January 1983

1983-1984 Undergraduate Course Descriptions

Rochester Institute of Technology

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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

Course Numbering Diagram

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In this catalog you will find course descriptions for all course offerings given by the day colleges, schools and departments of the Institute for undergraduate or graduate credit. The listing does not include courses provided by the College of Continuing Education (except for graduate statistics courses), Eisenhower College, nor those courses specifically for students of the National Technical Institute for the Deaf. These are described in the separate Continuing Education Catalog and the NTID and Eisenhower College Bulletins.

For information about the colleges and programs at the undergraduate level, please refer to the Undergraduate Bulletin; for further information about the colleges and programs at the graduate level, please request the Graduate Bulletin from:

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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 Service Courses

Service courses are offered by the Audiovisual Communications Department for other departments. These courses may not be taken by audiovisual communications majors.

ICIC-413 AV Production for Biomedical Communications
Registration #0612-413
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, dissolve, programming, graphics, combination of music, words, and images. For biomedical photography majors only.
Class 2, Lab 4, Credit 4

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; producing 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 the production of presentations using media other than slide/tape and requiring a three projector show using memory programming as well as increased emphasis on script, planning, and budget. Characteristics of various media and uses appropriate to different situations are included. (ICIC-421, ICIC-422) For nonmajors.
Credit 4

ICIC-444 Technical Writing for Computer Scientists
Registration #0612-444
An intensive course in the preparation of technical documents in the field of computer science. Topics include analysis of purpose of a document, and writing effectively for the expertise and interests of the intended audience. Writing assignments will cover such topics as technical project proposals, progress reports, and documentation for the users of a system. This course is a prerequisite to the third quarter of cooperative education. For computer science majors only.
Credit 2

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 except by department permission.
Credit variable (3-4)

ICIC-519 Principles and Methods for Dietetics
Registration #0612-519
Principles of learning; behavioral objectives, motivation, perception, evaluation, guidance, teaching methods and audiovisual techniques; development of a teaching/learning unit for a specific group. For dietetics majors only.
Credit 4

Upper Division Major Courses

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 graduation.
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 graduation.
Credit 2

ICIC-430 Visual Production Techniques
Registration #0612-430
Students develop and refine the visual techniques in developing an audiovisual show, especially a multi-image show. Includes lighting, color balancing, format design and principles of continuity composition in audiovisual production. Required for graduation, but may be waived on demonstration of competency.
Credit 4

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 graduation.
Credit 4

ICIC-450 Audiovisual Program Design II
Registration #0612-450
Students analyze the elements used in design of audiovisual programs and presentations. Emphasis is on the application of the key psychological principles—perception, memory, experience, attitudes—underlying successful communications. Students must design a series of presentations incorporating these principles. Required for graduation. (ICIC-440)
Credit 4

ICIC-490 Audio Techniques
Registration #0612-490
Students review principles of sound recordings and produce audiotapes 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-501 Practicum in Audiovisual Program Design
Registration #0612-501
Allows a student 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 (1-2)
ICIC-502  Practicum in Audiovisual Management
Registration #0612-502
Allows a student 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 (1-2)

ICIC-503  Practicum in Audiovisual Production
Registration #0612-503
Allows a student 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 (1-2)

ICIC-510  Writing for Audiovisual Programs
Registration #0612-510
Emphasizes the principles of script writing for verbal and visual 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 graduation.
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-571  Staging Audiovisual Presentations
Registration #0612-571
The student learns to plan and set up equipment for audiovisual presentations. Includes calculation of power requirements, analyzing facilities and developing plans, setting up, connecting and troubleshooting common audiovisual equipment such as sound systems, projectors, multi-image equipment, screens, (ICIC-468, 560)
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, and ICIC-468, and 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, and 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-583, and 581, and approval of project prior to enrollment)
Credit variable (1-2)

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 technique, produce slide animation and sequencing, 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 senior'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/Gtr.

Graduate Courses

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-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.
Credit 3

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 psycho-motor 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 registration for this course (guidelines available from the department). (ICIT-750, 751, and 720 or 721)
Credit variable (1-3)

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

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. (ICIT-735, 770)
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 spatial relationships, human factors, acoustics, lighting, heating, and ventilation. Includes a subject matter expert or job counseling. (ICIT-735, 770)
Credit 3

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 instructional 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; ICIT-735 and ICIT-755 are prerequisites)
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. (Prerequisites: ICIT-750)
Credit 4

ICIT-752  Instructional Development III
Registration #0613-752
Straddles 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. Emphasizes the development of innovative methods and materials. Students study special problems related to selected areas of instructional development. (Prerequisites: ICIT-750 & 751)
Credit 4

ICIT-755  Criterion Referenced Instruction and Technical Training I
Registration #0613-755
Required for graduation.
Credit 3

ICIT-756  Criterion Referenced Instruction and Technical Training II
Registration #0613-756
A two-course sequence which applies the principles of instructional development specifically to those areas of training in which performance criteria can be precisely stated and accurately measured. Such training usually tends to be in technical skill areas where procedures or products are predetermined or can be clearly specified. The course is largely self-paced and self-instructional and the student must complete a project in the technical training area.
Credit 3

ICIT-757  Techniques of Work Analysis
Registration #0613-757
Students learn a variety of job analysis and task analysis techniques based on Functional Job Analysis. 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 unrelated 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-757 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 the structuring of the module, actual module writing, and test 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-758)
Credit 4

ICIT-770  Interpersonal Communications
Registration #0613-770
Intructional 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-771  Group Development and Organizational Change
Registration #0613-771
Similar in format to ICIT-770, the course is designed to follow either ICIT-756 and/or ICIT-757. The course introduces the student to the concept and practice of interpersonal communication to the area 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 causative 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 Resources 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, educational development, and the implications of the "open door" policy are investigated.
Credit variable (1-3 credits)

IJCC-703  Management of Learning
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
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-742  Career Decision Making Concepts
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
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
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. Productions include 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 in Career Planning
Registration #0615-748
The primary goal is the ability to use several data based computer systems for the storage and retrieval of career information. This includes a sufficient understanding of the computer systems, languages and dictionaries for efficient utilization.
Additional goals are an awareness of other systems based upon media and print materials, and the ability to evaluate various systems. (CTAM-712 or equivalent)
Credit 4

IJCC-749  Manpower Forecasting Fundamentals
Registration #0615-749
Two different purposes that depend on a common base are goals for this course. The common base is an understanding of the techniques, theories and limitations of manpower forecasting as it applies to numbers of current occupations and to the probabilities of emerging careers.
The two purposes are: (1) the ability to provide, as a generalist having a broad knowledge of different careers, assistance to discipline specialists in feasibility studies for new educational programs, and (2) to assist people in making decisions in those careers for which insufficient information exists.
The ability to assist people in making decisions about the pursuit of a career that is projected to be available several years later will be studied in order to develop a uniform and responsible judgment in those areas where probability statements are extremely important. (CTAM-712 or equivalent)
Credit 4

IJCC-750  Seminar
Registration #0615-750
This is a series of interdisciplinary discussions led by course participants from different teaching disciplines and outside resource persons. The topics concern the challenges involved in teaching, and in educational planning, leading to a better understanding of the total learning by the two-year college students.
Credit 2

IJCC-751  Occupational/Industrial Environments
Registration #0615-751
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 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 & Special Settings
Registration #0615-752
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
The role of testing in the validation and acceptance of a program is important for credit.

Career and Human Resource Development courses are offered at least once annually, except as noted.

### Undergraduate Courses

#### Service Courses

**Computer Techniques**

- **ICSP-205** Computer Techniques (Registration #0601-205)
  - Students will be introduced to computer systems, learn problem-solving techniques, and have an opportunity to study the FORTRAN programming language under a "modified-PSI" plan. Topics available for study include straightline programming, decision and repetition capabilities, formatted input/output, data structuring, and the use of subprograms. Programming projects will be required.
  - Class 3, Credit 3

- **ICSP-208** Introduction to Programming (Registration #0601-208)
  - A continuation of the technical topics begun in ICSS 200, with emphasis on advanced features of Pascal and their use in implementing modular, well-documented programs. Topics include an overview of problem solving methods, elementary data types, arrays, records, file I/O, and procedures and functions with parameters. Programming projects will be required. (ICSS-200 or equivalent)
  - Class 4, Credit 4

**Program Design and Validation**

- **ICSP-210** Program Design and Validation (Registration #0601-210)
  - A third course in programming, where students use Pascal to implement moderately large programs. Topics include pointers, multidimensional arrays, classic data structures and their implementation (trees, lists, queues), and the application of these concepts to solve problems of intermediate complexity. The role of testing in the validation and acceptance of a program will be emphasized. Programming projects will be required. (ICSP-208)
  - Class 4, Credit 4

- **ICSP-216** Program Design and Validation/ FORTRAN (Registration #0601-216)
  - A course in program design, including specification, structured development, advanced data types, procedures and functions, program validation and verification, FORTRAN and its use in graphics programming. Programming projects will be required. (ICSP-208)
  - Class 4, Credit 4

**FORTRAN Programming for Engineers**

- **ICSP-220** FORTRAN Programming for Engineers (Registration #0601-220)
  - Students will be introduced to computer systems, learn problem solving techniques, and have an opportunity to study the FORTRAN programming language under a "modified-PSI" plan. Topics available for study include straightline programming, decision and repetition capabilities, formatted input/output, data structuring, use of subprograms, and application packages (e.g. plotter routines and the IMSL package). Several classical numerical techniques are illustrated. Programming projects will be required.
  - Class 4, Credit 4

**Business Applications**

- **ICSP-300** Business Applications Using COBOL (Registration #0601-300)
  - A study of elementary COBOL programming, using structured design and programming concepts developed in ICSP 210. The course will emphasize the use of COBOL in solving common business, commercial, and managerial problems. Topics include COBOL program organization, sequential input/output, COBOL control structures, arithmetic operations and report editing, control break processing, and tabular handling. Students will write programs which adhere to specific programming and documentation standards. (ICSP-10)
  - Class 4, Credit 4
ICSP-303  Advanced Business Applications
ICSP-243  Programming III
ICSP-305  Assembly Language Programming
ICSP-306  Systems Programming
ICSP-319  Scientific Applications
ICSP-330  PL/I Programming
ICSP-450  Programming Language Concepts
ICSP-488  Programming Systems Workshop

Computer Science Courses

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

ICSP-241  Programming I
Registration #0601-241  Algorithmic Structures
An introduction to programming emphasizing the development and documentation of modular computer-based algorithms. A structured procedural programming language (e.g., Pascal) is used to demonstrate modern programming principles. Topics include variables, expressions and assignment, control structures (sequential, selection, iteration), data structures, procedural and control structures. Programming assignments are an integral part of the course.
Class 4, Credit 4

ICSP-242  Programming II
Registration #0601-242  Data Structures
An introduction to the basic data structures used in computer applications. Both abstract concepts and implementation details will be discussed, including comparisons of alternative implementations. Topics include arrays, records, pointers, dynamic storage allocation, linked lists, stacks, queues, trees. Programming projects are required. (ICSP-241)
Class 4, Credit 4

ICSP-243  Programming III
Registration #0601-243  Design and Implementation
A first course on the design and implementation of moderately large single-programmer systems. Modern principles of design and testing will be presented in class and reinforced by programming assignments. The importance of both internal and external program documentation will be stressed. Topics include top-down design, stepwise refinement, test data selection, modularity measures (cohesion and coupling), common programming paradigms, and advanced file I/O. Programming projects are required. (ICSP-242)
Class 4, Credit 4

ICSP-305  Assembly Language Programming
Registration #0601-305  Assembly Language Programming
A study of assembly language concepts and programming methods, including computer organization, assembly process, addressing, binary arithmetic, relocation, 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. (ICSP-243 or equivalent)
Class 4, Credit 4

ICSP-306  Systems Programming
Registration #0601-306  Systems Programming
Fundamentals
A study of systems programming concepts and techniques. Topics include the roles of assembly languages and systems implementation languages, systems macros and supervisor calls, program linkage, reentrant and recursive subroutines, I/O programming at the device level, macros and conditional assembly. Programming projects will be required. (ICSP-305, ICSS-315)
Class 4, Credit 4

ICSP-319  Scientific Applications
Registration #0601-319  Scientific Applications
Program Design
An introduction to classical algorithms used in the solution of numerical problems encountered in science and engineering. The FORTRAN and APL languages will be introduced as tools for implementing these algorithms. Topics include an introduction to FORTRAN and APL algorithms for finding roots of equations, solutions to systems of equations, general matrix manipulation. Programming projects will be required. (ICSS-325)
Class 4, Credit 4

ICSP-330  PL/I Programming
Registration #0601-330  PL/I Programming
A study of PL/I and its applications in business, industry, and science. 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, modular programs. Programming projects will be required. (ICSP-243)
Class 4, Credit 4

ICSP-450  Programming Language Concepts
Registration #0601-450  Programming Language Concepts
A study of the syntax and semantics of a diverse set of high-level programming languages. The languages chosen are compared and contrasted in order to demonstrate general principles of programming language design. The course emphasizes the concepts underpinning modern languages rather than the mastery of particular language details. Programming projects will be required. (ICSS-325)
Class 4, Credit 4

ICSP-488  Programming Systems Workshop
Registration #0601-488  Programming Systems Workshop
A workshop for the application of programming systems specification, design and implementation techniques. Topics include data modeling, (with and without a database management system), system specification, and design charting techniques, and project scheduling and management. Students will work in teams to solve specific problems. Programming projects will be required. (ICSS-307, ICSS-435, ICSS-495)
Class 4, Credit 4
ICSS-489 Cooperative Education
Registration #0602-499
One quarter of appropriate work experience in industry.
Credit 0

ICSS-202 Introduction to Computer Science
Registration #0603-202
An introduction to the field of computer science. Topics include computer representation of information, integer (binary and decimal) and floating point arithmetic, logical operations, character codes, and an introduction to machine language and assembly language. The role of operating systems, compilers, and other software components will be surveyed.
Class 4, Credit 4

ICSS-315 Digital Computer Organization
Registration #0603-315
An introduction to computer design and implementation. Topics include a review of arithmetic and boolean algebra, combinational 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-320 Data Structure Analysis
Registration #0603-320
An introduction to classic information structures and associated algorithms. Topics include sequential lists, stacks, queues, linked lists (circular, doubly-linked, linked allocation), trees and tree traversal, 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-325 Data Organization and Management
Registration #0603-325
A course on the considerations associated with the external storage of data. Topics include file organization (sequential, indexed and direct access), storage optimization and directory organization, an introduction to external sorting and searching, and the basics of data modeling, database organization, and management. Programming projects will be required. (ICSP-305, either ICSS-243 or ICSS-320).
Class 4, Credit 4

ICSS-355 The Human Side of Computers
Registration #0603-355
The impact of computer systems on society is studied via 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 crime; 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 for Transfer Students
Registration #0603-360
Selected topics from ICSP-241, ICSP-242, ICSP-243 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
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 design. (ICSP-315)
Class 4, Credit 4

ICSS-420 Data Communication Systems
Registration #0603-420
Data communication and telecommunication systems, including communication techniques, communication interfaces, common carrier implications and tariffs, exchanges, concentrators, multiplexers, front-end computers; buffering, response time and human factors; network cost and design analysis, software considerations. (SMAM-309 or SMAM-325 and third year standing in Computer Science and Technology)
Class 4, Credit 4

ICSS-430 Mathematical 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, ordinary differential equations. The computational aspects rather than mathematical development 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-435 Systems Specification, Design and Implementation
Registration #0603-435
Students are introduced to basic concepts of system specification, design, system implementation and project management. Tools used include PERL/CPM (scheduling tools), structured English, structured flow-charts, and decision trees (description tools), dataflow diagramming (description and design tool), and hierarchical design of programming systems (design tool). A study of Youdon's structured design methods is included. (ICSS-325)
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, multiprocessor 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-315, ICSS-325)
Class 4, Credit 4

ICSS-450 Finite State Machines and Automata
Registration #0603-450
Topics include finite state models, machine capabilities, descriptive methods, decomposition methods, regular expressions, and synthesis, sequential iterative systems, and space-time transformations. (ICSS-315)
Class 4, Credit 4

ICSS-480 Formal Languages
Registration #0603-480
Formal language theory and principles. Topics include context free and context sensitive grammars, regular expressions, Turing machines, and an introduction to unsolvability and computability. (ICSS-470)
Class 4, Credit 4

ICSS-485 Data Base Concepts
Registration #0603-485
A course in the fundamental aspects of database management. Topics include data organization and structure, relational, hierarchical, and network approaches, data security and recovery, comparisons of the data base approach with traditional file organization and access methods, and performance and management issues. Example data base systems will be studied. (ICSS-325)
Class 4, Credit 4

ICSS-515 Analysis of Algorithms
Registration #0603-515
A course covering the mathematics and techniques needed to analyze the computational complexity of algorithms. Several classic algorithms will be studied, to determine their space and time efficiency. (Third-year standing in Computer Science and Technology)
Class 4, Credit 4

ICSS-520 Computer Architecture
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 operating memory schemes. Applications to current 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  
An examination of microcomputers and microcomputer applications, including the study of microprocessors and their use in the construction of microcomputers. Several commercially available microcomputer systems are used in laboratory projects to explore hardware and software design issues, as well as memory design and I/O interface techniques. Programming projects may be required. (ICSS-315)  
Class 4, Credit 4

ICSS-525  
Assemblers, Interpreters, and Compilers  
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-325)  
Class 4, Credit 4

ICSS-530  
Fundamentals of Discrete Simulation  
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 general statistics for the model are covered. Both the theoretical and statistical aspects of modeling are examined. Programming projects will be required. (SMAM-309 or equivalent and third-year standing in Computer Science and Technology)  
Class 4, Credit 4

ICSS-540  
Operating Systems Laboratory  
Application of operating system concepts. Laboratory work includes development of a small multi-tasking operating system and a study of its functional characteristics; special topics include I/O programming, interrupt handling, resource allocation and scheduling methods. A significant programming project is an integral part of the course. (ICSS-306, ICSS-440)  
Class 4, Credit 4

ICSS-541  
Introduction to Computer Networks  
An introduction to computer communication network design and implementation. Network terminology is discussed, and a variety of configurations are studied. Both hardware and software components are examined. The state of current technology is presented, along with possible trends for future evolution. Measurement and evaluation of network utilization and performance are also discussed. Programming projects will be required. (ICSS-420, SMAM-309 or SMAM-352, and third-year standing in Computer Science and Technology)  
Class 4, Credit 4

ICSS-545  
Computer Architecture II  
A continuation of ICSS-520, developing the topics introduced there to a greater depth, and introducing concepts at the forefront of computer architecture research. Lectures will be supplemented with outside reading and/or programming assignments. (ICSS-520)  
Class 4, Credit 4

ICSS-550  
Compiler Construction Laboratory  
A course in the design and implementation of high-level language compilers. Laboratory projects to be assigned in the areas of parsing, code generation, code optimization, and language design. (ICSS-580)  
Class 4, Credit 4

ICSS-565  
Computer Systems Selection  
A study of computer systems design, evaluation, and selection methodology. The design aspect deals with the problem of specifying physical systems on the basis of logical design criteria, and performance analysis of existing and proposed computer systems. The selection aspect covers vendor proposal requests, evaluation and validation of proposals, and procurement methods. (ICSS-315, ICSS-325)  
Class 4, Credit 4

ICSS-570  
Introduction to Computer Graphics  
A study of the hardware and software principles of computer graphics. Topics include an introduction to the basic concepts, 2-D transformations, viewing transformations, display file structure, geometric models, picture structure, interactive and non-interactive techniques, raster graphics fundamentals, 3-D transformations and perspective, hidden surface elimination, graphics packages and graphics systems. Programming projects will be required. (ICSS-325)  
Class 4, Credit 4

ICSS-580  
Language Processors  
A course exposing students to issues in the design of a variety of language processors and translators. The basic concepts will be presented in conjunction with the design of several such programs (e.g. assemblers, compilers, linkage editors, and macro processors). Programming projects will be required. (ICSS-450)  
Class 4, Credit 4

ICSS-585  
Systems Programming  
A study of the techniques applied to the design and implementation of a large systems program or module. Past projects have included floating point simulators, a small database system, system utilities, and a command language interpreter. (ICSS-580)  
Class 4, Credit 4

ICSS-590  
Seminar in Computer Science  
Current advances in computer science.  
Class 2 - 4, Credit 2 - 4

ICSS-599  
Independent Study  
Faculty directed study of appropriate topics on a tutorial basis. This course will generally be used to enable an individual to study particular computer science topics in greater depth. (Faculty approval is required prior to registration)  
Class 2 - 4, Credit 2 - 4

ICSS-610  
EDP Auditing  
A study of the techniques and approaches used to audit computer data centers and systems. Topics include the methodology and tools of EDP auditing, internal departmental controls, program controls, input/output controls, data security, physical security, computer hardware controls and data communication control. (Fourth-year standing in Computer Science and Technology)  
Class 4, Credit 4

Graduate Courses

Undergraduate Computer Science and Technology students may take 700 and 800 level courses only by consent of the Chairman of Graduate Studies 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-701  
Registration #0603-701  
Fundamentals of computer programming and problem-solving using a structured programming language (Pascal or Ada). Introduction to and use of an interactive editor and file system. Applications in business, science, mathematics, engineering, education, systems programming, and graphics will be covered. Techniques will be introduced for data representation and structuring, sorting, and searching. (Computer literacy)  
Credit 8

ICSS-702  
Programming II  
Registration #0603-702  
Computer programming in macro assembly language. Combining program segments written in assembly language with segments in a high-level language. Modern programming practices, tools, and techniques from the point of view of the software life cycle: specification, design and prototyping, coding and verification, integration, and maintenance. (ICSS-701 or equivalent; programming proficiency in a high-level language; algorithms and data structures)  
Credit 8
On-line Information Systems Design
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-703 and ICSS-302; a background in systems analysis is recommended)
Credit 4

ICSS-736 Data Base System Implementation
Requirements and characterization of generalized data base systems, the role of a 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-744 Data Communications 
& Networks I
An introduction to Computer Communication. This course will cover the fundamentals of data communication, including terminal communication and computer to computer communication. Emphasis in the first course will include the theoretical basis for data communication, terminal handling, data transmission and multiplexing, error detection and correction, as well as an introduction to the hierarchical model for computer networks. Also included will be an introduction to graph theory and the topological design of networks, queueing theory and delay analysis. Additional emphasis will be on the fundamental protocols for computer communication. (Statistics, ICSS-708)
Credit 4

ICSS-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 ICSS-703)
Credit 4

ICSS-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. Algorithmic and heuristic. Special purpose computer hardware for graphics. Programming projects will be required. (ICSS-570 or ICSS-770)
Credit 4

ICSS-809 Operating Systems I
An introduction to solving problems using cooperating parallel processes and to the concepts of operating systems design. Emphasis will be on the use of operating systems from the programmer's point of view and on the design of operating systems from a conceptual rather than an implementation oriented point of view. The student will be required to construct software systems of parallel processes and study how an operating system supports such parallelism. Also, the student will become conversant in the issues facing the operating system designer and will be able to evaluate tradeoffs inherent in the design process. (ICSS-708, ICSS-720)
Credit 4

ICSS-810 Operating Systems II
This course will elaborate on topics covered in the introductory course, such as virtual memory, I/O systems and file systems, as well as introduce new topics such as security, multiprocessing and networking. Also, an introduction to operating systems theory will be provided including topics such as queuing theory, the working set model and performance analysis. In addition, the student will be required to design and code a portion of an actual operating system. (ICSS-809)
Credit 4

ICSS-811 Topics in Operating Systems
This an advanced course in operating systems design and theory. The topics may be expected to vary from time to time as the direction of operating systems research and the interests of the faculty change. Examples of topics that might be covered are: distributed processing, operating systems theory, secure operating systems (e.g., the security kernel approach), etc. (ICSS-810)
Credit 4

ICSS-706 Foundations of Computing Theory
Review of discrete mathematics with emphasis on graph theory and proof techniques. A study of computer programs in the abstract, including program flow graphs, program transformations, the structuring theorem, abstract automata, and formal languages. An overview of computability and algorithmic complexity. (SMAM-265 or equivalent; ICSS-320 or ICSS-703)
Credit 4

ICSS-709 Programming Language Theory
A survey of several important modern programming languages, their methods of specifying data and control structures, and their approach to functionality, syntax and semantics specification systems. Programming projects will be required. (ICSP-305 and ICSS-320 or ICSS-703)
Credit 4

ICSS-710 Computer Architecture
Review of classical computer architectures, the design of operation codes and addressing modes, data formats, and their implementations. Analysis of internal and external bus structures. Architectural features to support virtual storage and page-replacement policies, high-level language features, and operating systems. Speed-up techniques. Future directions. (ICSS-708)
Credit 4

ICSS-720 Microprocessors and Microcomputers
A survey 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-809 Operating Systems I
An introduction to solving problems using cooperating parallel processes and to the concepts of operating systems design. Emphasis will be on the use of operating systems from the programmer's point of view and on the design of operating systems from a conceptual rather than an implementation oriented point of view. The student will be required to construct software systems of parallel processes and study how an operating system supports such parallelism. Also, the student will become conversant in the issues facing the operating system designer and will be able to evaluate tradeoffs inherent in the design process. (ICSS-708, ICSS-720)
Credit 4

ICSS-810 Operating Systems II
This course will elaborate on topics covered in the introductory course, such as virtual memory, I/O systems and file systems, as well as introduce new topics such as security, multiprocessing and networking. Also, an introduction to operating systems theory will be provided including topics such as queuing theory, the working set model and performance analysis. In addition, the student will be required to design and code a portion of an actual operating system. (ICSS-809)
Credit 4

ICSS-811 Topics in Operating Systems
This an advanced course in operating systems design and theory. The topics may be expected to vary from time to time as the direction of operating systems research and the interests of the faculty change. Examples of topics that might be covered are: distributed processing, operating systems theory, secure operating systems (e.g., the security kernel approach), etc. (ICSS-810)
Credit 4
ICSS-836 Data Base Systems
Registration #0603-836
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-320 or ICSS-703)
Credit 4

ICSS-846 Information Storage and Retrieval
Registration #0603-846
Topics include an overview of history, development and traditional approaches of information storage and retrieval, automatic text analysis, automatic classification, file structures, search strategies, probabilistic retrieval, system evaluation. (ICSS-320 or ICSS-703)
Credit 4

ICSS-850 Computability
Registration #0603-850
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 Computational Complexity
Registration #0603-851
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-708)
Credit 4

ICSS-852 Coding Theory
Registration #0603-852
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-855 Theory of Parsing
Registration #0603-855
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, theoretical properties of some grammars, general parsing, non-backtrack parsing and limited backtrack parsing algorithms. (ICSS-706)
Credit 4

ICSS-860 Compiler Construction
Registration #0603-860
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-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 4

ICSM-719 Data Processing and Administration
Registration #0611-719
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 interests of class participants. (ICSM-719)
Credit 4

ICSM-765 Advanced Computer Utilization
Registration #0611-765
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-790 Seminar
Registration #0611-790
Current advances in computer science.
Credit 2 - 4

ICSM-799 Independent Study
Registration #0611-799
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

ICSS-722 Library Automation and Management
Registration #0616-722
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)

ICSS-733 Information Media and Design
Registration #0616-733
A study of current information media and their design. Topics 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)

School of Engineering Technology

Upper Division Civil Engineering Technology

ITEC-404 Applied Mechanics of Materials
Registration #0608-404
Basic strength of material and statics are reviewed. Advanced topics are covered to include stress and strain, Mohr's circle, transversely loaded members, statically indeterminate problems, Euler's equations, and parabolic column equations.
Class 4, Credit 3
ITEC-420  Hydraulics
Registration #0608-420
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. (Physics)
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

ITEC-432  Water & Wastewater Transport Systems
Registration #0608-432
Discussion of surface and groundwater sources. Introduction to well hydraulics. The hydraulic design of sanitary and storm sewer systems, and water distribution systems. (ITEC-420)
Class 2, Recitation 3, Credit 3

ITEC-438  Principles of the Treatment of Water and Sewage
Registration #0608-438
An introduction to water and wastewater treatment interpretation of analyzed 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-444  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)
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. (ITEF-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 structural 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-480  Groundwater Hydraulics
Registration #0608-480
Groundwater movement; flow-net concept; graded filter design and construction, flow to wells and trenches, dewatering system analysis and design, water-flow cut-off methods and their use for construction. (ITEC-420 and Soil Mechanics or permission of instructor)
Class 3, Credit 3

ITEC-489  Co-operative Education
Registration #0608-489
One quarter of appropriate work experience in industry.
Credit 0

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. (BBU-245)
Class 4, Credit 4

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

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. (ITEC-422)
Class 2, Credit 1

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 3, Credit 3

ITEC-510  Design of Water Treatment Facilities
Registration #0608-510
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
Registration #0608-513
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
Registration #0608-514
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 development 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-516  Analysis and Design of Reinforced Concrete Structures
Registration #0608-516
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 (ITEC-404)
Class 5, Credit 4
ITEC-520 Design of Wastewater Treatment Facilities
Registration #0608-520 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
Registration #0608-527 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. (ITEC-404) Class 3, Lab 2, Credit 4

ITEC-544 Contracts and Specifications
Registration #0608-544 A study of the contract documents; the relationship between the owner, engineer, and contractor; various types of contracts and specifications are studied as well as an introduction to engineering law, insurance and bonding. Class 3, Credit 3

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

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 wastewater 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, 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 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 ASCE Code is covered, as well as practice in use of the ASD 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. (ITEC-404) Class 3, Recitation 2, Credit 4

ITEC-555, 557 Wastewater Treatment Plants
Registration #0608-555, 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-590 Senior Construction Seminar
Registration #0608-590 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

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

ITEE-201 DC Circuits
Registration #0609-201 An introduction to electrical technology, with emphasis on DC circuit analysis techniques. Topics include resistance, inductance, capacitance, and diodes with circuit techniques of Ohm's Law, Kirchhoff's Laws, Thevenin's Theorem, Mesh analysis, and superposition. (Co-requisite SMAM-221) Class 3, Lab 3, Credit 4

ITEE-202 AC Circuits
Registration #0609-202 Continuation of ITEE-201. AC circuits and devices with topics of phasor algebra, reactance, impedance, ac power and power factor. (ITEE-202) Class 3, Lab, 3, Credit 4

ITEE-203 Electronic Devices
Registration #0609-203 An introduction to electronic devices and systems. Emphasis on diodes and transistors, basic operation, biasing, and cascading. (ITEE-202) Class 3, Lab, 3, Credit 4

ITEE-301 Digital Fundamentals
Registration #0609-301 A first course in digital computer fundamentals. Topics include binary arithmetic, Boolean algebra, logic gates, Karnaugh mapping, 2's compliment and hexadecimal arithmetic. (ITEE-203) Lecture 3, Lab, 2, Credit 4

ITEE-302 Linear Integrated Circuits
REGISTRATION #0609-302 A course in the modern application of linear integrated circuits. The operational amplifier will be studied emphasizing the operating characteristics and applications. The basics of switching circuits will also be studied. (ITEE-203) Lecture 3, Lab, 2, Credit 4

ITEE-303 Microprocessors
Registration #0609-303 A first course in microprocessors. Emphasis on the programming and hardware aspects of 8 bit microcomputers, with emphasis on one of the Motorola 6800 or Intel 8085 machines. (ITEE-301 and ICSP-305) Lecture 3, Lab, 3, Credit 4

ITEE-305 Drafting and Fabrication
Registration #0609-305 A course for the skills that a technician will need in industrial employment. Includes fundamentals of drafting and electrical layout, printed circuit fabrication, and computer graphics. (ITEE 203) Lecture 2, Lab, 4, Credit 4

ITEE-310 Electricity
Registration #0609-310 Circuits using d.c. sources are analyzed. Components stressed are the inductor, capacitor, diode, transistor, relays, and photo devices. Class 3, Lab, 3, Credit 4

ITEE-311 Electronics I
Registration #0609-311 Circuits using a.c. sources are analyzed. Components stressed are the transformer, SCR and triac. Circuits used in the 2610 printer are analyzed. (ITEE 310) Class 3, Lab, 3, Credit 4

ITEE-312 Electronics II
Registration #0609-312 Continuation of ITEE-311. Circuits of other photographic equipment are analyzed. Digital devices are introduced. The 8085 microprocessor assembler language is covered. (ITEE 311) Class 3, Lab, 2, Credit 4
Upper Division Electrical Engineering Technology

ITEE-401 Circuit Theory I
Registration #009-401
An introductory course in the use of Laplace transforms to determine the complete response of circuits containing independent and dependent sources, resistance, inductance, and capacitance. Application of basic circuit theorems to the solution of transformed networks. (SMAT-420 concurrently)
Class 3, Lab. 2, Credit 4

ITEE-402 Circuit Theory II
Registration #009-402
Frequency response of network functions as solved by use of pole-zero diagrams and Bode diagrams. Mutual Inductance. The Fourier series solution of circuits with non-sinusoidal inputs. (ITEE-401)
Class 3, Rec. 2, Credit 4

ITEE-403 Advanced Circuit Theory
Registration #009-403
Transient and steady-state response of linear circuits to d.c., a.c., and non-sinusoidal inputs. Laplace transform application to circuits, Bode and Fourier series analysis. (ITEE-202)
Lecture 4, Recitation 2, Credit 5

ITEE-404 Control Systems I
Registration #009-404
Analysis and application of closed-loop control systems for stability, accuracy, transient response; block diagram algebra and transfer functions, Routh's and Nyquist's stability criteria; gain and phase margin, Bode plots, steady-state error, lead and lag compensating networks, microprocessor-based control systems. (ITEE-402, SMAT-422)
Class 3, Lab. 2, Credit 4

