sufficient request)</td>
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<tr>
<td>SMAM-531,532</td>
<td>Abstract Algebra</td>
<td>#1016-531,532</td>
<td>Class 4, Credit 4 (offered upon sufficient request)</td>
<td></td>
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<tr>
<td>SMAM-551</td>
<td>Topics in Algebra</td>
<td>#1016-551</td>
<td>Class 4, Credit 4 (offered upon sufficient request)</td>
<td>(SMAM-305, SMAM-552 or permission of instructor)</td>
</tr>
<tr>
<td>SMAM-552</td>
<td>Topics in Analysis</td>
<td>#1016-552</td>
<td>Class 4, Credit 4 (offered upon sufficient request)</td>
<td></td>
</tr>
<tr>
<td>SMAM-559</td>
<td>Special Topics-Mathematics</td>
<td>#1016-559</td>
<td>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. These courses will be structured as ordinary courses and will have prerequisites, contact hours, and examination procedures specified in advance. Class variable, Credit variable (offered upon sufficient request)</td>
<td></td>
</tr>
<tr>
<td>SMAM-561,562</td>
<td>Complex Variables</td>
<td>#1016-561,562</td>
<td>Class 4, Credit 4 (offered upon sufficient request)</td>
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</tr>
<tr>
<td>SMAM-565</td>
<td>Game Theory</td>
<td>#1016-565</td>
<td>Class 4, Credit 4 (offered upon sufficient request)</td>
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<tr>
<td>SMAM-566</td>
<td>Non-Linear Optimization Theory</td>
<td>#1016-566</td>
<td>Class 4, Credit 4 (offered upon sufficient request)</td>
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</tr>
</tbody>
</table>

The basic theory of graphs with applications to problems in transportation, communications and computer networks. Mathematical techniques for analysis of design, performance, and reliability of network structures modeled by graphs. (SMAM-265 or permission of instructor)
SMAM-571, 572  
Topology  
Registration #1016-571, -572  
Metric spaces, topological spaces, separation axioms, compactness, connectedness, product spaces. (SMAM-412 or permission of instructor)  
Class 4, Credit 4 (offered upon sufficient request)

SMAM-599  
Independent Study-Math  
Registration #1016-599  
Faculty directed study of appropriate topics on a tutorial basis. This course will generally be used to enable an individual to pursue studies of existing knowledge available in the literature.  
Class variable, Credit variable (offered every year)

SMAM-620  
The Fourier Transform  
Registration #1016-620  
This course provides an introduction to an important mathematical tool for the analysis of linear systems. Topics covered are: a Fourier integral theorem; the Fourier transform and its inverse; an introduction to generalized functions; the Dirac delta function; evaluating transforms; convolution, serial products; the sampling theorem; Rayleigh, power convolution, and auto-correlation theorems; the discrete Fourier transform. (SMAM-420)  
Class 4, Credit 4 (offered every year) (S)

SMAT-420  
Calculus for Technologists I  
Registration #1019-420  
An elementary applied calculus course covering differential and integral calculus of algebraic functions with emphasis on applications. (SMAM-204 or equivalent)  
Class 4, Credit 4 (offered every year) (F, W, SR)

SMAT-421  
Calculus for Technologists II  
Registration #1019-421  
A continuation of SMAT-420. 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 application to engineering technology problems (SMAT-420 or equivalent).  
Class 4, Credit 4 (offered every year) (F, W, S, SR)

SMAT-422  
Solutions of Engineering Problems  
Registration #1019-422  
A continuation of SMAT-421. Course covers selected applied mathematics topics including: differential equations through second order linear, Laplace transforms, Taylor series, and other appropriate topics. Emphasis is on the application of these topics to engineering technology problems (SMAT-421 or equivalent)  
Class 4, Credit 4 (offered every year) (F, W, S, SR)

Physics

SPSP-200  
Physics Orientation  
Registration #1017-200  
An introduction to the nature and scope of physics for freshmen interested in physics as a profession. Topics include: (a) what is physics? (b) professional opportunities in physics; (c) the physics profession; (d) the literature of physics; (e) communicating in physics. Laboratory includes safety instruction; measurement and recording techniques; graphical analysis; error analysis; and report writing. Each student will present a formal written or oral report on some topic of interest at the end of the course.  
Class 1, Lab. 2, Credit 2 (offered every year) (F)

SPSP-201, 202  
/  
Physics in the Arts  
Registration #1017-201, -202  
A study of topics from the world of art in which the underlying physical laws have influenced the art form and its development. A weekly laboratory will allow study of the relation of an art form to basic optical, mechanical, and electrical physics and in addition will provide time for the development of student projects.  
Class 2, Lab. 2, Credit 3 (offered upon sufficient request) (W, S)

SPSP-205, 206, 207  
General Physics  
Registration #1017-205, -206, -207  
General physics for engineering and computer science majors. Mechanics, heat, sound, electricity and magnetism, making moderate use of calculus. (Co-registration or credit in SMAM-252, or SMAM-253) (See SPSP-275.276, 277 for laboratory)  
Class 3, Credit 3 (offered every year) (205-W; 206-S; 207-F)

