

# **RIT**

**Courses 1984-85**

**Rochester Institute of Technology • Rochester, New York**

## Course Numbering

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

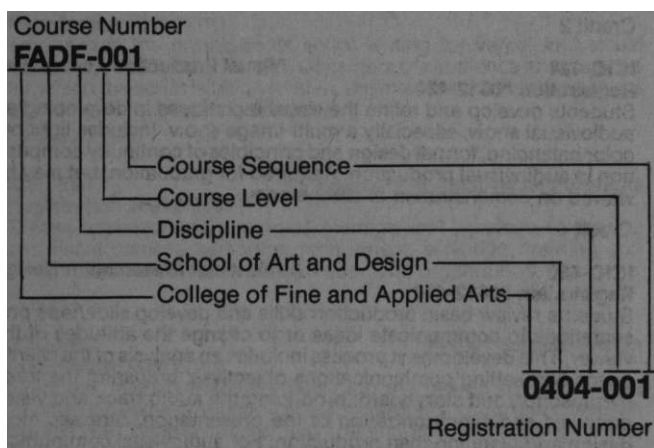
**First letter** College offering the course

**Second and third letters:** School or department of that college

**Fourth letter** Discipline

**First number:** Course level: 0 — Non-credit, 1 —Diploma; 2 or 3 — Lower level degree courses; 4, 5, or 6 — Upper level undergraduate degree courses; 7 or 8 — Courses for graduate credit.

**Second and third numbers:** Course differentiation and sequencing



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

Course prerequisites are shown in parentheses after course descriptions.

### Courses of Study 1984-85

Produced by RIT Communications

Rochester Institute of Technology

Office of Admissions

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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) nor those courses specifically for students of the National Technical Institute for the Deaf. These are described in the separate Continuing Education and NTID catalogs.

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:

**Rochester Institute of Technology**  
**Office of Admissions**  
**One Lomb Memorial Drive**  
**P.O. Box 9887**  
**Rochester, New York 14623**  
 or telephone (716) 475-6631.

# 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; preparing treatment, storyboard, and script; producing audio track and visual materials; synchronization and presentation preparation. Project required. (Photographic skills required) For nonmajors.

Credit 4

#### ICIC-422 Producing Audiovisual Presentations II Registration #0612-422

Basic slide/tape planning and production similar to ICIC-421 but with increased emphasis on scripting and production planning and the unique characteristics of slide/tape as a delivery medium; increased emphasis on synchronization methods and more sophisticated presentation hardware. (ICIC-421) For nonmajors.

Credit 4

#### ICIC-423 Producing Audiovisual Presentations III Registration #0612-423

Similar to ICIC-421 and 422 but with 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 Education 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 and 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-424 Visual Production Techniques Registration #0612-424

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-430 Audiovisual Presentation Design Registration #0612-430

Students review basic production skills and develop slide/tape presentations to communicate ideas or to change the attitudes of the viewer. This development process includes an analysis of the client's needs and setting communications objectives; preparing the treatment, script, and storyboard; producing the audio track and visual materials and synchronization of the presentation. Stresses more design and planning than production. For audiovisual communications majors only. Required for graduation.

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 recording and produce audio-tapes 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-570 Survey of Audiovisual Equipment  
Registration #0612-570**

Permits the student to both survey the wide spectrum of AV equipment available and to do an in-depth analysis of one type of equipment. Different groups of students will then report to the class the results of their in-depth study, using demonstrations, media presentations, visits by dealers or manufacturers and other methods.

Credit 2

**ICIC-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-489, ICIC-580)

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-489, 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. Projects 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-580, 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 techniques to produce slide animation and seamless masking. Emphasis is on design and planning as well as production and use of slides in presentations. (Enrollment for 4 credits requires the prior approval of special effects sequence for multi-image.)

Credit 3-4

**ICIC-587 Production Seminar Special Effects Slides  
Registration #0612-587**

For students with previous special effects slide experience who wish to explore new techniques with the optical camera stand. Students review special effects basics and camera operation, analyze existing special effects slides, and create new slides or slide sequences to meet presentation objectives. Exemplary slides or sequences will be duplicated for special effects library. Portfolio required for entry. (Approval of department; ICIC-585; slide+tape production course such as ICIC-413, 421, or 430; ICIC-580 recommended but not required)

Credit 2

**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/Qtr.

## 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 Programed Instruction**  
**Registration #0613-710**

Students review principles and techniques of preparing programed instruction; then design, produce and validate their own programed instruction materials; includes research and development related to programed instruction and sources of programed materials.

Credit 4

**ICIT-712 Computer Assisted Instruction**  
**Registration #0613-712**

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

Credit 4

**ICIT-715 Instructional Television**  
**Registration #0613-715**

Explores the various uses of television as an instructional medium, e.g., individualized instruction, instruction of mass audiences, stand-alone instruction, integrated instruction. Students must produce at least one television program. Surveys the hardware, technology and software of television.

Credit 4 (offered on demand)

**ICIT-720 Research in Instructional Technology**  
**Registration #0613-720**

Examines the fundamentals of educational research: hypothesis stating, designs, statistical procedures, reporting techniques, and types of research. Specifically examines the research in instruction. Students learn to critique research articles and develop evaluation plans.

Credit 4

**ICIT-721 Evaluation of Training and Instruction**  
**Registration #0613-721**

A course to train students in the development and application of testing methods used in measuring performance, principally cognitive and psychomotor skills, as well as methods to determine overall course effectiveness. Covers methods for both formative and summative evaluation, test construction, and means of validating instructional materials and instructional systems.

Credit 4

**ICIT-722 Research Project**  
**Registration #0613-722**

A variable credit course which allows a student to conduct a research project based on the student's interests and with the advice and consent of a faculty member. A formal research proposal must be submitted before registering for this course (guidelines available from the department). (ICIT-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**  
**Registration #0613-736**

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 acoustics, lighting, ventilation, electric circuits, planning for electronic distribution systems, equipment specifications, spatial relationships, together with architectural engineering and contracting procedures.