ITEE-405 Power Controls
Registration #009-405
A course in the fundamentals of control systems, as used from the standpoint of the digital computer. Emphasis on feedback control theory, control system components, digital control systems and solid state control. (ITEE 403)
Lecture 3, Lab. 2, Credit 4

ITEE-409 Technical Reporting
Registration #009-409
A course for those enrolled in Computer Technology to meet the minimum requirements in written and oral communications in their major area. Topics include effective sentence, paragraph, and report organization; documentation for use-friendly relationships; and oral presentation of ideas.
Lecture 2, Recitation 3, Credit 4

ITEE-411 Electrical Principles for Design I
Registration #009-411
A service course offered to non-electrical majors studying in the technical disciplines; covers basic electrical circuits, network theorems, power and energy concepts, P.F. correction, and basics of transformers and motors.
Class 3, Lab. 2, Credit 4

ITEE-412 Electrical Principles for Design II
Registration #009-412
An introductory survey course in the basics of analog and digital electronics; topics include basic semiconductors, transistor circuits, operational amplifiers, fundamental digital logic concepts, and an introduction to microcomputers. (ITEE-411)
Class 3, Lab. 2, Credit 4

ITEE-414 Basic Electrical Principles
Registration #009-414
Basic study of important electrical concepts for both A.C. and D.C. circuits. Topics covered include AC/DC circuit theory, single and 3 phase power distribution, power factor, line losses, efficiency, A.C. motors and transformers, energy costs, wiring methods, instrumentation and circuit protection. (SMAT-421)
Class 3, Lab. 2, Credit 4

ITEE-424 Logic and Digital Devices
Registration #009-424
The analysis and simplification of logic equations using Boolean algebra with applications to semiconductor integrated circuits. Truth tables and Karnaugh map reduction techniques, multiple output circuits, multi-level gate networks, multiplexers and demultiplexers, synchronous sequential circuits, state diagrams and counter circuits are also studied.
Class 3, Lab. 2, Credit 4

ITEE-425 Power Concepts
Registration #009-425
Steady-state AC circuits both single and three phase, DC and Stepper motors, solid-state power electronic devices and application to control of motors.
Class 2, Recitation 2, Credit 3

ITEE-428 Linear Amplifier Design
Registration #009-428
Bipolar and FET transistor biasing are reviewed. Design and analysis of class A amplifiers using small signal h-parameters is presented. Low and high frequency, and mid-band, response of single- and multi-stage amplifiers is included.
Class 3, Lab. 3, Credit 4

ITEE-429 Advanced Electronics
Registration #009-429
Analysis of small and large signal transistor amplifiers is covered, including elements of power supply design. (ITEE 402)
Class 3, Lab. 3, Credit 4

ITEE-471 Topics in Computer Engineering Technology
Registration #009-471
A course designed to broaden the knowledge of computer technologists. Topics covered include FORTRAN, Advanced B-bit microprocessors (the 6809), 16-bit microprocessors (the 8086 and 68000), and microprocessor development systems. (ITEE 303)
Lecture 3, Lab. 3, Credit 4

ITEE-472 Electronic Instrumentation
Registration #009-472
An introduction to the devices necessary to supply input to digital computers. A/D and D/A converters, impedance bridge circuits and sensing devices are emphasized. (ITEE 405)
Lecture 3, Lab. 2, Credit 4

ITEE-499 Cooperative Education
Registration #009-499
One quarter of appropriate work experience in industry. Credit 0

ITEE-520 Electrostatic and Magnetic Fields
Registration #009-520
Basic principles of electrostatic and magnetic fields including vector analysis, Coulomb's law, field intensity, Gauss's law, energy and potential gradient, conductors, dielectrics, capacitance, Biot-Savart law, Ampere's circuital law, Stokes' theorem, magnetic flux density, force on current element and magnetic boundary conditions. (SMAT-422)
Class 3, Rec. 2, Credit 4

ITEE-524 Microwave Systems
Registration #009-524
Microwave power sources, waveguide transmission systems, measurement of standing waves, impedance, Smith charts, power flow in waveguides, solid state microwave devices, microwave antennas and microwave communication system design are discussed. (ITEE-520)
Class 3, Lab. 2, Credit 4

ITEE-527 Semi-Conductor Devices
Registration #009-527
A course to provide the understanding of recent semi-conductor devices. Emphasis will be placed on the manufacture and usage of integrated circuits, field-effect devices, and small scale computer devices. The course will give the student an understanding of the physical bases of device characteristics. (ITEE-429)
Class 4, Credit 4

ITEE-528 Introduction to Mini computers
Registration #009-528
A continuation of the study of small computers with an emphasis on the characteristics which make minicomputers a part of the computer spectrum. Topics include minicomputer machine description, memory referencing techniques, microprogramming, assemblers, editors, linkers, number systems and macros. (CPS-205)
Class 3, Lab. 3, Credit 4
Fourier transforms are utilized to demonstrate relationships and computer systems are examined. Machine language programming, indexing and indirect addressing and interrupt programming are covered. (ITEE-428)

Communication Systems I

Design of control systems for specific application and performance criteria; a study of control motors and components for D.C./A.C. control systems; application of control theory to the solution of practical system problems. (ITEE-404)

Digital Computer Design II

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)

Digital Computer Design I

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)

Microprocessors

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)

Minicomputers, Controllers and Peripherals.

A study of the most common peripherals used with microprocessors and minicomputers. Peripherals include TTY's, MODEMS, CRT drivers, disk 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)

Industrial Electronics

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)

ITEE-544

ITEE-547

Digital Processing of Signals

Basic concepts of linear systems are covered, followed by an introduction to digital signal processing from a hardware and software approach. Emphasis is placed on digital filter design and the FFT. Applications are considered. (ITEE-402, SMAT-422)

ITEE-550

Power Systems I

Basic elements of a power system, energy sources, substations 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)

ITEE-551

Protective Relaying

The physical construction and characteristics of electromechanical relays, short circuit calculation and line, bus, transformer and motorgenerator protection are studied. Solid state relays, instrument transformers, and telecommunications and supervisory control are included. (ITEE-402)

ITEE-552

Power Systems II

Voltage regulation and efficiency of transformers, per unit systems, symmetrical components, lightning protection, energy conservation, switching surges, and system voltage regulation are included. Equal area criterion of transient stability is covered. (ITEE-550)

ITEE-554

Electronic Optic Devices

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.

ITEE-555

Transmission Lines and Antennas

Analysis of voltage, current, and power along transmission lines. Design of matching stubs. Use of Smith chart. Solution of Maxwell’s equations and their interpretation relevant to antenna theory. Characteristics of various antennas and arrays. (ITEE-402)

ITEE-556

Microelectronics I

The fabrication process of integrated circuits is covered, beginning with crystal growth up to the first predeposition and drive-in. Topics include: doping, deposition, oxide and epitaxial growth and masking

ITEE-557

Microelectronics II

This is a continuation of Microelectronics I. Topics covered are isolation drive-in, device formation, metalization, mounting and packaging. Device characteristics based upon their fabrication are discussed. (ITEE-560)

ITEE-559

Construction and Failure Analysis

Techniques for analyzing an integrated circuit to determine its construction and/or failure mode. Topics include photography, microscopes, and scanning electron microscopes. (ITEE-560, ITEE-561)

ITEE-562

Senior Project

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.
Upper Division
Manufacturing Engineering Technology

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-425 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 (ITEF-424).
Class 3, Recitation 2, Credit 4

ITEF-434 Operations Management
Registration #0617-434
A study of modern manufacturing organization and how it is managed. The course will cover manufacturing systems design, analysis and control. Techniques of decision making process, design of manufacturing process, materials handling, design of physical facilities and control of manufacturing operations will be discussed.
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-460 Computer-Aided Design
Registration #0617-460
The course will deal with CAD concepts, 2-D and 3-D interactive graphics, hardware and software systems, programming, and CAD applications. CAD and its role in computer-aided manufacturing, process planning and numerical control part programming will also be included.
Class 3, Lab. 2, 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-473 Compact II
Registration #0617-473
This is a second advanced level course in Computer Numerical Control. Compact II is one of the most commonly used NC part programming languages in the industry. The students will learn to write Compact II programming language and work on the Manufacturing Data Systems, Inc., time-sharing terminals to produce NC tapes.
Class 3, Credit 4

ITEF-475 Computer-Aided Manufacturing
Registration #0617-475
The basic elements, principles, and terminology of the hardware and software for computer-aided 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.
Class 3, Lab. 2, Credit 4

ITEF-481 Work Simplification and Measurement
Registration #0617-481
Principles and applications of basic methods to improve the worker-job time relationship. Job standards, predetermined time, and motion study, human engineering in relation to workspace designed for efficient use of laboratory.
Class 3, Recitation 2, Credit 4

ITEF-485 Robots in Manufacturing
Registration #0617-485
The course will deal with the technology and applications of industrial robots. Included are the study of engineering technology underlying the hardware and software systems. The hardware aspect will include physical configurations, degrees of freedom, precision, speed, load capabilities and gripper technology. Software aspect will deal with the manual methods of programming the robot and computer programming. The emphasis will be on the industrial applications of robots. Applications will include die casting, welding, painting, plastic molding, assembly operations, material handling and special applications such as glass manufacturing. Laboratory sessions will be used to provide the students "hands on" experience with robots.
Class 3, Lab. 2, Credit 4

ITEF-491 Production Control
Registration #0617-491
The fundamental principles in the control of industrial production in relation to forecasting, purchasing, inventory, production planning and scheduling with special emphasis on MRP.
Class 4, Recitation 1, Credit 4

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

ITEF-502 Advanced Manufacturing Processes
Registration #0617-502
This is an advanced course in Manufacturing Processes, dealing with the state-of-the-art in this area. A study of precision machining processes such as Chemical Milling, Electrochemical Machining, Electrical Discharge Machining, Ultrasonic Machining, Electron Beam Machining, Laser Machining will be made. Also included in the course are Surface Finishing, Micro-finishiing, Manufacture of Thin Films, and Printed Circuits. Lab sessions will include hands-on experience with EDM and Lasers.
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 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)
Upper Division Mechanical Engineering Technology

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Course Title</th>
<th>Registration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITEM-404</td>
<td>Applied Mechanics of Materials</td>
<td>0610-404</td>
<td>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</td>
</tr>
<tr>
<td>ITEM-405</td>
<td>Applied Dynamics</td>
<td>0610-405</td>
<td>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</td>
</tr>
<tr>
<td>ITEM-406</td>
<td>Dynamics of Machinery</td>
<td>0610-406</td>
<td>A study of the dynamics of machine elements such as gears, chains and linkages with emphasis on graphical methods. (ITEM-405) Class 3, Recitation 2, Credit 4</td>
</tr>
<tr>
<td>ITEM-407</td>
<td>Mechanical Engineering Laboratory I</td>
<td>0610-407</td>
<td>A course in mechanical laboratory techniques 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 3, Lab. 2, Credit 3</td>
</tr>
<tr>
<td>ITEM-408</td>
<td>Introduction to Strength of Materials</td>
<td>0610-408</td>
<td>Elements of statics and strength of materials. Topics include plane equilibrium, friction, stress, strain, tension, and the bending of beams. Class 3, Recitation 2, Credit 4</td>
</tr>
<tr>
<td>ITEM-409</td>
<td>Mechanical Engineering Laboratory II</td>
<td>0610-409</td>
<td>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 3, Lab. 2, Credit 3</td>
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<tr>
<td>ITEM-410</td>
<td>Mechanical Engineering Laboratory III</td>
<td>0610-410</td>
<td>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-technical majors. Class 3, Recitation 2, Credit 4</td>
</tr>
<tr>
<td>ITEM-411</td>
<td>Engineering Materials</td>
<td>0610-411</td>
<td>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, diffusional processes, melting behavior, and crystal growth. The course also includes the study of non-ferrous metals, heat treatment and age hardening of metals. Class 3, Credit 3</td>
</tr>
<tr>
<td>ITEM-412</td>
<td>Materials Technology I</td>
<td>0610-412</td>
<td>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, diffusional processes, melting behavior, and crystal growth. The course also includes the study of non-ferrous metals, heat treatment and age hardening of metals. Class 3, Credit 3</td>
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<tr>
<td>ITEM-413</td>
<td>Materials Technology II</td>
<td>0610-413</td>
<td>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, diffusional processes, melting behavior, and crystal growth. The course also includes the study of non-ferrous metals, heat treatment and age hardening of metals. Class 3, Credit 3</td>
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<tr>
<td>ITEM-414</td>
<td>Materials Technology III</td>
<td>0610-414</td>
<td>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, diffusional processes, melting behavior, and crystal growth. The course also includes the study of non-ferrous metals, heat treatment and age hardening of metals. Class 3, Credit 3</td>
</tr>
<tr>
<td>ITEM-415</td>
<td>Materials Technology IV</td>
<td>0610-415</td>
<td>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, diffusional processes, melting behavior, and crystal growth. The course also includes the study of non-ferrous metals, heat treatment and age hardening of metals. Class 3, Credit 3</td>
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</table>

**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-440) 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 kinetic 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 systems 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 4, 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. (ITEM-411)
Class 3, Lab. 2, Credit 4

ITEM-540 Thermal Technology
Registration #0610-540
Application of thermodynamics to internal combustion engines, compressors, steam cycles, refrigeration, and air conditioning. (ITEM-440)
Class 4, 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 ventilation. 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)

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

Undergraduate Courses

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-301, 311, 312)
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-410 Technical Communication
Registration #0607-410
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 Principles of Packaging
Registration #0607-433
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-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-499  Packaging Co-op
Registration #0607-499
One quarter of appropriate work experience in industry. Credit 0

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 4

IPKG-555  Military and Export Packaging
Registration #0607-555
Study of the particular forms and requirements for packaging for the military and export environments. Preservation techniques, military specifications, crates and large export containers, construction techniques, the export handling and transportation environment, and related topics (IPKG-432; senior elective)
Class 3, Credit 3

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-568  Food Preservation and Packaging
Registration #0607-568
Study of food products, common methods of processing and preservation, impact on quality and nutritional value of the product, and the relationships with common packaging methods and distribution practices. (IPKG-432; senior elective)
Class 3, Credit 3

IPKG-570  Point of Purchase Displays
Registration #0607-570
An interdisciplinary course considering the unique requirements for display packaging at the retail point of purchase. The retail store environment, display techniques, customer motivation, product tie-ins, construction techniques, production and distribution requirements, product promotion and point of purchase support materials and activities, design, and printing of point of purchase displays. (Course is intended to be an interdisciplinary, senior elective for students in packaging, packaging design, audio-visual technology, retailing, and printing. IPKG-433, FADK-403, BRER-410, ICIC-450, PFPM-403 or department approval, depending on major.)
Class 2, Lab. 2. 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

Graduate Courses

IPKG-701  Research Methods in Packaging
Registration #0607-701
Discussion of procedures, methods, and requirements for carrying out the research project. Students pursue advanced study and research in the following areas: distribution packaging, package systems development, product and/or package damage in the physical distribution environment, materials, quality preservation, production and mechanical properties of packaging materials and systems.
Credit 4

IPKG-721  Packaging Administration
Registration #0607-721
Study of the role of packaging operations in the corporate enterprise. Positioning of the packaging function in the corporation, managerial practice, interpersonal relationships, and control techniques are considered. Individualized instruction, case analysis, and/or research papers supplement classroom instruction.
Credit 4

IPKG-731  Advanced Packaging Economics
Registration #0607-731
An advanced study of the firm's economic behavior in relationship to activities within the packaging function. Included are packaging costs, production theory, and case studies demonstrating general trends in the packaging industry. Individual instruction, case study, and/or research paper required, as appropriate to the student's level or interest.
Credit 4

IPKG-742  Distribution Systems
Registration #0607-742
Study of the shipping and handling environment encountered by goods in packages during distribution to the product user. Materials handling, warehousing, and the impact of the distribution environment on shipping container design and development is considered. Case study or individual research appropriate to student's interest.
Credit 4

IPKG-750  Graduate Seminar
Registration #0607-750
Course concentrates on topic of current interest, depending on instructor, quarter offered, and mix of students. Content to be announced prior to registration dates. (Offered on sufficient demand.)
Credit 4
**IPKG-752**
Registration #0607-752
The Legal Environment
An intensive study of federal, state, and local regulation that affects packaging. Individualized study and research on an interest basis.
Credit 4

**IPKG-763**
Registration #0607-763
Packaging for End Use
An intensive study of packaging design requirements specific to use of a product at specified end points; individual design and development of a package system and its specifications, appropriate to the needs of the product and the consumer/user.
Credit 4

**IPKG-770**
Registration #0607-770
Computer Applications
Survey of the application of computer techniques and data processing for packaging applications: specification development, test simulation, optimum sizing of package systems, process control, and similar applications will be presented. Computer program development and individual research on an interest basis.
Credit 4

**IPKG-783**
Registration #0607-783
Packaging Dynamics
The study of instrumentation systems for analysis, evaluation, and application of shock and vibration test methods and data to package system design and development for specific products. Individualized instruction appropriate to student's interest.
Credit 4

**IPKG-798**
Registration #0607-798
Independent Study
Student-initiated study in an area of specialized interest, not leading to a thesis. A comprehensive written report of the investigation is required. Cannot be used to fulfill core requirements.
Credit variable (may be taken for a maximum of 8 credits)

**IPKG-890**
Registration #0607-890
Graduate Thesis
An independent research project to be completed by the student in consultation with the major professor. A written thesis and an oral defense of the thesis is required. (Consent of department)
Credit variable (maximum of 12)

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**School of Food, Hotel and Tourism Management**

**Dietetics and Nutritional Care**

**ISMD-213**
Nutrition Science
Registration #0620-213
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 4, Credit 4

**ISMD-314**
Sanitation & Safety
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. (ISMF-215)
Class 2, Credit 2 (Practicum in hospital by arrangement for Coordinated Dietetics Program)

**ISMD-402**
Dietetics Environment
Registration #0620-402 (Coordinated Dietetics Program)
Introduction to 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. (ISMF-215, IMP-213)
Class 1, Credit 4
Clinical hours by arrangement

**ISMD-519**
Educational Principles and Methods
Registration #0620-519
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

**ISMD-525, 526**
Advanced Nutrition and Diet Therapy I & II
Registration #0620-525, -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 dietitians in metabolic, gastro-intestinal, renal, musculoskeletal, cardiac, endocrine, febrile, and other diseases. (ISMD-213, SCHG-203, SBI0-306)
ISMD-525 Class 5, Credit 5
ISMD-526 Class 4, Credit 4

**ISMD-550**
Community Nutrition
Registration #0620-550
Study 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 of project involving nutrition care in a clinical facility in the community is required. Assignments are arranged by the instructor. (ISMD-213, ISMD-525 or ISMD-550)
Class 2, Credit 4
Clinical hours by arrangement

**ISMD-551**
Food Systems Management II
Registration #0620-551 (Coordinated Dietetics Program)
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. (ISMD-213, ISMD-525, ISMD-550)
Class 1, Credit 8
Practicum in hospital by arrangement

**ISMD-554**
Nursing in Life Cycle
Registration #0620-554
This is an applied course in nutritional needs throughout the life cycle. Emphasis will be given to nutrition during pregnancy, infancy, early childhood, adolescence, and in later years. (ISMD-213)
Class 4, Credit 4

**ISMD-560, 561**
Clinical Dietetics I & II
Registration #0620-560, -561 (Coordinated Dietetics Program)
An intensive integrated study and application of advanced nutrition and diet therapy theories and principles. The course is structured to integrate class lectures (ISMD-560) with clinical experience (ISMD-561) in a hospital setting. Designed for senior students in the Coordinated Dietetics Program. (ISMD-213, SCHG-203, SBI0-306)
ISMD-560 Class 4, Credit 4
ISMD-561 Clinical Hours by Arrangement, Credit 4

**ISMD-562, 563**
Clinical Dietetics III & IV
Registration #0620-562, -563 (Coordinated Dietetics Program)
A continuation of ISMD-560, -561 in the succeeding quarter with the clinical experience being conducted in the hospital. (ISMD-560, 561)
ISMD-562 Class 4, Credit 4
ISMD-563 Clinical Hours by Arrangement, Credit 6

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**Hotel and Resort Management**

**ISMF-210**
Introduction to Food, Hotel and Tourism Management
Registration #0621-210
An orientation course designed to trace the history, organizational structure, problems, opportunities and the place of the industry in the national and world economy. Trends and developments in the industry today are stressed.
Class 4, Credit 4
ISMF-215 Principles of Food Production
Registration #0621-215
Introduction of foods and basic preparation of high quality food products.
Topics include history, kinds, varieties, seasonal availability, sources, and composition of foods and ingredients; essential vocabulary; organization and management of work area; techniques and methods used for menu planning. (ISMF-205)
Class 3, Lab. 6, Credit 5

ISMF-220 Career Seminar
Registration #0621-220
Seminar designed to define career opportunities in the food, hotel and tourist industries. Students will be aided in developing career objectives. Leading industry executives will participate.
Class 1, Credit 1

ISMF-311 Design & Equipment Engineering
Registration #0621-311
Recognizing, analyzing and solving equipment and space problems in layouts of existing institutions and in designing new food service plans. Consideration of food service equipment; determination of needs; development of specifications; procedures of maintenance, sanitation, and safety. (ISMF-215)
Class 3, Lab. 2, Credit 4

ISMF-314 Fundamentals of Food Sanitation
Registration #0621-314
Survey of micro-organisms of importance to the food industry; emphasis on causes and prevention of food spoilage and poisoning. Responsibilities of management to provide and establish safe working conditions and policies; discussion of current problems confronting the industry as a result of recent legislative developments as they relate to safety and health. (ISMF-215)
Class 2, Credit 2 (For all ISMF and ISMH Majors)

ISMF-321 Menu Planning and Merchandising
Registration #0621-321
Recognizing, analyzing, researching and solving fundamental merchandising techniques including menus for food and beverages found in the food service industry. (ISMF-215)
Class 4, Credit 4

ISMF-331 Food Systems Management I
Registration #0621-331
Application of standards and preparation in quantity and service of high quality food. Recognizing, analyzing, solving and evaluating problems related to all aspects of quantity food production and management based on scientific, technological, economic, and social factors. Application of planning and scheduling. Students in Coordinated Dietetics Program will have hospital practical arranged. (ISMF-215, 321)
Class 1, Lab. 12, Credit 5

ISMF-340 Beverage Operations
Registration #0621-340
Practical course dealing with the management of a commercial beverage operation. Class and laboratory includes objectives, procedures, characteristics, regulations, controls and mixology of alcoholic beverages. (Open to Sophomores and Juniors only)
Class 3, Credit 3

ISMF-341 Beverage Operations Lab
Registration #0621-341
Course will allow experience in the actual operation of beverage center (Open to Sophomores and Juniors only)
Lab. 3, Credit 1

ISMF-316 Product Development
Registration #0621-316
This course is designed to develop new food products and to evaluate their market acceptance within major food companies for either consumer or institutional production. Group projects will be assigned in order to create a team approach to simulate product research. (ISMF-215, ISMF-314, ISMF-331, ISMD-213)
Class 2, Lab. 6, Credit 4

ISMF-342 Food and Labor Cost Control
Registration #0621-342
A fundamental course to assist the student in costing of food and labor needed to operate a food service system. Included is analysis of standardized recipes, scheduling, application of internal controls, and computations of operating statements. (Open to Sophomores and Juniors only)
Class 4, Credit 4

ISMF-425 Purchasing and Inventory Control
Registration #0621-425
Course covers controls of purchasing systems, including selection, ordering, receiving, storage, issuing, evaluation of food, non-food supplies and services. (ISMF-210, 213, 215, 220, 314)
Class 4, Credit 4

ISMF-426 Personnel and Training
Registration #0621-426
Course includes employee relation: selection, hiring, orienting, training, and supervising. Emphasis on development of employee training manuals, employee productivity using techniques of work analysis, job description formulation, and production and labor schedule development. (Open to Juniors and Seniors only)
Class 4, Credit 4

ISMF-430 Restaurant Management
Registration #0621-430
Application of theories and techniques dealing with total restaurant operation including: menu planning, marketing strategies, supervision of purchasing, equipment, production and service operations. Creation and calculation of management reports to evaluate efficiency and effectiveness of restaurant operations. (ISMF-210, 213, 215, 220, 311, 314, 321, 331, 330, 416, 424, 425, 426)
Class 1, Lab. 12, Credit 5

ISMF-499 Cooperative Education
Registration #0621-499
Career-related work experience. Employment within the food, hotel, tourism industry monitored by the division of Career Education and the School of Food, Hotel and Tourism Management. Designed for the student to experience progressive training on the job as related to the academic option. (Sophomore, Junior, and Senior year. Graduation Requirement)

ISMF-511 Banquet and Catering Management
Registration #0621-511
Management experience in planning, organizing, supervising preparation and service of foods for special functions. Emphasis is placed on experiences in organizational behavior, the responsibilities of management in marketing, promotion, sales promotion, sales production, personnel and customer relations and attitudes. Evaluation of management experience by preparation of operations reports. (ISMF-210, 213, 215, 220, 311, 314, 331, 321, 340, 416, 424, 425, 426) (Open to Seniors only)
Class 1, Lab. 12, Credit 5

ISMF-554 Senior Career Seminar
Registration #0621-554
A variety of current topics will be researched and discussed as they pertain to the hospitality industry: e.g. employee stress, employee dishonesty, alcoholism, divorce, management's response to current DWI laws, legal drinking age, casino operations.
Class 2, Credit 2

ISMF-555 Research Problems
Registration #0621-555
Independent study of research problems in food and hospitality management. Open to senior students only.
Class and Credit Variable

ISMH-400 Resort and Recreation Enterprises
Registration #0622-400
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 ISMH-401, 405 for specific enterprises.
Class 4, Credit 4

ISMH-401 Ski Resort Management
Registration #0622-401
The development, marketing and management of ski resorts. (ISMH-400)
Class 1, Credit 1

ISMH-402 Marina Management
Registration #0622-402
The development, marketing and management of marinas. (ISMH-400)
Class 1, Credit 1

ISMH-403 Golf Course Management
Registration #0622-403
The development, marketing and management of golf courses. (ISMH-400)
Class 1, Credit 1
ISMT-404 Campground Management
Registration #0622-404
The development, marketing and management of campgrounds. (ISMH-400)
Class 1, Credit 1

ISMT-405 Theme Park Management
Registration #0622-405
The development, marketing and management of theme park management. (ISMH-400)
Class 1, Credit 1

ISMT-406 Resorts, Clubs and Vacation Communities
Registration #0622-406
The development, marketing and management of resorts, clubs, and vacation communities. (ISMH-400)
Class 1, Credit 1

ISMT-410 Tourist Consumption Analysis
Registration #0622-410
A course designed to analyze the consumption of tourist goods and services. The analysis will include economic, recreation and personality theory in order to fully understand tourism consumption.
Class 4, Credit 4

ISMT-411 Problem Analysis & Decision-Making for Tourist Industries
Registration #0622-411
The course is designed to assist the student in constructing a problem-solving framework for the analysis of tourist industry management problems.
Class 4, Credit 4

ISMT-412 Maintenance and Engineering Systems of Hotel/Resort Properties
Registration #0622-412
A course designed to expose the student to various problems of maintaining a resort property. Maintenance practices, equipment, record keeping, and specific needs of recreational surfaces will be discussed as to proper maintenance for quality resort development.
Class 4, Credit 4

ISMT-420 Hotel and Travel Law
Registration #0622-420
Policies, laws, and liabilities are examined as they pertain to the traveling public. The focus will be on current management problems and responsibilities as they entail the legal aspects of the hospitality industry.
Class 4, Credit 4

ISMT-423 Hotel Operations
Registration #0622-423
Analysis and evaluation of systems and operations, franchising, feasibility planning, development, financing and organization of facilities; rate structure determination, front office procedures, guest room salesmanship and analysis of demand; reservation systems, ethics, security and on-the-job application of operational problems. (ISMF-210, BBUB-201 - Junior Standing)
Class 5, Credit 5

ISMT-450 Hotel Marketing and Convention Sales
Registration #0622-450
A study of tourism development, marketing and the interaction between the broad areas of the travel industry and its relationship to hotels, motels, restaurants, community economy, trade associations, competitive and non-competitive markets. Emphasis is given jointly in planning convention sales to various market segments, and in providing convention services at the meeting site. (ISMH-423, BBUM-463)
Class 4, Credit 4

Travel Management
Travel Lab I
ISMT-201 Travel Management
Registration #0623-201
The basics of the domestic air transportation system are examined with the focus on the student achieving proficiency in reservations, itinerary construction, fare construction, fare calculation, and ticketing procedures. The labs make use of the various air carrier and accommodation tariffs and guides. This course provides the basic understanding needed for the subsequent travel labs.
Class 3, Credit 3

ISMT-202 Travel Lab II
Registration #0623-202
The international air transportation system is surveyed. Emphasis is given to application of fares, baggage allowances, currency regulations and adjustments, and fare construction principles utilizing the Mileage System. Documentation requirements for international travel is also reviewed. (ISMT-201)
Class 2, Credit 2

ISMT-220 Travel Intermediaries
Registration #0623-220
A functional approach is utilized to aid in the understanding of the travel industry through the analysis of the marketing channels of distribution. The channel functions performed by the retail travel agent and the wholesale tour operator are examined in relation to suppliers (air carriers, hotels, etc.) marketing strategies and operations. Emphasis is given channel problems associated with group sales and packaged promotions.
Class 4, Credit 4

ISMT-303 Travel Lab III
Registration #0623-303
Cruise travel and rail travel are examined in considerable detail. Motor coach and auto rentals are also discussed. (ISMT-201)
Class 2, Credit 2

ISMT-320 Corporate Travel Planning
Registration #0623-320
A detailed examination of the economic forces which help determine product configurations and pricing structure of the various modes of passenger transportation. The market structure of the passenger transportation system is surveyed with the emphasis placed upon the analysis of the pricing system's multiple interactions created in part because of the nature of the various demand components and supply consequences. (ISMT-220 or Permission of Instructor)
Class 4, Credit 4

ISMT-370 Passenger Transportation Policy
Registration #0623-370
An examination of the development of transportation policy as it related to the various modes of passenger transportation. The role of regulatory policy is discussed with emphasis upon how it effects the economic and social policies and the physical aspects of passenger transportation. The various passenger transportation regulatory agencies are surveyed with the primary focus being their effect on the development of the present passenger transportation system and to their possible future implications. (ISMT-220 or Permission of Instructor)
Class 4, Credit 4

ISMT-420 Corporate Travel Planning
Registration #0623-420
This course focuses upon the specific travel goals, accounting policies, and informational requirements of corporate (business) travel. Three major orientations of corporate travel are examined: corporate travel utilizing the retail travel agent; corporate travel operated through the firm's transportation manager; and incentive travel. One of these orientations is emphasized during the quarter, corresponding to the interest of the students enrolled. (ISMT-220 or Permission of Instructor)
Class 4, Credit 4

ISMT-421 Tour Operations
Registration #0623-421
The operations of a typical tour wholesaler's program is examined. Emphasis is given to escorted and hosted tours, since they usually require direct involvement by representatives of the tour wholesaler. Financial and documentation flows are emphasized. The role of the tour guide/tour escort is highlighted. (ISMT-220 or Permission of Instructor)
Class 4, Credit 4

ISMT-422 Travel Product Development
Registration #0623-422
This course examines the planning function associated with the tour operator's development of new service offerings and/or the selection of new travel destinations. Initially, a marketing research orientation is utilized with emphasis on tour specifications (packaging), negotiations and pricing of the final package. The methods of marketing to various market segments are subsequently examined. (ISMT-220 or Permission of Instructor)
Class 4, Credit 4

ISMT-423 Computer Reservation and Accounting Systems
Registration #0623-423
A survey of various computer reservation systems used in passenger transportation is conducted. Application of the ASTA manual and several computer accounting systems are examined. (Permission of Instructor)
Class 4, Credit 4
College of Business
School of Business Administration

Accounting

BBUA-301 Financial Accounting
Registration #0101-301
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. (GSSE-301, GSSE-302)
Credit 4

BBUA-302 Managerial Accounting
Registration #0101-302
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 its collection. (BBUA-301)
Credit 4

BBUA-406, 409 Intermediate Accounting I, II
Registration #0101-406, 409
A study of the concepts, theories and practices used to prepare comprehensive financial statements in accordance with generally accepted accounting principles. The course will explore alternative accounting methods and valuation bases and the impact these have on financial statements. Current pronouncements of the Financial Accounting Standards Board will be studied if they are appropriate to the subjects of the course outline. (BBUA-302)
Credit 4

BBUA-431 Cost Accounting
Registration #0101-431
This course emphasizes the uses of cost data and cost reports for managerial decisions. Included are problems and procedures relating to job-order, process, standard cost systems and the techniques of overhead distribution. The role of the controller’s organization in the furnishing of accounting data and reports for managerial planning and control is emphasized. (BBUA-302)
Credit 4

BBUA-522 Tax Accounting I
Registration #0101-522
A basic course in Federal taxation relating to concepts of income, deductions and credits. The tax structure of business forms including sole proprietorship, partnership, S corporation, and C corporation will be compared. Tax research will be introduced as a component of the decision process. (BBUA-302)
Credit 4

BBUA-523 Tax Accounting II
Registration #0101-523
A course in Federal taxation emphasizing specialized topics in individuals and business taxation. Advanced topics will include acquisitions, mergers, liquidations and tax planning. (BBUA-522 and BBUA-409 or permission of instructor)
Credit 4

BBUA-530 Auditing
Registration #0101-530
A study of the legal, ethical, and technical environment in which the auditor works. Current auditing standards, procedures and techniques are studied. Audit programs are developed and problems connected with fraud and internal control are examined. The course includes a case study which simulates the conduct of an audit and which requires the preparation of working papers, an audit report, and an internal control memorandum. (BBUA-409)
Credit 4

BBUA-540 Advanced Accounting
Registration #0101-540
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-409)
Credit 4

BBUA-550 Accounting Theory
Registration #0101-550
A comprehensive study of the official pronouncements of the Accounting Principles Board and the Financial Accounting Standards Board. The course will also examine alternative theories of Accounting. (BBUA-409)
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)
Credit 4

Management

BBUB-301 Management Concepts
Registration #0102-301
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.
Credit 4

BBUB-202 Introduction to Business
Registration #0102-202
This course introduces the student to the many facets of business and the different types of work organizations in which these business activities are performed. As a result, the student will gain an understanding of alternative career opportunities and the competencies that must be developed to prepare for these careers. An important feature of this course is presentations by a variety of experts and practitioners in the field.
Credit 4

BBUB-210 Career Seminar I
Registration #0102-210
A basic introduction to the concept of career planning. The course emphasizes acquiring information about yourself such as understanding your own preferences and talents. In addition, the student will learn techniques for acquiring valid career information in order to select a field, or narrow occupational choices within a field. Self-assessment is an important feature of the course. (BBUB-202)
Credit 1

BBUB-315 Legal Environment of Business
Registration #0102-315
An introduction to the relationship between the business organization and laws that govern its operation. This includes the background and origins of law, law enforcement agencies, and government procedures for dealing with organizations that violate the law. Cases and examples are used as a guide to the observation of the legal requirements and forces which influence decision making about products and services, personnel, finances, and accounting practices. (BBUB-202)
Credit 4

BBUB-320 Organizational Behavior
Registration #0102-320
An introduction to understanding human behavior in organizations with a particular emphasis upon organizational psychology and organizational behavior. Major topics include motivation, communication, stress and burnout, organizational power and politics, leadership, and research methods in organizational behavior. Students are required to analyze cases and participate in experiential activities. (BBUB-202)
Credit 4
An introductory survey course about the field and practice of management for the nonbusiness student. Generally, this course has been geared to the special interests of civil engineering students. The course is designed to familiarize the student with the basic nature of business organizations, as well as the nature of management. Among the key topics are planning, organizing, controlling, leading, delegation, and decision making.