SPSP-211, 212, 213  
College Physics  
Registration #1017-211, -212, -213  
An elementary course in college physics. Mechanics, heat, sound, light, and electricity and magnetism, with some elements of modern physics. (SMAM-203 or SMAM-223) (See SPSP-271, 272, 273 for laboratory)  
Class 3, Credit 3 (offered every year) (211-F, 212-W, 213-S)

SPSP-214, 215, 216  
Physics for Graphic Arts  
Registration #1017-214, -215, -216  
An introductory course in college physics covering the fundamentals of mechanics, heat, sound, light, electricity and magnetism, and some modern physics, with emphasis on topics having application in the printing industry. (SMAM-203) (See SPSP-217, 218, 219 for laboratory)  
Class 3, Credit 3 (offered every year) (214-F, 215-W, 216-S)

SPSP-217, 218, 219  
Physics for Graphic Arts Lab  
Registration #1017-217, -218, -219  
The labs for these courses will include experiments related to the principles and theories discussed in the corresponding lectures. (SPSP-214,215,216)  
Lab. 2, Credit 1 (offered every year) (F, W, S)

SPSP-271, 272, 273  
General Physics Lab  
Registration #1017-271, -272, -273  
The labs for these courses will include experiments related to the principles and theories discussed in the corresponding lectures. (SPSP-211,212,213).  
Lab. 2, Credit 1 (offered every year) (F, W, S)

SPSP-275, 276, 277  
General Physics Lab  
Registration #1017-275, -276, -277  
The labs for these courses will include experiments related to the principles and theories discussed in the corresponding lectures (SPSP-205,206,207)  
Lab. 2, Credit 1 (offered every year) (F, W, S)

SPSP-289**  
Contemporary Science-Physics  
Registration #1017-289  
Introductory science for non-science students One or more topics such as astronomy, space exploration, relativity, nuclear energy, and lasers are discussed and explained simply, 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 the small group meetings once a week, which reinforce the material given in demonstration lectures and audiovisual presentations.  
Class 4, Credit 4 (F, W, S)

SPSP-311, 312, 313  
University Physics  
Registration #1017-311,-312, -313  
An intensive course in general physics, using calculus, for majors in the sciences. Also open to engineering majors. Mechanics, heat, sound, electricity and magnetism, and light. (Co-registration or credit in SMAM-252 or SMAM-253)  
Class 4, Credit 4 (offered every year) (311-F, W; 312-W, S; 313-S, F)

SPSP-314  
Introduction to Modern Physics  
Registration #1017-314  
An introductory survey of modern physics at the sophomore level. Fundamentals of relativity, photons, interaction of radiation with matter, de Broglie waves, Bohr model, introduction to quantum mechanics, nuclear systematics, radioactivity, alpha, beta, and gamma decays, Q-values, nuclear fission, nuclear fusion. (SMAM-305; SPSP-313, or SPSP-207)  
Class 4, Credit 4 (offered every year) (W, S)

SPSP-315  
Introduction to Semiconductor Physics  
Registration #1017-315  
Kinetic theory of gases and transport phenomena; Drude’s theory of metals, quantum mechanics of a particle in a box; atomic orbitals; band theory of metals, insulators, and impurity semiconductors; Fermi-Dirac distribution; equilibrium charge-carrier densities in metals, insulators, and semiconductors; operating principles of diodes, bipolar junction transistors, and MOS-FETS. (SMAM-306, SPSP-314)  
Class 4, Credit 4 (offered every year) (S, F)

SPSP-319  
Electrical Processes in Solids  
Registration #1017-319  
Introduction to statistical mechanics; Planck’s formula; transport equation; electronic properties of conductors and semiconductors; characteristics of metal-metal, metal-semiconductor, and p-n junctions; operating principles of solid state devices; theory and application. (SPSP-315 and permission of instructor)  
Class 4, Credit 4 (offered upon sufficient request) (W, S)

*Wot acceptable for science credit for College of Science major.
SPSP-321 Introduction to Laboratory Techniques
Registration #1017-321
A.C. circuits, the oscilloscope, vacuum systems. (SPSP-313, SPSP-373)
Class 3, Lab. 3, Credit 4 (offered every year) (W)

SPSP-331 Introduction to Electricity and Electronics
Registration #1017-331
Fundamentals of electricity; construction and measurements of electrical and electronic circuits encountered in a scientific laboratory, (two quarters of introductory physics).
Class 3, Lab. 3, Credit 4 (offered every year) (F, W, S)

SPSP-341 Foundations of Scientific Thinking
Registration #1017-341
Definition of science; historical perspective; ingredients of the scientific quest; the scientific method; scientific explanation, laws theories, and hypothesis; 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)

SPSP-351, 352, 353 Radiation Physics
Registration #1017-351,-352,-353
The physics of nuclear radiation and the electronics used in its detection and monitoring. Application of radioactivity to nuclear medicine. (SPSP-213, SMAM-223 required; SMAM-309 recommended)
Class 4, Lab. 3, Credit 5 (offered every year) (351-F; 352-W; 353-S)

SPSP-355 Radiation Protection
Registration #1017-355
Principles and practical aspects of radiation protection; calculation of external and internal radiation dose measurements. (Permission of instructor and one year of college level physics)
Class 3, Credit 3 (offered every year) (S)