Credit 4

**ICIT-750 Instructional Development I**  
**Registration #0613-750**

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

Credit 4

**ICIT-752 Instructional Development III**  
**Registration #0613-752**

Stresses the difference between personnel/faculty development, instructional/program development, and curriculum/organizational development and how the instructional developer or trainer becomes an agent for change. Examines the methods of disseminating and promoting the adoption of innovative methods and materials. Students research special problems related to selected areas of instructional development. (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**

Credit 3

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 product 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.

**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 interrelated purposes. Students must complete a total of three additional job analyses.

Credit 3

**ICIT-758 Developing Instructional Modules**  
**Registration #0613-758**

The course is designed to follow ICIT-756 to give the student extended practice in the development, evaluation, and revision of self-instructional materials. The course, largely self-instructional and project oriented, emphasizes structuring the module, actual module writing, and tryout and revision procedures. Students must have already selected a content area and developed objectives, a course plan, and criterion tests. (ICIT-755, ICIT-756)

Credit 3

**ICIT-762** **Management & Budgeting in**  
**Registration #0613-762** **Instructional Technology**  
 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 each relates to individual learning style. (ICIT-735)  
 Credit 4

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

**ICIT-772** **Group Development and**  
**Registration #0613-772** **Organizational Change**  
 Similar in format to ICIT-770, the course extends the concept and practice of interpersonal communications 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 causing work-oriented, personal and organizational change. Offered on demand. (ICIT-750, ICIT-751, ICIT-757, ICIT-770, IJCC-753, and permission of department.)  
 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, ICIT-751 plus 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, ICIT-751 plus 20 hours of course work)  
 Credit variable (1-3)

## Department of Career and Human Resource Development

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

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

**IJCC-702** **Teaching, Learning, Content**  
**Registration #0615-702** **& Environment**  
 Advising/counseling relationships, learning styles, student activities, motivations, developmental education, and the implications of the "open door" policy are investigated.  
 Credit variable (1-3 credits)

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

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

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

**IJCC-743** **Education/Business/Industry**  
**Registration #0615-743** **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 postsecondary education, differing size business organizations and industrial groups that involve differing levels of technical specialization are studied.  
 Credit 2

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

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

**IJCC-747** **Career Concepts: Services**  
**Registration #0615-747**  
 These three courses form a single set and are separated only to facilitate registration and scheduling flexibility.  
 Each of these three courses concentrates on particular careers. Production includes manufacturing, construction, mining, skilled trades, design and engineering related fields, and food processing and the field of agriculture, fisheries, etc. Commerce covers general business, banking and finance, sales and advertising, communications, hospitality and tourism, retail and wholesale distribution and related fields. Service includes allied health careers, education, government and civil service, law and criminal justice careers, and other service careers.

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

**IJCC-748 Information Retrieval Systems  
Registration #0615-748 In Career Planning**

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 the 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 in 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) assisting 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 judgement 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 employer expectations.

Credit 3

**IJCC-752 Career Education in Colleges &  
Registration #0615-752 Special Settings**

The course goals are to develop the abilities and knowledge necessary to function effectively in college career education and information centers and other organizations helping adults develop career plans. Topics include career education components in community/junior and four year colleges and universities: multiple, middle, and late careers; advocacy; spouse and family concerns; and special settings for career assistance.

Credit 3

**IJCC-753 Group Dynamics for Career Development  
Registration #0615-753**

This course concentrates on the abilities needed to plan, conduct and evaluate various group counseling and peer assistance processes as used in assisting individuals to formulate career plans. Each participant will understand the appropriate functions, advantages and disadvantages of different group dynamic procedures; and will demonstrate the required skills of attending, listening, guidance, problem solving, and decision making needed to plan and moderate such sessions.

Credit 3

**IJCC-754 i Human Resources Topics  
Registration #0615-754**

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

Credit variable (1-4 credits)

**IJCC-760 Career Counseling Skills  
Registration #0615-760**

Students are introduced through demonstration and role playing to selected interviewing and counseling skills including attending, listening, questioning, paraphrasing, reflection of feelings, giving directions, and interpreting. The primary tenets of related counseling theories are presented and discussed.

Credit 4

**IJCC-762 Career Education Seminar—Women  
Registration #0615-762**

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

Credit 3

**IJCC-763 Career Education Seminar—Handicapped  
Registration #0615-763**

An elective course for students in Career and Human Resource Development concentrating on the ability to provide effective counseling for handicapped persons who wish to plan and succeed in desired careers.

Credit 3

**IJCC-777 Career Development Project  
Registration #0615-777**

This is a variable (1-3) credit course that is required of all students unless they have had sufficient approvable experience. It is an opportunity to practice one or more of the defined functions in career education or human resource development. Proposals approved by director required prior to enrollment. (IJCC-742, IJCC-760, 20 additional hours of coursework)

Credit variable (1-3 credits)

**IJCC-840 Teaching Internship  
Registration #0615-840**

An individual arrangement with an appropriate community or junior college will be made for those persons not having sufficient experience. This will provide definite teaching assignments and responsibilities, together with participation in other faculty functions, including advising, committee work, planning, and student evaluation on a full semester or term basis at a two year college. Supervision, assistance, and evaluation will be provided by a mentor in the participating college and by the CHR. Proposals approved by director required prior to enrollment. (IJCC-742, IJCC-760, 20 additional hours of coursework)

Credit variable (1-3 credits)

**IJCC-850 Special Projects  
Registration #0615-850**

This course provides for independent study, investigation, or research activity in subject matter areas not formalized by the Center's program, but having specialized value. Proposals approved by director required prior to enrollment. (IJCC-742, IJCC-760, 20 additional hours of coursework)

Credit variable (1-3 credits)

## School of Computer Science and Technology

School of Computer Science and Technology courses are offered at least once annually, except as noted.

### Undergraduate Courses Service Courses

Service courses are offered by the School of Computer Science and Technology for students in other departments. These courses may not be taken by Computer Science and Technology majors.