Credit 4

BBUB-301, 302
Business Law I & II
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 injuries, the utilization of professional services, and for familiarity with legal nomenclature. Representative topics include contracts, bankruptcies, and product liability.

Credit 4

BBUB-310
Career Seminar II
A more advanced course in career development and planning. Students enrolled in this course are involved in a number of experiential exercises designed to provide self-insight for purposes of career planning. Information is provided about techniques for advancing one's career including career pathing and obtaining visibility. Exposure to career information is also included.

Credit 1

BBUB-420
Principles of Management
A comprehensive course in the theory and practice of management for upperclass students. Emphasis is placed on the functional (or classical) and decision science schools of management. Among the major topics included are planning, controlling, organizing, budgeting, delegation, organization structures, organization design, and productivity improvement information. In this course applies to different types of organizations and different levels of management. Cases and student activities are part of the instructional process. (BBUB-320)

Credit 4

BBUB-455
Personnel and Human Resource Management
An overview of the personnel and human resource (personnel) function in both large and small organizations. The major topics studied include employee selection, training and development, compensation, and productivity improvement. Information is placed on the legal aspects of managing human resources. (BBUB-320)

Credit 4

BBUB-470
Compensation and Performance Appraisal
An intensive study of the key aspects of personnel and human resource management, employee compensation and performance evaluation. Specific topics studied include the effective management of salary, bonuses, pensions, tuition refund programs, medical insurance, and the variety of other employee benefits. Modern approaches to performance evaluation are studied including management-by-objectives and behaviorally anchored rating scales. Experiential exercises are used to facilitate acquiring skills in performance appraisal. (BBUB-455)

Credit 4

BBUB-475
Human Resources Planning and Selection
Course is designed to provide information, insight, and skills about forecasting the demand for managers and individual contributors within a firm and recruiting and selecting employees to meet that demand. The role of computer-generated information in forecasting will be studied. Emphasis is given to matching the demands of individuals and the organization as a byproduct of forecasting. Among the selection methods studied are personnel tests, employment interviews, biographical data, reference checks, and the assessment center method. (BBUB-455)

Credit 4

BBUB-490
Training and Development
Course provides intensive description and analysis of techniques for the training and development of individual contributors and managers, along with a study of formal methods of evaluating training and development. Among the techniques and methods studied are on-the-job training and consultation, leadership training, teambuilding, transactional analysis, assertiveness training, computer-assisted instruction, skillbuilding, and career development programs. (BBUB-455)

Credit 4

BBUB-485
Employee and Labor Relations
Overview of the functioning of labor unions and employee associations in both the private and public sectors. The course includes information about labor law, the collective bargaining process, union certification and decertification, the grievance process, the factors precipitating strikes, and current developments in labor-management relations. Emphasis is placed upon achieving a better understanding of both the management and labor points of view. (BBUB-455)

Credit 4

BBUB-490
Entrepreneurship
An exploration of the basics of small business management with an emphasis on understanding the role of the small business owner. Major topics studied include starting and operating a small business, small business marketing, managing small business operations, managing human resources, financial and administrative controls, and governmental interaction with the small business. (BBUB-420)

Credit 4

BBUB-507
Business Environment
The impact and effect of social responsibility and law on business activity including the managerial response to those environmental forces. Topics include a study of the demands made on the firm by consumers, citizens groups, the government, and educational institutions. Ethics in business are treated extensively. The implications of current events are an integral part of this course. (Senior status, BBUB-420, BBUF-441, BBUM-463, BBUG-460)

Credit 4

BBUB-534
Purchasing
An exploration of the purchasing and material handling function of industrial firms. Major topics include the organization of the sources of supply, computerized information systems, and legal ramifications of purchasing. Also explored are the unique problems of purchasing in public sector and third sector (not-for-profit) organizations. (BBUB-420)

Credit 4

BBUB-536
Organization Theory
An analysis of organizations as entities from the perspective of the total organization rather than from the small-group or individual point of view. Among the topics included are the various forms of organization structure, the design of organizations, matrix structures, centralization and decentralization, organizational effectiveness, and the interaction of organizations with their external environments. The student may be asked to prepare an analysis of the strengths and weaknesses of an existing organization. (BBUB-320, BBUB-420)

Credit 4

BBUB-547
Small Business Administration
Students enrolled in this course are provided the opportunity to serve as consultants to a specific small business firm within this geographic area. Under an arrangement with the Small Business Administration, and working under the supervision of a senior faculty member, teams of students provide management consulting about a variety of problems to small businesses. As a practicum this course does not have regularly scheduled class hours. Instead students confer with their faculty member on an as-needed basis. (Senior standing)

Credit 4

BBUB-551
Integrated Business Analysis
An integrated viewpoint on business operations achieved through analysis and evaluation of actual cases. Also referred to as business strategy and policy, this course provides experience in combining theory and practice gained in other management courses. The content of the course is from the viewpoint of top management in its role as a developer and implementer of strategy and policy. As a capstone course, the workload is considerably above average. (Senior status, BBUB-420, BBUF-441, BBUM-463, BBUG-460)

Credit 4

BBUB-554
Management Seminar
A variety of special interest topics in the field of management, ordinarily treated in more depth than would be possible in a survey course. The topic and instructor for each seminar will be announced in advance, along with any prerequisites or other special requirements. Seminar topics in recent years have included career development, the management of stress, real estate investment, and managerial control systems.

Credit 4
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-301, GSSE-302)
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)
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)
Credit 4

BBUE-407 Managerial Economics
Registration #0103-407
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-405)
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-405 or BBUE-406)
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. (GSSE-301 and GSSE-302)
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)
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 or BBUE-406)
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)
Credit 4

Finance

BBUF-441 Corporate Finance
Registration #0104-441
An introduction to the functions of Financial Management and Financial Markets and institutions. Asset Valuation as it applies to working capital management and long term financing. The theories of leverage and dividend policy. (BBUB-352, BBUA-302, GSSE-301)
Credit 4

BBUF-445 Advanced Corporate Finance
Registration #0104-445
A broad coverage of business finance with emphasis on the analytical techniques of resource allocation and asset management. Covers securities and securities' markets, capital structures, analysis of financial statements, financing business operations, cost of capital and capital budgeting. (BBUF-441)
Credit 4

BBUF-450 Mathematics of Finance and Economics
Registration #0104-450
The introduction of calculus and matrix algebra as a language for expressing models and solving problems in finance and economics. Students will be exposed to the use of mathematics in finance and economic journal articles. (BBUE-405)
Credit 4

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-445)
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 rate system, international capital movements, exchange, restrictions, and international monetary experience. (BBUF-445)
Credit 4 (offered upon demand)

BBUF-507 Security Analysis
Registration #0104-507
This course is introductory and provides background in the field of securities investment. It is both descriptive and analytical in nature. The course covers the economics of stocks, types of issues, the historical investment perspective, and the valuation of different types of securities. (BBUF-441)
Credit 4

BBUF-508 Portfolio Management
Registration #0104-508
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)
Credit 4

BBUF-510 Financial Institutions and Markets
Registration #0104-510
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. (BBUF-441)
Credit 4

BBUF-525 Theory of Finance
Registration #0104-525
This course is a sophisticated approach to the theory underlying modern business finance. Current developments in financial decision making under risk and uncertainty are examined and the statistical foundations of modern finance theory are studied in detail. (BBUF-445)
Credit 4

BBUF-530 Public & Non-Profit Sector Finance
Registration #0104-530
An exposure to the financial management practices of public sector institutions with an emphasis on state and local governmental agencies. This course will also expose the students to the financial management practices of private non-profit institutions such as cultural, educational and health related institutions. (BBUF-445)
Credit 4

BBUF-554 Seminar in Finance
Registration #0104-554
Course will be designed by individual instructor. (Varies by seminar content)
Credit 4
Marketing

**Principles of Marketing**

Registration #0105-463

A basic course in which the student is introduced to the marketing system and specific marketing functions of the business firm. An analytical approach is used to develop an understanding of marketing strategy. (BBUM-301, GSSE-302)

Credit 4

**Consumer Behavior**

Registration #0105-420

A course focusing on the role of the ultimate consumer in the marketing process. Emphasis will be on understanding the psychological, cultural and socioeconomic influences in the consumer decision making process. (BBUM-463)

Credit 4

**Consumer Services Analysis**

Registration #0105-510

A course designed to examine the common attributes and problems of consumer service institutions. Topics to be covered: factors of market segmentation, customer needs, models of present and future service organizations, organizational concerns, and external environmental variables affecting consumer service industries. (BBUM-463)

Credit 4

**Marketing Management Problems**

Registration #0105-550

A course designed to provide the student with an in-depth knowledge of middle and upper management level marketing problems. In addition, the student should become familiar with tools used by marketing managers at these levels. (BBUM-552, 553)

Credit 4

**Marketing Research**

Registration #0105-551

A study of research methods and procedures used in the marketing process. Topics include problem formulation, sources of market data, research methodology, data collection, data analysis, and the role of marketing research within the firm. (BBUM-463, BBUQ-352)

Credit 4

**Advertising/Sales Promotion**

Registration #0105-552

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-463)

Credit 4

**Sales Management**

Registration #0105-553

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-463)

Credit 4

**Seminar in Marketing**

Registration #0105-554

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)

Normal Credit 4 (maximum 12 hours credit)

**International Marketing**

Registration #0105-555

Management problems of marketing in foreign countries. Topics to be considered include the economic, cultural, and political roots of marketing systems. (BBUM-463)

Credit 4

**Marketing Logistics**

Registration #0105-556

A study of physical supply and physical distribution activities. Topics include transportation, inventory control, materials handling, warehousing, order processing, protective packaging, product scheduling, facility location and customer service. (BBUM-463, BBUQ-352)

Credit 4

**Comparative Marketing**

Registration #0105-557

A study of marketing in selected foreign countries to acquaint the student with its functional role in various economic environments. Comparisons between geographic regions and cultural settings are explored. (BBUM-555)

Credit 4 (offered upon demand)

**Marketing Communications**

Registration #0105-560

This course is an overview of total promotion techniques and research. The course will stress promotion in terms of accomplishing overall marketing objectives, impact on the consumer, and the evaluation of promotion effectiveness. (BBUM-463)

Credit 4

**Advanced Marketing Research**

Registration #0105-565

This course is a continuation of the groundwork acquired in the marketing research course. Emphasis is on the analytical basis of marketing research in support of management decision making. Multivariate analytic techniques will be stressed and applied to projects and data base analysis. (BBUM-551)

Credit 4

**Industrial Marketing**

Registration #0105-570

The course is concerned with developing understanding and application of marketing processes to industrial marketing organizations. Topics covered include: industrial purchasing motivations, industrial purchasing organizations, and industrial channels. (BBUM-463, BBUE-405)

Credit 4

Decision Sciences

**Management Science**

Registration #0106-334

Introduces the student to quantitative approaches to decision making. Topics include linear programming, computer simulation, and calculus-based solution techniques. (SMAM-225, ICSS-200, BBUQ-351)

Credit 4

**Applied Statistics I, II**

Registration #0106-351, 352

An introduction to forecasting methods in business. Students will be required to analyze several data sets using an interactive forecasting package. (BBUQ-352)

Credit 4

**Business Forecasting**

Registration #0106-353

Theory and practice of production and operations management utilizing quantitative methods and computer techniques as applied to business problems. (BBUQ-352, BBUQ-334)

Credit 4

**Operations Management**

Registration #0106-460

A study of the decision making and problem solving processes of administrative officials and managers in business organizations. Emphasis is on the use of quantitative techniques in planning, organizing, and controlling business activities. (BBUQ-352)

Credit 4

**Seminar in Decision Sciences**

Registration #0106-554

The course content depends on the instructor and quarter when offered. Specific content for a particular quarter will be announced prior to course offering. (BBUQ-352)

Credit 4
School of Retailing

**BRER-201** Introduction to the Retail Industry
Registration #0109-201
An introduction to the tasks, functions, and structures of the retail industry. The major forms and types of retailers will be studied along with the various approaches to the controllable retail variables including location, merchandising, image pricing, and promotion. The nature and expectations of various career paths will be considered. (BRER-201)
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. (BBUB-202)
Credit 1

**BRER-301** Retail Buying and Merchandise Control
Registration #0109-301
Introduction to the Retail Buying and Merchandise Control course. A study of the acquisition of merchandise investment planning, analysis, and control of the dollar merchandise investment to meet profitability objectives. The course will be organized around the task of the retail buyer. (BRER-201)
Credit 4

**BRER-401** Retail Store Operations and Management
Registration #0109-401
A detailed examination of the operation of a retail enterprise including fixtures, information systems, operating costs, merchandise flows, and security. Particular attention will be paid to the managerial tasks of selecting, training, and motivating store personnel. (BRER-201)
Credit 4

**BRER-412** Advanced Merchandising
Registration #0109-412
A study of creative merchandising with advanced topics and complex merchandising applications. The emphasis is on merchandising as a control and management tool. The course will enable the student to develop and evaluate the impact of alternative merchandising decisions on the performance of the retail operation. (BRER-201)
Credit 4

**BRER-413** Buying Management and Market Analysis
Registration #0109-413
A seminar addressing the specific role of the buyer within the retail organization and the retailer's markets, performing the following functions: merchandise management and planning, the buying and selling activity and merchandise resource relationships. Information gathering as it specifically supplements the buyer's knowledge of the field is accomplished through exposure to many periodicals, trade journals, trade associations, retail buying offices, and other market contacts. (BRER-201, BRER-301)
Credit 4

**BRER-431** Interior Design I
Registration #0109-431
A study of the basic elements and principles of design, lighting and color theory, and the applications of these principles and theories in creating an interior design. (BBUB-202)
Credit 4

**BRER-432** Interior Design II
Registration #0109-432
Planning a home and its furnishings through the use of scaled floor plans and electrical plans. Budget allocations, project scheduling and surface material selections are included. The rendering of interior designs in one-point and two-point perspective. A professional approach to client presentation. (BRER-431)
Credit 4

**BRER-433** Interior Design History
Registration #0109-433
A study of architecture and furnishings as expressive of social, economic, political, and technological developments. Emphasis on significant and lasting design developments from each period. This course covers the history of interior design from antiquity through the present. (BBUB-202)
Credit 4

**BRER-452** Retail Sales Promotion
Registration #0109-452
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, copy writing, layout. The full promotional mix employed by typical retailers including newspapers, broadcast, display, specialty advertising, and in store promotions is analyzed and evaluated. (BRER-201)
Credit 4

**BRER-501** Senior Seminar in Retail Management
Registration #0109-501
An opportunity to apply and integrate all previous retailing and business core courses to solve retail management problems in a number of different organizations and situations. The problems will reflect a mix of actual managerial problems and complex cases. Written and oral presentations of analysis and conclusions will be stressed. The course will reflect a top management perspective. (All retail core courses, one senior level co-op).
Credit 4

**BRER-552** Current Trends in Retailing
Registration #0109-552
A course that studies and identifies the forces that promote trends in the industry, and the environments in which they exist. Further analysis and attempts to translate the trends into lifestyle merchandising strategies. (BRER-201)
Credit 4

**BRER-553** Textiles
Registration #0109-553
Analysis of textile fibers, weaves, and fabrics, methods of printing, dyeing and finishing, evaluation of fabrics and materials commonly used in home furnishings. (BRER-301)
Credit 4

**BRER-554** Seminar in Retail Management
Registration #0109-554
Selected topics associated with various aspects of retailing. Course content and structure will differ according to faculty assigned and quarter when offered. (Permission of instructor)
Credit 4
## Graduate Business Courses

### Business Administration Courses

#### Accounting Group

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit</th>
<th>Registration</th>
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<tbody>
<tr>
<td>BBUA-703</td>
<td>Accounting Concepts for Managers</td>
<td>4</td>
<td>*0101-703</td>
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<tr>
<td>BBUA-704</td>
<td>Accounting Theory I</td>
<td>4</td>
<td>*0101-704</td>
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<tr>
<td>BBUA-705</td>
<td>Accounting Theory II</td>
<td>4</td>
<td>*0101-705</td>
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<tr>
<td>BBUA-706</td>
<td>Cost Accounting</td>
<td>4</td>
<td>*0101-706</td>
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<tr>
<td>BBUA-707</td>
<td>Advanced Accounting and Theory</td>
<td>4</td>
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<tr>
<td>BBUA-708</td>
<td>Auditing</td>
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<tr>
<td>BBUA-709</td>
<td>Basic Taxation Accounting</td>
<td>4</td>
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</tr>
<tr>
<td>BBUA-810</td>
<td>Advanced Taxation Accounting</td>
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### Economics Group

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<th>Course Code</th>
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<th>Credit</th>
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<tbody>
<tr>
<td>BBUE-711</td>
<td>Microeconomics</td>
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<tr>
<td>BBUE-712</td>
<td>Macroeconomics</td>
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<tr>
<td>BBUE-713</td>
<td>Advanced Microeconomic Theory</td>
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<tr>
<td>BBUE-714</td>
<td>Advanced Macroeconomic Theory</td>
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### Other Courses

- **BBUE-611**: Auditing Theory (Advanced course in auditing where classical auditing cases, use of computer and statistical accounting techniques, current official auditing pronouncements and changes in legal and ethical considerations are fully explored. (BBUA-703 or admission to the MS in accountancy). Credit 4
- **BBUE-612**: Accountancy Seminar (A variety of advanced accounting topics are covered, depending on the instructor. Topics included would be: CPA problems, SEC accounting, small business accounting, non-profit accounting, internal auditing (BBUA-705 or admission to the MS in accountancy). Credit 4
- **BBUE-613**: Financial Accounting Theory (An advanced course in financial accounting that examines the basic assumptions, principles and postulates upon which current practice rests; and the 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
- **BBUE-614**: Accounting Information Systems (A complete analysis of management's need for financial data in decision making and the various alternatives available to provide the information in a timely, cost-effective manner. Topics covered will include manual, mechanical, and computerized alternatives to the capturing, compiling, and reporting of relevant data. Credit 4
BBUF-715
Managerial Economics
Registration #0103-715
Analysis of the economic conditions facing the firm. Topics include: demand and cost analyses, resource utilization, pricing, market structure, and other selected topics. (BBUA-703, BBUF-711, BBUF-782)
Credit 4

BBUF-716
Seminar in Economics
Registration #0103-716
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

Finance Group
BBUF-721
Financial Management I
Registration #0104-721
An examination of the basic financial theories relating to the valuation of assets and the analysis of risk. The course will concentrate on both the theory and practice of capital budgeting decision making. Topics include, capital budgeting techniques, portfolio risk and diversification, the capital asset pricing model and practical problems in the selection of long term assets. (BBUG-782, BBUA-703, BBUF-711)
Credit 4

BBUF-722
Financial Management II
Registration #0104-722
An introduction to the concept of capital market efficiency. In this course, capital structure decisions and dividend policy will receive primary emphasis. Other topics will include option valuation, leasing, working capital management, and financial analysis. (BBUF-721)
Credit 4

BBUF-723
Theory of Finance
Registration #0104-723
This course involves a study of the current literature and most recent developments relating to the theories of valuation, risk, investment analysis, cost of capital, capital structure and dividend policy. Topics will be studied within the framework of the capital asset pricing model and the option pricing model. Also considered are specific areas of application and the policy implications of the theories studied. (BBUF-721, BBUF-722)
Credit 4

BBUF-724
Problems in Finance
Registration #0104-724
This course is designed to give the student greater in-depth understanding of contemporary problems in finance. The focus will be on state-of-the-art techniques in both theory and practice. Examples of specific topics that might be addressed in this course include: agency cost problems, mergers and acquisitions, international finance, financial distress, and regulatory impacts on capital markets. Specific topics will be determined by the instructor. (BBUF-723)
Credit 4

BBUF-725
Securities & Investment Analysis
Registration #0104-725
Study of securities and other investment media and their markets. Analysis of investment values based on financial and other data. Considers factors such as return, growth, risk and the impact of various institutional arrangements on value determination. (BBUF-721, BBUF-722)
Credit 4

BBUF-726
Capital Markets
Registration #0104-726
This course will review the statistical tools employed in financial analysis and examine the descriptive evidence on the behavior of security prices. The course will consider theory and evidence of capital market efficiency, portfolio theory, and the theory and evidence on the relationship between expected return and risk. The implications of the theory for applied practice will also be considered. Other topics will include: The evaluation of portfolio performance, international capital markets and efficient markets for other assets. (BBUF-721, BBUF-722)
Credit 4

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

Management Group
BBUF-740
Organizational Behavior
Registration #0102-740
A study of human behavior in organizations, primarily at the individual and small group level of analysis. The implications of knowledge from psychology, social psychology, and sociology are emphasized. Major topics include motivation, leadership, group dynamics, conflict, organizational power and politics, stress and burnout, and research methods in organizational behavior. Most topics are related to individual and organizational performance. Course includes lectures and experiential learning.
Credit 4

BBUF-741
Organization and Management
Registration #0102-741
A study of organizations as systems, including their subsystems and interrelationships with other organizations and the external environment. Focus is placed on the role of managers as those responsible for understanding and integrating the needs of the organization, its members, and its external environment. Major topics studied include organization structure and design, organizational effectiveness, organizational change, organizational analysis, and bureaucracy. (BBUF-740)
Credit 4

BBUF-742
Business and Society
Registration #0102-742
A study of the impact on the manager and organization of needs, demands, and restrictions imposed by employees, government, consumer, citizens, groups, and other environmental forces. The course examines possible managerial responses within the framework of several definitions of social responsibility. The implications of current events are an integral part of the course. (BBUF-740)
Credit 4

BBUF-746
Management and Career Development
Registration #0102-746
Study and application of current methods of developing managers, with a primary emphasis on career development of both managerial personnel in general and the person taking this course. Student is required to develop a career plan (career pathing). Implications of current technological developments for training, replacement, and advancement of managerial personnel are discussed. Insight is also provided into the organizational function of management development. (BBUF-741)
Credit 4

BBUF-748
Employee and Labor Relations
Registration #0102-748
A study of labor-management relations as they influence managerial decision making in both union and nonunion organizations. Topics may include collective bargaining, conflicts and agreements between labor and management, sharing of productivity gains between labor and management, and contemporary issues. An analysis is made of how market forces, labor unions, employee associations, and labor law influence employee compensation. Employee and labor relations are studied in both private and public sector firms. (BBUF-740, BBUF-710)
Credit 4

BBUF-750
Personnel Systems
Registration #0102-750
A study of personnel systems or the methods of the personnel and human resource management function in organizations. The major personnel topics studied include: organizational staffing (selection and recruitment), training and development, compensation, safety and health, equal employment opportunity, human resource forecasting, and performance appraisal. Course includes experiential learning in such topics as job design, job analysis, selection interviewing, and performance evaluation. (BBUF-740, BBUF-782)
Credit 4

BBUF-751
Legal Environment of Business
Registration #0102-751
An introduction to legal principles and their relationship to business practices. Business ethics and the environmental impact of the federal administrative agencies are stressed. Among the agencies considered will be the EPA, EEOC, FDA, OSHA, FTC and the NLRB. (BBUA-703, BBUF-740)
Credit 4
BBUB-753 Small Business Administration
Registration #0102-753
Students enrolled in this course are provided the opportunity to serve as consultants to a specific small business firm within this geographic area. Under an arrangement with the Small Business Administration, and working under the supervision of a senior faculty member, teams of students provide management consulting about a variety of problems to small businesses. As a pragmatic approach this course does not have regularly scheduled class hours. Instead students confer with their faculty member on an as-needed basis. (BBUA-702, BBUF-721, BBUM-761)
Credit 4

BBUB-754 Business Law
Registration #0102-754
An introduction to the law of contracts, sales, agency, commercial paper, and partnerships. Among the subjects covered are: consumer protection, unfair methods of competition and the ethics of the business community. (BBUA-703, BBUB-740)
Credit 4

BBUB-755 Compensation and Reward Systems
Registration #0102-755
A comprehensive analysis of compensation (wages and benefits) in contemporary organizations. Among the major topics studied are the role of money, the practical problems of developing and administering compensation programs, motivational factors related to compensation, motivational features of benefits, the role of government, and current trends in benefit packages. Forces shaping the establishment of wage rates in a given firm are also studied. (BBUB-740)
Credit 4

BBUB-758 Seminar in Management
Registration #0102-758
A presentation of current specialty topics within the broad field of management. Seminar topics have included organizational power and politics, improving individual and managerial effectiveness, managerial control systems, money and motivation, organization development, conflict resolution, and small business information systems. The course topic for a specific quarter will be announced prior to the course offering. Although a seminar, the course may include some lectures and examinations.
Credit 4

BBUB-759 Integrated Business Analysis
Registration #0102-759
Also referred to as business strategy and policy, this course provides 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 functional areas of marketing, production, finance, and personnel. This course is aimed at the formulation and implementation of business policy as viewed by top management. The case method is used extensively. Since this is a capstone course, the workload is considerably above average. (All other required courses)
Credit 4

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, introduction of the use of multivariate techniques as a means for data reduction and the analysis of complex data bases. (BBUQ-782, BBUM-761)
Credit 4

BBUB-771 Research Option
Registration #0102-771
A practicum or thesis alternative permitting the student to confront a real management problem. Requirements include steps from design to completed management report. (To be developed with selected faculty)
Credit 4

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. (To be developed with selected faculty)
Credit 1-4

Marketing Group

BBUM-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. (BBUA-703, BBUE-711, BBUB-740)
Credit 4

BBUM-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. (BBUM-761)
Credit 4

BBUM-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. (BBUM-761)
Credit 4

BBUM-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. (BBUM-761)
Credit 4

BBUM-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 include building and managing an effective sales force and to selling philosophy and techniques creating managerial "win-win" situations with both superiors and subordinates. (BBUM-761)
Credit 4

BBUM-766 International Marketing
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. (BBUM-761)
Credit 4

BBUM-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. (BBUM-761)
Credit 4

BBUM-769 Seminar in Marketing
Registration #0105-769
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

Decision Sciences Group

BBUQ-743 Operations Management
Registration #0106-743
An analytical approach to the theory and application of production and operations management. Combines quantitative models and qualitative considerations relating to analysis of time series data forecasting, quality assurance, inventory control, MRP, Project Management, and System Design. (BBUQ-780, BBUQ-782)
Credit 4
BBUQ-780 Management Science
Registration #0106-780
An introduction to quantitative approaches to decision making. Topics covered include linear programming, goal programming, integer programming, computer simulation, and calculus-based solution procedures. The emphasis is not on the techniques per se, but rather on showing how quantitative approaches can be used to contribute to a better decision-making process.
Credit 4

BBUQ-781 Statistical Analysis I
Registration #0106-781
An introduction to the use of statistics in business. Topics covered include descriptive statistics, probability concepts, probability distributions, sampling methods, and sampling distributions. Includes the use of computerized data analysis.
Credit 4

BBUQ-782 Statistical Analysis II
Registration #0106-782
The course emphasizes the use of statistical tools in decision making. Topics include estimation of means and proportions, one and two sample tests of means, proportions, and variances, chi-square tests, and simple and multiple regression analysis. Extensive use of a statistical software package.
BBUQ-781
Credit 4

BBUQ-784 Decision Analysis
Registration #0106-784
An introduction to decision analysis for the manager. Emphasis will be on (1) structuring the problem in terms of alternatives possible, decision attributes, and operational constraints; (2) quantifying the manager’s judgments as probabilities; (3) assessing the utility of the manager’s preferences; (4) analyzing the problem via evaluation of the alternatives and checking the sensitivity of the solution. Simple and multiple attribute cases under certainty will be covered.
BBUQ-782
Credit 4

BBUQ-785 Applied Regression Analysis
Registration #0106-785
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 a standard statistical package. Relevant theory will be introduced to enable the student to pursue further study in data analysis.
BBUQ-782
Credit 4

BBUQ-786 Mathematical Programming
Registration #0106-786
An indepth study of the application of mathematical programming to business decision making. The objective of this course is to present state-of-the-art methodology and applications of mathematical programming.
BBUQ-780
Credit 4

BBUQ-788 Survey Design & Sampling
Registration #0106-788
This course will cover the following topics in survey design and sampling: (1) questionnaire design, (2) types of sampling techniques, (3) determination of sample size, (4) methods for increasing the response rate, (5) use of appropriate statistics to analyze results.
BBUQ-782
Credit 4

BBUQ-789 Simulation
Registration #0106-789
An introductory course in the use of computer simulation in the solution of complex business problems. A simulation language is introduced and applied in the solution of a term project. Particular attention is focused on the types of problems for which computer simulation is a viable solution technique as well as methods for establishing the validity of the simulation.
BBUQ-780, BBUQ-782
Credit 4

BBUQ-790 Information Systems
Registration #0106-790
The concepts and techniques for the design and implementation of a computer-based management system are studied. Topics include systems theory, the generation and collection of data, the transformation and dissemination of information, and the economics of information.
BBUQ-743
Credit 4

BBUQ-793 Business Forecasting Methods
Registration #0106-793
An introduction to quantitative and qualitative forecasting methods and their use in business forecasting. The student will be taught how to recognize which forecasting procedures to use based upon an analysis of problem characteristics. Includes the use of interactive forecasting techniques.
BBUQ-782
Credit 4

BBUQ-794 Multivariate Methods in Business
Registration #0106-794
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 using several large-scale data sets. The student will be required to use a standard statistical package. A major objective will be to teach the student how to interpret the output of a computer package in terms of the decision-making situation underlying the problem being investigated.
BBUQ-785
Credit 4

BBUQ-795 Seminar in Decision Sciences
Registration #0106-795
This course will take on different content depending on the instructor and quarter when offered. Specific content for a particular quarter will be announced prior to course offering.
BBUQ-791
Credit 4

Human Services Group

BBUH-701 Economic Environment of Human Services
Registration #0115-701
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-710
Credit 4

BBUH-711 Law and the Administrative Process
Registration #0115-711
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.
BBUQ-701
Credit 4

BBUH-712 Bureaucracy in Modern Society
Registration #0115-712
The nature of bureaucratic organization in modern Western societies, especially the United States; business corporations, trade unions, the military, hospitals, law enforcement agencies. Problems resulting from conflicts and values, constituencies, and theories among these institutions.
BBUQ-740
Credit 4

BBUH-721 Organization and Management
Registration #0115-721
Considerations of organization, management, and planning as tools of the administrator with emphasis on bureaucratic 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.
BBUQ-741
Credit 4

BBUH-722 Administration in the Social Work Setting
Registration #0115-722
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.
BBUQ-741
Credit 4
BBUH-731  Intervention in the Community  
Registration #0115-731  
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. (BBUB-740)  
Credit 4

BBUH-732  Cooperation and Conflict  
Registration #0115-732  
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-740)  
Credit 4

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 weakness to develop an increased awareness of the particular characteristics leading towards beneficial managerial outcomes. (BBUB-740)  
Credit 4

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.  
Credit 4

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.  
Credit 4

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 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, agriculture, 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: fractional experiments; factorial, three level, mixed; response surface analysis. 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-821 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 I
Registration #0240-830
Deals with the summarization, representation, and interpretation of data sampled from populations where more than one characteristic is measured on each sample element. Usually the several measurements made on each individual experimental item are correlated, so univariate analysis should not be applied to each measurement separately. This course covers the use of the basic multivariate techniques. Computer problem solving will be emphasized. Topics will include multivariate t-test, ANOVA, regression analysis, repeated measures, quality control and profile analysis. (CTAM-801, 802)
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
Deduction-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-852 Managerial Decision Making
Registration #0240-852
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)

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)

Bayesian Statistics
Registration #0240-881
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 Summer Quarter)

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 use of the optimum sample evidence are also offered. (CTAM-712 or equivalent.)
Credit 3 (offered in Summer Quarter)

Special Topics in Applied Statistics
Registration #0240-891, 892, 893
These courses provide 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)

Statistics Seminar
Registration #0240-895
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 the College of Engineering (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)