SPSP-361 Ultrasonic Physics
Registration #1017-361
A course in the basic physics of ultrasound, covering ultrasonic wave generation and propagation, transducers, Doppler effect, reflection and refraction, biological effects, and applications of ultrasonic physics in medicine (Permission of instructor and one year of college level physics)
Class 4, Lab. 3, Credit 5 (offered every year) (F)

SPSP-371, 372, 373 University Physics Lab
Registration #1017-371,-372,-373
The labs for these courses will include experiments related to the principles and theories discussed in the corresponding lectures. (SPSP-311,312,313)
Lab. 3, Credit 1 (offered every year) (F, W, S)

SPSP-374 Modern Physics Laboratory
Registration #1017-374
Basic experiments representative of the experimental foundations of modern quantum physics, such as: photoelectric effect, Franck-Hertz experiment, X-ray diffraction; optical diffraction and interference; atomic spectroscopy; electron microscopy; nuclear spectroscopy; radioactive half-life; Millikan oil drop; black-body radiation. Students enrolled in SPSP-315 may include experiments in semiconductor solid state physics. (SPSP-314)
Lab. 3, Credit 1 (offered every year) (S)

SPSP-401, 402 Intermediate Mechanics
Registration #1017-401, 402
Particle dynamics, systems of particles, motion of a rigid body, gravitational fields and potential, moving coordinate systems, generalized coordinates, Lagrange's equations, mechanics of continuous media. (SMAM-307, SPSP-313)
Class 4, Credit 4 (offered every year) (401-F; 402-S)

SPSP-411,412 Electricity and Magnetism
Registration #1017-411, 412
Class 4, Credit 4 (offered every year) (411-F; 412-S)

SPSP-415 Thermal Physics
Registration #1017-415
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. (SMAM-307, SPSP-313)
Class 4, Credit 4 (offered alternate years) (F)

SPSP-421,422 Experimental Physics
Registration #1017-421, 422
Advanced laboratory work in physics, with experiments selected from one or more of the following branches of physics: mechanics, acoustics, heat, electromagnetism, and the physical optics. (SPSP-314,321 plus co-registration or credit in any one of these: SPSP-401, 411, 415, 455)
Class 1, Lab. 5, Credit 3 (offered every year) (421-F, 422-S)

SPSP-431, 432 Electronic Measurements
Registration #1017-431,-432
Laboratory course in electronic measurements and instrumentation, with theory and applications of discrete and integrated circuits in analog and digital electronics. (SPSP-313, SPSP-321).
Class 3, Lab. 3, Credit 4 (offered every year) (431-S, 432-F)

SPSP-455 Optical Physics
Registration #1017-455
Physical optics including interference, diffraction, and polarization. Brief introduction to modern optics. (SMAM-305, SPSP-313)
Class 4, Credit 4 (offered alternate years) (F)

SPSP-480 Theoretical Physics I
Registration #1017-480
An introduction to mathematical topics necessary for a quantitative study of physical phenomena. Topics include: vector analysis including vector differentiation and integration, curvilinear coordinate systems and transformations from one orthogonal coordinate system to another, Fourier series and an introduction to Fourier integrals. Applications of these concepts to physics are presented. (SMAM-307, SPSP-313)
Class 4, Credit 4 (offered every year) (S)

SPSP-501 Theoretical Physics II
Registration #1017-501
Application of advanced mathematical methods to physics. (SMAM-307, SPSP-480, plus co-registration or credit in SPSP-401 and SPSP-411)
Class 4, Credit 4 (offered every year) (F)

SPSP-521 Advanced Experimental Physics
Registration #1017-521
Advanced laboratory experiments and projects in atomic physics, nuclear physics, or solid state physics. Special emphasis on experimental research techniques. (SMSM-307, SPSP-421)
Lab. 6, Credit 2 (offered every year) (F)

SPSP-522 Introduction to Quantum Mechanics
Registration #1017-522
A study of the concepts and mathematical structure of non-relativistic quantum mechanics. Exact and approximate techniques for solving the Schr"{o}dinger equation are presented for various systems. (SPSP-314, SPSP-480; SPSP-315 and SPSP-501 are recommended)
Class 4, Credit (offered every year) (S)

SPSP-531 Solid State Physics
Registration #1017-531
The structure of solids and their thermal, mechanical, electrical and magnetic properties. (SPSP-315, SPSP-480, and SPSP-522; SPSP-501 is recommended.)
Class 4, Credit 4 (offered every year) (F)

SPSP-541, 542, 543 Physics Research
Registration #1017-541,-542,-543
Faculty-directed student projects or research usually involving laboratory work or theoretical calculations that could be considered as of an original nature. (Permission of instructor)
Class variable, Credit variable (offered every year)

SPSP-550 Physics Seminar
Registration #1017-550
Preparation and presentation of papers based on physics literature search. May include reports on student research projects. Special emphasis on the techniques of physics literature search and on the mechanics of preparation, organization, and presentation of technical papers. (Senior physics major or permission of instructor)
Class 1, Credit 1 (offered every year) (F, S)