#### 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

#### 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 implementations (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 (Not offered in 1984-85)

#### 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

#### 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 file I/O, COBOL control structures, arithmetic operations and report editing, control break processing, and table handling. Students will write programs which adhere to specific programming and documentation standards. (ICSP-210)

Class 4, Credit 4

#### ICSP-303 Advanced Business Applications Registration #0601-303

An advanced course developing more expertise in the application of COBOL to business and industrial problems. Topics include advanced COBOL constructs, direct and indexed sequential access methods, sorting and searching, and database system access using commands embedded in the COBOL source. Students will write programs which adhere to specific programming and documentation standards. (ICSP-300)

Class 4, Credit 4

#### ICSS-200 Survey of Computer Science Registration #0603-200

An introduction to the field of computer science and technology for non-majors, serving as a basic literacy course and as a first course in the computer science minor sequence. Topics include an introduction to Pascal, the use of Pascal as a vehicle for the design and implementation of simple programs, basic computer organization concepts, and the impact of computers on society. Programming projects will be required.

Class 4, Credit 4

#### ICSS-410 Computer Concepts and Software Systems Registration #0603-410

An introduction to the overall organization of digital computers and operating systems for non-majors. Topics include basic machine organization, an overview of machine and assembly language, properties of common I/O devices, synchronization and scheduling of processes, physical and virtual memory management techniques, resource allocation and protection, and user interface issues. (ICSP-210)

Class 4, Credit 4 (Not offered in 1984-85)

#### ICSS-411 Data Communications and Computer Networks Registration #0603-411

An introduction to data communications hardware and software, and the use of these components in computer networks. Topics include communication system components, communications software, packet switching, network control, common carrier issues, long-haul vs. local area networks, and performance considerations (ICSP-210)

Class 4, Credit 4 (Not offered in 1984-85)

#### ICSS-483 Applied Database Management Registration #0603-483

An introduction to issues in data management in organizations, and the role of database management systems in addressing these issues. Topics include the uses and needs for data in organizations, review of simple data structures, the influence of computer architecture and I/O devices on the management of data, basic file organizations supporting data management (sequential, direct access, indexed sequential), logical data models and their physical implementation, database administration, and DBMS selection (ICSP-300 or permission of instructor)

Class 4, Credit 4 (Not offered in 1984-85)

### Computer Science Courses

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

#### ICSP-241 Programming I Algorithmic Structures Registration #0601-241

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 (sequencing, selection and repetition), modularity via procedures and functions, parameter mechanisms, and identifier scope in block structured languages. Programming assignments are an integral part of the course.

Class 4, Credit 4

#### ICSP-242 Programming II Data Structures Registration #0601-242

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**

A study of assembly language concepts and programming methods, including computer organization, assembly process, addressing, binary arithmetic, repeatability, storage allocation, subroutine linkage, looping 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** **Fundamentals**

A study of systems programming concepts and techniques. Topics include the roles of assembly language 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. (ICSS-315, ICSS-325)

Class 4, Credit 4

**ICSP-307** **Business Applications**  
**Registration #0601-307** **Programming**

An introduction to the concepts and techniques relevant to the business programming environment. Structured COBOL is used to solve common business application problems, including report generation, sorting and table processing and generation, and complex I/O processing. Project management, programming teams, and the module stubs for prototype development are used in the course. Programming projects will be required. (ICSS-325)

Class 4, Credit 4

**ICSP-319** **Scientific Applications**  
**Registration #0601-319** **Programming**

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**

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, and subroutines. Emphasis is placed on developing well structured, modular programs. Programming projects will be required. (ICSP-243)

Class 4, Credit 4 (Not offered in 1984-85)

**ICSP-450** **Programming Language Concepts**  
**Registration #0601-450**

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**

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-485)

Class 4, Credit 4

**ICSG-499** **Cooperative Education**  
**Registration #0602-499**

One quarter of appropriate work experience in industry.

Credit 0

**ICSS-202** **Introduction to Computer**  
**Registration #0603-202** **Science**

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, combinatorial and sequential circuit design, flip-flops and adders, storage mechanisms and their organization, instruction fetch decode and execution in a simple CPU, input/output subsystems, interrupts, and variations in memory addressing (ICSP-305)

Class 4, Credit 4

**ICSS-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 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**  
**Registration #0603-325** **Management**

A course on the considerations associated with the external storage of data. Topics include file organization (sequential, indexed and direct access), space 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 ICSP-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**  
**Registration #0603-360** **for Transfer Students**

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**

Topics include an introduction to switching theory, sequential circuit analysis and synthesis, error detection, error correction networks, speed-up techniques, serial and parallel approaches, interface techniques, and comparative studies of digital computer architecture. (ICSP-315)

Class 4, Credit 4

**ICSS-420 Data Communications Systems****Registration #0603-420**

Data communication and telecommunication systems, including communication techniques, communication interfaces; common carrier implications and tariffs, exchanges; concentrators, multiplexors, front-end computers; buffering, response time and human factors; network cost and design analysis, software considerations. (SMAM-309 or SMAM-352, and third year standing in Computer Science and Technology)

Class 4, Credit 4

**ICSS-430 Numerical Methods****Registration #0603-430**

Topics include introductory error analysis, roots of an equation, solution of systems of linear and non-linear equations, interpolation, power series calculation of functions, numerical integration and first-order ordinary differential equations. The computational aspects rather than mathematical 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 (not offered in 1984-85)

**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 PERT/CPM (scheduling tools), structured English, structured flowcharts, and decision trees (description tools), data-flow diagramming (description and design tool), and hierarchical design of programming system (design tool). A study of Yourdon'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 and multiprocessing, processor scheduling and resource management, memory management, overlays, static and dynamic relocation, virtual memory, file systems, logical and physical I/O, device allocation, I/O processor scheduling, process and resource protection. (ICSS-315, ICSS-325)