Thesis
Registration #0240-896, 897, 898
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)
College of Engineering

Computer Engineering

Required Courses

EECC-341 Introduction to Digital Systems for Computer Engineering Students
A study of the organization 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 a simple CPU 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 (W)

EECC-655 Real-Time Computation
Principles and applied problems in real-time computation and process control using microprocessors as laboratory equipment. Topics include interrupt handlers, multi-tasking concepts, process synchronization, 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
Registration #0306-660
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-620 Design Automation of Digital Systems
Registration #0306-620
Design automation deals with the use of computers as a tool or aid in the design and manufacture of digital systems. Topics covered will include systematic methods for digital design, hardware description languages, simulation techniques at system level, register-transfer level, and logic element level, partitioning of digital systems, placement, routing, and fault test generation. (EECC-341, ICSS-620 or 720)
Class 4, Credit 4 (S)

EECC-630 VLSI Design
Registration #0306-630
An introduction to the design and implementation of Very Large Scale (VLSI) systems. Basic NMOS devices and circuits are described. From this base, a variety of methods for designing both combinational logic and state machines are developed, with emphasis on the use of regular structures such as programmed logic arrays. System architecture and use of Computer Aided Design (CAD) tools will be stressed. (EECC-341 or ICSS-400, ICSS-520; Basic Electronics)
Class 4, Credit 4 (W, S)

EECC-722 Advanced Computer Architecture
Registration #0306-722
A study of the latest advances in computer architecture. Includes existing machines as well as the latest ideas on non von-Neumann architectures, data-flow architectures, tightly coupled multiprocessors and distributed systems. Also includes the impact of VLSI on Computer Architecture. (ICSS-520 or 720; and ICSS-521)
Class 4, Credit 4 (S)

EECC-758 Fault-Tolerant Computer Systems
Registration #0306-758
Formal models and concepts in fault diagnosis. Test generation and minimization redundant and self-checking systems. Fault tolerant hardware and software based computer systems. (Switching Theory/ICSS 400 or EEEE-650 or EECC-750; or Computer Architecture ICSS 520 or 720)
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 Electrical Engineering Graphics
A two-hour per graphics laboratory which stresses elementary graphic communication techniques. The accent is on the graphical description rather than on drafting methods.
Class 0, Lab. 2, Credit 1 (Fall Quarter)

EEE-240 Introduction to Digital Systems
Registration #0306-240
This course will survey digital circuits and systems from the viewpoint of a user. It will describe these circuits' operation and typical uses in terms of the external connections made to commercially available circuit packages. As an example of circuit interconnection, the organization of a digital computer is discussed in some detail. The electrical principles normally covered in engineering physics course are assumed but not any prior knowledge of electronics.
Class 3, Lab. 0, Credit 3 (Fall Quarter)

EEE-340 Introduction to Digital Systems
Registration #0306-340
This course will survey digital circuits and systems from the viewpoint of a user. It will describe these circuits' operation and typical uses in terms of the external connections made to commercially available circuit packages. As an example of circuit interconnection, the organization of a digital computer is discussed in some detail. The electrical principles normally covered in engineering physics course are assumed but not any prior knowledge of electronics.
Class 4, Credit 4 (Fall and Winter Quarter)

EEE-351 Circuit Analysis I
Registration #0301-351
Potential Difference: voltage polarity notation; current; power and energy; sources and sinks; linearity; resistance; source models; inductors; capacitors; Kirchhoff's Laws: series circuit; parallel circuit; series-parallel circuits; ladder networks; branch current method of circuit analysis. Principles of nodal analysis; nodal analysis; general discussion of nodal analysis Network topology; principles of loop and mesh analysis; duality; general loop analysis. Thevenin's and Norton's theorems: maximum power transfer; superposition and reciprocity theorems. Properties and relationships of inductance: RL circuit with a step input; properties and relationships of capacitance; RC circuit with a step input; pulse response of RC circuits; RLC circuit with a step input. (This will be an overall discussion rather than detailed analysis.) Sinusoidal Steady State - introduction; combination and decomposition of sinusoidal functions; single components; series RL circuit, series RC circuit - time domain solution; parallel RLC circuit - time domain solution; duality; instantaneous and average power: RMS values. Concepts of Transfer Functions, Phasor concepts, impedance, admittance, resistance, admittance, susceptance, conductance; impedance to admittance conversions; impedance bridges; power.
Class 4, Recitation 1, Lab. 2, Credit 4 (Spring and Summer Quarters)

EEE-352 AC Network Analysis (nodal analysis, loop and mesh analysis) Thévenin's and Norton's theorems: maximum power transfer, superposition and reciprocity theorems. Transfer Functions: frequency response; Bode diagrams; generalized signals and complex frequency; Laplace transforms and the complex frequency plane; poles and zeros of transfer functions. Variable Frequency Circuit Response: parallel and series resonance: bandwidth; poles and zeros of impedance and admittance functions; resonance in nonstandard circuit. Three-Phase Networks: Y and delta loads; power; measurement of power; Two-port notations and definitions; Open circuit impedance parameters; short circuit admittance parameters; hybrid parameters; transmission parameters; interconnection of two-ports. Characteristics of common magnetic materials; analysis of linear and nonlinear magnetic circuits; magnetic hysteresis; self and mutual induction; coupled coils; analysis of circuits with coupled coils; linear and ideal transformers; resonance in coupled circuits.
Class 3, Recitation 2, Lab. 2, Credit 4 (Fall and Winter Quarters)

EEE-353 Circuit Analysis III
Registration #0301-353
This course has been discontinued. The topics have been integrated into EEE-351 and EEE-352 in the revised curriculum.
Theels Discrete Switching Logic Systems

upon the Motorola 6800 and Intel 8085 microprocessors. Partial fraction evaluation and convolution in time and frequency. Discrete representation of continuous systems via sampling, trapezoid and hold action. A/D and D/A conversion. Elements of discrete signal processing: conceptual view, special cases, linearity and shift invariance, difference equations, impulse response sequence and the convolution sum. Linear discrete shift invariant discrete system analysis: general input-output difference equation, response to exponential sequences, the Z transform, the inverse integral, the transfer function, transforms of common sequences, basic theorems, partial fraction expansion. "Frequency Response" of Discrete Systems: sinusoidal input/output, frequency response H(e^{jω}), relations between Z plane and s plane, j axis and Z plane unit circle, frequency response in Z plane, aliasing effects. Introduction to Digital Filters: difference equations and transfer functions, block diagram realizations, FIR and IIR systems. Central sum, central shift, partial fractional cascade effects on algorithms, aliasing effects and the bilinear transform, impulse invariant design vs. bilinear transform, FIR filters and windows. Frequency Domain in Methods: continuous system analogy, discrete Fourier transform, processing in the frequency domain, intro to FFT. Quantization Effects: signal quantization, coefficient quantization, arithmetic quantization, signal scaling and overflow.

Class 4, Credit 4 (Fall and Winter Quarters)

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


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 electrical machines. (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 computer techniques are studied and used, in laboratory, 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, EEE-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; normal and inverse modes; and JFETs and MOSTs in the saturation and triode regions. The following logic families are covered in considerable detail: RTL, PLD, 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 EEE-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 stressed 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, ROMS. Sequential circuits, flip flops, counters, shift registers, RAMS. Additional topics such as logic networks and the shift register 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 desirable)

Class 4, Credit 4 (Spring Quarter)

EEE-665 Microcomputer Systems I

Registration #0301-665 This is the introductory course dealing with the structure and operation of microcomputers. It includes descriptions of computer number systems and computer architecture and analyzes the major parts of a computer including the CPU, memory and I/O system. Computer instruction sets and addressing methods are discussed and then applied to the machine language and assembly language programming of computers. Software and hardware aspects of input/output are discussed along with consideration of special I/O interfaces. The course concludes with discussions of subroutine 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 micro- assemblers, editors, linkers, loaders, and other systems software aids used in microcomputer development systems to produce efficient modular code will be covered. Several aspects of software/hardware organization of input/output programs will be considered including interrupt and direct memory access. The use of special LSI interface devices to connect a microcomputer to peripheral devices such as A/D and D/A converters, CRT terminals, floppy disks, etc. will be studied. Lab experience in the use of software development systems, incircuit emulators, and logic analyzers 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 utilizing 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.
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 in 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-451 or concurrent registration for EEEE-531)
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 and test tool is stressed. An introduction to sampled data systems is given and the design of software compensation for digital controllers, based on z-plane and w-plane analysis, is discussed. (EEE-613)
Class 3, Lab. 1, Credit 4

EEE-621 Transmission Propagation and Waves (Applied Electromagnetic Theory)
Registration #0301-621
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 familiarize and review optical fundamentals but to introduce state of the art concepts and applications. Fundamental aspects of laser operation, lens system analysis, optical recording, 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 familiarize the engineer with the basic concepts involved in dealing with an ever-expanding field of applied optics, called fiber optics. Fundamental 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. Experiments and course projects will deal with the topics of fiber optic sensing and the way to the study of controlled and uncontrolled rectification and inversion. Class projects will be selected and will complement course content. (EEE-672)
Class 3, Lab. 3, Credit 4

EEE-675 Analog/Hybrid Computation
Registration #0301-675
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-301TR48 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, photoresist technology, wafer characterization, wafer cleaning, metal semiconductor fabrication, diffusion, silicon cell fabrication, MOS transistor fabrication, wire bonding and packaging. Each experiment 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 Z-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 design of quantization 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, equalization 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, amplifiers, matching networks, phase-locked loops and other RF systems. A course project is required. (EEE-442, EEEE-454, EEEE-472)
Class 3, Lab. 3, Credit 4
Graduate Courses in Electrical Engineering

The courses listed below are normally open to students who have been formally admitted into the graduate electrical engineering programs. Students with a baccalaureate degree in engineering or science may be permitted to enroll in any of these courses as non-matriculated students if they have already completed the stated prerequisites for a particular course. Undergraduate students may be permitted to take some of these courses as undergraduate technical electives provided they are in good academic standing and have already completed the prerequisites. The permission of the director of graduate studies is required for enrolling in these courses except in the case of matriculated graduate students.

EEEE-723 Semiconductor Physics
Registration #0301-723
An introductory course in semiconductor physics for engineering students. The emphasis in this course is semiconductor materials rather than semiconductor devices. Topics include band gap theory, equilibrium carrier concentrations, transport mechanisms, and shallow impurities and properties of silicon, GaAs, Ge and other semiconductors. Credit 4

EEEE-724 Physics of Semiconductor Devices
Registration #0301-724
A basic course dealing with the physics of semiconductor devices. Topics include evaporation, sputtering, epitaxial growth, diffusion, ion implantation, oxidation of silicon, photolithography, pattern generation, layout of silicon integrated circuits, transistors, MOS capacitors, isolation techniques, and in-process measurement and testing. (EEEE-723) Credit 4

EEEE-725 Physics of Semiconductor Devices II
Registration #0301-725
An intermediate level course in semiconductor device physics for engineering students. Limitations of bipolar and field effect transistors are studied. The physics of pn-pn devices, solid state optical devices, interface devices, and others are also discussed. (EEEE-724) Credit 4

EEEE-726 Analog IC Circuits
Registration #0301-726
A course in the analysis and design of bipolar and MOS analog integrated circuits. Topics include device models, amplifiers, current sources and active loads, output stages, operational amplifiers, and analog circuit design in MOS-LSI. Course will involve circuit design and computer simulation projects. Credit 4

EEEE-727 VLSI Design
Registration #0301-727
Design of very large scale integrated circuits at the level of Mead and Conway’s VLSI Design. Topics include MOS devices and circuits, n-channel MOS process, data and control flow in systematic structures, implementing integrated system design, system timing, and examples of LSI computer systems. (EEEE-724, -725) Credit 4

EEEE-728 IC Operational Amplifiers
Registration #0301-728
Analysis of operational amplifier circuits using the ideal op amp; development of circuit models to predict non-ideal op amp characteristics; study of feedback systems, stability (using Bode plots), and compensation; direct coupled amplifiers and operational amplifier design; interpretation of manufacturer specifications and basic applications with emphasis on practical aspects. (EEEE-442, -754, -755) Credit 4

EEEE-744 Advanced Microprocessor Systems Design
Registration #0301-744
The effective application of microprocessors in the design of digital systems requires a knowledge of both hardware and software. This course will develop an understanding of assembly language programming and hardware design techniques. The emphasis will be on instruction sets, microprocessors, addressing, interrupting, and memory access. The use of special LSIs interface devices to allow a computer to operate with peripheral devices such as A/D and D/A converters, CRT terminals, floppy disks, etc., will be studied. Laboratory sessions will be used to provide experience in the use of software development systems, and logic analyzers in developing and testing a microcomputer system design. (EEEE-665) Credit 4

EEEE-745, 746 Topics in Digital Systems Design
Registration #0301-745, -746
Topics will be selected on different aspects of digital systems design. Some of the proposed topics are signature analysis, bit slice processors, timing problems, reliable systems design, and designing for maintainability. (EEEE-650)
Credit 4

EEEE-747 Topics in Switching Theory
Registration #0301-747
A selection of topics on various theoretical aspects of switching circuits will be presented. Topics such as decomposition of combinational switching functions, experiments on sequential circuits, and regular expressions will be covered. (EEEE-650) Credit 4

EEEE-748 Microcomputers in Control and Instrumentation
Registration #0301-748
The use of microcomputers in process control and instrumentation to achieve intelligent industrial operations will be discussed. Topics include concepts of control, analog vs. digital controllers, sensors, A/D and D/A converters, digital vs. analog control, real-time systems, computer bus standards, and the local networks. Lab work may include temperature, pressure, and optical controllers, stepper motor controllers, and robotics control. (EEEE-744) Credit 4

EEEE-754 Analytical Techniques I
Registration #0301-754
Complex variable theory including conformal mapping; the Laurent expansion; residues; and the evaluation of contour integrals. The Nyquist stability criterion in the Laplace transform, its existence and convergence; use in the solution of differential equations; the transfer function and its properties. (EEEE-725) Credit 4

EEEE-755 Analytical Techniques II
Registration #0301-755
Fourier analysis; signal and power spectra; the Fourier transform related to the Laplace transform. The convolution integral; determinants and matrices; linear transformations; eigenvalues and eigenvectors; the solution of matrix differential equations; introduction to state variable approach for continuous and discrete systems. (EEEE-754) Credit 4

EEEE-756 Advanced Microprocessor Systems Design
Registration #0301-756
Vector analysis; Gauss’s law and Stoke’s theorem; curvilinear coordinates. Random variables. Probability densities and distributions; functions of random variables; moments; parameter estimation; statistical decision theory. (EEEE-754) Credit 4

EEEE-757 Network Theory
Registration #0301-757

EEEE-760 Practical R&D Management
Registration #0301-760
The course is intended to help engineers currently in industrial R&D management careers understand the concepts and practical aspects of project and organizational management and planning in R&D and environment. Topics to be discussed will include: objectives of industrial R&D, types of R&D organizations, selection of new products for development, long- and short-range planning, methods of project scheduling and control, communication within R&D, financial controls and budget preparation, proposal and report writing. The participants will be expected to carry out planning, organization and control of a simulated R&D project. Credit 4 (Offered upon sufficient demand)

EEEE-761 Modern Control Theory
Registration #0301-761
Review of state-space formulation of SISO systems; solution of state equations; STM and its properties. Applications of state-space concepts; state variable design. Multivariate systems: preliminaries; systems of least order; stability and control. (EEEE-764, -755, -613) Credit 4
EEE-762 Nonlinear Control Systems
Registration #0301-762
An introduction to the physical nature and mathematical theory of nonlinear control systems behavior using phase plane techniques, Liapunov theory (including Aizerman's method, variable gradient methods, and the Lure forms). Perturbation methods, describing function techniques, and Popov's criterion. Analysis of switching and relays. These are applied to both piece-wise-linear and analytical nonlinear systems. (EEE-761)
Credit 4

EEE-763 Stochastic Estimation and Control
Registration #0301-763
Stochastic control and optimization; estimation and filtering techniques such as Wiener filtering and Kalman filtering; stochastic stability; applications. (EEE-756, 761)
Credit 4

EEE-764 Digital Control Systems Design
Registration #0301-764
Introduction to the analysis and design of control systems in which microcontroller plays a principal role. Topics include: sampled data systems, Z and W-plane analysis and design, algorithm generation, and the effect of computer word length on noise and stability. The student will be expected to make use of the digital computer in the implementation of design procedures. (EEE-754, 755)
Credit 4

EEE-765 Optimal Control
Registration #0301-765
Introduction to calculus of variations: conditions of optimality; optimizing transient performance by statistical and variational procedures, dynamic programming and Pontryagin's maximum principle; design of optimal linear systems with quadratic criteria. (EEE-761)
Credit 4

EEE-767 Thyristor Power Control and Conversion
Registration #0301-767
The objective of this course is to provide an adequate, application-oriented knowledge to those interested in the areas of control, power, and power electronics. Topics to be discussed: preliminaries, basic principles of static switching, thyristor theory, triggering, commutations; rectifiers; principles of controlled rectification, analysis of single and three-phase controlled rectifiers; inverters; series and parallel SCR inverters, design of inverters, sine wave filters, forced commutated inverter, McMurray inverter; DC systems; principles of DC-DC conversion, choppers, DC motor control, single phase DC motor drives, three phase DC motor drives, dual converter; cyclo-converter; frequency conversion using SCR's phase-controlled cyclo-converter; cyclo-converter controls. Modeling and simulation of thyristor circuits; thyristor models; approximations, digital simulation of choppers, inverters and cyclo-converters, areas of further research. Demonstration experiments will be set up. Also individual projects by interested students will be encouraged.
Credit 4

EEE-772 Special Topics in Electrical Engineering
EEE-773 - 777
Topics and subject areas that are not among the courses listed here are frequently offered under the title of Special Topics. Such courses are offered in a normal format, that is, regularly scheduled class sessions with an instructor.
Credit 4 per course (No regular course schedule)

EEE-775 Optical Engineering I
Registration #0301-775
An introduction to the properties of optical components and their combination into systems, primarily from the geometrical point of view, but with reference to the wave nature of light where appropriate. Refraction and reflecting components. Radiation sources. Object-image relations. Stops and energy Ray tracing and matrix methods of analysis and design. Discussion of common optical devices and instruments.
Credit 4

EEE-776 Electro-optics
Registration #0301-776
An advanced treatment of optical systems through the use of Maxwell's equations describing light interaction will be considered. Lens systems, optical modulation, laser operation, optical detection and associated noise problems will be discussed. Classroom work will be complemented by demonstrations. (EEE-775, 471)
Credit 4

EEE-777 Optical Engineering II
Registration #0301-777
Credit 4

EEE-778 Fiber Optics
Registration #0301-778
The objective of this course is to educate the engineer in the applied optical fiber field. Fundamentals of the fiber waveguide are treated using geometrical optics and Maxwell's equations. Other topics include design criteria, practical coupling techniques, discussion of optical sources and detectors used in fiber optics systems. Applications to communications and other areas will be discussed. (EEE-775, 776, 777)
Credit 4

EEE-779 Digital Image Processing
Registration #0301-779
Introduction to digital image processing concepts, image digitization, 2D discrete Fourier transforms; topics on image enhancement including contrast equalization, false color displays; edge enhancement techniques; topics in image reconstruction to include causes of image degradation, deblurring procedures, and homomorphic filters; 3D image reconstruction from 2D projections. (EEE-754, 755)
Credit 4

EEE-780 Independent Study
Registration #0301-780
This course number should be used by students who plan to study a topic on an independent study basis. The student must obtain the permission of the appropriate faculty member before registering for the course.
Credit 4

EEE-781 Electromagnetic Fields
Registration #0301-781
Development of electromagnetic theory from basic postulates leading to Maxwell's equations in differential and integral forms. Solution of Maxwell's equations for the plane waves, transmission lines, waveguides, and antennas.
Credit 4

EEE-782 Boundary Value Problems
Registration #0301-782
Credit 4

EEE-783 Antennas and Antenna Systems
Registration #0301-783
Theoretical and practical characteristics of electromagnetic radiators. Equivalent circuits and radiating properties of antenna elements. Dipoles, slots, small loops, helical and dielectric radiators. Pattern analysis, primary and secondary patterns. Theory of phased antenna arrays, reflectors, and horns. (EEE-781)
Credit 4

EEE-784 Advanced Electromagnetic Engineering
Registration #0301-784
Time varying electromagnetic fields. Field theorems, propagation and reflection of plane waves, transmission theory, waveguides, resonators, radiation and diffraction. Microwave networks. (EEE-781)
Credit 4

EEE-785 Special Topics in Electromagnetic Theory
Registration #0301-785
Advanced and current topics in electromagnetic theory. Topics vary each time and may include: array theory, electromagnetic compatibility, numerical methods, propagation and radiation in ionized media, moving media, and random media. May be repeated for additional credit. (Permission of the instructor)
Credit 4
EIE-510, -511 Applied Statistical Analysis
Registration #0303-510, -511
An applied approach to statistics utilizing theoretical tools acquired in other math-stat courses. Heavy emphasis on understanding and applying statistical analysis methods in real-world situations in engineering. Topics include quality control, reliability, analysis of variance, and regression. (SMAM-351, 352) (F-510, Sp-511)
Class 4, Credit 4

EIE-520 Engineering Economics
Registration #0303-520
Time value of money, methods of comparing alternatives, depreciation and depletion, income tax consideration, replacement, retirement, and obsolescence, and capital budgeting. (F) (SMAM 351 or consent of instructor)
Class 4, Credit 4

EIE-530 Engineering Design
Registration #0303-530
A case study approach of ten real world experiences in engineering design. (consent of instructor) (W)
Class 4, Credit 4

EIE-560 Project Design
Registration #0303-560
A design course oriented to the solution of on-site industrial engineering problems. Each student group will attempt to define, analyze, design, and implement a solution to actual ongoing problems in the Rochester community. (consent of instructor) (Sp)
Class 4, Credit 4

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.

EIE-450 Applied Human Factors Design of Experiments
Registration #0303-450
An applied approach to the problem of how one goes about running a study or experiment in human factors. (EIE-511 or consent of instructor)
Class 4, Credit 4

EIE-482 Production Control I
Registration #0303-482
A basic course in production control emphasizing the systems approach. Topics covered include forecasting, mathematical inventory models, material requirements planning and scheduling including PERT. (EIE-511 or consent of instructor)
Class 4, Credit 4

EIE-483 Production Control II
Registration #0303-483
A design course in production control. Each student is asked to design, test, and implement a complete production control system for an operating plant. (EIE-482)
Class 4, Credit 4

EIE-504 Introduction to Operations Research III
Registration #0303-504
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. (EIE-401, 402 or consent of instructor)
Class 4, Credit 4

EIE-512 Reliability
Registration #0303-512
Concepts of reliability, basic failure laws, reliability measurement, structural analysis reliability; repair problems, surveillance problems, maintenance problem. (EIE-510, 511 or consent of instructor)
Class 4, Credit 4

EIE-540 Introduction to Operations Research IV
Registration #0303-540
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. (5th year I.E. standing or consent of instructor)
Class 4, Credit 4

EIE-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

EIE-550 Safety Engineering
Registration #0303-550
Familiarizes 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

EIE-625 Computer Aided Manufacturing I
Registration #0303-625
To introduce the area of Computer Aided Manufacturing (past, present and future). Emphasis will be placed on advantages/disadvantages, methods, applications and availability of current systems. Topics include Numerical Control Language, Group Technology, Flexible Manufacturing Systems, Robotics, Automatic Process Planning and Adaptive Control. (Consent of instructor)
Class 4, Credit 4

EIE-630 Computer Aided Manufacturing II
Registration #0303-630
To familiarize students in Industrial Engineering with the basic concepts and techniques needed to specify, design, and implement systems that are computer controlled. Emphasis is on real-time data acquisition and process control as related to Computer-Aided Manufacturing. Physical Simulations relate to real-world systems such as automated storage and retrieval systems, material handling systems, flexible manufacturing systems using robots. Topics include real-time programming, interface electronics, and microprocessor-based data acquisition systems and programmable controllers. (EIE-503, consent of instructor)
Class 3, Lab. 3, Credit 4

EIE-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.

EIE-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

EIE-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-701**  
**Registration #0303-601**  
**Value Analysis**  
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

**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

**EIEI-705**  
**Survey of Operations Research**  
Registration #0303-705  
A survey course designed to introduce the student to such topics as 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.
Credit 4

**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, computerized 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 Factors I**  
Registration #0303-730  
Credit 4

**EIEI-731**  
**Biotechnology and Human Factors II**  
Registration #0303-731  
Effect of mechanical and physical environment on human body systems. Performance of man. Design considerations to protect man against environmental effects (thermal, chemical, 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 Courses

**EMEM-201**  
**Introduction to Mechanical Engineering**  
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 #0304-331  
For students majoring in computer, electrical and industrial engineering. Statics and introduction to strength of materials. Newton's laws, the principle of transmissibility of forces, couples, centroids, trusses, frames, machines, 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  
This course is meant for students majoring in computer and industrial engineering. Topics include dynamics of particles and rigid bodies with an introduction to mechanical vibrations, kinematics and kinetics of particles and rigid bodies, work, energy, impulse momentum, and vibrations. Emphasis is on problem solving. (EMEM-331)
Class 4, Credit 4 (Sp)
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
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, Hooker's Law, axial loading, torsion, and bending stresses and deflections. (EMEM-336)

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

EMEM-338
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 2 (Sp, Su, F)

EMEM-340
Registration #0304-340
The objective of this course is to study advanced engineering graphics. The laboratory portion of the course is devoted to working drawings, shop processes, mechanical elements, tolerances and fits, assembly and detail drawings, and an introduction to computer graphics. (EMEM-201 or equivalent)

Class I, Lab. 2, Credit 2 (W, Sp)

EMEM-341
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
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 2, Credit 4 (F, W)

EMEM-344
Registration #0304-344
A study of the structure and 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/properties relationship in materials in service environments.

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

EMEM-349
Registration #0304-349
This is a basic course in the fundamentals of dynamics of particles and rigid bodies, with introduction to mechanical vibrations. Topics include kinematics and kinetics of particles and rigid bodies, work, energy, momentum, and vibrations. (EMEM-331)

Class 3, Credit 3 (T.B.A.)

EMEM-413
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-338)

Class 4, Credit 4 (F, W)

EMEM-414
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
Registration #0304-415
Physical characteristics of a fluid: density, stress, pressure, viscosity, temperature, heat transfer, compressibility. Descriptions of flows: Lagrangian and Eulerian; stream lines, path lines, streak lines. Classification of flows. Fluid Statics: hydrostatic pressure at a point, pressure field in a static fluid, manometry, forces on submerged surfaces, buoyancy, standard and adiabatic atmospheres. Flow fields and fundamental laws; the flux vector, systems and control volumes, Reynolds Transport theorem, integral control volume analysis of basic equation for stationary and moving control volumes. Inviscid Bernoulli and the Engineering Bernoulli equations; some applications. Incompressible flow in pipes; laminar and turbulent flows, separation phenomena. Dimensional analysis: Buckingham's Pi-theorem, similitude, model studies. (EMEM-308, EMEM-413)

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

EMEM-431
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
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)

EMEM-439
Registration #0304-439
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 collision are derived. Newton's three laws of planetary motion are used to derive Newton's Universal Law of Gravitation. The central force-field problems is thus defined, and problems involving satellite motion of satellites about the Earth are solved. (EMEM-336, SMAM-308)

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

EMEM-440
Registration #0304-440
The solution of 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)

EMEM-501
Registration #0304-501
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, temperature, pressure, flow rate, vibration, etc., and transient response of transducers. Introduction 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 3, Lab. 2, Credit 4 (Sp, Su)
Group I Courses

Elective courses that are offered at least once every three years:

EMEM-501 *0304-601 Alternative Energy Sources
Registration 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 utilization. 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-535 *0304-635 Heat Transfer II
Registration 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 utilization. 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-652 *0304-652 Fluid Mechanics of Turbomachinery
Registration 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 utilization. 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 (Sp, Su)

EMEM-600 *0304-660 Refrigeration and Air Conditioning
Registration 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 utilization. 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 (T.B.A.)

EMEM-672 *0304-672 Dynamics of Machinery
Registration 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 utilization. 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-694 *0304-694 Stress Analysis
Registration 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 utilization. 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 (Sp, Su)
Group II Courses

EMEM-620 Introduction to Optimal Design
Registration #0304-620
Introduction to some basic optimization techniques for engineering design with emphasis on actual applications in the work of mechanical design synthesis. Topics covered include: basic theory and techniques for optimization of engineering designs, with emphasis on the method of optimum design, geometric programming, method of Lagrangian multipliers, and the use of digital computers. Summary presentation of various optimization techniques. Many real problems and industrial examples are covered. Selection of factors for optimal design uses.

A knowledge of the fields of differential and integral calculus, physics, digital computer 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 Assemblies
Registration #0304-625
Purpose of the course is to study basic problems of creative design, to present explicit techniques for stimulating creative action in the work of mechanical design synthesis, and to illustrate applications of the same in real problem 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 and typical engineering applications are given with the ensuing 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-632 Advanced Mechanical Systems Design
Registration #0304-632
Procedures and techniques for designing a mechanical engineering system are presented and illustrated with many examples from professional practice. Process system flow charts, machine system flow charts, determination of functional requirements to meet system needs, conceptual design, optimal design, dynamic programming, and computerized design are topics specifically covered for systems related to open-ended design problems. Knowledge from basic mathematics and engineering science is integrated with intuitive thinking and the inclusion of practical effects in solving systems related design problems. The student is encouraged to work on an approved systems related open-ended project of his/her choosing. For students who have had EMEM-620 and/or EMEM-625, the systems related project is mandatory. (EMEM-437)
Class 4, Credit 4 (Sp)

EMEM-655 Thermal Fluid Design
Registration #0304-655
This course involves development in the student of a pragmatic approach to engineering design with particular emphasis in the area of thermo-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)

Elective Courses

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 the 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; rotaiting 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 projects 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-688 Patent Law and Protection
Registration #0304-688
A study of protection of intellectual property including study of patent rights, inventions, procedures for obtaining patents, and a study of the law and drafting techniques of patents and their claims. Insights to invention protection and legal ramifications of inventors' and attorney's activities will be included.
Class 4, Credit 4 (T.B.A.)

EMEM-692 Airfoil Design
Registration #0304-692
Partial differentiation, chain rule, and total derivatives; 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)
Offered upon sufficient demand (at least 12 students registered) to students wishing to enter the graduate program.

EMEM-650 Gas Dynamics
Registration #0304-650
An advanced course in compressible fluid flows. One-dimensional isentropic flows through a nozzle, normal shocks, moving shocks, shock tubes, supersonic nozzles, diffusers, wind tunnels, Oblique shocks and applications. Prandtl-Glauert expansion fan and reflections of shocks. Two and three-dimensional compressible flows. Theory of characteristics. Laminarized flows. Thin airfoil theory, supersonic nozzle design. (EMEM-518)
Class 4, Credit 4 (T.B.A.)

EMEM-651 Viscous Flows
Registration #0304-651
Class 4, Credit 4 (T.B.A.)

EMEM-669 Introduction to Water Pollution
Registration #0304-669
Hydraulic cycle; water supply requirements and sources; waste water generation and characteristics; chemical and biological treatment processes; waste water transport and hydraulics; thermal discharges; basic dispersion analysis for rivers, estuaries, and lakes.
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 to be studied from a "case study" standpoint 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 the 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-693 Thermo Fluid System Analysis
Registration #0304-693
Thermodynamic properties and processes, ideal and real gas, vapors and phases; laws of thermodynamics and selected power cycles; fluid statics; conservation of mass, momentum and energy. Bernoulli's equation; viscosity, loss of heat due to friction (flow through pipes), conduction, radiation, and diffusion. (EMEM-688)
Credit 4 (T.B.A.)
EMEM-897* 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-810 Introduction to Continuum Mechanics
Registration #0304-610
A rigorous basis for the study of advanced fluid mechanics and theory of elasticity is presented. Cartesian tensors. Analysis of stress and deformation. Motion of a continuous medium. Applications to theory of elasticity, thermoelasticity, viscoelasticity, and fluid mechanics. (EMEM-871)
Credit 4 (T.B.A.)

EMEM 811 Theory of Elasticity
Registration #0304-811
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. Navier and Levy solutions. Thermal stresses in plates. Membrane theory of shells, cylindrical shells, pressure vessels, and shells of revolution. (EMEM-885 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 gage instrumentation, photelastic methods, brittle coating, Moire 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. Utilization 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 820 Advanced Optimal Design
Registration #0304-820
Topics from nonlinear programming as applied to automated optimal design. Use of penalty functions for the transformation of constrained nonlinear optimization problems. Multivariate pattern and gradient based algorithms, such as the method of steepest descent. Newton's method, quasi-Newton methods, and generalized conjugate gradient techniques. Algorithms for the univariate subproblem of the line search. Applications to the solution of practical nonlinear optimization problems using the digital computer. Decomposition strategies for improving efficiency in the search process. (EMEM-871 and EMEM-874)
Class 4, 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, #0304-829
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 fluidized 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 Thermal Fluid Systems
Registration #0304-848, #049
Fluid Systems
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) (T.B.A.)

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) (T.B.A.)

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 landfilling, 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 (T.B.A.)

EMEM-872 Mechanics
Registration #0304-872
Advanced dynamics and vibrations are emphasized. 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. (EMEM-871)
Credit 4 (T.B.A.)

EMEM-873 Heat Transfer
Registration #0304-873
Formulation of the heat conduction equation, solution of the one-dimensional, steady heat conduction equation by separation of variables, Fourier series, Bessel functions. Solution of the two-dimensional, steady heat conduction equation; Cartesian and cylindrical geometry. Solution of some three-dimensional problems, unsteady problems. (SMAM-308, EMEM-814, EMEM-871)
Credit 4 (T.B.A.)