SPSP-553 Nuclear Physics
Registration #1017-553
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. (SPSP-522)
Class 4, Credit 4 (offered on sufficient request) (S)
SPSP-559  Special Topics-Physics
Registration #1017-559
Advanced courses which are 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. Topics could include: introductory statistical mechanisms; plasma physics; general relativity; linear integrated circuits; cryogenics; radio astronomy; history of physics; astro-physics; astronomy.
Class variable, Credit variable (offered upon sufficient request)

SPSP-599  Independent Study-Physics
Registration #1017-599
Faculty-directed study of appropriate topics on a tutorial basis. This course will generally be used to enable an individual to pursue studies of existing knowledge available in the literature.
Class variable, Credit variable (offered every year)

Clinical Sciences

SCLG-301  Medical Terminology
Registration #1026-301
Emphasizes etymology, definition, pronunciation and correct utilization of medical terms which enables students to develop a vocabulary essential to the understanding of and communication with the various health areas in which allied health professionals will serve. (SBIO-306 or instructor’s permission)
Class 3, Credit 3 (offered every year) (F)

SCLG-415  Pathophysiology
Registration #1026-415
The terminology and concepts of the pathophysiological nature of human disease.
Credit 4 (S)

SCLG-559  Special Topics-Clinical Sciences
Registration #1026-559
Advanced courses which are 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 every quarter)

SCLG-599  Independent Study-Clinical Sciences
Registration #1026-599
Faculty directed study of appropriate topics on a tutorial basis. This course will be used to enable an individual to pursue studies of existing knowledge available in the literature.
Class variable, Credit variable (offered every quarter)

SCLM-210  Medical Technology Seminar
Registration #1024-210
A discussion group involving current topics in the field of medical technology; orientation toward the role of medical technologists in health care.
Class 1, Credit 1 (offered every year) (W)

SCLM-401  Hematology/Immunohematology
Registration #1024-401
A study of the blood (erythrocytes, leukocytes, platelets and blood group antigens). Descriptions of the cellular components of the blood in health and in disease. Cellular and immunological functions and other inter-relation- ships. Hemostasis and coagulation mechanisms. Structures of antigens and antibodies and mechanisms of antigen-antibody reactions. Lab procedures demonstrate cell counting techniques, coagulation studies, antigen-antibody reactions and compatibility testing of various blood groups. (SBIO306) or instructor’s permission.
Class 3, Lab. 3, Credit 4 (S)

SCLM-405  Diagnostic Bacteriology and Mycology
Registration #1024-405
Study of bacteria and fungi that cause human disease. Lecture and laboratory subjects include microorganism growth, isolation, identification, antibiotic sensitivity, and related human immunological and serological responses. (SBIC-404)
Class 3, Lab. 3, Credit 4 (W)

SCLM-432  Biology Laboratory Techniques I
Registration #1024-432
Principles of clinical laboratory instruments in the analysis of body fluids. This quarter stresses the basic chemistries underlying the classical methodologies and relates them to the disease state. Topics include: liver function tests, renal function tests, carbohydrates, electrolytes, acid base balance, enzymes, lipids, hormone function tests, drug analysis, and statistical quality control. (SCHG-217, or equivalent, SBIO-306)
Class 2, Lab. 6, Credit 4 (F, W)

SCLM-433  Biology Laboratory Techniques II
Registration #1024-433
Principles of chemical analysis in the chemistry of body fluids. This quarter stresses the basic chemistries underlying the classical methodologies and relates them to the disease state. Topics include: photometry, atomic absorption spectrophotometry, chromatography, electrophoresis, osmometry, radiation counters, and automated chemical analysers. (SCHG-217, or equivalent, SBIO-306)
Class 2, Lab. 6, Credit 4 (S)

SCLN-401  Introduction to Clinical Nuclear Medicine
Registration #1025-401
A combination lecture/laboratory course introducing clinical aspects of Nuclear Medicine. Hospital organization is presented as well as the relationship of nuclear medicine services to other hospital services. Laboratories in affiliated hospitals are correlated with lectures on nuclear medicine technology, patient care and emergency procedures. (Fourth year standing in NMT program)
Credit 4 (F)

SCLN-402  Nuclear Medicine Procedures-Central Nervous System
Registration #1025-402
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving structures in the central nervous system. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year standing in NMT program)
Credit 1 (F)

SCLN-501  Nuclear Medicine Procedures-Reticuloendothelial System
Registration #1025-201
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving structures in the reticuloendothelial system. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year standing in NMT program)
Credit 1 (F)

SCLN-502  Nuclear Medicine Procedures-Skeletal System
Registration #1025-502
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving structures in the skeletal system. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year standing in NMT program)
Credit 1 (F)

SCLN-503  Nuclear Medicine Procedures-Respiratory System
Registration #1025-503
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving structures in the respiratory system. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year standing in NMT program)
Credit 1 (F)

SCLN-510  Nuclear Medicine Procedures-Urinary System
Registration #1025-510
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving structures in the urinary system. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year standing in NMT program)
Credit 1 (F)
SCLN-511 Nuclear Medicine Procedures - Endocrine System
Registration #1025-511
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving structures in the endocrine system. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year standing in NMT program)
Credit 2 (W)

SCLN-512 Nuclear Medicine Procedures - Cardiovascular System
Registration #1025-512
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving structures in the cardiovascular system. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year standing in NMT program)
Credit 2 (W)