Class 4, Credit 4

**ICSS-470 Finite State Machines and Automata****Registration #0603-470**

Topics include finite state models, machine capabilities, descriptive methods, decomposition methods, regular expressions, bilateral analysis and synthesis, sequential iterative systems, and space-time transformations. (ICSS-315)

Class 4, Credit 4

**ICSS-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 on the formal aspects of database management. Topics include data organization and structure, relational, hierarchical, and network approach, 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 I****Registration #0603-520**

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

Class 4, Credit 4

**ICSS-521 Introduction to Microprocessor Systems****Registration #0603-521**

An examination of microcomputers and microcomputer applications, 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****Registration #0603-525**

A survey of the three basic programming language processors. Topics include design and construction of language processors, formal syntactic definition methods, parsing techniques, and code generation techniques. Laboratory work includes actual construction of language processors. (ICSS-325)

Class 4, Credit 4 (not offered in 1984-85)

**ICSS-530 Fundamentals of Discrete Simulation****Registration #0603-530**

An introduction to discrete simulation modeling. Methods for the design of discrete simulation models are examined, and simulation models are designed and implemented using a general purpose discrete simulation language. Related topics such as the validity and appropriateness of 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****Registration #0603-540**

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****Registration #0603-541**

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****Registration #0603-545**

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-560****Compiler Construction Laboratory****Registration #0603-560**

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****Registration #0603-565**

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****Registration #0603-570**

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****Registration #0603-580**

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 processors). Programming projects will be required. (ICSP-450)

Class 4, Credit 4

**ICSS-585****Systems Programming Laboratory****Registration #0603-585**

Systems programming techniques applied to the design and implementation of a large systems program or module. Past projects have included floating point simulators, a small data base system, system utilities, and a command language interpreter. (ICSS-580)

Class 4, Credit 4

**ICSS-590****Seminar in Computer Science****Registration #0603-590**

Current advances in computer science.

Class 2-4, Credit 2 - 4

**ICSS-599****Independent Study****Registration #0603-599**

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****Registration #0603-610**

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****Programming I****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. Techniques will be introduced for data representation and structuring, sorting, and searching. (The material of ICSS 703 will be covered in this course.) Applications in business, science, mathematics, engineering, education, systems programming, and graphics will be covered. (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

**ICSS-703****Algorithm\* and Data Structures****Registration #0603-703**

Topics include data representation, data structures such as: linked lists, trees, stacks, queues, hash tables, sparse matrix techniques. Searching and sorting techniques, file structure and maintenance. Programming projects will be required. (Programming proficiency in some high level structured programming language.)

Credit 4

**ICSS-706****Foundations of Computing Theory****Registration #0603-706**

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; Data Structures)

Credit 4

**ICSS-708****Computer Organization and Programming****Registration #0603-708**

An introduction to the basic concepts and terminology of hardware and software systems including such topics as elementary circuit design, interrupt programming, and virtual memory. The intent is to prepare the student for future study in computer architecture and operating systems. Programming projects will be required. (Assembly Language: Data Structures)

Credit 4

**ICSS-709****Programming Language Theory****Registration #0603-709**

A survey of several important modern programming languages, their methods of specifying data and control structures, and their approach to functionality; syntax and semantics specification systems. Programming projects will be required. (Assembly Language; Data Structures)

Credit 4

**ICSS-720****Computer Architecture****Registration #0603-720**

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-721** **Microprocessors and**  
**Registration #0603-721** **Microcomputers**  
 A study of microprocessors, microcomputers, and their applications. Topics include microprocessor hardware, microcomputer organization, software, microcomputer programming, interface techniques and development trends. Case studies will be provided. Programming projects will be required. (ICSS-720)

Credit 4

**ICSS-730** **Modeling and Simulation I**  
**Registration #0603-730**  
 Computer simulation techniques are examined. Topics include abstract properties of simulations modeling, analysis of a simulation run, and statistics. One or more general purpose simulation languages will be taught. Programming projects will be required. (Data Structures; Statistics)

Credit 4

**ICSS-731** **Modeling and Simulation II**  
**Registration #0603-731**  
 Design and validation of systems models using advanced statistical methods and queuing theory. Programming languages that support simulation and procedural applications (e.g., Simscript, Simula, SLAM). Continuous system simulation and programming packages. Applications to world population models, computer operating systems, etc. Programming projects will be required. (ICSS-530 or ICSS-730)

Credit 4

**ICSS-735** **On-Line Information**  
**Registration #0603-735** **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. (Data Structures; Assembly Language; a background in systems analysis is recommended)

Credit 4

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

Credit 4

**ICSS-744** **Data Communications**  
**Registration #0603-744** **& 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, queuing theory and delay analysis. Additional emphasis will be on the fundamental protocols for computer communication. (Statistics, ICSS-708)

Credit 4

**ICSS-745** **Data Communications**  
**Registration #0603-745** **& Networks II**  
 A second course in computer communication and networks. Emphasis will be on higher level protocols and local networks. Included in this course will be design and analysis of communication protocols, routing algorithms, satellite and local networks. (ICSS-744, ICSS-720)

Credit 4

**ICSS-770** **Fundamentals of**  
**Registration #0603-770** **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. (Data Structures)

Credit 4

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

Credit 4

**ICSS-809** **Operating Systems I**  
**Registration #0603-809**  
 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)

Credit 4

**ICSS-810** **Operating Systems II**  
**Registration #0603-810**  
 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, like 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**  
**Registration #0603-811**  
 This is 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-809 or 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. (Data Structures)

Credit 4

**ICSS-846** **Information Storage and**  
**Registration #0603-846** **Retrieval**  
 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. (Data Structures)

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-706)

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-856** **Theory of Parsing**  
**Registration #0603-856**  
 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**  
 A study of the theory, techniques, and tools for: 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 masters degree program. Student must submit an acceptable thesis proposal in order to enroll.  
 Credit 4

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

## Computer Systems Management

**ICSM-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**  
 A study of management techniques for the evaluation, selection, and implementation of computer systems. Both hardware and software aspects are investigated. Topics include methodologies, possible problems, and common pitfalls involved in the processes. Students will be expected to make group presentations based on research. Outside speakers are invited for specific topics. (ICSM-719)  
 Credit 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