EMEM-874 Numerical Methods
Registration #0304-874
The course emphasizes 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 (T.B.A.)
EMEM-975 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 (T.B.A.)

EMEM-976 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 (T.B.A.)

EMEM-980 Research and Thesis Guidance
Registration #0304-880
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)

Special topics courses will be offered in the following areas if there is a sufficient demand.

Continuum Mechanics
Theory of Elasticity
Energy Methods in Mechanics
Advanced Vibration Theory
Lubrication
Advanced Heat Transfer
Advanced Thermodynamics
Advanced Fluid Dynamics
Control Systems
Thermal Stresses

Microelectronic Engineering

EMCR-210 Introduction to Microelectronics
Registration #0305-210
This course will provide the student with introductory and career information about the profession of microelectronic engineering.
Class 1, Lab. 2, Credit 2

EMCR-340 Integrated Circuit Technology
Registration #0305-340
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

EMCR-440 Linear Systems
Registration #0305-440
A study of time and spatial transform methods important to electrical and optical systems.
Class 4, Credit 4

EMCR-530 Electromagnetic Fields I
Registration #0305-530
A study of electrostatics and magnetostatics important to the understanding of physics of semiconductor devices and microelectronic processing.
Class 4, Credit 4

EMCR-540 Electromagnetic Fields II
Registration #0305-540
A study of time varying electromagnetic fields important to optical and electrical 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

EMCR-560 Device Physics
Registration #0305-560
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

EMCR-630 Microelectronic Chemistry IV
Registration #0305-630
A selection of topics from physical and plasma chemistry important to the understanding of integrated circuit processing.
Class 3, Lab. 3, Credit 4

EMCR-640 Microelectronics
Registration #0305-640
An intermediate level course in the study of integrated circuit processing.
Class 4, Credit 4

EMCR-650 Integrated Circuit Processing Lab
Registration #0305-650
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

EMCR-660 Seminar/Research
Registration #0305-660
An investigation of a problem in microelectronic processing. Seminars by experts from the various phases of the microelectronic industry.
Class 2, Lab. 6, Credit 4
Applications

College of Fine and Applied Arts

School of Art and Design

In September 1962, the Communication Design program name was changed to Graphic Design, and Environmental Design was changed to Industrial and Interior Design.

FADD-301, -302, -303  
Introduction to Graphic Design  
Registration #0403-301, -302, -303  
An introduction to the field of graphic design through explorations of formal and perceptual understanding and control. Deals with point, line, shape, color, pattern, organizational systems, Gestalt principles, dimension interaction and communication. The relationship of typography and photography to graphic design is included. (Foundation program or equivalent)

FADD-301, -302, -303  
Recommended pre-related courses include introductory photography, introductory typography, photomechanics, motion picture, and television. No special sequence required.

Lab. 6, Credit 3 (offered each year)

FADD-401, -402, -403  
Graphic Design (Junior Major)  
Registration #0403-401, -402, -403  
Creative problem solving experiences relating to visual communication imagery based on strong emphasis of formal design values and their utilization for the communication of ideas and information. Assignments oriented to basic knowledge of communication media areas such as print, typography, photography, etc. Media Center facility available for extension and application of studio experiences. (FADD-301, -302, -303 or equivalent)

Lab. 12, Credit 6 (offered each year)

FADD-411, 412, 413  
Graphic Design  
Registration #0403-411, -412, -413  
An elective providing the opportunity to carry on problem solving in graphic design. Each quarter concentrates on a specific design topic of study (such as design for reproduction, design of self-promotional material, or computer graphics)

Lab. 6, Credit 3 (offered each year)

FADD-501, -502, -503  
Graphic Design (Senior Major)  
Registration #0403-501, -502, -503  
Advanced creative problem solving experiences relating to visual communication imagery based on a strong emphasis of formal design values and their utilization for the communication of ideas and information. Assignments oriented to include thematic graphic design applications such as visual identity, signage, audio-visual, packaging or computer graphics.

Lab. 18, Credit 9 (offered each year)

FADD-650, -511, -512, -513  
Graphic Design  
Registration #0403-511, -512, -513  
A professional elective providing the opportunity to work in aspects of graphic design. Each quarter concentrates on specific topic of design study.

Lab. 6, Credit 3 (offered each year)

FADD-750, -520  
Professional Design Business Practices and Ethics  
Registration #0403-520  
Ethical principles will be discussed along with sound business practices; setting up in business; invoicing and costing; the designer and the law; professional associations.

Class 3, Credit 3 (offered each year)

FADD-301, -302, -303  
Industrial and Interior Design  
Registration #0403-301, -302, -303  
(Sophomore Core)  
An introduction to the fields of industrial and interior design. Emphasis on basic processes for design conceptualization and development.

301 - Graphic Visualization  
302 - Spatial Form  
303 - Object Form

Lab. 6, Credit 3 (offered each year)

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 of values to the designer.

Lab. 6, Credit 3 (offered each year)

FADD-401, -402, -403  
Industrial and Interior Design  
Registration #0403-401, -402, -403  
(Junior Major)  
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  
(Senior Major)  
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 - Design Methods  
502 - Furniture Design  
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)

FADD-201, 202, 203  
Design (Crafts Major)  
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)

FADD-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 2 (offered each year)

FADD-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)

FADD-221, 222, 223  
Design for Photo I  
Registration #0404-221, -222, -223  
Lectures in two- and three-dimensional applications

Class 1, Lab. 2, Credit 2 (offered each year)

FADD-231, 232, 233  
2-D Design  
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)

FADF-261, 262, 263  
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  
Registration #0404-321, -322, -323  
Emphasis upon problems which are related to visual phenomena, fundamentals, and communications.  
Class 1, Lab. 2, Credit 2 (offered each year)

FADF-330  
Registration #0405-330  
An elective providing the opportunity for exploration of personal expression through a painting medium.  
Lab. 6, Credit 3 (offered each year)

FADF-351, 352, 353  
Registration #0405-351, -352, -353  
An elective that provides further exploration of personal expressive styles through a painting media.  
Lab. 6, Credit 3 (offered each year)

FADF-450  
Registration #0405-450  
Study of traditional and contemporary means of developing form and space in drawing. Individual drawing projects exploring drawing as a conceptual tool or as a fine art medium.  
Lab. 6, Credit 3 (offered each year)

FADF-501, 502, 503  
Registration #0405-501, -502, -503  
The third year of advanced painting completing a major course of study in the fine arts. Concentrated studio production focused upon individual creative solutions. Individual and group presentations of work in an exhibition format is encouraged, as is the development of a visual portfolio of one's work. Advanced drawing incorporated into studio procedure.  
Lab. 10, Credit 9 (offered each year)
Ceramics Materials and Processes
FSCC-200
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 pot-
ttery and primitive firing techniques.
Lab. 6, Credit 3 (offered each year)

FSCC-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 prob-
lems. Mold-making, slip casting, lugging and decorative techniques. Ceramic
raw materials, sources of supply, use and maintenance of equip-
ment and glaze chemistry. 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 con-
struction. Materials and sources of supply. Development of bodies and
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 and 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 in-
cluding 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 aesthet-
ic 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 Symbol
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-350
Asian Art
Registration #0410-350
Survey of the art of India, China, and Japan in the areas of painting, printmak-
ing, sculpture, architecture and the crafts with emphasis on their impact
on contemporary artists/designer and craftsmen.
Class 3, Credit 3 (offered each year)

FSCF-360
16th & 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 on 20th century styles and focusing on their impact on the artist/ craft-
smen/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
Contemporary Art
Registration #0410-380
A study of the painting, printmaking, sculpture, architecture and crafts from
the present year to the 1980's with focus on the current American scene.
Class 3, Credit 3 (offered each year)

FSCF-390
Selected Topics
Registration #0410-390
Consideration of special art historical themes, areas, and topics not covered
in regular courses.
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 con-
struction of the glass studio, including the design and fabrication of furnaces,
annealing ovens, burners, tools, and grinding equipment. The function and use 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 molten glass. Basic principles of the cutting, shap-
ing, and polishing techniques.
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 elec-

tive 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:
slab bending, lamination, non-glass surface decoration, etching, sand blast-
ing, grinding, etc. The use of and maintenance of equipment, research pro-
jects, papers, and reports.
Lab. 15, Credit 5 (offered each year)

School for American
Craftsmen
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 #0412-400
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 and 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 #0412-500
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)

FSCW-200 Woodworking Materials and Processes
Registration #0412-200
Sequential course for three quarters, introducing basic exercises in the use of equipment and metalcrafts techniques through jewelry design and production in various metals. Fundamental techniques in hollow ware; raising, forming, and planning in copper, bronze, and brass. Discussion of design, materials, processes, and equipment.
Lab. 15, Credit 5 (offered each year)

FSCW-300 Woodworking Materials and Processes
Registration #0412-300
Sequential course for three quarters, introducing field trips. Lectures and research on decorative techniques. Independent study, papers, reports.
Lab. 15, Credit 5 (offered each year)

FSCW-400 Woodworking Materials and Processes
Registration #0412-400
Sequential course for three quarters, providing individual projects based on techniques presented in the second year. The survey of contemporary practices, including field trips. Lectures and research on decorative techniques. Independent study, papers, reports.
Lab. 15, Credit 5 (offered each year)

FSCW-500 Woodworking Techniques and Thesis
Registration #0412-500
Sequential course for three quarters, providing individual research in technical problems including a summarizing thesis.
Lab. 24, Credit 8 (offered each year)

FSCT-200 Textile Materials and Processes
Registration #0412-200
Lab. 15, Credit 5 (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, 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, teaching, and research. A final project on one extensively studied aspect of art education is required.
Lab. 25, Credit 3 (offered every year-Spring)

FADA-560 (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)
Registration #0402-750
Advanced creative problem solving experiences in graphic design imagery. Professional problems in visual techniques for communication media. Center facility available for extension of studio problems.
Lab. 6, Credit 3 (offered every quarter)

FADC-780
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)
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
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)
Registration #0405-750 (Major)
The study of the techniques and concepts of present day painting and its relation to the great sweep of the past for those who intend to paint and to teach.
Lab. 6, Credit 3 (offered every quarter)

FADP-780
Registration #0405-780 (Major)
The pursuit of the pertinent, the ecstatic, the beautiful, by a small group of those dedicated to the art. The student will become familiar with the trends and questings of modern painting, and by strengthening both intellectual and technical facilities, be prepared for a career as a professional painter.
The work leads toward the master's thesis.
Lab. 9-27, Credit 3-9 (offered every quarter)

FADP-751
Drawing Problems
Registration #0405-750 (elective painting major)
Individual drawing projects related to graduate students' major area of study. Opportunity to refine drawing skills on the graduate level.
Lab. 6, Credit 3 (offered each year)

Printmaking

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

FADR-780
Registration #0406-780 (Major)
Contemporary and historical printmaking concepts are presented as stimulant and provocation for the development of an individual approach to expression. Advanced techniques are demonstrated in intaglio, relief and lithography with resources available in non-silver photo processes, paper making and combinations. A complete understanding of the development and maintenance of the print studio is supportive for the professional artist.
The work leads toward the master's thesis.
Lab. 9-27, Credit 3-9 (offered every quarter)

Sculpture

FADS-750
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 plastic.
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 l
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 appropriate. Students will be asked 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 (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 (MFA Majors)
Registration #0408-785 Students will learn to plan, cost-analyze, and construct three dimensional illustrations for in-house presentation or for traveling displays. Practical experience will be gained in the problems of collaborating with clients, selecting appropriate display techniques and modes, and developing a manageable display.
Lab. 6, Credit 3 (offered each year)

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

Thesis
FAD (C, D, P, R, or M)-890 Research and Thesis Guidance (Major MFA only)
The development of a thesis project initiated by the student and approved by a faculty committee and the Graduate Academic Council representative. Primary creative production, the thesis must also include a written report.
Lab. 27, Credit 3-12 (offered every quarter)

FASA-790 Graduate Forum (Required for MFA)
The presentation and discussion of issues in aesthetics, criticism, creativity and perception as they relate to art, design and craft will be undertaken. Points of view will be clarified through critical writing. Required for MFA; to be taken prior to Thesis.
Class 2, Credit 3

School for American Craftsmen

Ceramics and Ceramic Sculpture
FSCC-750 (elective, minor) Ceramics and Ceramic Sculpture (MFA only)
Basic instruction and experience in ceramic design, fabrication and production of ceramic forms is undertaken. This study provides ceramic theory, design concepts and development of design awareness is encouraged through lectures and critiques.
Lab. 6, Credit 3 (offered each quarter)

FSCC-780 Ceramics and Ceramic Sculpture (Major)
Registration #0409-780 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 (MFA only)
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 (MFA only)
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 (MFA 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, copper 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 (MFA major)
Registration #0412-750 This is the study and manipulation of metals for hollow ware/jewelry. Design sensitivity and concepts are approached through the raising, forming and finishing of casting, forging, and fabricating techniques.
Lab. 6, Credit 3 (offered every quarter)

Weaving and Textile Design
FSCW-750 (elective, minor) Weaving and Textile Design (MFA Major)
Registration #0413-750 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 (MFA Major)
Registration #0414-750 A program structured on the basis of individual needs, interests and background preparation as they may be determined through faculty counseling. Techniques offered are combination weaves and pattern design, double weave, embroidery and stitchery, flem-techniques, expand the student's knowledge of applied design, strengthen perceptual and philosophical concepts and develop an individual mode of expression. 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 (Major MFA only)
Registration #0409(11, 12, 13 or 14)-890 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 and a thesis show.
Lab. 27, Credit 3-12 (offered every quarter)
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

**PPHB-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.

**PPHB-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, researchers, and staff personnel.
Class 1, Credit 1 (Spring Quarter only)

**PPHB-301, 302, 303** Biomedical Photography II
Registration #0901-301, -302, -303
Further study and practice of theory and principles used in biomedical photography, including photomicrography, photomicrography, hospital photography techniques, infrared and ultraviolet radiation, biological field studies.
Class 2, Lab. 10, Credit 5/Qtr.

**PPHB-331, 332, 333** Preparation of Biomedical Visuals
Registration #0901-331, -332, -333
Study of basic principles of effective visual communication and design. Students will produce a slide presentation and exhibition displays as well as anatomical demonstrations using cell animation techniques.
Lab. F-4, W-4, S-6, Credit 3/Qtr.

**PPHB-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

**PPHB-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.

**PPHB-551, 552, 553** Special Topics in Photography
Registration #0901-551, -552, -553
A seminar offered upon 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

PPHB-781 Medical Illustration Advanced Photography
Registration #0901-781
This study of photography is for the medical illustration major. It involves the study of sophisticated and creative applications of scientific photography 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.

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 interactive 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. 1/4 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, 1/4 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** Structuring the Moving Image and Conceptual 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 structured 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

*Selected courses for equal credit may be substituted with permission of the chairman.
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 straight 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 and production interpretation and expression with emphasis in the narrative film 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 use 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.

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

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 recording 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, storyline development, graphics design, camerawork, portable lighting, sound work and on-line insert editing. Lectures cover structure and visualization, how the electronic image is formed, displayed and recorded, audio mixing and editing. In-class critiques, outside readings and viewings supplement the practical work of the course.

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. 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 non-documentary due at the end of the quarter. (417 or permission of instructor)

Class 2, Lab. 4, Credit 4

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 and advanced editing, video art and image processing. Lectures include production budgeting, public television, 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 elements of dramatic construction. The exploration of fictional writing examines information gathering techniques and methods of investigation. Both non-fiction and fiction are treated as expository, storytelling forms. Students are responsible for writing film or television scripts on subjects of their own choosing and for completing several 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 kinetasia. 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 #0902-621
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

PPHF-541 Senior Production I

Registration #0902-541
(Film/Television)
Continuation of the introduction to business and legal factors begun in the basic film and Video Production activities. The course assists the student in detailing a number of shooting, script preparation and breakdown. Final project shooting begins in this quarter. (PPHF-413 or PPHF-419)

Credit 4

PPHF-542 Senior Production II

Registration #0902-542
(Film/Television)
Continuing the senior project shooting phase to completion. Production teams meet as sections with faculty whose experience matches the kind of production involved. (PPHF-541)

Credit 4
General Photography

PPHG-200 Registration #0903-200
An intensive 10-week summer course for students entering the transfer program in photographic illustration and professional photography. This is the minimum photographic education needed to gain entry to second-year standing and replaces PPHG-201, 202, 203. Since this course is such an intensive offering, some previous photographic experience is highly advisable.
Credit 12

PPHG-201, 202, 203 Registration #0903-201, -202, -203
A program in basic photography with emphasis on craftsmanship, theory, and visual communications. The major aim is to enable the student to form a broad foundation of understanding and skills necessary for advanced study in photography available in upper-class programs. The completion of this foundation year allows the student to select a more specific program culminating in the baccalaureate degree in photography.
Class 3, Lab. 12, Credit 7/Qtr.

PPHG-207, 208, 209 Registration #0903-207, -208, -209
Still Photography
A program in black-and-white photography for students who are not majoring in photography.
Class 1, Lab. 6, Credit 3/Qtr.

PPHG-210 Registration #0903-210
Materials and Processes of Photography
An intensive 10-week summer course for students entering the transfer program in technical photography, biomedical photographic communications, film and television, fine art photography, and professional photographic illustration. A basic study of the technology of photography, with emphasis on real photographic problems. Among the topics studied are image formation and evaluation, photosensitive materials, exposure, processing, tone reproduction, visual perception, color theory, variability, quality control, and photographic effects. An independent-study project is required. This course replaces PPHG-211, 212, 213.
Credit 6

PPHG-211, 212, 213 Registration #0903-211, -212, -213
Materials and Processes of Photography
A basic study of the technology of photography, with emphasis on applications to real photographic problems. Learning experiences include workshops, projects, demonstrations, lectures, discussions, and readings. Among the topics studied are image formation and evaluation, photosensitive materials, exposure, processing, tone reproduction, visual perception, color theory, variability, quality control, and photographic effects. An independent-study project is required.
Class 2, Lab. 1, Credit 3/Qtr.

PPHG-300 Registration #0904-300
Professional Photographic Illustration
A concentrated 10-week summer course for students entering the transfer program in photographic illustration. Students must have had previous photography, 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-311, 312, 313 Registration #0904-311, -312, -313
Photography II, BFA Transfer
History and Aesthetics of Photography
Covers 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-400, 401, 402, 403 Registration #0904-400, -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 printmaking techniques, may be utilized.
Class 2, Lab. 8*, Credit 4/Qtr.

PPHL-411, 412, 413 Registration #0904-411, -412, -413
Photojournalism I
A journalistic photography for mass media publication with emphasis on the development of specialized skills in projects dealing with various aspects of reporting 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 origin of material as well as the study of publications is explored.
Class 2, Lab. 8*, Credit 4/Qtr.

PPHL-421, 422, 423 Registration #0904-421, -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.
Class 2, Lab. 8*, Credit 4/Qtr.

PPHL-431, 432, 433 Registration #0904-431, -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 studio 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.
Class 2, Lab. 8*, Credit 4/Qtr.

PPHL-437, 438, 439 Registration #0904-437, -438, -439
Visual Communications Workshop
Primarily a photographic course, however, emphasis is placed on experimental approaches to communications. Visual and psychological aspects of media will be explored. This course presupposes a basic background in design, as well as in photography.
Class 2, Lab. 8*, Credit 4/Qtr.

*Lab hours may not be scheduled and are to be completed in available time.
Photographic Processing and Finishing Management

PPHM-201, 202, 203 Basic Principles of Photography
Registration #0905-201, -202, -203
The program of study is designed to provide photographic marketing students with a thorough knowledge of the basic photographic process in order that they may have an understanding of how photographic products work. The course will include units of study in film characteristics, lighting, optics, photographic chemistry, sensometry and color theory. Each of these will be related to the actual practice of photography.
Class 2, Lab. 6, Credit 4/Qtr.

PPHM-204 Orientation to Production Photographic Processing and Finishing
Registration #0905-204
This course is designed to provide the photo management freshman with an orientation to the facilities, equipment, practice and procedures of the Processing and Finishing Management Lab prior to having to assume responsibility of working in the lab. This course will also introduce the freshman to some of the basic problems of the processing and finishing industry. Prerequisite: freshman standing in the photo management program.
Credit 1 (Fall only)

PPHM-211, 212, 213 Introduction to Photofinishing Technology
Registration #0905-211, -212, -213
This course is designed to provide Photographic Processing and Finishing Management students with a thorough knowledge of the basic photographic process so that they will have an understanding of how photographic products work. Included will be units of study on film characteristics, optics, photographic chemistry, sensometry and color theory. Each of these areas will be related to the practice of picture making.
Class 2, Lab. 4, Credit 4/Qtr.

PPHM-300 Production Processing and Finishing
Registration #0905-300
A 10-week summer course which provides an opportunity for students who have completed basic photography to gain an understanding of all aspects of production processing and finishing. They will be involved with machine processing on a full production basis. A hands-on type of learning experience will be the method most often employed in this course. (Permission of the instructor)
Class 2, Lab. 30, Credit 12

PPHM-301, 302, 303 Production Processing and Finishing
Registration #0905-301, -302, -303
Provides an opportunity for photographic students to gain an understanding of the mechanical, electrical, electronic, chemical, and production concepts of automated processing and finishing. Students will be involved with automated processing and finishing on a full production basis. (PPHM-213, PPHS-203, or PPHG-213 and PPHG-203)
Class 2, Lab. 8, Credit 4/Qtr.

PPHM-310 Survey of Production Registration #0905-310
Provides the non-photographic processing and finishing major with an opportunity to become knowledgeable in the operational procedures and services of a processing and finishing laboratory (PPHM-203)
Class 2, Credit 2 (spring only)

PPHM-320, 321 Mechanics of Photographic Hardware
Registration #0905-320, -321
The course will cover causes, effects and benefits of the application of basic principles optics, mechanisms and electronics embodied in the type of hardware handled by retail and wholesale photographic establishments catering to the general public. (PPHM-203)
Class 4, Credit 4/Qtr. (winter and spring only)

PPHM-401, 402, 403 Photographic Process Control
Registration #0905-401, -402, -403
Statistical methods of studying repetitive processes, with special application to photographic processing; methods of obtaining data about processes, including chemical and physical factors; methods of making process adjustments, including automatic control methods. (PPHM-303 or PPHM-300)
Class 2, Lab. 6, Credit 4/Qtr.

PPHM-410, 411, 412 Training and Supervision
Registration #0905-410, -411, -412
Photographic Processing and Finishing Laboratory Personnel
Provides an opportunity for the processing and finishing management students to experience supervisory and training techniques as they prepare and use training aids and techniques in the actual supervision of the various work areas in the processing and finishing laboratory (PPHM-303 or PPHM-300)
Class 2, Lab. 8, Credit 4/Qtr.

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 photo. Procedures for obtaining employment, i.e., preparing resumes, taking interviews, plant visits, 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 industry. Prerequisite: senior standing.
Class three times a quarter for three quarters. Credit 1

*Lab hours may not be scheduled and are to be completed in available time.
PPHM-506 Theory of Corrective Color Printing
Registration #0905-505
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 used 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
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 or PPHM-300)
Lab. 12, Credit 4/Qtr.

PPHM-520 Operation, Care and Maintenance of Registration #0905-520
Photofinishing Equipment
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 teaching and 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)

PPHM-599 Independent Study Registration #0905-599
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

Professional Photography

PPHP-395 Photo Electronic Workshop
Registration #0906-395
An introductory hands-on course covering basic elementary electronic 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 problemsolving. Event timing, photo sensitizing, 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 competencies. Introductions to the problems of the art director, editor, layout person, and writer form the basis on the course content. (PPHP-303, PPHP or PPHL-313)
Class 2, Lab. 6*, 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 craftspeople 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-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-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 PPHP-406 to a greater depth on a seminar basis. (PPHP-406 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 #0905-521, -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 caliber which can include images in black-and-white or color. A knowledge of color harmonies and the ability to create images with exciting and effective color schemes comes from lectures, assignments, analysis of student projects and of contemporary work. The course is subdivided into the individual aspects of independent study with the advantages of shared class critiques, lectures and other professional related experiences. (PPHP-303 and PPHP-313, or PPHL-313 and permission of instructor)
Class 3, Lab. 4, Credit 4/Qtr.

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
An introduction to color harmony, use of "props," backgrounds, vignetting, candid wedding, bridal portraiture, full length, 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-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  Fundamental of Photographic Science I
Registration #0907-200
An intensive course presenting the subject matter normally taken by photographic science and instrumentation students during their first 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  Fundamental 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 data 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 analytic 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, sample 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 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  Research
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-305, 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 image 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 chairman of the Imaging and Photographic Science Dept.)
Class, Credit: variable

PPHS-599  Independent Study
Registration #0907-599
A student proposed advanced project sponsored by an instructor. Approval required by the department chairman and the director of the school. Available to upper level students with a G.P.A. of 3.0 or greater.
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. Includes 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)

Technical Photography

PPHT-301  Photographic Sensitometry  Registration #0920-301  Principles of sensitometric methods as applied to the selection and use of photographic emulsions. Problems in exposure, processing, densitometry, and data interpretation will be addressed. The characteristics of commercially available sensitometers and densitometers will also be reviewed. The laboratory work will consist of practical comparisons of currently marketed photographic materials upon which the student is required to prepare written reports.  Class 2, Lab. 3, Credit 3

PPHT-302  Technical Photographic Chemistry  Registration #0920-302  Theory and applications of developers, stop baths, fixers and washing, with emphasis on black-and-white and color processing for special effects and quality control. Laboratory will include experiments on selected subjects.  Class 2, Lab. 3, Credit 3

PPHT-303  Photographic Optics  Registration #0920-303  The principles of optics applied to photographic imaging systems. Object-image geometry and perspective, real and virtual images, using lens formulas, aperture stops and exposure, image quality, depth-of-field and focus, using cameras with other optical instruments, lens testing and evaluation. Field and laboratory work to illustrate principles.  Class 2, Lab. 3, Credit 3

PPHT-311  Color Photography/Design  Registration #0920-311  The exploration of images through the application of visual elements, principles and attributes, including the key and quality of light in the making of photographs, color contrast and rendition, and comparison of rendition from different materials.  Class 2, Lab. 4, Credit 4

PPHT-312  Color Printing/Theory  Registration #0920-312  The theory and practice of color photographic systems including the study of color vision, principles and photographic materials, with practice in printing from separation negatives, color negatives and transparencies. Topics include color analysis and synthesis, additive and subtractive systems, color measurement, the Ostwald, Munsell, and CIE color notation systems, illumination for color, color coupling, dye bleaching, instant color photography, masking, color scanners, color television, metamerism, visual effects, and permanence of color images.  Class 2, Lab. 4, Credit 4

PPHT-313  Color Measurement  Registration #0920-313  Study of the principle of the objective measurement of color with particular emphasis on the measurement of colored images for the purpose of evaluating both originals and reproductions. Topics include CIE and Munsell Color Systems, Tristimulus Integration, Uniform Color Spaces, expressions of color, color rendering properties of light sources and evaluation of color gamuts.  Class 2, Lab. 4, Credit 4

PPHT-411  Preparation of Visuals  Registration #0920-411  Layout and design techniques necessary for producing art for print (publication), slide visuals and television graphics. Hands-on experience with equipment and materials for producing type, including phototypesetter, Headliner, prepress-sensitive lettering. Black-and-white and color art techniques will be explored in assignments similar to those encountered in work situations. Attention will be given to a variety of photocopying techniques.  Class 2, Lab. 4, Credit 3

PPHT-412  High Magnification Photography  Registration #0920-412  Basic principles of photomacrography and photomicrography with major emphasis on illumination techniques and image formation, with lectures, demonstrations, and projects.  Class 2, Lab. 4, Credit 3

Master of Fine Arts in Photography

PPHG-701, 702  History and Aesthetics of Photography  Registration #0903-701, 702  Graduate Seminar  The course will survey the major issues throughout the development of the medium: (1st quarter) pre-history up to the 19th century; (2nd quarter) fin de siecle to present.  Credit 3/Qtr.

PPHG-705, 706  Graduate Seminar  Registration #0903-705, 706  The seminar provides an opportunity for all MFA students to develop a sense of community and to openly discuss matters of concern, to discuss each others' photographs, to meet with visiting artists on campus and to participate in a thesis sharing from time to time.  Credit 2/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.
**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
- Winter

**PPRM-210** Financial Controls I
- Registration #0910-210
- Gives the line manager an understanding of a company's financial accounting system so that he or she can work with the accounting group to use the system effectively. Includes preparation of balance sheet, income statements, organization of accounts, review of problem areas for management and governmental accounting requirements.
- Class 4, Credit 3
- Winter

**PPRM-301** Application of Computers to the Graphic Arts
- Registration #0910-301
- An introduction to basic concepts of the computer, its hardware, and software. Computer programming using BASIC language will be emphasized as a problem-solving technique. Application of computers to the graphic arts industry as well as the impact of computers in society will be stressed.
- Class 4, Credit 3
- Winter

**PPRM-302** Personnel Relations I
- Registration #0910-302
- An introductory study of human relations in the printing industry, emphasizing the personnel management aspects of a supervisor's job. Students study problems of individual behavior and how workers are affected by organizational influences. Case analysis is used extensively.
- Class 3, Credit 3
- Winter

**PPRM-310** Industrial Organization and Management
- Registration #0910-310
- An introductory level course which includes such main topic headings as management fundamentals, planning, controlling, organizing, the behavioral environment and managerial adaptation to changing circumstances. Although some emphasis is put on newspaper industry applications, the fundamentals apply to all organizations.
- Class 3, Credit 3
- Winter

**PPRM-401** Estimating I
- Registration #0910-401
- Introductory course in current estimating practices; the development of hourly costs and production rate standards; costs of materials and outside services; one-color offset and flat sheet bindery operations; introduction to flat sheet imposition and pre-planning techniques; overview of cost accounting and pricing theory as they apply to the printing industry. (PPRT-311, PPRM-210)
- Class 4, Credit 4
- Winter

**PPRM-402** Estimating II
- Registration #0910-402
- Continuing study of sheet-fed offset lithography estimating; obtaining and interpreting specifications; design and use of estimating forms; pricing for a profit margin; preparing quotations; multi-color offset presses and signature-related bindery operations; signature imposition; camera, layout, stripping and plate processing production standards; phototypesetting and mechanical artwork costs; the application of the computer to estimating procedures. (PPRT-301, PPRM-401, PPRT-312)
- Class 4, Credit 4
- Winter
PPRM-403 Printing Production Management I
Registration #0910-403
Examines the non-technical functions of production as components of a system, emphasizing organizational alternatives relating to human factors. Includes such topics as organization, 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

PPRM-404 Printing Production Management II
Registration #0910-404
Explores certain analytical models which can be used practically in an ordinary printing company. Includes such topics as decision theory, probability concepts, mathematical modeling, break-even and economic-order analysis under conditions of certainty and uncertainty, linear programming using computer, Markov chains, waiting line analysis, game theory, simulation. These topics are considered from a conceptual and problem solving viewpoint 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 analyses and the management control process. (PPRM-210)
Class 4, Credit 4

PPRM-503 Business Law
Registration #0910-503
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 implementation of computer estimating systems. The class will work as a systems design team with each student required to research, design, code, debug, and document an algorithm for a specific printing operating that will run within the framework of the overall system design. Classroom lectures will focus on the implementation of 1978 ANSI BASIC on business microcomputers, the CP/M operating system, data structures, disk file handling techniques, and the creation of good error handling sub-routines. (PPRM-402, a working knowledge of BASIC, and willingness to undertake a non-trivial programming project)
Class 4, Open Labs, 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 describe real existing company situations involving price, product or equipment decisions. Students analyze situations; prepare, present and defend arguments for specific course of action.
Class 4, Credit 4

PPRM-510 Personnel Relations II
Registration #0910-510
Principles of operations management are studied from the viewpoint of the first-line supervisor.
Class 4, Credit 4

PPRM-511 Labor Relations in Graphic Arts
Registration #0910-511
History and background for organized labor movement; makeup and characteristics 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 industry. Wage issues, fringe issues, and such concepts as seniority, discipline, grievance procedures, and managerial prerogatives are considered.
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 various types of salespeople and their roles in the sales process. Includes negotiation, personal selling, marketing and promotion, market research and public relations.
Class 4, Credit 4

PPRM-514 Newspaper Management
Registration #0910-514
Consideration of personnel, organization, finance, maintenance, advertising, circulation, and other sources of revenue as they pertain to the metropolitan 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 rights granted the graphic arts industry, especially those involving free speech under the First Amendment as well as the First Amendment plus the limitations of libel, obscenity, and pornography.
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 of performing them in various company situations.
Class 4, Credit 4

PPRM-517 Purchasing in the Graphic Arts
Registration #0910-517
A management, or management related, course used to present and investigate 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/quarter

PPRM-518 Special Topics--Printing
Registration #0910-518
A management or management related course used to present and investigate 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/quarter

PPRM-551 Senior Seminar
Registration #0910-551
Consideration of related graphic arts areas not normally covered in regular courses; consideration of recent and possible future developments in technology, management, and scientific applications, and their implications and probable effects on the industry.
Class 2, Credit 2

PPRM-599 Independent Study
Registration #0910-599
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

Technical Courses

PPRT-200 Introduction to Printing
Registration #0911-200
Introduction to printing for packaging science students; study of different printing processes; analysis of process advantages and disadvantages relative to a variety of applications; examination of procedures for each process, from design through finished product; practice of the 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
Typographical 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 typesetting, laboratory projects in setting composition photographically and in hot metal, utilization of various input systems.
Class 2, Lab. 3, Credit 3

PPRT-203 Layout and Printing Design
Practical application of theory relating to typography and ideas developed 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 alphabfenic, pictorial, and related graphics and their interpretation into printing techniques, procedures, and materials. Emphasis on offset lithography for consumer products and institutional printed literature.
Class 2, Lab. 3, Credit 3