SCLN-513 Nuclear Medicine Procedures - Digestive System
Registration #1025-513
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving structures in the digestive system. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year standing in the NMT program)
Credit 1 (S)

SCLN-514 Nuclear Medicine Procedures - Special Studies
Registration #1025-514
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving special studies. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year standing in the NMT program)
Credit 1 (S)

SCLN-515 Nuclear Medicine Procedures - Hematological and In Vitro Studies
Registration #1025-515
This course covers the basic procedures utilised in nuclear medicine for the evaluation of patients with hematologic disorders. Medical indications, fundamental principles, technique data calculations and test interpretation are covered for each procedure discussed. (Fourth year standing in the NMT program)
Credit 1 (S)

SCLN-516 Instrumentation and Computers
Registration #1025-516
A combination lecture/practicum course covering the various nuclear instrumentation found in the clinical setting. The lectures provide knowledge of the function and characteristics of the basic components of any scintillation detection system necessary to understand its applications in nuclear medicine. Lectures are reinforced through clinical practicums in which the student operates the equipment. Collimation, quality control, computer systems and data processing are covered. Fourth year standing in NMT program
Credit 2 (W)

SCLN-517 Radiochemistry and Radiopharmacology
Registration #1025-517
A combination lecture/lab course covering the production and use of radioisotopes in medicine. Radiopharmaceutical compounding, quality control procedures, dose calibration, and licensing regulations regarding the handling and use of radio-pharmaceuticals are covered. (Fourth year standing in NMT program)
Credit 2 (W)

SCLN-518 Radionuclide Therapy and Radiation Biology
Registration #1025-518
A study of the application of radionuclides in the treatment of disease and the study of the biologic changes which occur following irradiation. (Fourth year standing in NMT program)
Credit 1 (W)

SCLN-519 Radiation Health Safety
Registration #1025-519
A course designed to familiarise the student with the daily routine for safe handling of radioactive materials. Radiation protection, licensing regulations, decontamination procedures, waste disposal and area surveys are covered. (Fourth year standing in NMT program)
Credit 2 (S)

SCLN-520 Radioimmunoassay
Registration #1025-520
A combination lecture/practicum course in RIA. Topics include theory and basic principles, instrumentation, specific assays, and quality control. Commonly encountered pitfalls, current RIA developments and the diagnostic meaning of each test are covered. (Fourth year standing in NMT program)
Credit 4 (S)

SCLN-521 Review in Nuclear Medicine
Registration #1025-521
Discussion of all aspects of nuclear medicine covered during the clinical internship including preparation for the national and certification exams in nuclear medicine technology. (Fourth year standing in NMT program)
Credit 2 (S)

SCLN-522 Clinical Nuclear Medicine I
Registration #1025-522
A clinical practicum which gives the student the opportunity to learn and master nuclear medicine procedures through technical and practical experience. Each student is assigned a particular combination of three hospitals and trains approximately four months in each. Students work with patients under the supervision of physicians and technologists on the hospital staff. Student progress and performance is monitored by the R I T. nuclear medicine technology clinical coordinator who makes periodic visits to the hospital department. (Fourth year standing in NMT program)
Credit 6 (F)

SCLN-523 Clinical Nuclear Medicine II
Registration #1025-523
Continuation of Clinical Nuclear Medicine I. (Fourth year standing in NMT program)
Credit 7 (W)

SCLN-524 Clinical Nuclear Medicine III
Registration #1025-524
Continuation of Clinical Nuclear Medicine II (Fourth year standing in NMT program)
Credit 7 (S)

SCLS-411 Intro, to Diagnostic Ultrasound
Registration #1030-411
A course which surveys the historical development of medical ultrasound technology, the professional and occupational development of sonography and the current major diagnostic uses of ultrasound. Registry certification will also be discussed
Class 2, Credit 2 (F)

SCLS-412 Ultrasonic Cross-Section Anatomy
Registration #1030-412
Basic cross-sectional anatomy of the head, neck, abdomen, and pelvis with emphasis placed on sonographic correlation of anatomical structures.
Class 3, Rec. 1, Credit 4 (W)

SCLS-413 Ultrasound Instrumentation
Registration #1030-413
Principles of techniques and instrumentation used in medical ultrasound imaging. Topics include: pulsed echo technique; real time scanners; A-, B-, and M-mode instrumentation; Doppler; instrument controls; calibration and quality assurance.
Credit 4 (S)

SCLS-551 Intro, to Clinical Ultrasound
Registration #1030-551
A combined lecture/laboratory course introducing clinical aspects of ultrasound technology. Topics include: applied ultrasonic physics and instrumentation, imaging and scanning techniques, nursing procedures, and patient care. Cross-sectional anatomy and pathophysiology will be correlated with ultrasound images.
Class 4, Lab. 2, Credit 6 (F)