## School of Engineering Technology

### Upper Division Civil Engineering Technology

**ITEC-099** **Introduction to CET**  
**Registration #0608-099**  
 This course will introduce CET transfer students to RIT, showing them the difference in types and methods of instruction and what is expected in the way of student ethics. Guest lectures and field trips will be used to show the many aspects of the industry.  
 Class 1, Credit 1

**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 4

**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) ITEC-421 Hydraulics Lab must be taken concurrently.  
 Class 3, Credit 3

**ITEC-421** **Hydraulics Laboratory**  
**Registration #0608-421**  
 Laboratory to be taken concurrently with ITEC-420. Seven laboratory exercises are introduced to support lecture material.  
 Lab. 3, Credit 1

**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-428** **Technical Communications**  
**Registration #0608-428**  
 The principles of organizing data and information into clear and concise engineering memos, letters, reports, and presentations. The techniques of library research and oral presentations, including audiovisual, are also stressed. (Basic college writing)  
 Class 4, Credit 4

**ITEC-432** **Water and Wastewater Transport Systems**  
**Registration #0608-432**  
 Discussion of surface and groundwater sources. The hydraulic design of sanitary and storm sewer systems, and water distribution systems. (ITEC-420)  
 Class 2, Recitation 3, Credit 3 (Effective 1985-86, Class 2, Credit 2)

**ITEC-434** **Environmental Pollution**  
**Registration #0608-434**  
 The study of various forms of pollution including air, thermal, noise, erosion, pesticides, radiation, and visual pollution, with the investigation of the sources, measurement, methods of control, legislation, codes, and enforcing agencies, water pollution and land pollution.  
 Class 3, Credit 3 (not offered after 1985-86)

**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 codes applicable to plumbing, heating, air-conditioning, and operation and control will be studied.

Class 3, Credit 3 (Effective 1986-87, Class 2, Credit 2)

**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 (not offered after 1985-86)

**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 economic aspects of equipment ownership, principles of equipment management, and earthmoving project analysis.

Class 3, Credit 3, (Effective 1985-86, Class 4, Credit 4)

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

Class 3, Credit 3 (Effective 1985-86, Class 4, Credit 4)

**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 ITEC-527 or permission of instructor)

Class 3, Credit 3 (Effective 1986-87, Class 4, Credit 4)

**ITEC-482 Hydrology**  
**Registration #0608-482**  
 Course presents major theoretical and practical considerations of hydrology in application to study Groundwater Hydraulics, Hydraulic Structures, Water Transportation Systems, and Transportation.

Class 4, Credit 4 (Effective 1985-86)

**ITEC-485 Hydraulic Structures**  
**Registration #0608-485**  
 This course will study analysis and design of dams, spillways, storage reservoirs, canals, tunnels and river diversion systems for the effective utilization of water resources, energy, soil conservation, and flood control. Principles of maintenance and operation of hydraulic structure will also be studied. (ITEC-432).

Class 4, Credit 4 (Effective 1986-87)

**ITEC-490 Structural Analysis**  
**Registration #0608-490**  
 Introduction to the analysis of statically determinate and indeterminate structures by classical and modern techniques. The types of structures covered include beams, trusses, and frames which are loaded in the plane of the structure. Topics include influence lines and approximate methods. The course is intended to bridge the gap between the previous course in Applied Mechanics of Materials and the subsequent course in Structural Design. (ITEC-404)

Class 4, Credit 4, (Effective 1985-86)

**ITEC-495 Structural Design**  
**Registration #0608-495**  
 Structural design in reinforced concrete and structural steel. In the reinforced concrete portion of the course, the working stress method is briefly covered, but emphasis is on the strength method; members and frames are primarily of the indeterminate type. In the structural steel portion, the working stress method is emphasized; members and frames are primarily of the determine type. In both portions the accent is on building structures. Provisions of the ACI code and AISC specification will be followed. (ITEC-404, ITEC-490)

Class 4, Credit 4 (Effective 1985-86)

**ITEC-499 Co-operative Education**  
**Registration #0608-499**  
 One quarter of appropriate work experience in industry.  
 Credit 0

**ITEC-500 Labor Relations**  
**Registration #0608-500**  
 Introduction to the fundamentals of labor law and its applications to the construction industry. Topical areas include the Fair Labor Standards Act, Davis-Bacon Act, Title VII of the Civil Rights Act, National Labor Relations Act, hiring halls, pre-hire agreements, strikes and Open Shop construction. Several guest speakers representing government, private industry and organized labor also lecture.  
 Class 4, Credit 4 (Effective 1985-86, Class 2, Credit 2)

**ITEC-505 Construction Safety**  
**Registration #0608-505**  
 General safe practices in construction operations. Safety standards, both voluntary and mandatory. Employers' responsibilities under the provisions of OSHA and state labor law. A portion of this course is audiovisual.  
 Class 3, Credit 3 (Effective 1986-87, Class 2, Credit 2)

**ITEC-508 Cost Estimates**  
**Registration #0608-508**  
 A study of construction cost determination and bidding procedure; including construction business practices; overhead cost, breakeven analysis, profit determination and statistical cost forecasting. (ITEF-436, ITEC-509 or may be taken concurrently)  
 Class 2, Credit 2 (not offered after 1986-87)

**ITEC-509 Cost Estimating**  
**Registration #0608-509**  
 An introduction to direct cost estimating of a construction project. The estimating techniques reviewed include productivity analysis, material pricing, and quantity take-offs. (ITEC-422 may be taken concurrently)  
 Class 2, Credit 1 (Effective 1986-87, Class 3, Credit 2)

**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: setting, filtration, softening, disinfection, organics, removal, and plant design construction elements.  
 Class 3, Lab. 2, Credit 3 (Effective 1986-87, Class 2, Credit 2)