PPRT-204 Flexography
Introduction to the principles and practice of the flexographic printing process. Discussion of the elements of flexographic technology from artwork through plates, inks and presswork. Lab work centers on plate mounting, ink formulation and presswork. Students print on a variety of presses and substrates. Course serves as an introduction to the newest major printing processes in the graphic arts.
Class 2, Lab. 3, Credit 3

PPRT-205 Gravure Printing
Introduction 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
A basic course in the fundamental principles, procedures, techniques, and applications of the photographic process as it relates to the production of film negatives or film positives for the major printing processes.
Class 2, Lab. 3, Credit 3

PPRT-207 Printing Plates
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 principles that are applicable to the plate image-forming process; laboratory work that deals with plate processing variables; also an introduction to recent development in printing plate technology.
Class 2, Lab. 3, Credit 3

PPRT-208 Lithographic Press
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
Theory and practice of screen printing covering areas such as: frames, fabrics, stretching of fabrics, stencil methods, fillers, squeegees, 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
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
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, silhouette cropping, "windows," 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
Emphasis is put upon finished typographic problems. Topics included in lectures are typographic movements, design concepts, analysis of current type of basic practices, private presses, and bookmaking. The lab work is designed to present interesting and challenging problems to the serious student of typography.
Class 2, Lab. 6, Credit 4

PPRT-302 Composition Systems
Detailed study of photocomposition with emphasis on systems approach; introduction to use of computers in composing rooms, and operation of specialized equipment.
Class 2, Lab. 3, Credit 3

PPRT-303 Layout and Printing Design
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-306 Tone Reproduction Photography
The photographic process and its relation 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.
Class 2, Lab. 3, Credit 3

PPRT-308 Lithographic Press Problems
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.
Class 2, Lab. 6, Credit 4

PPRT-309 Advanced Screen Printing
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 running of automatic cylinder screen printing press and container press capable of printing cylindrical, conical and flat objects.
Class 2, Lab. 3, Credit 3

PPRT-310 Advanced Image Carriers
Advanced study of technological requirements involved in producing letterpress and flexographic plates and gravure cylinders. Extensive laboratory program involves devoted to molded rubber platemaking for flexography, photopolymer plates for both letterpress and flexography and both flat plate and cylinder imaging for gravure. Gravure cylinder imaging is done chemically and with the use of the Helio-Klischograph.
Class 2, Lab. 6, Credit 4

PPRT-311 Planning and Finishing
The course is designed to teach the understanding of printing production planning from design to finishing. Topics include preparing production specifications for image assembly, printing and finishing. Laboratory experiments cover the operation of modern, including some computerized, bindery equipment to provide real world experiences. Problems solving projects are followed through with economical and quality considerations. Students learn how to implement modern tools, evaluate materials and test the physical structure of bound products.
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 as well as color work. Roomlight contact and duplicating films are prepared by students as needed throughout the course. Projects in stripping line, halftone, complementary flats, split-page layout, spreads and chokes, fake color and process color are assigned, also an eight page book layout is to be ruled-out on latest model line-up tables. Electronic and automated pre-press imaging systems and emulsion stripping are presented in form of slide lectures.
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; pasteup techniques, methods of pre-separation mechanicals, "keyline" mechanicals, use of photographic and typographic copy. Relation to production is stressed by sheething copy on camera, stripping and proofing, proper instructional specification writing. (PPRT-203)
Class 2, Lab. 6, Credit 4

PPRT-314 Advanced Flexography
Registration #0911-314
An advanced course in the principles and practices of the flexographic printing process. Expanded lab time allows students to get into greater depth in all phases of flexographic technology. Students perform all operations necessary to print a large variety of substrates on all lab presses. (Prerequisite 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 broad-edged pen to develop primary forms of Italic, Roman Capitals, and Uniccial letter styles and the evolution of letter forms. Consideration of historical origins of letters, use of basic tools, understanding of methods and disciplines stress.
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 equipment; 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 newspapers.
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 offset 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 Marderstieg 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
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-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.
Graduate Courses

Master of Science in Printing Technology

**PPRT-702**
Registration #0910-702
Discussion of printing requirements in relation to computer system configurations; applications of computers to management and production control problems; investigation of computer-oriented production control techniques. (PPRM-301)
Credit 4

**PPRT-701**
Registration #0911-701
Theory and application of principles of laboratory oriented research in the graphic arts; analysis of research techniques, interdisciplinary relationships, conditions for technology transfer and synergism; status of research and organization of literature including patents, illustrations of techniques and research programs and methods followed in various research situations; systematic study of scientific methods including induction, deduction, hypothetical-deduction, hypothesis formation, theory development, etc.
Credit 4

**PPRT-702**
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-704**
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, hypothesis testing, multiple comparisons, analysis of variance, and applications of applied statistics to graphic arts.
Credit 4

**PPRT-708**
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**
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**
Registration #0911-711
Instrumentation and methods for process optimization and in-process control of graphic arts production procedures and the associated quality assurance programs.
Credit 4
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 1-4

Research Projects

PPRT-850
Registration #0911-850
An experimental survey of a problem area in the graphic arts.
Credit 8

PPRT-890
Registration #0911-890
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-713
Registration #0911-713
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.
Credit 4

PPRT-722
Registration #0911-722
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)

Criminal Justice

GCJC-201
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
Registration #0501-203
A survey of the field of criminal justice 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
Registration #0501-204
Introduction to Public Administration
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 also the criteria and/or standards by which law enforcement agencies may be evaluated or improved administratively. (GCJC-203) (GCJC-303)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-207
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 mental state, 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 Law Enforcement in Society
Registration #0501-303
The social and historical origins of the various police systems, police culture, role and career, police in the legal system, social and legal restraints on police practices, police discretion in practice; police and the community, police organization and community control mechanisms. (GCJC-201)
Class 3, Credit 4 (offered annually)

GCJC-304 The Judicial Process
Registration #0501-304
Judicial process is designed to provide the student with an overview of the structure and function of the Federal and State Court systems. Emphasis will be placed on the relationship between the Federal and State Courts, judicial review, judicial decision making, and the Courts as interpreters of constitutional rights. (GCJC-201)
Class 3, Credit 4 (offered annually)

GCJC-306 Introduction to Paralegals
Registration #0501-306
The course deals with criminal and civil law, matrimonial law, legal research, with special reference to utilization of data and the field of criminal justice. The course will consist of 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 and in 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 all preservice criminal justice students. The course is designed to give the student firsthand experience in the field of criminal justice in an appropriate organization which meets the needs of the student's career objectives. Students will be closely supervised at selected organizations developing their pre-professional skills while learning the organization's programs and methods. The student also will be required to attend a seminar which will run concurrently with field work. Field Experience I and II can be taken as two consecutive quarters in conjunction with Field Research or students may take Field Experience I and II in one quarter.
Class variable, Credit 4 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)

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 management 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
Survey of the philosophy and history of civil disobedience, civil disobedience as a political tactic, differentiation between civil disobedience and "ordinary crime," civil disobedience and "non-criminals," 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-414 White Collar Crime
Registration #0501-414
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)
Evidence and Process

GCJC-508 Registration #0501-506
Evidence
This course is designed to provide the student with an awareness of what types of evidence are admissible 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 illegal obtained evidence. (GCJC-201)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-510 Registration #0501-510
Counseling in the Criminal Justice System
This course is designed to instruct the student in the various, accepted contemporary dynamics of interrogating 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 Registration #0501-511
Alternatives to Incarceration
The course analyzes possible sentencing options available to the criminal courts as well as non-traditional 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 lectures from non-traditional programs are typically included in the course. (GCJC-207)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-512 Registration #0501-512
Minority Groups and the Criminal Justice System
This course will examine the role traditionally attributed to the members of minority groups as criminals and analyze their interaction with the criminal justice system. We are focusing 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-203, 203)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-514 Registration #0501-514
Planning and Change in the Criminal Justice System
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 intensely scrutinize the prospective shape of the criminal justice system. (GCJC-401)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-516 Registration #0501-516
Court Administration
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 courts 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 Registration #0501-517
Comparative Criminal Law
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, repression and punishment, methods of trial, punishment and pardon. (GCJC-201)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-518 Registration #0501-518
Police/Community Relations
This course focuses the importance of the police role in the 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 Registration #0501-520
Sentencing Process
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 method of punishment now available in the courts, including, but not necessarily restricted to: fines, imprisonment, 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 Registration #0501-522
Victimless Crime and the Law
This 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. This course addresses the moral, legal and practical consequences of normalizing such activities are examined and evaluated. (GCJC-201, 203, 301)
Class 3, Credit 4 (offered on sufficient demand)

GCJC-523 Registration #0501-523
Crime and Violence
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 Registration #0501-525
Institutional Security
This 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 Registration #0501-526
Seminar in Law Enforcement
A critical analysis of some of the current issues, problems and concerns in the area of law enforcement; emphasis on basic police functions as they relate 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 Registration #0501-527
Advanced Criminal Law
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 Registration #0501-528
Etiology of Crime
This course is a comprehensive survey of the sociological, psychological, and psychiatric views of the etiology of crime and other forms of deviant behavior. With major emphasis on the sociological forms of explanation, the course will undertake a historical review of criminality theory and progress to present-day concerns of both etiological and epidemiological origins. (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, are also examined. (GCJC-2011)
Class 3, Credit 4 (offered annually)

GCJC-530 Women and Crime
Registration #0501-530
This course will deal with women as criminal offenders and as victims of crime, focusing upon theories about women in crime, types of crimes committed, patterns of criminality, and the treatment of women offenders. The course, also, will examine the role of women as law enforcement officers, judges, lawyers, and correctional officers in the criminal justice system.
Class 3, Credit 4 (offered annually)

GCJC-531 Emergency and Disaster Planning
Registration #0501-531
This 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 audits, 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-535 Security Management
Registration #0501-535
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)

GCJC-536 Seminar in Security
Registration #0501-536
The 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 Wilful torts including: false arrest and imprisonment; nuisance; defamation; and invasion of privacy.
Class 3, Credit 4 (offered on sufficient demand)

GCJC-541 Field Research
Registration #0501-541
Through lecture, discussion, and activities associated with a field research project, the techniques and methods of data collection and analysis are presented. Students will acquire the skills necessary to conduct criminal justice research in field settings and the ability to prepare a formal research/evaluation report. The required research projects typically include data gathering and coding procedures, entry of the data to a file on the VAX/VMS, the use of application software (e.g. SPSS, MINITAB, DATA PLOT), and preparation of a final report. (GCJC-401)
Class variable, Credit 4 (offered annually)

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 "micro-computer." (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)

GSWS-210 Social Work: Structure and Function
Registration #0516-210
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. (GSWS-302, or concurrent)
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. (GSWS-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. Focus is on the gradual modification of social policy in order to provide the student with a basic understanding of the evolution of programs and services to meet the changing needs of people. Traces the development of the social work profession and its response to the changing needs of society. (GSWS-210 or concurrent)
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 various communities, the disabled, the 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 leadership, group processes, (prevention, rehabilitation), group development, composition, group processes (problem solving, decision-making, affecion), programming, leadership, communication, structure, and modes of intervention are covered. The course provides the knowledge base for the 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 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 different 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, 311, 321, 356, or concurrent) Class 4, Lab. 4, Credit 4

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

GSWS-413 Intervention Strategies
Registration 0516-413
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-421 and 433) Field 300, Credit 5

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

GSWS-433 Supervisory Process
Registration 0516-433
A seminar taken during the first term of field placement. Topics include staff structure, group 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-421, 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-534 Research Methods
Registration 0516-534
Introduction to the methodology of research in behavioral and social sciences. Stress is placed on the use of theoretical concepts, formulation of hypotheses, collection of data, measurements, statistics, tests and evaluation. Instruction and practical demonstration are provided in techniques ranging from simple case studies to computer utilization. (GSWS-210) (Usually taken after Field Placement) 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, 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 the 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. (GSSP-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 variables of drug, 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
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
Registration 0516-320
This course presents the chemistry of alcohol and its effect on the body and mind as well as its symptoms, addiction and withdrawal. The study of normal and abnormal personality development and the psychological and social mechanisms of alcohol use and alcoholism in society are emphasized. Class 3, Credit 4
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
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<tbody>
<tr>
<td>GSWS-321</td>
<td>Alcoholism: Interventive Skills and Techniques</td>
<td>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)</td>
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<td>Class 3</td>
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<tr>
<td>GSWS-322</td>
<td>Alcoholism: Rehabilitation Modalities and Community Resources</td>
<td>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)</td>
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<td>Class 3</td>
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<tr>
<td>GSWS-330</td>
<td>Rural Social Services</td>
<td>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 poor 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.</td>
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<tr>
<td>GSWS-340</td>
<td>Fundamentals of Deafness</td>
<td>The purpose of this course is to provide the student with a basic understanding of deafness. This overview includes an historical perspective, techniques and roles 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.</td>
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<td>Class 3</td>
<td>Credit 4</td>
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<tr>
<td>GSWS-341</td>
<td>Psychosocial Implications of Deafness</td>
<td>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)</td>
</tr>
<tr>
<td>Class 3</td>
<td>Credit 4</td>
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</tr>
<tr>
<td>GSWS-342</td>
<td>Intervention Strategies with the Deaf</td>
<td>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)</td>
</tr>
<tr>
<td>Class 3</td>
<td>Credit 4</td>
<td></td>
</tr>
<tr>
<td>GSWS-357</td>
<td>Mental Health and Mental Illness from a Social Work Perspective</td>
<td>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)</td>
</tr>
<tr>
<td>Class 3</td>
<td>Credit 4</td>
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</tr>
<tr>
<td>GSWS-360</td>
<td>Social Work with the Disabled</td>
<td>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.</td>
</tr>
<tr>
<td>Class 3</td>
<td>Credit 4</td>
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</tr>
<tr>
<td>GSWS-370</td>
<td>Child Protective Services</td>
<td>&quot;If the only tool you have is a hammer, then you tend to treat every problem as if it were a nail.&quot; The same statement reversed, &quot;If you see your problem as a nail, then the only tool you can use is a hammer,&quot; 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.</td>
</tr>
<tr>
<td>Class 3</td>
<td>Credit 4</td>
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</tr>
<tr>
<td>GSWS-380</td>
<td>Social Work and the Law</td>
<td>The main purpose of the legal orientation of the 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)</td>
</tr>
<tr>
<td>Class 3</td>
<td>Credit 4</td>
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<tr>
<td>GSWS-431</td>
<td>Social Work Management</td>
<td>Management of a social work agency is a complex and multi-faceted position. This course focuses on many of the knowledge, attitudes and skills 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 for-profit sector.</td>
</tr>
<tr>
<td>Class 3</td>
<td>Credit 4</td>
<td></td>
</tr>
<tr>
<td>GSWS-432</td>
<td>Supervision in Social Work</td>
<td>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.</td>
</tr>
<tr>
<td>Class 3</td>
<td>Credit 4</td>
<td></td>
</tr>
<tr>
<td>GSWS-455</td>
<td>Contemporary Issues in Social Work</td>
<td>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 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.</td>
</tr>
<tr>
<td>Class 3</td>
<td>Credit 4</td>
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</tr>
<tr>
<td>GSWS-509</td>
<td>Services for Children and Their Families</td>
<td>This course is designed to give social-work students a beginning knowledge of social-work services to children and their families. The development of each type of service will be discussed as well as the reasons why each service is needed and for what type of situation. The social worker's role in each area will also be considered.</td>
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<tr>
<td>Class 3</td>
<td>Credit 4</td>
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</tr>
<tr>
<td>GSWS-512</td>
<td>Advanced Intervention with Individuali</td>
<td>This course builds upon the methods sequence knowledge base and develops students' understanding of the specific ways in which these concepts and theories are applied in social casework intervention with individuals and families. Use will be made of case studies and role-play situations to further develop the students' skills in this area. (GSWS-415, 422, and 434)</td>
</tr>
<tr>
<td>Class 3</td>
<td>Credit 4</td>
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</tr>
<tr>
<td>GSWS-513</td>
<td>Advanced Intervention with Families</td>
<td>This course is for students who have completed Field Placement where it is assumed that they have learned the theories and concepts of generic social work intervention. This course builds on that knowledge base and develops the students' understanding of the specific ways in which these concepts and theories are applied (GSWS-215, 415, 422, 434)</td>
</tr>
<tr>
<td>Class 3</td>
<td>Credit 4</td>
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</tbody>
</table>
### Liberal Arts Courses

#### Language and Literature

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Registration</th>
<th>Credits</th>
<th>Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLLC-220</td>
<td>English Composition</td>
<td>#0502-220</td>
<td>3</td>
<td>Offered quarterly</td>
</tr>
<tr>
<td>GLLC-440</td>
<td>Human Communication</td>
<td>#0502-440</td>
<td>3</td>
<td>Offered annually</td>
</tr>
<tr>
<td>GLLC-441</td>
<td>Small Group Communication</td>
<td>#0502-441</td>
<td>3</td>
<td>Offered annually</td>
</tr>
<tr>
<td>GLLC-442</td>
<td>Persuasion</td>
<td>#0502-442</td>
<td>3</td>
<td>Offered annually</td>
</tr>
<tr>
<td>GLLC-443</td>
<td>Writing and Thinking</td>
<td>#0502-443</td>
<td>3</td>
<td>Offered annually</td>
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</table>

#### Advanced Intervention in Communities

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Registration</th>
<th>Credits</th>
<th>Offered</th>
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</thead>
<tbody>
<tr>
<td>GSW-522</td>
<td>Advanced Intervention in Communities</td>
<td>#0516-522</td>
<td>3</td>
<td>Offered annually</td>
</tr>
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</table>

#### Independent Study

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Registration</th>
<th>Credits</th>
<th>Offered</th>
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</thead>
<tbody>
<tr>
<td>GSW-599</td>
<td>Independent Study</td>
<td>#0516-599</td>
<td>3</td>
<td>Offered annually</td>
</tr>
</tbody>
</table>

### Advanced Intervention with Groups

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Registration</th>
<th>Credits</th>
<th>Offered</th>
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</thead>
<tbody>
<tr>
<td>GSW-523</td>
<td>Advanced Intervention with Groups</td>
<td>#0516-523</td>
<td>3</td>
<td>Offered annually</td>
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### Grantwriting

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<th>Credits</th>
<th>Offered</th>
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</thead>
<tbody>
<tr>
<td>GSW-525</td>
<td>Grantwriting</td>
<td>#0516-525</td>
<td>3</td>
<td>Offered annually</td>
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### Mass Communication

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Registration</th>
<th>Credits</th>
<th>Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLLC-514</td>
<td>Mass Communication</td>
<td>#0502-514</td>
<td>3</td>
<td>Offered annually</td>
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### Effective Speaking

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Registration</th>
<th>Credits</th>
<th>Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLLC-501</td>
<td>Effective Speaking</td>
<td>#0502-501</td>
<td>3</td>
<td>Offered annually</td>
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</table>

### Uses and Effects of the Mass Media

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Registration</th>
<th>Credits</th>
<th>Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLLC-515</td>
<td>Uses and Effects of the Mass Media</td>
<td>#0502-515</td>
<td>3</td>
<td>Offered annually</td>
</tr>
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</table>

### Creative Writing

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Registration</th>
<th>Credits</th>
<th>Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLLC-518</td>
<td>Creative Writing</td>
<td>#0502-518</td>
<td>3</td>
<td>Offered annually</td>
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</table>

### College Vocabulary Skills

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Registration</th>
<th>Credits</th>
<th>Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLLC-520</td>
<td>College Vocabulary Skills</td>
<td>#0502-520</td>
<td>3</td>
<td>Offered annually</td>
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### Intercultural Communication

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Registration</th>
<th>Credits</th>
<th>Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLLC-521</td>
<td>Intercultural Communication</td>
<td>#0502-521</td>
<td>3</td>
<td>Offered annually</td>
</tr>
</tbody>
</table>

### Advanced Creative Writing

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Registration</th>
<th>Credits</th>
<th>Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLLC-519</td>
<td>Advanced Creative Writing</td>
<td>#0502-519</td>
<td>3</td>
<td>Offered annually</td>
</tr>
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### German I

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Registration</th>
<th>Credits</th>
<th>Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLLC-530</td>
<td>German I</td>
<td>#0502-530</td>
<td>3</td>
<td>Offered annually</td>
</tr>
</tbody>
</table>

### German II

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Registration</th>
<th>Credits</th>
<th>Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLLC-531</td>
<td>German II</td>
<td>#0502-531</td>
<td>3</td>
<td>Offered annually</td>
</tr>
</tbody>
</table>
The course concentrates on literature by women and about women primarily from the early nineteenth century to the present. The course considers the aspirations, frustrations, and achievements of women as documented by themselves, as well as the perceptions and representations of women in literature by male writers. Works are examined for their literary value as well as their documentation of broader feminist issues. 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-480 Women in Literature
Registration #0504-480
The course concentrates on literature by women and about women primarily from the early nineteenth century to the present. The course considers the aspirations, frustrations, and achievements of women as documented by themselves, as well as the perceptions and representations of women in literature by male writers. Works are examined for their literary value as well as their documentation of broader feminist issues. This course is part of the Literature Concentration and may also be taken as an elective.

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)
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
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<tbody>
<tr>
<td>GLLL-494</td>
<td>Religion and Literature</td>
<td>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)</td>
</tr>
<tr>
<td>GLLL-501</td>
<td>Speculative Fiction</td>
<td>Speculative fiction is a survey course in contemporary literature presenting conjectural views of man, his world, his society and his beliefs. Some attention is given to the historical development of the genre but the major areas of concern are the ideas presented by writers publishing in the last ten years. Class 3, Credit 4 (offered annually)</td>
</tr>
<tr>
<td>GLLL-503</td>
<td>Great World Drama</td>
<td>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)</td>
</tr>
<tr>
<td>GLLL-504</td>
<td>Shakespeare: Comedy and History</td>
<td>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)</td>
</tr>
<tr>
<td>GLLL-505</td>
<td>The American Spirit in Literature</td>
<td>This is a survey of the development of American philosophy through the study of the selected works from the colonial period through the mid 19th century. Particular attention is given to the ideas of the writers under consideration and their effect on modern American thought. Class 3, Credit 4 (offered annually)</td>
</tr>
<tr>
<td>GLLL-508</td>
<td>Literary Symbol in Short Fiction</td>
<td>Emphasis is on defining literary symbolism and in recognizing the 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)</td>
</tr>
<tr>
<td>GLLL-515</td>
<td>Contemporary American Novel</td>
<td>The course will cover American fiction written after World War II. Works by contemporary American writers will be examined, with special emphasis being placed on these writers' relation to contemporary American culture. Class 3, Credit 4 (offered annually)</td>
</tr>
<tr>
<td>GLLL-516</td>
<td>Literature and Society</td>
<td>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)</td>
</tr>
<tr>
<td>GLLL-517</td>
<td>Literature of the Bible</td>
<td>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)</td>
</tr>
<tr>
<td>GLLL-522</td>
<td>Mark Twain and the American Dream</td>
<td>The course will consist of readings from the bittercomic writings of the last part of Twain's career, focusing on his philosophy of total determinism, his disenchantment with the &quot;demned human race&quot; and its institutions of government, his trust in and later disillusionment with industrialism, and his romantic nostalgic desire to return to an idyllic pre-civil War existence. Class 3, Credit 4 (offered annually)</td>
</tr>
<tr>
<td>GLLL-524</td>
<td>Contemporary Film</td>
<td>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)</td>
</tr>
</tbody>
</table>
GSHF-214 Fine Arts: Musical Arts
Registration #0505-214
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 quarterly)

GSHF-215 Fine Arts: Film Arts
Registration #0505-215
This course will develop ability to view analytically and evaluate the film arts, both still and moving (motion) pictures, through consideration of their technologies, histories, aesthetics and critical writings.
Class 3, Credit 4 (offered quarterly)

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.
Class 3, Credit 4 (offered quarterly)

GSHF-442 Music in the United States
Registration #0505-442
A survey of music in the United States from the time of European colonization 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.
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 analyze 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.
Class 3, Credit 4 (offered annually)

GSHF-444 American Painting
Registration #0505-444
A survey of the style and meaning in American paintings from the colonial limners to contemporary artists. It will center on what distinguishes painting of the colonies and of the United States from its European counterpart. This course is part of the American Artistic Experience Concentration and may also be taken as an elective.
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 1650 to the present. This course is part of the American Artistic Experience Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSHF-446 American Film
Registration #0505-446
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.
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 by 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)

Science and Humanities

GSHF-213 Fine Arts: Visual Arts
Registration #0505-213
The course will develop ability in perceiving worth in objects of art through consideration of fundamental concepts in painting, sculpture, and architecture, involving analysis, interpretation and principles of aesthetics.
Class 3, Credit 4 (offered quarterly)
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Description</th>
<th>CreditHours</th>
<th>Registration Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSHF-509</td>
<td>Impressionism to Analytical Cubism</td>
<td>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)</td>
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<tr>
<td>GSHF-512</td>
<td>Master Drawings Since the Renaissance</td>
<td>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)</td>
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</tr>
<tr>
<td>GSHF-513</td>
<td>Oriental Art</td>
<td>The life and work of one of the most influential artists of our century.</td>
<td>Class 3, Credit 4 (offered annually)</td>
<td></td>
</tr>
<tr>
<td>GSHF-514</td>
<td>Cubism to the Present</td>
<td>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 occasionally)</td>
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<tr>
<td>GSHF-519</td>
<td>Rembrandt Van Rijn: His Art and Times</td>
<td>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)</td>
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<tr>
<td>GSHF-520</td>
<td>Picasso</td>
<td>The life and work of one of the most influential artists of our century.</td>
<td>Class 3, Credit 4 (offered annually)</td>
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</tr>
<tr>
<td>GSHF-524</td>
<td>Music Theory I</td>
<td>A course designed for the student who has basic musical literacy (ability to read music notation). In addition to the writing of melody, two-part counterpoint and four-part harmony, some attention will be given to the analysis of form and style. Class 3, Credit 4 (offered occasionally)</td>
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<tr>
<td>GSHF-525</td>
<td>Major Symphonies</td>
<td>A non-specialized humanistic approach to the understanding of the people, ideas, and times during which major musical compositions were created. Class 3, Credit 4 (offered occasionally)</td>
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</tr>
<tr>
<td>GSHF-526</td>
<td>Twentieth Century Music</td>
<td>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 jazz. Class 3, Credit 4 (offered annually)</td>
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<tr>
<td>GSHF-527</td>
<td>Orchestral Music</td>
<td>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)</td>
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<tr>
<td>GSHF-528</td>
<td>Romanticism in Music</td>
<td>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)</td>
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<tr>
<td>GSHF-530</td>
<td>Art and Human Values</td>
<td>Offered as a non-specialized course offering the student the opportunity to examine specific works of art and music against the background of ideas and concepts that influenced and animated the life of its times. Class 3, Credit 4 (offered annually)</td>
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<tr>
<td>GSHF-532</td>
<td>African Tribal Art</td>
<td>A course offered in the Tribes of the Great Lakes and the Plains, focusing on the unique artistic expressions of these indigenous cultures. Class 3, Credit 4 (offered occasionally)</td>
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<tr>
<td>GSHF-534</td>
<td>Renaissance and Baroque Art</td>
<td>This course examines the stylistic development of painting in Europe from 1420 to 1660. The Renaissance style will be analyzed and studied through the works of painters, with emphasis placed on stylistic evolution through the 15th century and the classical synthesis created in the high Renaissance. Mannerist and Early Baroque paintings will be discussed from the point of view of the Renaissance style to investigate concepts of stylistic continuity, evolution, and change. Paintings will also be discussed within their cultural and political contexts. Class 3, Credit 4 (offered occasionally)</td>
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<tr>
<td>GSHF-536</td>
<td>Music and the Stage</td>
<td>This course will survey the development of opera and the American musical theatre, highlighting representative works, composers, librettists, and performers. Class 3, Credit 4 (offered occasionally)</td>
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<tr>
<td>GSHH-301</td>
<td>History: Modern American</td>
<td>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)</td>
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<tr>
<td>GSHH-302</td>
<td>History: Modern European</td>
<td>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)</td>
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<tr>
<td>GSHH-440</td>
<td>United States: Its People and Its Institution</td>
<td>This course examines 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 also be taken as an elective. Class 3, Credit 4 (offered annually)</td>
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<tr>
<td>GSHH-441</td>
<td>20th Century American Diplomatic History</td>
<td>An examination of the major events and forces which shaped American diplomacy during the 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. Class 3, Credit 4 (offered annually)</td>
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<tr>
<td>GSHH-442</td>
<td>The Contemporary Middle East</td>
<td>#0507-442</td>
<td>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)</td>
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<tr>
<td>GSHH-443</td>
<td>European Social and Intellectual</td>
<td>#0507-443</td>
<td>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)</td>
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<tr>
<td>GSHH-444</td>
<td>European Diplomatic History, 1871-1945</td>
<td>#0507-444</td>
<td>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)</td>
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<tr>
<td>GSHH-445</td>
<td>Modern Latin America</td>
<td>#0507-445</td>
<td>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)</td>
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<tr>
<td>GSHH-480</td>
<td>History of American Women</td>
<td>#0507-460</td>
<td>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)</td>
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<tr>
<td>GSHH-483</td>
<td>Christianity in the West</td>
<td>#0507-483</td>
<td>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)</td>
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<tr>
<td>GSHH-508</td>
<td>History of England</td>
<td>#0507-508</td>
<td>A political and constitutional history of England from the Anglo-Saxon period to the present. Class 3, Credit 4 (offered on sufficient demand)</td>
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<tr>
<td>GSHH-514</td>
<td>Race and Society</td>
<td>#0507-514</td>
<td>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)</td>
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<tr>
<td>GSHH-516</td>
<td>The Middle Ages and the Rise of Europe</td>
<td>#0507-516</td>
<td>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)</td>
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<tr>
<td>GSHH-519</td>
<td>United States-Latin America Diplomatic Relations</td>
<td>#0507-519</td>
<td>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)</td>
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<tr>
<td>GSHH-520</td>
<td>Crime, Violence, and Urban Crisis</td>
<td>#0507-520</td>
<td>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. The course will be a comparative study on America's and the world's problems of violence, crime, and urban crisis. Class 3, Credit 4 (offered annually)</td>
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<tr>
<td>GSHH-524</td>
<td>The Italian American Experience</td>
<td>#0507-524</td>
<td>This course examines the history and culture of the Italian Americans from the colonial period to the present. Stresses their role in the arts, business, politics, the Church, and the labor movement. Italian history is studied as it relates to the Italians in America. Class 3, Credit 4 (offered annually)</td>
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<tr>
<td>GSHH-526</td>
<td>The United States and The Third World Revolutions</td>
<td>#0507-526</td>
<td>The course will be a comparative study on the historical development of the Hispanic and Portuguese areas of the Americas from independence to the present. 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)</td>
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<tr>
<td>GSHH-528</td>
<td>The History of Popular Culture in America</td>
<td>#0507-528</td>
<td>American myths, icons, heroes, and institutions as represented in American popular culture from the late nineteenth century to the present. 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)</td>
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<tr>
<td>GSHH-529</td>
<td>Military History</td>
<td>#0507-529</td>
<td>An analysis of the causes and nature of war. Class 3, Credit 4 (offered on sufficient demand)</td>
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<tr>
<td>GSHH-530</td>
<td>19th Century American Diplomatic History</td>
<td>#0507-530</td>
<td>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)</td>
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<tr>
<td>GSHH-531</td>
<td>Black Experience in America</td>
<td>#0507-531</td>
<td>Examine the history of Blacks in America, treating the subject primarily from a social and cultural perspective. Studies the impact of White on Black Americans and describes the contribution of Blacks to the development of the United States. Class 3, Credit 4 (offered annually)</td>
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<tr>
<td>GSHH-532</td>
<td>Civil Liberties in American History</td>
<td>#0507-532</td>
<td>The course will teach the history of civil liberties in America. Emphasis will be placed on the critical state of civil liberties. Students will make philosophical as well as historical analyses of cases. Class 3, Credit 4 (offered annually)</td>
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<tr>
<td>GSHH-536</td>
<td>History of Mexico</td>
<td>#0507-536</td>
<td>The historical development of Mexico including the colonial period, independence movement, the liberal-conservative class, and the revolution of 1910. Class 3, Credit 4 (offered alternate years)</td>
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<tr>
<td>GSHH-538</td>
<td>Social Justice and the Constitution</td>
<td>#0507-538</td>
<td>This course will examine 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)</td>
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<tr>
<td>GSHH-540</td>
<td>Selected Problems in Black History</td>
<td>#0507-540</td>
<td>A seminar approach to the thought of key black leaders (Washington, Garvey, King) and the study of the civil rights and black power movements. Class 3, Credit 4 (offered occasionally)</td>
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GSHH-541 Modern Germany
Registration #0507-541
A study of Germany in the 19th and 20th centuries. This course will begin with the unification of Germany in 1871 and trace the political evolution of the nation to the present. Special emphasis will be placed on the rise of Nazism. Pertinent social and cultural factors will be considered as well.
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 the nature of these "revolutionary" movements, it is hoped that the student will come to an understanding of the historical perspective and nature of the social discontent in Latin America.
Class 3, Credit 4 (offered annually)

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, intellectual, technological and scientific perspectives of man's development from prehistoric times to the present. The course is partially based on the television series The Ascent of Man created and narrated by J. Bronowski.
Class 3, Credit 4 (offered annually)

GSHH-551 Social History of 18th Century England
Registration #0507-551
Students will study the emergence of the modern English society in the 18th century and the conflict this caused with the pre-existing traditional culture.
Class 3, Credit 4 (offered occasionally)