SCLS-552 Intro, to Obstetrical Ultrasound
Registration #1027-552
This course will equip the student with the practical skills and clinical knowledge necessary to perform competent Obstetrical ultrasound scans Image production, recognition, and acceptability are stressed; examination protocols are outlined. Instruction also includes review of teaching files and discussion of new techniques and research trends. (SCLS-551)
Lec. 2, Lab., Credit 5 (F)
SCLC-810  Advanced Clinical Chemistry Laboratory I
Registration #1023-810
Comparison of current methods for analysis of toxicology samples-gas-liquid chromatography, radioimmunoassay, enzyme multiplied immunoassay. (Permission of instructor, class size limited to 12)
Lab. 4, Credit 1 (offered concurrently with SHPC-820)

SCLC-811  Advanced Clinical Chemistry Laboratory II
Registration #1023-811
Comparison of current methods for separation and determination of isoenzymes. (Permission of instructor, class size limited to 12)
Lab. 4, Credit 1 (concurrent with SHPC-821)

SCLC-821  Advanced Clinical Chemistry II
Registration #1023-821
Proteins, enzymes, hemoglobins, iron, renal functions, lipids, quality control, automation, and method selection. (Permission of instructor)
2 hr lecture, 2 hr seminar, Credit 3 (S 1983; F 1984)

SCLC-822  Advanced Clinical Chemistry III
Registration #1023-822
Radioimmunoassay, hormones, fetal-placement unit, integration of laboratory data. (Permission of instructor)
2 hr lecture, 2 hr seminar, Credit 3 (F 1985; S 1985)

SCLS-553  Intro, to Gynecologic Ultrasound
Registration #1030-553
This course will equip the student with the practical skills and clinical knowledge necessary to perform competent Gynecologic ultrasound scans. Image production, recognition, and acceptance are stressed; examination protocols are outlined. Instruction also includes review of recent papers and discussion of new techniques and research trends. (SCLS-551)
Class 3, Lab, Credit 7 (S)
Material Science and Engineering

Graduate Courses

**SESM-701** Introduction to Materials Science
Registration #1028-701
Crystal structure and defects, strength of materials, metals, alloy principles, ferrous alloys.
Credit 4 (offered every year)

**SESM-702** Introduction to Polymer Science
Registration #1028-702
Introduction to the physical chemistry and organic chemistry of polymers, structure, preparation and properties of polymers.
Credit 4 (offered every year)

**SESM-703** Solid State Science
Registration #1028-703
Crystal structure and x-ray diffraction; lattice vibrations and thermal properties; electron band theory of insulators, metals, aifd semiconductors, junction diodes and transistors.
Credit 4 (offered every year)

**SESM-704** Introductory Theoretical Methods
Registration #1028-704
Treatment of waves and fields; selected topics of interest in electrodynamics and fluid mechanics; statistical mechanics, Maxwell-Boltzmann, Bose Einstein, and Fermi-Dirac distributions and their applications.
Credit 4 (offered every year)

**SESM-705** Introductory Experimental Techniques
Registration #1028-705
The list of laboratory projects includes the areas of:
- Microanalysis of materials: x-ray diffraction, scanning electron microscopy metallography, microelectronics, fluorescence, phosphorescence, etc.;
- Thermal systems: thermomechanical and thermogravimetric systems and differential scanning calorimetry;
- Thin films: thermal evaporation system, sputter coating system, phase contact microscopy, chemical vapor deposition system;
- Sonics and ultrasonics
Credit 4 (offered every year)

**SESM-706** Experimental Techniques
Registration #1028-706, -707, -708
The study of more topics listed in Introductory Experimental Techniques.
Credit 4 (offered every year)

**SESM-710, 711** Material Properties and Selection I and II
Registration #1028-710, -711
Mechanical properties of metallic polymeric materials; application and selection of such materials based on strength, fatigue, impact, creep, processing, and economy.
Credit 4 per quarter

**SESM-714** Ceramics and Glass
Registration #1028-714
Nature of ceramics, nature of glass, processing of ceramics and glass materials, properties and application of ceramics and glass.
Credit 4

**SESM-717** Materials Degradation: Corrosion
Registration #1028-717
Electrochemical nature of corrosion, high-temperature corrosion, anticorrosion techniques, materials selection for corrosion services.
Credit 4

**SESM-720** Organic Polymers
Registration #1028-720
This course is designed to meet the needs of students in the area of organic chemistry related to synthesis, polymerization mechanism, structures, stereochemistry and reactions of organic polymers and their industrial usage.
Credit 4

**SESM-721** Physical Chemistry of Polymers
Registration #1028-721
This course is designed to meet the needs of students of materials science in the area of theoretical and experimental physical chemistry macromolecules.
Credit 4

**SESM-722** Polymer Processing
Registration #1028-722
A study of the basic principles and methods involved in the technology of polymeric materials, including treatment of heat transfer, mass flow, mixing, shaping and moulding of polymeric materials.
Credit 4

**SESM-730** Optical Properties of Materials
Registration #1028-730
Fundamentals of geometrical and physical optics; interaction of radiation with atoms, molecules, and matter; dielectrics; phenomenological considerations of electro-optics, acousto-optics, and lasers.
Credit 4

**SESM-733** Electrical and Magnetic Properties
Registration #1028-733
Band structures of pure and doped solids and solid compounds, transport phenomena, semiconductor, optical properties, galvanomagnetic and magneto-optic effects.
Credit 4