**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 or ICSP-220)  
 Class 2, Credit variable 1-2

**ITEC-514 Land Planning**  
**Registration #0608-514**  
 The environmental and social aspects of land planning are covered as well as the engineering and cost considerations. Topics included are zoning concepts, master plans, subdivision regulations and design criteria, flood plains, environmentally sensitive areas, wetlands, other planning and control tools, and as solar access planning.  
 Students are involved in an independent project consisting of a concept design for a subdivision or other land use project. Extensive use is made of field trips and attendance at appropriate meetings or work sessions. (Drafting, surveying, and ITEC-432)  
 Class 2, Credit 2 (Effective 1985-86, Class 3, Credit 4)

**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-518** **Masonry Design**  
**Registration #0608-518**  
 An introduction to masonry design and construction. Both brick and concrete masonry will be covered, with the emphasis on concrete masonry. Topics covered include terminology, non-reinforced masonry, reinforced masonry, joint reinforcement, types of mortar, design of bearing walls and partitions. Use will be made of the publications of the Brick Institute of America, the National Concrete Masonry Association, and the Portland Cement Association. (ITEC-404)

Class 2, Credit 2 (Effective 1986-87)

**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-522** **Principles of Treatment of Water and Sewage II**  
**Registration #0608-522**  
 Principles of microbiology and their application to water and wastewater. Principles and practice of water and wastewater treatment processes with emphasis on settling, chemical precipitation, adsorption, disinfection, granular medium filtration, aerobic suspended and attached growth, and anaerobic suspended growth. (ITEC-438)

Class 3, Lab. 3, Credit 4 (Effective 1986-87)

**ITEC-525** **Hazardous Waste**  
**Registration #0608-525**  
 Identification, classification and legal aspects of hazardous waste. Generator, transport, storage and disposal of hazardous waste with emphasis on chemical landfill and incineration of hazardous and toxic wastes. The possibility of using genetic engineering in treating hazardous and toxic wastes. (ITEC-438)

Class 4, Credit 4 (Effective 1986-87)

**ITEC-526** **Industrial Wastewater**  
**Registration #0608-526**  
 Industrial wastewater characterization and waste flow survey. Case studies of selected industrial wastewater. (ITEC-438)

Credit: 2 or 4 Class 2, Lab. 6 (For students taking 4 cr.) (Effective 1986-87)

**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) ITEC-528 Soil Mechanics Laboratory must be taken concurrently.

Class 3, Credit 3

**ITEC-528** **Soli Mechanics Laboratory**  
**Registration #0608-528**  
 Laboratory to be taken concurrently with ITEC-527. Exercises will include tests in internal friction by direct shear, unconfined compression, triaxial compression, consolidation and compaction.

Laboratory 2, Credit 1

**ITEC-530** **Transportation Engineering**  
**Registration #0608-530**  
 This course exposes the student to the fields of highway, airport, and rail engineering. The areas of administration, planning, design, construction, maintenance, and operation are covered; however, after the introductory material is presented, stress is put on specific skills needed in these fields, including highway, rail, and airport standards, geometry and alignment, drainage, earthwork, safety standards, and structures.

Ample field exposure to all elements is part of the formal structured program. (ITEC-422 may be taken concurrently)

Class 4, Credit 4 (Effective 1986-87)

**ITEC-535** **Pavement Design**  
**Registration #0608-535**  
 This course expands upon the background of the Transportation Engineering core-course, providing additional detailed engineering knowledge on pavement design. Included with the theoretical knowledge will be the development of, and practice in, the necessary design skills. The course includes not only the design of new pavements, but also addresses the very active programs in pavement recycling, bridge and pavement rehabilitation, and strengthening. Problems are attacked in a practical manner, utilizing the expertise of national organizations and state highway departments involved in this work.

Class 3, Lab. 1, Credit 4 (Effective 1986-87)

**ITEC-544** **Contracts & Specifications**  
**Registration #0608-544**  
 This course includes a fundamental overview of contract law, followed by the application of this material into the contracts of construction. Subsequently, the student is exposed to construction specification. Substantial use is made of actual documents such as those of the New York State Department of Transportation, the Construction Specification Institute, and trade standards such as an ANSI, ASTM, and others. Students are required to develop and assemble a mock-up set of contract documents.

Class 3, Credit 3, (Effective 1986-87, Class 2, Credit 2)

**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 water pollution control treatment processes. Field trips to water pollution control plants. Students are required to prepare a technical report based on laboratory study or actual treatment plant data. (ITEC-438, -520 and permission of instructor)

Class 2, Lab. 3, Credit 4 (not offered after 1985-86)

**ITEC-550** **Construction Practices**  
**Registration #0608-550**  
 An introduction to basic construction management and organization with CPM scheduling, estimating, bidding, heavy construction techniques, methods, and equipment applications.

Class 3, Recitation 2, Credit 4 (Effective 1986-87, Class 2, Credit 2)

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

Class 4, Credit 4

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

Credit 1-4

**ITEC-560** **Construction Project Management**  
**Registration #0608-560**  
 An introduction to basic construction management and organization. Topics include company and project organization, contracts, specifications, bonds, insurance, bidding, cost and financial accounting, labor relations, and project planning and scheduling. (ITEC-509 and ITEC-422 may be taken concurrently.)