GSHH-552 History of the World Since 1945
Registration #0507-552
World backdrop for American foreign policy and relations from 1945 to the present, dealing with the Greek Civil War, the Chinese Civil War, the Korean War, the American assumption of Western leadership in the Cold War, economic warfare, the Cuban crisis, war in Southeast Asia, the roles of Presidents from Truman to Reagan, detente, multinational business, the press, and crises in the Middle East. Background is developed for decisions of the 1980's.
Class 3, Credit 4 (offered occasionally)

GSHH-553 The United States Since World War II: Patterns in Recent American History
Registration #0507-553
An analysis of the major themes characterizing post World War II United States history. The course aims to investigate the specific characteristics of America as a modern state. Selected themes will have an intellectual, cultural and political history focus.
Class 3, Credit 4 (offered annually)

GSHH-554 China and Japan in the 20th Century
Registration #0507-554
An examination of social, political, economic, and intellectual developments of China and Japan in the 20th Century with an analysis of how these two Asian powers have reached their respective significant status in the contemporary world.
Class 3, Credit 4 (offered annually)

GSHH-555 The History of the Soviet Union
Registration #0507-555
A study in depth of the Bolshevik revolution, the rise of Stalin, industrialization and collective under Krushchev and his successors, and current developments in the Soviet Union.
Class 3, Credit 4 (offered annually)

GSHH-556 The Renaissance World
Registration #0507-556
A thematic study of the Renaissance in Europe from 1300 to 1600. The course explores the art, literature, philosophy, society and institutions of the Renaissance which have contributed to the renewal of the western culture and heritage.
Class 3, Credit 4 (offered occasionally)
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 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-484 Environmental Legislation, Regulation, and Enforcement
Registration #0508-484
Public compliance with environmental regulations has become increasingly complicated as a result of many laws and regulations instituted since the mid-1960's. The purpose of this course is to study the consequences of major environmental legislation and regulations and to examine the actions of both citizens and the corporate sector as they comply with these laws. The course will also focus on the value, economic, and social implications of environmental regulation, enforcement, and will identify current developments in the area. This course is a concentration course in 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)

GSHN-506 Space, Time and Reality
Registration #0508-506
In this course we learn the conceptual development of the 20th century theories of time and space with major emphasis on their applications in the present decade. These views, which grew out of the rigorous, mathematical logic of relativity theory and quantum theory, represent one of the most profound revisions of intellectual thought in human history. We learn how any vestige of an absolute frame of reference in space and time, and how cause and effect and strict determinism were demolished and how probability was introduced by means of these theories.
Class 3, Credit 4 (offered occasionally)

GSHN-507 Community Energy Planning
Registration #0509-507
This course is designed to allow the student to understand the concepts underlying community energy self-reliance, how to analyze a community's energy supply and consumption, and how to evaluate possible energy futures for a community based as much as possible on conservation and alternative energy strategies.
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)

GSHN-440 Philosophy of Religion
Registration #0509-440
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)

GSHP-441 Logic
Registration #0509-441
An introduction to the basic principles of logic. The main emphasis will be on symbolic or formal logic, but some attention may be paid to informal logic as well. This course is part of the Philosophy Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSHP-442 Aesthetics
Registration #0509-442
This course will introduce students to thinking philosophically about the nature of art and its relation to other human experiences. Among the topics considered will be: the aesthetic experience, the relation between morality and art, ugliness in art, and truth in art. This course is part of the Philosophy Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSHP-443 Social and Political Philosophy
Registration #0509-443
An examination of the nature of the scientific enterprise; possible discussion topics include the presuppositions of science, its logic, its claims to reliability, and its relationships to society and to problems of human values. This course is part of the Philosophy Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSHP-444 The Great Thinkers
Registration #0509-444
This course will introduce the student to the thought of some of those philosophers who have been most influential in the history of ideas. An attempt will be made to cover in some depth the works of one or more of these "great thinkers." It is hoped that the student will begin to recognize the enduring nature of some of our most pressing problems, as well as the intellectual foundation of proposed solutions. This course is part of the Philosophy Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSHP-445 Social and Political Philosophy
Registration #0509-445
An examination of some of the main problems of social and political philosophy through an analysis, comparison and critical examination of various views concerning the natures of individuality and society, the relations between them and the dependence of one on the other. This course is part of the Philosophy Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

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-515 Philosophy of Law
Registration #0509-515
An introduction to philosophical analysis centering on the nature, extent and justification of law, the nature of legal thought, and the problems and theories of justice.
Class 3, Credit 4 (offered annually)

Social Science

GSSA-210 Cultural Anthropology
Registration #0510-210
This course is a study of the nature, method, and scope of human culture—the patterns of thought and behavior with which mankind makes decisions, criticisms, choices, and judgments in order to satisfy the needs of life and experience.
Class 3, Credit 4 (offered quarterly)
GSSA-483
The Anthropology of Religion
Registration #0510-483
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 primitive and peasant societies. This course is part of the Perspectives of Religion Concentration and may also be taken as an elective.
Class 3, Credit 4 (offered annually)

GSSA-503
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 homogeneous society. The primary emphasis in the course will be involvement of 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
Registration #0511-210
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 economic problem, economic foundations of American capitalism, the marginal principle and efficient choice, supply and demand, national income accounting, models of income determination, the role of government in the economy, money and the banking system, unemployment, and inflation.
Class 3, Credit 4 (offered quarterly)

GSSE-440
Urban Economics and Public Policy
Registration #0511-440
Urban economics is the application of economic analysis to spatial relationships in densely populated (urban) areas. The first part of the course develops economic models which explain the location behavior of consumers and businesses in cities. The second part of the course is issue-oriented, applying insights gained in the first part to a number of urban problems. This course is part of the Economic 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-441
Economics of Human Resources
Registration #0511-441
The microeconomic study of human resources encompasses aspects of human involvement in the production and distribution of goods and services. Topics include labor force participation, economics of employment discrimination, primary and secondary education, higher education, distribution of income and wealth, poverty and income maintenance, manpower planning, and microeconomic analysis of the work/leisure decision. 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
Registration #0511-442
This course aims to prepare the student to deal with foreign exchange market, international trade decisions, the macroeconomic 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
Registration #0511-443
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 macroeconomics, 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
Registration #0511-444
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. (0511-210 or 0511-301 & 0511-302 or equivalent)
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. Though 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)

GSSE-482
Intermediate Price Theory
Registration #0511-520
Intermediate Price Theory develops the tools of analysis utilized in contemporary economics to study the process of price formation in a capitalist society. Topics covered in the course include the theories of consumer behavior, cost and production, alternative market structures, and the pricing of factors of production. (0511-302 or equivalent)
Class 3, Credit 4 (offered occasionally)

GSSE-483
Intermediate Macroeconomic Theory
Registration #0511-521
The central question of macroeconomics is the determination of output, employment and prices. This course develops models which incorporate behavioral assumptions concerning consumption, investment, and the role of money and their relationship to macroeconomic variables. (0511-301 or equivalent)
Class 3, Credit 4 (offered occasionally)

GSSE-484
International Trade and Finance
Registration #0511-522
This course introduces the students to the theory and the practical issues of the export-import markets, the international flow of capital, and international investment decisions. In addition, the students study the foreign exchange and the Eurodollar markets and the investment opportunities in them. The role of multi-national corporations in international trade and finance is also discussed. (0511-210 or 0511-301 & 0511-302 or equivalent)
Class 3, Credit 4 (offered occasionally)

GSSE-485
Monetary Analysis and Policy
Registration #0511-523
This course is the study of monetary behavior and the role of monetary institutions in the modern economy. The course will cover the development and current characteristics of monetary institutions in the American economy, and the use of the tools of monetary analysis to evaluate alternative monetary policies. The course will conclude with an evaluation of the Keynesian and Monetarist positions. (0511-210 or 0511-301 or equivalent)
Class 3, Credit 4 (offered occasionally)
This course is the study of the structure, conduct, and performance of contemporary American industry. The course involves the application of the tools of microeconomic analysis and empirical evidence to aid in understanding the behavior of modern industry. In addition the course considers the historical determinants of contemporary market structure and the public policy measures designed to preserve a competitive market structure. (0511-302 or equivalent)

Class 3, Credit 4 (offered occasionally)

GSSM-211 American Politics Registration #0513-211
This course is a study of the American national political system, its theoretical foundations and institutions, and the contemporary issues which confront it.

Class 3, Credit 4 (offered quarterly)

GSSM-215 Ideology and the Political Process Registration #0513-215
This course examines major ideological concepts and how these are operationalized through the political processes of various governmental structures.

Class 3, Credit 4 (offered quarterly)

GSSM-441 Politics in China Registration #0513-441
This course is designed to provide the students with the political dynamics of the People's Republic of China. Major emphasis will be given to the historical background, major aspects of the political system, and the foreign relations of China. 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-442 Government and Politics of the USSR Registration #0513-442
This course examines various aspects of the Soviet political system with particular emphasis on the communist party apparatus, governmental institutions, political leadership and contemporary issues in the USSR. 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-443 Foreign Policy of the Soviet Union Registration #0513-443
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-444 The Cold War Registration #0513-444
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 #0513-450
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 course 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
This course is an examination of the foreign policies of 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-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 is paid to the governmental structure, current leadership, and major issues of public policy of those selected political systems under review.

Class 3, Credit 4 (offered annually)

GSSM-510 Comparative Politics Registration #0513-510
This course provides a mode of analysis for the study of political systems. Basic concepts of political science are utilized to present a descriptive and analytical examination of various political systems that can be classified as Western by the political philosophers, and an inquiry into the major political ideologies.

Class 3, Credit 4 (offered annually)

GSSM-514 Theories of Political Systems Registration #0513-514
An examination of the major political, social, and economic developments affecting the United States in the 20th century. Emphasis is paid to the governmental structure, current leadership, and major issues of public policy of those selected political systems under review.

Class 3, Credit 4 (offered annually)

GSSM-523 Political Parties & Voting Registration #0513-523
Political parties are a crucial part of the Democratic process. Parties serve as a critical link between citizens and their Government, as parties promote policies favored by their voters. This course studies parties: their history, their future and their role in the Democratic process. Its overall emphasis is on the degree to which parties perform, or fail to perform, as links between citizens and Government.

Class 3, Credit 4 (offered annually)

GSSP-210 Introduction to Psychology Registration #0513-210
This course is designed to introduce the student to the scope and methodology of psychology. Topics will include: aims and methods, sensation and perception, learning and memory, emotion and motivation, normal and abnormal personality, and social psychology.

Class 3, Credit 4 (offered quarterly)
Human Growth and Development

Registration #0514-440
This course explores human development from conception through adolescence. The developmental approach provides the opportunity to integrate many areas of psychological research such as cognition, personality, perception, social interaction and moral development as they apply to human development. This course is part of the Human Growth and Development Concentration and may also be taken as an elective. (0514-210 or equivalent)
Class 3, Credit 4 (offered annually)

GSSP-441 Growth Psychology

Registration #0514-441
This course examines the major assumptions, theories and implications of "growth" or humanistic psychology. In the course, students will study human beings as dynamic, complex creatures who shape themselves and their world through the choices they make each day and whose best hope for realizing their individual and collective potential is an accurate understanding of what human persons need to grow psychologically and what societal conditions seem to foster such growth. This course is part of the Human Growth and Development Concentration and may also be taken as an elective. (0514-210 or equivalent)
Class 3, Credit 4 (offered annually)

GSSP-442 Psychology of Adult Life

Registration #0514-442
This course encompasses the psychology of the span of life from young adulthood through the middle years. The developmental approach, presented in an interdisciplinary framework, provides a systematic orientation to the study of individuals during early adulthood. This course is part of the Human Growth and Development Concentration and may also be taken as an elective. (0514-210 or equivalent)
Class 3, Credit 4 (offered annually)

GSSP-443 Learning and Memory

Registration #0514-443
The course focuses on the environmental forces that are responsible for the outcome of human development. It studies how learning shapes and changes individuals almost from the moment they are born and how it continues to be all pervasive throughout their lives. It examines the complexity of memory process, which is an essential element of learning and learning theories and their applications in real-life situations. This course is part of the Human Growth and Development Concentration and may also be taken as an elective. (0514-210 or equivalent)
Class 3, Credit 4 (offered annually)

GSSP-450 Psychology of Women

Registration #0514-450
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. (0514-210 or equivalent)
Class 3, Credit 4 (offered annually)

GSSP-451 Social Psychology of Religion

Registration #0514-451
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 formation 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 problem solving 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. (0514-210 or equivalent)
Class 3, Credit 4 (offered annually)

GSSP-503 Abnormal Personality

Registration #0514-503
This course examines the major categories of mental disorder not only from the descriptive point of view but, also in terms of the major theoretical explanations of the causes of disorder. The major treatment modalities are also covered. (0514-210 or equivalent)
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. (0514-210 or equivalent)
Class 3, Credit 4 (offered annually)

GSSP-509 Psychology of Perception

Registration #0514-509
The course covers topics of all sense modalities with emphasis on visual perception. It traces what happens to the physical stimulus as our sensory systems analyze it to produce complicated perceptions of the world around us. Many complex perceptual phenomena drawn upon explanations at the physiological, psychological and cognitive levels. (0514-210 or equivalent)
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 undergoing the most intensive investigation, and likely to be of most interest to the student, including nonverbal communication, attraction, aggression and group effects. (0514-210 or equivalent)
Class 3, Credit 4 (offered annually)

GSSP-512 Psychology of Personality

Registration #0514-512
This course examines the strengths and weaknesses of the major psychological theories of personality. Methods of assessing personality, research, and applications of theory to real-life situations are included in the evaluation of each theory. (0514-210 or equivalent)
Class 3, Credit 4 (offered annually)

GSSP-513 Psychology of Motivation

Registration #0514-513
This course surveys basic motivational concepts and provides a fair representation of many different areas of motivational research, relating these to each other where possible. (0514-210 or equivalent)
Class 3, Credit 4 (offered annually)

GSSP-514 Behavior Modification

Registration #0514-514
This course will teach you the skills of changing your behavior by controlling your environment and the consequences of your behavior. (0514-210 or equivalent)
Class 3, Credit 4 (offered annually)

GSSP-515 Psychology of Human Adjustment

Registration #0514-515
This course will teach you the skills of coping with a variety of everyday experiences. Particular attention will be given to the areas of self validation, interpersonal tactics, and interpersonal relations. (0514-210 or equivalent)
Class 3, Credit 4 (offered annually)

GSSP-517 Death & Dying

Registration #0514-517
This course will view death from a social-psychological perspective. After dealing with topics such as the leading causes of death, attitudes toward death, suicide, and American funeral practices, it will focus on such questions as how people can better cope with their own mortality and that of loved ones, and how people can help others face death, and help themselves and others during periods of bereavement. (0514-210 or equivalent)
Class 3, Credit 4 (offered annually)

GSSP-518 Psychology of Aging

Registration #0514-518
The Psychology of Aging course will present a psychological overview of human aging with some study of the dynamic problems of the elderly in contemporary society. Psychological aspects of adulthood and aging will be emphasized within the perspectives of an interdisciplinary approach. (0514-210 or equivalent)
Class 3, Credit 4 (offered annually)
Coursework and Politics

Amerlcan Social System

This course will cover such topic areas as the specialized consciousness in the two halves of the brain, dreaming, hypothesis, meditation, systematic relaxation, and parapsychology. The course format will be discussion/demonstration. (0514-210 or equivalent)
Class 3, Credit 4 (offered annually)

Psychology of Creativity

This course examines how political attitudes are acquired and altered, how politicians and ordinary citizens satisfy psychological needs through participation in politics and how principles of learning can illuminate processes of political leadership, persuasion, and control. (0514-210 or equivalent)
Class 3, Credit 4 (offered annually)

Psychology of Art

An introduction to psychological research in the area of cognition (thinking, perception, memory) and the application of these findings to the study of art. Also included will be a critical examination of certain theories of personality and abnormality in terms of their relevance to the understanding of the artistic process. Emphasis will be on the areas of painting, sculpture, ceramics, photography and film. (0514-210 or equivalent)
Class 3, Credit 4 (offered annually)

General Sociology

This course introduces students to the way sociologists interpret social reality, the major elements of the field and the most important research findings. Included are such topics as cultural differences and ethnocentrism, socialization, social statuses and roles, group dynamics, social institutions, stratification, collective behavior.
Class 3, Credit 4 (offered quarterly)

Contemporary American Social System

This sociology course examines American society as a complete entity using a sociological framework and capitalizing on the contributions of theory and research. The course focuses on the contemporary U.S. social system, American culture, and the motivating forces and values of the people. Such institutions as the family, economic life, political system, education, religion, recreation, health and welfare systems will be analyzed. This course is part of the American Society in Transition Concentration and may also be taken as an elective. (0515-210 or 0510-210)
Class 3, Credit 4 (offered annually)

The Changing American Family

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 or 0510-210)
Class 3, Credit 4 (offered annually)

The Urban Experience

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 planning. This course is part of the American Society in Transition Concentration and may also be taken as an elective. (0515-210 or 0510-210)
Class 3, Credit 4 (offered annually)

Work and Society

This sociology course analyzes the essential properties of work, its structure, the group processes involved in it, and its social meaning. The course treats work as emerging, like other social realities, out of social relationships between individuals and groups. It looks at ways in which people can develop a positive self-regard or a sense of alienation in their occupations and professions and various types of work organizations. It also considers leisure as a complement to work. This course is part of the American Society in Transition Concentration and may also be taken as an elective. (0515-210 or 0510-210)
Class 3, Credit 4 (offered annually)

Women in Contemporary U.S. Society

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)

Contemporary Social Problems

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)

Population & Society

Study of demographic variables of mortality, fertility, and migration as they affect the rise and quality of population.
Class 3, Credit 4 (offered annually)

Educational Sociology

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)

Sociological Seminar

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)

Applied Sociology

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)

Sociology of Work

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)

Hispanic Culture

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)
Communications

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 quarterly)

GSSE-302 Principles of Economics II

This is the second course in a two quarter sequence designed to introduce the student to the basic principles of economics. This course will focus on microeconomics. Topics of primary interest include market structure, supply and demand analysis involving elasticity, the theory of cost in the long and short run, perfect competition, monopoly, monopolistic competition oligopoly, marginalist distribution theory, the labor market, and general equilibrium analysis. Other topics in microeconomics will be selected by the individual instructor.

Class 3, Credit 4 (offered quarterly)

Sexuality

This course is designed to be sex positive in its approach to the study of human sexual behavior. It will focus upon basic physiology, sexual awareness, sexual development throughout the life cycle, sex roles, sexual myths, legal and social issues, pre-marital and marital sexual behavior, and alternative sexual choices. Frequently these issues raise questions of sexual attitude and value and these will be examined and clarified.

Class 3 + 2 hr. weekly seminar, Credit 4 (offered bi-annually)

GSSS-569 Human Sexuality

Social Service Courses

Service courses are required courses offered by the College of Liberal Arts for specific professional departments. These courses may not be taken as liberal arts electives.

GSSS-527 Black Culture

Registration #0515-527

This course is designed to introduce students to the social, cultural, and political aspects of black culture. It will also provide an introduction to the history and development of black institutions and institutions that have supported the black community.

Class 3, Credit 4 (offered annually)

GSSS-566 Human Sexuality

Registration #0515-566

This course is designed to be sex positive in its approach to the study of human sexual behavior. It will focus upon basic physiology, sexual awareness, sexual development throughout the life cycle, sex roles, sexual myths, legal and social issues, pre-marital and marital sexual behavior, and alternative sexual choices. Frequently these issues raise questions of sexual attitude and value and these will be examined and clarified.

Class 3, Credit 2 (offered quarterly)

Independent Study

The student has the freedom to select any course within the College or 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 Liberal Arts. 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

A course designed to provide the student with the basic vocabulary of frequently used signs and the American manual alphabet.

Class 3, Credit 4 (offered on sufficient demand)

GSSP-203 Psychology of Childhood and Adolescence

Registration #0514-203

A systematic, integrated, and interpretive study of a growing person. Includes physical, cognitive, social, moral and emotional development.

Class 3, Credit 4 (offered annually)

GLLL-200 Basic Communications

Registration #0518-200

Students will gain an understanding of deafness, plus basic skills which will permit communication with a segment of the deaf population.

Class 3, Credit 4 (offered on sufficient demand)

Class 3, Credit 4 (offered on sufficient demand)

Film History and Criticism

A critical examination of key aspects of film criticism and of the development 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)

American Art

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)

Cubism to the Present

Cubism as a way of seeing and as an expression of 20th century thinking. Differences and similarities with art forms of earlier eras and other cultures will be discussed.

Class 3, Credit 4 (offered on sufficient demand)

Oriental Art

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 application of research techniques and critical methods of an individually selected area of interest which may serve as a foundation for continuing study.

Class 3, Credit 4 (offered occasionally)
College of Science

Biology

SBIB-201
Registration #1001-201
A study of cellular and organismal reproduction, the principles of genetics and development biology, introduction to evolution and ecology.
Class 3, Credit 3 (F)

SBIB-202
Registration #1001-202
Chemical basis and functions of life including enzyme systems, respiration and photosynthesis, nutrient procurement in plants and animals, hormones and behavior.
Class 3, Credit 3 (W)

SBIB-203
Registration #1001-203
A study of cellular and organismal reproduction, the principles of genetics and development biology, introduction to evolution and ecology.
Class 3, Credit 3 (S)

SBIB-205, 206, 207
Registration #1001-205, 206, 207
Laboratory work to complement the lecture material of General Biology (SBIB-201, 202, 203). The experiments are designed to illustrate concepts, develop laboratory skills and techniques, and improve ability to make, record and interpret observations. (Corequisites SBIB-201, 202, 203)
Lab. 3, Credit 1 (F-205, W-206, S-207)

SBIB-250
Registration #1001-250
Introduction to Biotechnology
An introduction to the nature and scope of the science of biotechnology, the employment environment and opportunities, and the literature of the field (One quarter of general biology).
Class 1, Credit 1 (W)

SBIB-301
Registration #1001-301
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)

SBIB-302
Registration #1001-302
Morphology, physiology, behavior, classification, and ecology of chordates. (One year of general biology)
Class 3, Lab. 3, Credit 4 (F-alternate years)

SBIB-303
Registration #1001-303
Comparative Vertebrate Anatomy
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)

SBIB-304
Registration #1001-304
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)

SBIB-305
Registration #1001-305
Physiology and Anatomy
An integrated systems approach to cellular, nerve, muscle and cardiovascular 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)
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBIB-306</td>
<td>Physiology and Anatomy</td>
<td>Integrated systems approach to renal, respiratory and gastro-intestinal physiology, metabolism and endocrinology. Laboratory exercises include studies of kidney function, lung performance, neuroanatomy and gastrointestinal anatomy and physiology. (SBIB-305)</td>
</tr>
<tr>
<td>SBIB-310</td>
<td>Plant Physiology</td>
<td>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 and one year of organic chemistry)</td>
</tr>
<tr>
<td>SBIB-320</td>
<td>Histology</td>
<td>Detailed study of the structure and function of normal and abnormal vertebrate tissue. (One year of general biology)</td>
</tr>
<tr>
<td>SBIB-330</td>
<td>Small Animal Laboratory Techniques</td>
<td>A course designed to prepare the student for small animal handling, biological administrations and preparations, minor surgery and autopsies. (Minimum of 20 credits in biological sciences and permission of the instructor)</td>
</tr>
<tr>
<td>SBIB-340</td>
<td>General Ecology</td>
<td>Introduction to ecosystem ecology stressing the dynamic interrelationships of plant and animal communities with their environments. A study to include such ecological factors as energy flow and trophic levels in natural communities, plant responses and animal behavior, population dynamics, bio-geography and representative ecosystems. (One year of general biology)</td>
</tr>
<tr>
<td>SBIB-350</td>
<td>Molecular Biology</td>
<td>The study of the structure, function, and organization of proteins, nucleic acids and other biological macromolecules. (One year of general biology)</td>
</tr>
<tr>
<td>SBIB-402</td>
<td>Immunology</td>
<td>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)</td>
</tr>
<tr>
<td>SBIB-403</td>
<td>Cell Physiology</td>
<td>Functional cytology, cellular water and electrolyte homeostasis, exchange of materials across cell membranes, regulation of cellular metabolism and control of cell growth. (SCHO-334, biochemistry)</td>
</tr>
<tr>
<td>SBIB-404</td>
<td>Introductory Microbiology</td>
<td>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)</td>
</tr>
<tr>
<td>SBIB-406</td>
<td>Virology</td>
<td>Molecular biology, chemistry, epidemiology and clinical aspects of viruses; morphology, genetics, immunology, environmental effects, methods of isolation, cultivation, identification; assays. Human virus diseases. (One year of general biology)</td>
</tr>
<tr>
<td>SBIB-407</td>
<td>Microbial and Viral Genetics</td>
<td>The study of the molecular genetics of bacteria, bacteriophage, fungi, and eucaryotic viruses. (SBIB-350, SBIB-421, SCHO-334)</td>
</tr>
<tr>
<td>SBIB-409</td>
<td>Plant Anatomy</td>
<td>A detailed study of the cellular structure and development of plant tissues and organs. (One year of general biology)</td>
</tr>
<tr>
<td>SBIB-412</td>
<td>Parasitology</td>
<td>Structure, life cycle, and control of human parasites. Emphasis on forms of diagnostic importance. (One year of general biology)</td>
</tr>
<tr>
<td>SBIB-413</td>
<td>Comparative Animal Physiology</td>
<td>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)</td>
</tr>
<tr>
<td>SBIB-417</td>
<td>Industrial Microbiology</td>
<td>The study of the microbiology, chemistry, biochemistry, and engineering aspects of industrial microbiology. (SBIB-404, SCHO-334)</td>
</tr>
<tr>
<td>SBIB-420</td>
<td>Plant Ecology</td>
<td>A consideration of the nature and variation of plant communities with a discussion of factors which limit, maintain, and modify communities both locally and regionally. Field studies of various plant communities will be conducted. (SBIB-340)</td>
</tr>
<tr>
<td>SBIB-421</td>
<td>Genetics</td>
<td>Genes and cytoplasmic factors as units of inheritance; the nature and origin of inheritable characteristics and variations. Principles of inheritance in plants, animals and man. (One year of general biology, third-year status)</td>
</tr>
<tr>
<td>SBIB-422</td>
<td>Developmental Biology</td>
<td>Study of the processes of growth, differentiation and development which lead to the mature form of an organism. Emphasis is placed on descriptive and experimental embryology. (One year of general biology)</td>
</tr>
<tr>
<td>SBIB-430</td>
<td>Radiation Biology</td>
<td>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)</td>
</tr>
<tr>
<td>SBIB-431</td>
<td>Histological Techniques</td>
<td>Preparation of plant and animal tissues of slide mounts. Techniques in paraffin and frozen sectioning, Sectioning on the rotary and sliding microtomes and multiple staining techniques. (One year of general biology)</td>
</tr>
<tr>
<td>SBIB-442</td>
<td>Hybridoma Techniques</td>
<td>Designed to acquaint each student with the basic methods employed in the production of hybridoma cells lines and monoclonal antibodies. To include preparation of viable cell suspensions, cell culture fusion techniques, cloning, and monoclonal antibody production and characterization. (SCHO-233, Tissue Culture, corequisite SBIB-402)</td>
</tr>
<tr>
<td>SBIB-445</td>
<td>Tissue Culture</td>
<td>Study of the techniques and applications of culturing cells, tissues, and organs in vitro. Emphasis on mammalian systems. (One year of general biology)</td>
</tr>
</tbody>
</table>

*Additional, non-scheduled laboratory time required*
SBIB-446 Plant Tissue and Cell Culture
Registration #1001-446
Study of the techniques and applications of plant organ, tissues, and cell culture in vitro, with emphasis on plant regeneration. (One year of general biology)
Class 2, Lab 3, Credit 3 (W)

SBIB-450 Genetic Engineering
Registration #1001-450
Introduction to the theoretical basis, laboratory techniques, and applications of gene manipulation. (SBIB-350, SBIB-421, SBIB-407)
Class 3, Lab 3, Credit 4 (W)

SBIB-471 Limnology
Registration #1001-471
A study of the physics, chemistry and biology of inland waters. The course will emphasize the physical and chemical properties of water and how these properties affect the associated biological communities. Planktonic, benthic and littoral communities will be considered. Field trips to streams and lakes will be conducted to gather physical, chemical and biological data. (SBIB-340 or permission of instructor)
Class 3, Lab 3, Credit 4 (W-alternate years)

SBIB-472 Introduction to Oceanography
Registration #1001-472
An introduction to the study of the world ocean, with emphasis on fundamental principles, concepts and processes of biological, geological, chemical and physical oceanography. (SBIB-340 or permission of instructor)
Class 4, Credit 4 (W-alternate years)

SBIB-490 Transmission Electron Microscopy
Registration #1001-490
A lecture/laboratory course covering operation, maintenance and calibration of transmission electron microscopes; preparation of biological, chemical and physical specimens for the transmission electron microscope; black-and-white photographic darkroom techniques. (3rd, 4th or 5th year status)
Class 1, Lab 6, Credit 3 (F)

SBIB-491 Scanning Electron Microscopy
Registration #1001-491
A lecture/laboratory course covering operation, maintenance and calibration of scanning electron microscopes; preparation of biological, chemical and physical specimens for the scanning electron microscope; black-and-white photographic darkroom techniques. (3rd, 4th or 5th year status)
Class 1, Lab 6, Credit 3 (W)

SBIB-541, 542, 543 Biology Research
Registration #1001-541, 542, 543
Faculty directed projects of research usually involving original field or laboratory work, encompassing a period of at least two quarters. Final reports 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 (F, W, S, SR)

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 (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-561 Biotechnology Senior Project
Registration #1001-561
Completion of a laboratory project in biotechnology using a team approach; preparation of laboratory notebook and research report. (4th or 5th year biotechnology major status)
Lab. 6, Credit 2 (F)

SBIB-579 Topics in Biotechnology
Registration #1001-579
An in-depth study of one or more aspects of the field of biotechnology, with emphasis on current areas of research. (4th or 5th year biotechnology major status)
Class 3, Credit 3 (S)

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)

SBIB-710 Antibiotics & Chemotherapy
Registration #1001-710
Antibiotics and other chemical agents used clinically against microbial infections. Chemotherapy of cancer. Discovery, production, sale and usage of antibiotics. Impact of antibiotics on viruses, bacteria, fungi, protozoa and on the patient. Medical consequences. Assay procedures, fermentation technology (SBIB-404, one year of organic chemistry)
Class 3, Lab. 2, Credit 4 (W-alternate years)

SBIB-741 General Toxicology Laboratory
Registration #1001-741
Laboratory work to accompany the lectures in General Toxicology. (Corequisite SBIB-740)
Lab. 3, Credit 1 (W)

NOTE: The following courses may not be taken for biology credit by biology or biotechnology majors.

SBIG-210 Microbiology in Health and Disease
Registration #1004-210
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)

SBIG-211 Human Biology I
Registration #1004-211
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 biochemistry 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)

SBIG-212 Human Biology II
Registration #1004-212
A general study of human anatomy and physiology with emphasis on mechanisms by which the nervous and endocrine systems coordinate and integrate body functions. This second course includes discussions of nutrition, metabolism and respiratory, circulatory, lymphatic, urinary and reproductive systems. Recitation for the social work students emphasizes common disease states and their treatments.
Class 3, Credit 3 or Class 3, Rec. 1, Credit 4 (S)

SBIG-220 Microbiology in Health & Disease Laboratory
Registration #1004-220
Laboratory cultures, 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 foodborne diseases. (Corequisite SBIG-210)
Lab. 3, Credit 1 (F, S)

SBIG-231 Human Biology Laboratory
Registration #1004-231
Laboratory for dietetic and medical illustration students complements the lecture materials of SBIG-211. Experiments are designed to illustrate the dynamic characteristics of cells, tissues and organ systems.
Lab. 3, Credit 1 (W)
SBIG-232 Human Biology Laboratory
Registration #1004-222
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)

SBIG-289 Contemporary Science-Biology
Registration #1004-289
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, biotechnology.
Class 4, Credit 4 (F, W, S)

SBIG-315 Medical Genetics
Registration #1004-315
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)

SBIG-440 Environmental Microbiology
Registration #1004-440
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, S)

Chemistry

SCHA-261, 262, 263 Introduction to Chemical Analysis
Registration #1008-261, -262, -263
An introduction to quantitative 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 acid-base reactions. Introduction to electro-chemical techniques, and fundamentals of spectroscopy are stressed. Equilibrium concepts and statistical evaluation of results are incorporated. To be taken concurrently with SCHC-211, SCHC-212, SCHC-230.
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; electrochemistry, chromatography including gas, liquid, column, paper, thin layer, and ion exchange. SCHA-319 is a corequisite. (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. Laboratory report writing is emphasized. 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. SCHA-312 is a corequisite. (SCHA-212)
Lab. 4, Credit 1 (offered every year) (S, SR)

SBCH-334 Biochemistry
Registration #1008-334
Introduction to biochemistry. 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 safely 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 photoscience 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 Seminar
Registration #1010-230
Exploration of cooperative 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. (SCHC-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) (F, W, S, SR)

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 photochemistry, mathematics, and physics majors who are taking General Chemistry (SCHC-211, 212) and introduction to Organic Chemistry (SCHC-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 #101-208, -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 4, Credit 4 (offered every year) (208-F, W; 209-S)

SCHG-221  
**General Chemistry Laboratory**

Registration #101-221  
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 #101-222  
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 #101-215, -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 #101-225, -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. 8, Credit 2)  
(offered every year)

SCHG-271  
**Chemistry of Water**

Registration #101-271  
Basic training in general chemistry assuming no prior experience, concentrating on those aspects important to the field of water conservation. SCHG-275 should be taken concurrently.

Class 3, Credit 3 (offered every year) (F, W)

SCHG-272  
**Chemistry of Water**

Registration #101-272  
Chemistry of organics, metals, construction materials, radioactive and other environmental pollutants, and other substances related to waste analysis. SCHG-276 should be taken concurrently (SCHG-271).