**SESM-734** Advanced Optics
Registration #1028-734
Lasers: theory, types and construction; optical properties of various metals and alloys; thin films: multilayer dielectric coating; principles and applications of electro-optical and acousto-optical materials; shutters and modulators.
Credit 4

**SESM-735** Amorphous and Semicrystalline Materials
Registration #1028-735
Electrical, thermal, and optical properties of amorphous materials; models of conduction.
Credit 4

**SESM-740** Nuclear Science and Engineering
Registration #1028-740
Systematics of the atom nuclei; radioactivity; neutron induced reactions; fission; nuclear reactor principles, design and materials.
Credit 4

**SESM-800** Special Topics
Registration #1028-800
In addition to in-depth study of any of the courses listed under Elective Courses, special topics may be selected from such areas as elastomers, organometallics, radiation damage, processing of materials, superconductivity, etc.
Credit 4

**SESM-879** Research and Thesis Guidance
Registration #1028-879
A project involving research on a topic in materials science and engineering carried out either on campus or off campus under the industrial internship option. An oral examination and written thesis are required.
Credit variable

**SESM-880** Seminar
Registration #1028-880
This course is required for completion of the program and will involve a one-hour presentation on some topic in materials science and engineering.
Credit 1

**SESM-890** Independent Study
Registration #1028-890
This course number should be used by students wishing to study a topic or topic an independent study basis. Permission to register required.
Credit variable
National Technical Institute for the Deaf

Department of Educational Support Services Training

Interpreting

NITP-201 Expressive Interpreting I
Registration #0850-201
This course introduces several basic interpreting skills. It includes development of memory retention skills, learning of primary sign vocabulary, skills and techniques for oral interpreting, mime and gesturing. The course combines lectures and lab practice. Students are critiqued to check their progress.
Class 3, Credit 3 (offered annually)

NITP-202 Expressive Interpreting II
Registration #0850-202
This course requires the student to use skills and principles learned in Expressive Interpreting I. The student will practice interpreting from English to American Sign Language (ASL). Practice will include interpreting both live talent and audiotapes. The audiotapes begin at speeds of 50 wpm and increase to 80 wpm. (NITP-201)
Class 3, Credit 3 (offered annually)

NITP-211 Voice Interpreting I
Registration #0850-211
This course will increase the student's ability to receive the spoken and signed messages of hearing-impaired people. It also refines student's ability to use vocal modulation to prepare for the voice interpreting task. This is a self-paced lab course. Students learn by viewing videotapes and completing a series of exercises. The videotapes contain hearing impaired people communicating orally, in Signed English or in ASL.
Class 3, Credit 3 (S)

NITP-212 Voice Interpreting II
Registration #0850-212
This course develops the student's ability to generate a spoken English equivalent while viewing/listening to a hearing-impaired person's signed/spoken message. This is a self-paced lab course. (NITP-211)
Class 3, Credit 3 (Fall)

NITP-213 Voice Interpreting III
Registration #0850-213
This course continues development of the voicing task. More complex videotaped samples of signed/spoken messages of hearing-impaired persons are delivered at a faster rate than those in Voice I and II. This is a self-paced lab course. (NITP-212)
Class 3, Credit 3 (Summer)

NITP-251, 252 Aspects and Issues of Deafness I, II
Registration #0850-251, -252
The student learns the communication and psycho-social/cultural aspects of deafness through panels, discussions, readings and field trips.
Class 3, Credit 3 (offered annually)

NITP-261, 262 Theory & Practice of Interpreting I, II
Registration #0850-261, -262
Students use a communication process model to acquire a theoretical base for the interpreting task. Addressed are: the linguistic principles associated with sign language and the interpreting task, and skills in positioning and lighting. These courses include lectures and student participation in small and large group activities.
Class 3, Credit 3 (offered annually)

SCL
RegfTP-271, 372 The Professional Interpreter I, II
Compigistration #0850-271, -372
Students develop a broad understanding of interpreting as a profession, say, (oral and standard for certification, and the concepts contained in the RID Lab of ethics. Other areas of concentration are: interpersonal skills, self- lude, professional development, and resume writing. Course work includes panels, role plays, discussions, readings and lectures.
Class 3, Credit 3 (offered annually)

NITP-281, 382 Interpreting Practicum I, II
Registration #0850-281,-382
These field experiences provide an opportunity to practice and integrate skills acquired in the classroom and laboratories. They include instructional and non-instructional activities on the RIT campus and in the Rochester community, under the supervision of the interpreter manager on site and the instructor responsible for the course.
Class 15, Credit 5 (available any quarter)

NITP-283, 384 Interpreting Seminar I, II
Registration #0850-283, -384
Designed as part of the field experience, students share their experiences and concerns as practicing interpreters. Panels of interpreters and consumers of interpreting services are used.
Class 1, Credit 1 (available any quarter)

NITP-303 Expressive Interpreting III
Registration #0850-303
This course introduces advanced vocabulary needed for legal, medical, and educational settings. Audiotapes and other materials are made beginning at a speed of 80 wpm and increase to a speed of 120 wpm. The students are critiqued to check progress and help to increase skills.
Class 3, Credit 3 (offered annually)