Class 4, Credit 4 (Effective 1986-87)

**ITEC-561** **Construction Project Management II**  
**Registration #0608-561**  
 An overview of advanced applications in construction management through precedence modeling. Both CPM and PERT precedence models will be used for scheduling, resource leveling and cost control. (ITEC-560)

Class 4, Credit 4 (Effective 1986-87)

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

Class 3, Credit 3

**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

## Electrical Engineering Technology Lower Division

**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, Kirchoffs Laws, Thevenin's Theorem, Mesh analysis, and superposition. (Co-requisite SMAM-204)

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, power factor correction, resonance, maximum power transfer, bandwidth, and three phase circuits. (ITEE-201)

Class 3, Lab. 3, Credit 4

**ITEE-203** **Electronic Devices**  
**Registration #0609-203**  
 An introduction to electronic devices and systems. Emphasis on semiconductor diodes (including zener and other two-terminal devices) and transistors (BJTs and FETs), basic operation, biasing and cascading. SCRs' triacs and other npn devices will be discussed. (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 such as comparators, amplifiers, signal generators, differential amplifiers and active filters. The basics of switching circuits will also be studied. (ITEE-301)

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**  
 An introductory course involving the development of skills in electrical circuit layout, circuit board fabrication and assembly. Drafting and computer aided design will be included. (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 #0609-401**  
 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, Rec. 2, Credit 4

**ITEE-402** **Circuit Theory II**  
**Registration #0609-402**  
 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 2, Rec. 2, Credit 3

**ITEE-403** **Advanced Circuit Theory**  
**Registration #0609-403**  
 Transient and steady-state response of linear circuits to d.c., a.c. and nonsinusoidal 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 #0609-404**  
 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 #0609-405**  
 A course in the fundamentals of control systems, as used from the stand-point 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 #0609-409**  
 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 makeup for user-friendly relationships; and oral presentation of ideas.  
 Lecture 2, Recitation 3, Credit 4
- ITEE-411** **Electrical Principles for Design I**  
**Registration #0609-411**  
 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 #0609-412**  
 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 #0609-414**  
 Basic study of important electrical concepts for both A.C. and D.C. circuits. Topics covered include AD/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 #0609-424**  
 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 #0609-425**  
 Steady-state ac circuits both single and three phase, transformers, dynamometer theory, motor characteristics, 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 #0609-428**  
 Biasing of bipolar and field effect transistors is reviewed. Design and analysis of Class A amplifiers using small signal h-parameters is presented. Included are the topics of feedback and frequency response in multistage amplifiers. (Co-requisite ITEE-402)  
 Class 3, Lab. 3, Credit 4
- ITEE-429** **Advanced Electronics**  
**Registration #0609-429**  
 Analysis of small and large signal transistor amplifiers is covered, including elements of power supply design. (ITEE-403)  
 Class 3, Lab. 3, Credit 4
- ITEE-437** **Computer Programming Techniques**  
**Registration #0609-437**  
 The objective of this course is to learn to write good, well documented programs using PASCAL as the programming language. The emphasis of the program will be to learn modern programming techniques and methods of solving problems using computers.  
 Class 4, Credit 4
- ITEE-471** **Topics in Computer Engineering Technology**  
**Registration #0609-471**  
 A course designed to broaden the knowledge of computer technologists. Topics covered include FORTRAN. Advanced 8-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 #0609-472**  
 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 #0609-499**  
 One quarter of appropriate work experience in industry.  
 Credit 0
- ITEE-520** **Electrostatic and Magnetic Fields**  
**Registration #0609-520**  
 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 #0609-524**  
 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 #0609-527**  
 A course to provide an understanding of current semiconductor 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 Minicomputers**  
**Registration #0609-528**  
 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. (ICSP-205)  
 Class 3, Lab. 3, Credit 4
- ITEE-530** **Application of Discrete and Integrated Circuit Elements**  
**Registration #0609-530**  
 Selected topics in the application of discrete circuit components to linear and non-linear circuit design. Theory and application of integrated circuit op-amps in the design of active filters, analog computers, feedback control systems and function generators. (ITEE-428)  
 Class 3, Lab. 2, Credit 4
- ITEE-532** **Power Amplifier Design**  
**Registration #0609-532**  
 The design of Class A and B low-frequency power amplifiers is studied including the use of feedback and heat sinking requirements. Principles of design for Class C RF amplifiers and Class D voltage regulators are also covered. (ITEE-428)  
 Class 3, Lab. 2, Credit 4
- ITEE-534** **Communications Systems I**  
**Registration #0609-534**  
 This course provides an introduction to AM, DSB, SSB, VSB, and FM modulation systems. Fourier transforms are utilized to demonstrate relationships between the time and frequency domain. Circuits for modulators and demodulators are discussed. (ITEE-428)  
 Class 3, Lab. 2, Credit 4

**ITEE-535 Communication System\* II****Registration #0609-535**

Topics include sampling theorem, time division multiplexing, pulse modulation systems, pulse code modulation and quantization, phase-shift keying, noise, noise effects in analog and digital communication systems, analog and digital system performance, and an introduction to statistical methods. (ITEE-534)

Class 4, Credit 4

**ITEE-536 Control Systems II****Registration #0609-536**

A review of ITEE-404, Control Systems I; Root locus and Nichols charts will also be discussed. Design of control systems for specific application and performance criteria; a study of control motors and components for DC/AC control systems; application of control theory to the solution of practical system problems. Time domain analysis including state variables, matrices and numerical solutions to state equations will be studied. Digital computer control utilizing real-time controllers and z-transforms will also be included. (ITEE-404)

Class 3, Lab. 2, Credit 4

**ITEE-538 Digital Computer Design I****Registration #0609-538**

Design of logic circuits using 7400 series TTL gates; a study of TTL flip-flops, one shots and oscillator circuits; design of timing circuits, shift registers and counters. (ITEE-424)

Class 3, Lab. 2, Credit 4

**ITEE-539 Digital Computer Design II****Registration #0609-539**

A continuation of ITEE-538 with application of logic circuits to computer design. Multiplexers, semiconductor memories, ALUs and their applications to computers and microprocessors are considered. The basic operation of computers, and computer systems are examined. Machine language programming, indexing and indirect addressing and interrupt programming are introduced. The student will build a small prototype minicomputer for use in this course. (ITEE-538)

Class 3, Lab. 2, Credit 4

**ITEE-542 Microprocessors****Registration #0609-542**

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

Class 3, Lab. 3, Credit 4

**ITEE-543 Minicomputers, Controllers and Peripherals****Registration #0609-543**

A study of the most common peripherals used with microprocessors and minicomputers. Peripherals include UARTs, IC Timers, TTYs, MODEMS, CRT drivers, disc drives, cassettes, card readers, line printers, and D/A and A/D converters. Methods of interfacing these peripherals to minicomputers and microprocessors are emphasized. (ITEE-539)