Class 2, Credit 2 (offered every year) (S, SR)

SCHG-275  
**Chemistry of Water Lab**

Registration #101-275  
Laboratory to be taken concurrently with SCHG-271. General chemistry and volumetric techniques will be covered.

Lab. 3, Credit 1 (offered every year) (F, W)

SCHG-276  
**Chemistry of Water Lab**

Registration #101-276  
Laboratory to be taken concurrently with SCHG-272. Techniques used in water and waste water analysis will be covered. (SCHG-271 or equivalent)

Lab. 3, Credit 1 (offered every year) (S, SR)

SCHG-281, 282, 283  
**General Chemistry**

Registration #101-281, -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. SCHG-285, -286, -287 should be taken concurrently.

Class 3, Credit 3 (offered every year) (281-F, 282-W, 283-S)

SCHG-285, -286, -287  
**Chemistry for Printers Lab**

Registration #101-285, -286, -287  
SCHG-285 and 286 will consist of laboratory techniques in general chemistry experiments. SCHG-287 will have experiments directly related to the printing career area.

Lab. 2, Credit 1 (offered every year) (285-F, 286-W, 287-S)

SCHG-289  
**Contemporary Science—Chemistry**

Registration #101-289**  
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 #101-230  
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 alkanes, alkenes, alkynes, aliphatic, and aromatic molecules (SCHC-212 or permission of instructor)

Class 3, Credit 3 (offered every year) (S)

SCHO-231, 232  
**Organic Chemistry**

Registration #101-231, -232  
Survey of the structure, names, reactions, and synthesis of the major functional groups. Mechanisms of main classes of reactions are discussed.

(SCHO-216, or SCHC-212, or SCHG-209)

Class 3, Credit 3 (offered every year) (231-F, 232-W)

SCHO-233  
**Organic Chemistry**

Registration #101-233  
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 #101-235, -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 #101-431, -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-230 or equivalent)

Class 3, Credit 3 (offered every year) (431-S, 432-F, W)  
Class 2, Credit 2 (offered every year) (433-S, SR)

SCHO-435, 436  
**Preparative Organic Chemistry**

Registration #101-435, -436  
Synthesis of organic compounds utilizing a variety of laboratory techniques. Purification techniques and spectral characterization will be routinely used. (SCHO-230) (SCHO-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)

SCHO-437  
**Systematic Identification of Organic Compounds**

Registration #101-437  
A laboratory course utilizing chemical and spectral (largely IR and NMR) techniques to identify and characterize organic compounds. (SCHO-432, 436) (SCHO-433 should be taken concurrently)

Lab. 6, Credit 2 (offered every year) (437-S, SR)

SCHP-340  
**Introduction to Physical Chemistry**

Registration #101-340  
Properties of gases, kinetic theory of gases. Maxwell-Boltzmann distribution; energy and the first law; thermochemistry; entropy and the second and third laws; introduction to Helmholtz and Gibbs free energy; gas equilibrium (SCHC-212, SMAM-252, SPSP-311 concurrent)

Class 3, Credit 3 (offered every year) (F, W)

SCHP-441  
**Physical Chemistry I**

Registration #101-441  
Review of the thermodynamic laws; criteria for equilibrium and spontaneity; chemical equilibrium; phase rule: equilibrium in ideal and non-ideal solutions; electrochemistry. SCHP-445 should be taken concurrently. (SCHP-340)

Class 3, Credit 3 (offered every year) (S, SR)

**Not acceptable for science credit for College of Science major.**
Graduate Courses

SCHA-711 Instrumental Analysis
Registration #1008-711
Theory, applications and limitations of instrumental methods in qualitative, quantitative, and structural analysis. Topics include fluorescence and photoluminescence, Raman, mass spectrometry, nuclear magnetic resonance, X-ray and radiochemistry, and spectroscopy. (SCHA-312)
Class 3, Credit 3 (offered every year) (F, W)

SCHA-720 Instrumental Analysis Lab
Registration #1009-720
Lab accompanying SCHA-711. Experiments include AA, fluorometry, coulometry, 13C and 1H 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 compounds. Chromatography and separation techniques and the structural and functional aspects of biomolecules. (SCHB-433 and SCHP-340 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 and Molecular Genetics
Registration #1009-704
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)
**Chemistry**

- **Chemistry Seminar**
  - Registration #1010-870
  - Credit 1 (offered every year)

- **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)

- **Independent Study—Chemistry**
  - Registration #1010-899
  - Credit variable (offered every year)

- **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, and new synthetic reagents. (SCHO-433)
  - Class 3, Credit 3 (offered every year)

- **Quantum Mechanics**
  - Registration #1014-744
  - Matrix formulation of quantum mechanics; variational and perturbation methods; group theory; molecular orbital energies of complex molecules; calculation of vibrational frequencies and selection rules for complex molecules. Emphasis on use of spectroscopy and quantum chemistry to obtain chemical information. (SCHO-443)
  - Class 3, Credit 3 (offered alternate years)

- **Mathematics**
  - **Algebra, Trigonometry and Analytic Geometry**
    - A sequence of courses covering essential skills and concepts in such topics as solutions of equations, graphing, exponents and radicals, logarithms, trigonometric functions and applications, vectors, determinants, inequalities and conic sections.
    - Class 3, Credit 3 (offered every year) (201-F, 202-W, 203-S)

  - **College Algebra and Trigonometry**
    - Topics include a review of the fundamentals of algebra; solution of linear, fractional, and quadratic equations; functions and their graphs; polynomial, exponential, logarithmic, and trigonometric functions; systems of linear equations.
    - Class 4, Credit 4 (offered every year) (F, W)

  - **Freshman Seminar**
    - Registration #1010-210-211
    - An orientation program for entering mathematics majors that provides information and guidance concerning various aspects of applied mathematics, career problem solving, job opportunities, construction of resumes, letters for job applications, and guidelines in interviewing for a job.
    - Class 1, Credit 1 (offered every year) (210-F, 211-W)
SMAM-214, 215  
Introduction to Calculus I, II  
Registration #1016-214, -215  
214: A non-rigorous introduction to the study of differential calculus. The following topics will be covered: functions and graphs, limits, continuity, the derivative and its significance, the algebra of derivatives, chain rule, related rates, maxima and minima. (SMAM-204 or equivalent)  
215: A continuation of SMAM-214, dealing with an introduction to integral calculus. The following topics will be covered: definite integral, area, work and distance problems, volumes, fundamental theorem of calculus, approximation techniques, exponential and logarithmic functions, applications, introduction to differential equations. (SMAM-214 or equivalent)  
Class 3, Credit 3 (offered every year) (214-F, W; 215-W, S)

SMAM-216, 217  
Mathematics of Business and Finance I, II  
Registration #1016-216, -217  
A non-rigorous introduction to selected topics in matrix algebra, finite mathematics, and calculus, used extensively in business and finance applications.  
216: Demand, revenue and cost functions, break-even analysis, matrix and vector operations, and applications to systems of linear equations and inequalities, the Simplex method for solving linear programming problems (with and without a computer). (SMAM-204 or equivalent)  
217: Compound interest, annuities, depreciation, differentiation techniques, marginal cost and marginal revenue, elasticity of demand, applied max-min problems. (SMAM-216)  
Class 3, Credit 3 (offered every year) (216-W, S; 217-S)

SMAM-221, 222, 223  
College Mathematics I, II, III  
Registration #1016-221, -222, -223  
A survey of selected topics from college algebra, trigonometry, analytic geometry and differential and integral calculus generally useful for laboratory technicians. The emphasis is placed on understanding of concepts, problem solving and graphs. The topics are divided roughly as follows.  
221: Algebra (Exponential, log & trig functions; linear equations, curve fitting and special graph papers)  
222: Basic differential calculus with applications (SMAM-221)  
223: Basic integral calculus with applications (SMAM-222)  
Class 4, Credit 4 (offered every year) (221-F, 222-W, 223-S)

SMAM-225  
Algebra for Management Sciences  
Registration #1016-225  
Introduction to functions, including linear, quadratic, exponential, and logarithmic functions, with applications to business and economics. Additional topics include matrices, solutions of simultaneous linear equations, and arithmetic and geometric sequences as applied to simple and compound interest, annuities, and depreciation.  
Class 4, Credit 4 (offered every year) (F, W, S)

SMAM-226  
Calculus for Management Sciences  
Registration #1016-226  
A course stressing applications of calculus concepts to solving problems in business and economics. (SMAM-225)  
Class 4, Credit 4 (offered every year) (F, W, S)

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. (SMAM-251)  
253: Parametric equations, polar coordinates, improper integrals, indefinite forms, sequences series, Taylor series. (SMAM-252)  
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.  
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 problem 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-308  
Differential Equations I  
Registration #1016-308  
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, Laplace Transforms. (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. (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 popular mean; t-distributions; testing of hypotheses concerning the mean and difference between means; use of chi-square in testing statistical independence and in estimating variance. (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-204 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-328  
Engineering Mathematics  
Registration #1016-328  
This course provides introduction 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. 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-351  
Probability  
Registration #1016-351  
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, confidence intervals, and simple linear regression. (SMAM-351)

Class 4, Credit 4 (offered every year) (W, S)

SMAM-353 **Applied Statistics II**

**Registration # 1016-353**

Additional topics in simple linear regression, introduction to analysis of variance, nonparametric statistics and the use of statistical software packages. (SMAM-352)

Class 4, Credit 4 (offered every year) (S)

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, SMAM-431)

Class 4, Credit 4 (offered every year) (S)

SMAM-365 **Combinatorial Mathematics**

**Registration # 1016-365**

An introduction to the mathematical theory of combination, arrangement and enumeration of discrete structures. Topics include: enumeration, recursion; inclusion-exclusion; block design; generating functions. (SMAM-255 or permission of instructor)

Class 4, Credit 4 (offered every year) (F)

SMAM-410 **Advanced Calculus**

**Registration # 1016-410**

An in-depth study of vector calculus. Topics will include: scalar and vector fields; the gradient; divergence and curl vectors and their applications to mechanical systems; integration along a path; Green’s theorem in the plane; line integrals independent of path; surface integrals; the divergence theorem; and Stoke’s theorem. (SMAM-306)

Class 4, Credit 4 (offered every year) (S, SR)

SMAM-411, 412 **Real Variables**

**Registration # 1016-411, 412**

Functions of one and several variables are considered, with the basic concepts of sequences, series, continuity, differentiation, and integration studied in depth. Included are the Heine-Borel, Mean Value, Taylor, and implicit function theorems. (SMAM-305 and either SMAM-255 or permission of the instructor)

Class 4, Credit 4 (offered every year) (411-F, W; 412-S, SR)

SMAM-420 **Complex Variables**

**Registration # 1016-420**

A study of the complex number system and preliminary items leading to the concepts of an analytic function. Integrals of complex functions, Cauchy integral theorem, Cauchy integral formulas, Taylor and Laurent series, singularities, residues. (SMAM-305)

Class 4, Credit 4 (offered every year) (F, W)

SMAM-431 **Matrix Algebra**

**Registration # 1016-431**

A first course in the algebras of matrices and n-tuple vectors over the complex numbers. Topics include addition, multiplication, transposes and inverses of matrices; symmetric and triangular matrices; partitioning; solution of \( Ax=b \); Gauss algorithm, residual and error, partial pivoting, ill-conditioning, iterative techniques; elementary matrices; echelon form; determinants; eigenvalues and eigenvectors; real symmetric matrices and diagonalization. (SMAM-305)

Class 4, Credit 4 (offered every year) (F, W, S)

SMAM-432 **Linear Algebra**

**Registration # 1016-432**

Topics will be pursued to a greater depth, with more emphasis on theory than in Matrix Algebra. Topics include: \( \mathbb{R}^n \); and function spaces; subspaces; spanning sets; linear dependence and independence; basis; dimension; inner products; Gram-Schmidt; orthogonality; linear transformations; representation relative to ordered bases; change of basis; similarity; eigenvalues and eigenvectors; diagonalization and special classes of matrices. (SMAM-431)

Class 4, Credit 4 (offered every year) (S, SR)

SMAM-451, 452 **Mathematical Statistics I, II**

**Registration # 1016-451, 452**

451: Brief review of basic probability concepts and distribution theory; mathematical properties of distributions needed for statistical inferences; classical and Bayesian methods in estimation theory. Neyman-Pearson Theory of hypothesis testing and mathematical justification of standard test procedures. (SMAM-352) (F, W)

452: Chi-square tests; symmetric methods, sufficient statistics and further topics in statistical inference. (SMAM-451)

Class 4, Credit 4 (offered upon sufficient request) (S, SR)

SMAM-465 **Linear Programming**

**Registration # 1016-465**

A presentation of the general linear programming problem to be solved. A review of pertinent matrix theory including convex sets and systems of linear inequalities; the Simplex Method of solution; artificial bases; duality; parametric programming; and applications. (SMAM-432)

Class 4, Credit 4 (offered upon sufficient request)

SMAM-466 **Integer Programming**

**Registration # 1016-466**

The optimization of functions of integers; theory and practice of branch and bound; implicit enumeration; cutting plane duality and related solution techniques; heuristics; and applications. (SMAM-465)

Class 4, Credit 4 (offered upon sufficient request)

SMAM-467 **Theory of Graphs and Networks**

**Registration # 1016-467**

The basic theory of graphs and networks, including the concepts of circuits, trees, edge and vertex separability, planarity and vertex coloring and partitioning. There is a strong emphasis on applications to physical problems and on graph algorithms such as those for spanning trees, shortest paths, non-separable blocks and network flows.

Class 4, Credit 4 (offered every year) (F, W)

SMAM-501, 502 **Advanced Differential Equations**

**Registration # 1016-501, 502**

A study of first order, linear higher order and systems of differential equations including such topics as existence, uniqueness, properties of solutions, Green’s functions, Sturm-Liouville systems and boundary value problems. (SMAM-307)

Class 4, Credit 4 (offered upon sufficient request)

SMAM-511, 512 **Numerical Analysis**

**Registration # 1016-511, 512**


Class 4, Credit 4 (offered every year) (511-F, W; 512-S, SR)

SMAM-521, 522 **Probability Theory**

**Registration # 1016-521, 522**

Selected topics in applied probability and statistics to meet the needs and interests of the students. (SMAM-305, SMAM-352 or permission of instructor)

Class 4, Credit 4 (offered upon sufficient request)
SMAM-531, 532  Abstract Algebra  
Registration #1018-531, -532  
531: A review of pertinent basic set theory and number theory. Groups, subgroups, cyclic and permutation groups, Lagrange’s theorem, quotient groups, isomorphism theorems, applications to scientific problems. (SMAM 265, SMAM-432)  
532: The basic theory of rings, integral domains, ideals and fields, polynomial rings, quotient structures, finite Galois fields GF (p^n), applications to coding theory, abstract vector spaces, function spaces, direct sums, applications to differential equations, applications to scientific problems. (SMAM-531)  
Class 4, Credit 4 (offered every year) (531-F, W, 532-S, SR)  

SMAM-551  Topics in Algebra  
Registration #1018-551  
Topics in abstract algebra to be chosen by the instructor either to give the student an introduction to topics not taught in SMAM-531, 532 or to explore further the theory of groups, rings, or fields. (permission of instructor)  
Class 4, Credit 4 (offered upon sufficient request)  

SMAM-581, 582  Complex Variables  
Registration #1018-581  
Introduction to the theory of functions of one complex variable. Limits, continuity, differentiability, analytic functions, complex integration, Cauchy integral formula, singularities, residues, analytic continuation, conformal mapping. A more indepth study of analytic function theory than SMAM-420. (SMAM-305)  
Class 4, Credit 4 (offered upon sufficient request)  

SMAM-599  Independent Study-Math  
Registration #1018-599  
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)  

SMAT-420  Calculus for Technologists I  
Registration #1018-420  
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 #1018-421  
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 applications to engineering technology problems (SMAT-420 or equivalent).  
Class 4, Credit 4 (offered every year) (F, W, SR)  

SMAT-422  Solutions of Engineering Problems  
Registration #1018-422  
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, SR)  

SMAT-424  The Fourier Transform  
Registration #1018-424  
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, linear products; the sampling theorem; Rayleigh, power convolution, and auto-correlation theorems; the discrete Fourier transform; the fast Fourier transform. (SMAM-420)  
Class 4, Credit 4 (offered upon sufficient request)  

SMAT-425  Calculus for Technologists III  
Registration #1018-425  
A continuation of SMAT-421. Topics covered in this course are applications of the integral calculus; differential and integral calculus of the transcendental functions; and basic techniques of integration with emphasis on applications to engineering technology problems (SMAT-420 or equivalent).  
Class 4, Credit 4 (offered every year) (F, W, SR)  

SMAT-426  Calculus for Technologists IV  
Registration #1018-426  
A continuation of SMAT-422. 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, 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-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-205 or SMAM-223) (See SPSP-271, 272, 273 for laboratory)  
Class 3, Credit 3 (offered every year) (211-F, 212-W, 213-S)  

SPSP-271, 272, 273  College Physics Lab  
Registration #1017-271, -272, -273  
These laboratory courses include experiments related to the principles and theories discussed in corresponding lectures. (SPSP-211, 212, 213)  
Lab 2, Credit 1 (offered every year) (271-F, 272-W, 273-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 society. A minimum of mathematics is used. A laboratory or discussion option may be offered for 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, and light; and electricity and magnetism (Co-registration or credit in SMAM-252 or SMAM-253)
Class 4, Credit 4 (offered every year) (F, W, S)

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) (F, 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 semi-conductors; operating principles of diodes, bipolar junction transistors, and MOSFET's. (SMAM-306; SPSP-314)
Class 4, Credit 4 (offered every year) (W, S)

SPSP-319  Electrical Processes in Solids
Registration #1017-319
Introduction to statistical mechanics; Planck's formula; transport equation; 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) (F, W, S)

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 hypotheses; the role of mathematics; probability and induction; science and other disciplines. (At least a year of basic sciences at the college level)
Class 2, Credit 2 (offered upon sufficient request) (F, W)

SPSP-351, 352, 353  Radiation Physics
Registration #1017-351, -352, -353
The physical principles in 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
These laboratory courses include experiments related to the principles and theories discussed in the corresponding lectures. (SPSP-311, 312, 313) (see SPSP-375, 376, 377 for a 2-hr lab for University Physics)
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 experience; X-ray diffraction; optical diffraction and interference; atomic spectroscopy; electron microscopy; nuclear spectroscopy; radioactive half-life; Milikan 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-375, 376, 377  University Physics Lab
Registration #1017-375, -376, -377
These laboratory courses include experiments related to the principles and theories discussed in the corresponding lectures (SPSP-311, -312, -313). Recommended for all students in the University Physics lectures who are not required to take a 3-hr laboratory.
Lab. 2, Credit 1 (offered every year) (F, W, 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) (411-F; 412-S)

SPSP-411, 412  Electricity and Magnetism
Registration #1017-411, 412
Electric and magnetic fields using vector methods; Gauss's law, theory of dipoles, Ampere and Faraday's laws, vector potential, displacement current, Maxwell's equations. (SMAM-307, SPSP-313)
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, electricity and magnetism, 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
Principles of light, 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, orthogonal coordinate systems, 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. (SMAM-307, SPSP-421)
Lab. 6, Credit 2 (offered every year) (F)
Clinical Sciences

SCLG-301 Medical Terminology
Registration #1026-301
Emphasizes etymology, definition, pronunciation and correct utilization of medical terms which enable students to develop a vocabulary essential to the understanding of and communication with the various health areas in which allied health professionals will serve. (SBID-306 or instructor's permission)
Class 3, Credit 3 (offered every year) (F, S)

SCLG-415 Pathophysiology
Registration #1026-415
The concepts and terminology of the pathophysiological nature of human disease are reviewed with particular emphasis on specific organ systems. The physiologic interaction of the various organs in disease states will be examined to demonstrate pathologic profiles.
Credit 4 (S)

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 technologist in health care.
Class 1, Credit 1 (offered every year) (W)

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. (SBID-404)
Class 3, Lab. 3, Credit 4 (W)

SCLM-431 Biology Laboratory Techniques I
Registration #1024-431
Principles of clinical laboratory instruments in the analysis of body fluids. This quarter stresses the principles of instrumental methods of analysis including visible and ultraviolet spectrophotometry, nephelometry, fluorometry, flame photometry, atomic absorption spectrophotometry, chromatography, electrophoresis, osmometry, radiation counters, and automated chemical analyzers. (SBID-217, or equivalent, SBID-306)
Class 2, Lab. 6, Credit 4 (F, W)

SCLM-432 Biology Laboratory Techniques II
Registration #1024-432
Principles of clinical chemistry in the analysis of the chemical component of body fluids. This quarter stresses the basic chemistry underlying the classical methodologies and relates them to the disease state. Topics include: liver function tests, renal function tests, carbohydrates, electrolytes, and base balance, enzymes, lipids, endocrine function tests, drug analysis, and statistical quality control. (SBID-217, or equivalent, SBID-306)
Class 2, Lab. 6, Credit 4 (S)

SCLM-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)
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
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
注册 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
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
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
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
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
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 NMT program)
Credit 1 (S)

SCLN-514 Nuclear Medicine Procedures - Special Studies
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 NMT program)
Credit 1 (S)

SCLN-515 Nuclear Medicine Procedures - Hematological and In Vitro Studies
A course covering the basic procedures utilized 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
A combination lecture/lab course covering the production and use of radioactive isotopes 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-517 Radiochemistry and Radiopharmacology
A course designed to familiarize 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 Radiolmmunoassay
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
Discussion of all aspects of nuclear medicine covered during the clinical internship including preparation for the national certification exams in nuclear medicine technology. (Fourth year standing in NMT program)
Credit 2 (S)

SCLN-522 Clinical Nuclear Medicine I
Clinical Nuclear Medicine I
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 rotates 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 Electrical Nuclear Medicine I
A course covering the basic procedures utilized 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 7 (W)

SCLN-524 Clinical Nuclear Medicine III
Clinical Nuclear Medicine III
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 7 (S)
Graduate Courses

Master of Science in Clinical Chemistry

SCLC-820 Advanced Clinical Chemistry I
Registration #1023-820
Toxicology, therapeutic drug monitoring, electrolytes acid-base, vitamins, oncology, hepatitis, coagulation, and various standard methods. (Permission of instructor)
2 hr. lecture, 2 hr. seminar, Credit 3 (F 1983; S 1985)

SCLC-811 Advanced Clinical Chemistry Laboratory I
Registration #1023-811
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-821 Advanced Clinical Chemistry II
Registration #1023-821
Proteins, enzymes, hemoglobin, iron, renal functions, lipids, quality control, automation, and method selection. (Permission of instructor)
2 hr. lecture, 2 hr. seminar, Credit 3 (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 1983; S 1985)

SCLC-812 Advanced Clinical Chemistry Laboratory III
Registration #1023-812
Methods for the development, improvement, and trouble shooting of radioimmunoassay analyses. (Permission of instructor, class size limited to 12)
Lab. 4, Credit 1 (offered concurrently with SHPC-822)

SCLC-859 External Clinical Chemistry Research
Credit variable

SCLC-879 Clinical Chemistry Research
Credit 1-16

SCLC-899 Independent Study
Credit variable
SCLC-712 Statistics and Quality Control
Registration #1023-712
Principles of statistics as they apply to biomedical sciences and to clinical laboratory analyses. Illustrative examples will involve clinical laboratory data. Probability, normal distributions, analysis of variance sampling, normal values, quality control, applications in patient care, hypothesis testing.
Class 3, Credit 3 (S 1984)

SCLC-870 Clinical Chemistry Seminar
Registration #1023-870
Credit 1

SCLC-872 Special Topics in Clinical Science
Registration #1023-872
In response to student and/or faculty interest, special courses which are of current interest and/or logical continuations of regular courses will be presented. These courses will be structured as ordinary courses with specified prerequisites, contact hours and examination.
Class variable, Credit variable

SCLC-722 Clinical Laboratory Computer Applications
Registration #1023-722
Data processing overview and terminology, hospital computer utilizations, evaluation of the need for computers in the laboratory, design of laboratory and hospital systems, evaluation-selection-installation of computer systems, legal aspects of biomedical data processing, instrument interfacing.
Class 3, Credit 3 (W 1983-84)

SCLC-705 Advanced Physiology
Registration #1023-705
Following a brief review of normal physiology, emphasis will be on aspects of the development and reversal of functional abnormalities in disease states. Cellular damage will be integrated with organ failure and multi-organ systemic disease and healing.
Credit 3 (W 1983-84)

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 and audiotapes. The audiotapes begin at speeds of 50 wpm and increase to 80 wpm. (NITP-201)
Class 3, Credit 3 (offered annually)

NITP-203 Principles of American Sign Language for Interpreters
Registration #0850-203
Students will be able to generate and accurately produce ASL classifiers and ASL idioms, recognize and accurately produce non-manual grammatical markers, use appropriate body/facial expressions, apply grammatical features of ASL, and manipulate sign utilization to vary meaning. (CHGD-0234-211 & 212)
Class 2, Lab 2, Credit 3 (any quarter)

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 voice interpreting 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-214 Fingerspelling and Number Comprehension
Registration #0850-214
Students improve their ability to comprehend fingerspelled words and manually signed numbers within messages signed at a conversational rate of speed. Instructional activities include games, drills, and voice interpreting. (CHGD 0234-211 & 212)
Lab 6, Credit 3 (F, S)

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 Theory and Practice of Interpreting I
Registration #0850-261
This course addresses the current theory and practice of the profession of interpreting. Topic areas include: (1) general communication principles and their application to the interpreting task; (2) the history of the profession of interpreting; (3) different types of interpreting and related terminology; (4) general skills required in interpreting and current applications by professional interpreters; (5) overview of the professional code of ethics and its rationale; (6) populations served by interpreters, e.g. hearing-impaired speech readers, deaf/blind individuals, multiply-handicapped individuals, etc.; (7) resources available to students related to interpreting and mainstreaming; (8) current issues facing the profession, i.e. multiple roles, mainstreaming specialists.
Class 3, Credit 3 (F, W, S)

NITP-262 Theory & Practice of Interpreting II
Registration #0850-262
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)

NITP-271, 372 The Professional Interpreter I, II
Registration #0850-271, #0850-372
Students develop a broad understanding of interpreting as a profession, national standards for certification, and the concepts contained in the RID Code of Ethics. Other areas of concentration are: interpersonal skills, self-critique, 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, #0850-382
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, #0850-384
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. (NITP-0850-202)
Class 3, Credit 3 (offered annually)

NITP-331, 332 Expressive Transliterating I & II
Registration #0850-331, #0850-332
These two courses concentrate on expressive transliteration as it relates to conceptually accurate English. Students develop the skills required to present a spoken message which is in a signed English mode. Emphasis is placed on conceptual accuracy, accuracy of fingerspelling, vocabulary development, facial expression and body movement, and self-critiquing skills. (NITP-0850-202)
Class 2, Lab 2, Credit 3 (S, F)

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 in creating translations for artistic samples. (NITP-0850-303)
Class 3, Credit 3 (offered annually)

NITP-342 Deaf-Blind Interpreting
Registration #0850-342
Students are prepared to interpret for deaf-blind consumers. These topics, concerning deaf-blindness are included: causes and effects, aspects and issues of deaf-blindness, information and resources, interpreting modes and methods of communication. Practice with deaf-blind consumers is included where possible. (NITP-0850-202, 0850-212, 0850-271, 0850-331)
Class 3, Credit 3 (F, W, S)

NITP-343 Expressive Oral Interpreting/Transliteration
Registration #0850-343
This course concentrates on the skill of expressive oral transliteration. Students develop the skill of receiving an auditory message and reproducing it in a highly visual modality by applying the principles of clear speech production and support techniques. Emphasis will be placed on speech production principles, natural gestures, body language, facial expression, and speed of transmission. (NITP-0850-252)
Class 2, Lab 2, Credit 3 (F, W)

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. (NITP-391)
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)

NITP-396 The Support Service Professional
Registration #0850-396
This course addresses the knowledge and skills necessary for functioning in a variety of educational and/or non-educational settings where the support service provider will have more than one major responsibility. Case studies and practical experience in the field will be used to enhance student's awareness of what it means to be a support service professional. (NITP-0850-281, 0850-391)
Class 3, Credit 3 (S)

NITP-397 Contemporary Studies in Support Services
Registration #0850-397
This course addresses the dynamic nature of support services and special education. As changes and growth happen in the field, this course will address "state of the art" issues. Some examples are: court decisions; state or federal legislation; research findings; developments of new technologies and technology, in-service training programs for faculty and service providers; management of support services. The course will be offered as new topics arise, or if a lecturer with specific expertise is available to conduct the course. (NITP-0850-281)
Class 1-3, Credit variable 1-3 (F, W, S)

NITP-399 Independent Study
Registration #0850-399
This course provides the student with the opportunity for supervised exploration of special topics related to interpreting, deafness, tutoring, notetaking, and/or mainstreaming. (NITP-0850-202, 0850-252, 0850-271, 0850-282, 0850-331, 0850-391)
Credit variable 1-3 (W, S, U)
### Military Science and Reserve Officers' Training Corps

All courses are offered annually.

#### First Year

**MMSM-201 Introduction to Military Science and Basic Map Reading**  
Registration #0701-201  
This course is designed to introduce the student to the ROTC program and military map reading techniques. Topics of primary interest will include: the organization and purpose of ROTC program, the organization of the U.S. Army, and basic military land navigation techniques with emphasis on the U.S. Army grid system, voluntary leadership laboratory, map reading exercise. (The Physical Education course—Orienteering Course, XPEF—may be taken in lieu of this course.)  
Class 1, Credit 1

**MMSM-202 Applied Health Dynamics**  
Registration #0701-202  
This course is designed to give the student a basic understanding of the Army medical system and emergency first aid techniques used in the military. Special emphasis is given to CPR, prevention of injuries, and supervision of preventive medicine activities; voluntary leadership lab. (The Physical Education course—Military Preventive Medicine and First Aid, XPEF—may be taken in lieu of this course.)  
Class 1, Credit 1

**MMSM-203 Military Heritage**  
Registration #0701-203  
This course is designed to provide a practical introduction to the basic military organization and rank structure; the historical basis for customs and traditions found in the military and current discussions on the military and its impact upon society; voluntary leadership laboratory. (The Physical Education course—Drill and Ceremonies, XPEF—may be taken in lieu of this course.)  
Class 1, Credit 1

#### Second Year

**MMSM-301 Military Geography**  
Registration #0701-301  
A continuation of studies in military land navigation (MMSM-201) with special emphasis given to navigation using a map and compass. Geographical concepts and realities are studied as they apply to the solution of military problems. Major topics for discussion will include identification of terrain features, determination of location using resection and intersection techniques, and determination of direction. This course stresses practical application rather than theory; voluntary leadership lab. (The following Physical Education courses, if not previously completed, may be taken in lieu of this course: Orienteering XPEF; ROTC Rangers XPEF 02501; Army Conditioning Drills XPEF 00101.)  
Class 2, Credit 2

**MMSM-302 Psychology and Leadership**  
Registration #0701-302  
This course provides the student the basic principles of leadership and management of human resources; motivation, morale and communication. Special emphasis is placed on applying the theories and models of the behavioral sciences and personnel management to leadership as it functions in a military environment; voluntary leadership laboratory. (The following physical education courses if not previously completed may be taken in lieu of this course: Military Preventive Medicine and First Aid XPEF; ROTC Rangers XPEF 02501; Army Conditioning Drills XPEF 00101.)  
Class 2, Credit 2

#### Third Year

**MMSM-303 The Military and American Society**  
Registration #0701-303  
This course is designed to give the student an introduction to the principles of war and the study of the application of these principles in military history from 1945 to 1970. Primary emphasis is given to the impact of the Vietnam conflict upon American society and the Army. Other discussions will include the Army of the future, the Soviet threat, and a contrast of the U.S. and Soviet Union military systems. Voluntary leadership laboratory. (The following physical education courses if not previously completed may be taken in lieu of this course: Drill and Ceremonies XPEF; ROTC Rangers XPEF 02501; Army Conditioning Drills XPEF 00101.)  
Class 2, Credit 2

**MMSM-510 History of the Military Art**  
Registration #0701-510  
This course examines the evolution of the art of war in the modern period. The course concentrates on World War I, World War II, and selected military experiences, the changing nature of warfare, and civil-military relations.  
Class 4, Credit 4

#### Fourth Year

**MMSM-503 Combined Arms Operations**  
Registration #0701-503  
This course introduces the student to the mission, organization, and capabilities of the branches of the Army. Discussions on the tactics of the Airland Battle 2000, advanced studies in U.S. and Soviet capabilities and tactics, and practical application of these tactics through war gaming; leadership laboratory.  
Class 3, Lab 1, Credit 4

**MMSM-502 Military Administration and Logistic Management**  
Registration #0701-502  
This course includes 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, Lab 1, Credit 4

**MMSM-501 The Military and American Society**  
Registration #0701-501  
This course is designed to give the student an introduction to the principles of war and the study of the application of these principles in military history from 1945 to 1970. Primary emphasis is given to the impact of the Vietnam conflict upon American society and the Army. Other discussions will include the Army of the future, the Soviet threat, and a contrast of the U.S. and Soviet Union military systems. Voluntary leadership laboratory. (The following physical education courses if not previously completed may be taken in lieu of this course: Drill and Ceremonies XPEF; ROTC Rangers XPEF 02501; Army Conditioning Drills XPEF 00101.)  
Class 2, Credit 2

**MMSM-510 Senior Seminar and Project**  
Registration #0701-510  
For military science students who have completed their junior year of military study. The seminar is directly related to military science projects that students are working on and consists of written and/or oral presentations given during the quarter. Students may also be required to present this material to other students in a classroom environment.  
Class 2, Credit 2