NITP-331 Expressive Transliterating
Registration #0850-331
The students develop the skills required to accurately represent a spoken message in signed English. Some areas of concentration are: facial expression, body shifting, mouth movements and finger-spelling. Practice of these skills occur in formal lectures and certain classroom environments.
Class 3, Credit 3 (offered annually)

NITP-341 Introduction to Specialized Interpreting Settings
Registration #0850-341
This course introduces the student to interpreting in various specialized settings. Included are: platform, telephone, religious, artistic, and educational. Practice is given to creating translations for artistic samples.
Class 3, Credit 3 (offered annually)

NITP-391 Principles of Tutoring/Notetaking
Registration #0850-391
This course prepares personnel to provide tutoring and notetaking support services for the hearing-impaired in mainstreamed educational settings. The methodology is appropriate for elementary, secondary, and postsecondary educational levels.
Class 3, Credit 3 (offered annually)

NITP-392 Tutoring/Notetaking Practicum
Registration #0850-392
Students provide tutoring and notetaking services to hearing-impaired students. A minimum of 10 hours per week is committed to taking notes in class and tutoring outside of class. Practicum sites include the Rochester City School District, the Monroe County Board of Cooperative Educational Services (BOCES) program, colleges of RIT, and other Rochester area universities and colleges. Supervision is provided.
Class 10, Credit 3 (available any quarter)

NITP-395 Mainstreaming: Educational Programs and Alternatives
Registration #0850-395
Explores the goals and processes of education of the hearing-impaired and covers current demographic, legal, economic and social trends affecting education of the hearing-impaired; identifies criteria and processes for the establishment of quality support services for deaf students.
Class 3, Credit 3 (offered annually)

Course descriptions for A.A.S., Diploma, and Certificate programs for the deaf may be found in the NTID catalog.
## Reserve Officers’ Training Corps

Central to the Reserve Officers’ Training Corps (ROTC) program are courses that are offered annually. These courses are designed to prepare students for leadership roles in the U.S. Army. Here is a list of courses offered over the course of the student’s academic years:

### First Year

- **MHSM-201**
  - Registration #0701-201
  - The Military and American Society I
  - Introduction to the organization and purpose of the ROTC Program; organization of the United States Army, its world-wide missions, its relationship to the National Security Organization, with emphasis on the Executive Office of the President; branches of the US Army; voluntary leadership laboratory; military communications exercise.
  - Class 1, Credit 1
- **IISM-202**
  - Registration #0701-202
  - Military History and Leadership
  - Introduction to map reading with emphasis on the US Army grid system; an introduction into leadership and principles of war; military history from 1945 to 1970; voluntary leadership laboratory.
  - Class 1, Credit 1
- **USM-03**
  - Registration #0701-203
  - The Military and American Society II
  - The impact the Vietnam conflict upon the American society and the US Army; the future; US Army weapon systems, Soviet weapon systems; comparison and contrast of the US and Soviet Union military systems; intelligence preparation of the battlefield; voluntary leadership laboratory.
  - Class 1, Credit 1

### Second Year

- **AMSM-301**
  - Registration #0701-301
  - Leadership and Management
  - Provides future officers with the basic principles of leadership and management of human resources; motivation, morale, communication, individual and group behavior are discussed; voluntary leadership laboratory.
  - Class 2, Credit 2
- **MMSM-302**
  - Registration #0701-302
  - Basic Military Studies
  - A practical introduction to the basic military organization. Emphasis is placed on tactical operation and movement of the squad, first aid, land navigation and communication techniques. The course stresses practical application rather than theory; voluntary leadership laboratory.
  - Class 2, Credit 2
- **WMSM-303**
  - Registration #0701-303
  - World Change and Military Implications
  - Study of the Army’s contribution to the total military structure; an introduction to military implications in the international system; readings in military history; voluntary leadership laboratory.
  - Class 2, Credit 2

### Third Year

- **MMSM-401**
  - Registration #0701-401
  - Introduction to Basic Operations and Tactics
  - Provides a knowledge of small-unit leadership training on map reading skills, land navigation and techniques of squad level tactics and tactical employment; leadership laboratory.
  - Class 3, Credit 3
- **MMSM-402**
  - Registration #0701-402
  - Military Skills Training I
  - Provides knowledge and training of basic military skills essential as a junior officer; weapons training, an introduction to military communication equipment and techniques; leadership laboratory.
  - Class 3, Credit 3

### Fourth Year

- **MMSM-501**
  - Registration #0701-501
  - Junior Officer Development and Training
  - Briefings/discussions on military organization, professionalism and ethics, and branches of the Army; principles and techniques of military instruction; the company level training management system; leadership laboratory.
  - Class 3, Credit 3
- **MMSM-502**
  - Registration #0701-502
  - Unit Level Officer Responsibilities
  - Discussions and seminars on officer extra duties, military justice, supply and property accountability, maintenance management, officer-enlisted personnel management and command and staff responsibilities; leadership laboratory.
  - Class 3, Credit 3
- **MMSM-503**
  - Registration #0701-503
  - Advanced Officer Management and Career Planning
  - Discussions on the officer personnel management system, active duty orientation seminars, the military as a career and preparations for commissioning; leadership laboratory; field training exercise.
  - Class 3, Credit 3

*Also offered during summer, which enables a student to begin the third-year courses with his/her class.*