Class 3, Lab. 3, Credit 4

**ITEE-546 Industrial Electronics****Registration #0609-546**

Design of SCR/Traic control circuits for D.C. and A.C. motors; control of lights and heating elements with D.C. power supplies and polyphase rectifier circuits; speed control of D.C. and A.C. motors; process control systems utilizing solid state electronic circuits. (ITEE-532)

Class 3, Lab. 2, Credit 4

**ITEE-547 Digital Processing of Signals****Registration #0609-547**

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. Programming projects will be assigned. (SMAT-422, ITEE-530)

Class 3, Recitation 2, Credit 4

**ITEE-550 Power Systems I****Registration #0609-550**

Basic elements of a power system, energy sources, substation configuration, load cycles, balanced and unbalanced three phase circuits, power factor correction, transmission line configurations and impedances, voltage regulation of transformers, and the per unit system are studied. The symmetrical component method of analysis is introduced. (ITEE-425 or ITEE-412)

Class 3, Lab. 2, Credit 4

**ITEE-551 Protective Relaying****Registration #0609-551**

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

Class 3, Lab. 2, Credit 4

**ITEE-552 Power Systems II****Registration #0609-552**

The symmetrical component method of three phase circuit analysis is used for fault analysis. Various methods of circuit reduction are developed. Lightning and surge protection, load flow, economic operation, and system stability are covered. System protection is introduced. (ITEE-550 or permission of instructor)

Class 4, Credit 4

**ITEE-554 Electronic Optic Devices****Registration #0609-554**

Basic photometry is discussed. Light emitting and light receiving devices are covered with circuits and applications. Optics is introduced with laser theory and fiber-optics.

Class 3, Lab. 2, Credit 4

**ITEE-555 Transmission Lines and Antennas****Registration #0609-555**

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)

Lecture 3, Lab. 2, Credit 4

**ITEE-560 Microelectronic\* I****Registration #0609-560**

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.

Lecture 3, Recitation 2, Credit 4

**ITEE-561 Microelectronics II****Registration #0609-561**

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)

Lecture 3, Recitation 2, Credit 4

**ITEE-562 Construction and Failure Analysis****Registration #0609-562**

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)

Lecture 3, Recitation 2, Credit 4

**ITEE-580 Senior Project****Registration #0609-580**

Selected independent study of design project by electrical technology students with the approval of the department. Approval must be granted first week of fall or winter quarter for spring quarter registration.

Class/Lab. as required. Credit 4

## 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 group technology, 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 the design and application of dies.

Class 3, Recitation 2, Credit 4

### ITEF-473

#### 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 in the Manufacturing Data Systems, Inc., time-sharing terminals to produce NC tapes.

Class 3, Credit 4

### ITEF-475

#### 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. Computer Aided Process Planning and FMS are dealt with as they apply to CAM. Lab sessions will be devoted to system building.

Class 3, Lab. 2, Credit 4

### ITEF-481

#### Registration #0617-481

Principles and applications of basic methods and techniques to improvement of the worker-job time relationship. Job standards, predetermined time, time and motion study, human engineering in relation to work-space designed for efficient use of laboratory.

Class 3, Recitation 2, Credit 4

### ITEF-485

#### 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

#### 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

#### Registration #0617-499

Class 0, Credit 0

### ITEF-502

#### 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 Machining, Electrochemical Machining, Electrical Discharge Machining, Ultrasonic Machining, Electron Beam Machining, Laser Machining will be made. Also included in the course are Surface Finishing, Microfinishing. 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

#### 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

#### 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 is presented.

Class 4, Recitation 1, Credit 4

### Compact II

### Computer-Aided Manufacturing

### Work Simplification and Measurement

### Robot\* In Manufacturing

### Production Control

### Manufacturing Technology Co-op

### Advanced Manufacturing Processes

### Process Design I, II

### Quality Systems

**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

**ITEM-404** **Applied Mechanics of Materials**  
**Registration #0610-404**  
 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

**ITEM-405** **Applied Dynamics**  
**Registration #0610-405**  
 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

**ITEM-406** **Dynamics of Machinery**  
**Registration #0610-406**  
 A study of the kinematics of machine elements such as gears, cams and linkages with emphasis on graphical methods. (ITEM-405)  
 Class 3, Recitation 2, Credit 4

**ITEM-407** **Mechanical Engineering Technology Laboratory!**  
**Registration #0610-407**  
 A course in mechanical laboratory techniques and the preparation of laboratory reports; experimental work in materials testing, strength of materials, experimental stress analysis, metallurgy, and metalography; instruction in the preparation of laboratory reports. (It is intended that students enroll concurrently in ITEM-404 and ITEM-414.)  
 Class 2, Lab. 3, Credit 3

**ITEM-408** **Introduction to Strength of Materials**  
**Registration #0610-406**  
 Elements of statics and strength of materials. Topics include plane equilibrium, friction, stress, strain, torsion, and the bending of beams.  
 Class 3, Recitation 2, Credit 4

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

**ITEM-411** **Engineering Materials**  
**Registration #0610-411**  
 A study of the physical properties of materials; survey of manufacturing processes including casting, molding, metal removal, metal forming, welding; field trips to local manufacturing installations; material testing inspection labs, and selected heat treating experiments are available. For non-mechanical majors.  
 Class 3, Recitation 2, Credit 4

**ITEM-414** **Material\* Technology I**  
**Registration #0610-414**  
 A course involving a study of materials, their structure and their characteristics. Topics covered include metallic structures, unit cell, phases and phase diagrams, physical properties, diffusion in metals, recovery, recrystallization and grain growth, ferrous and some non-ferrous metals, heat treatment and age hardening of metals.  
 Class 3, Credit 3

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

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

**ITEM-442** **Heat Transfer**  
**Registration #0610-442**  
 A first course in heat transfer. The theory and application of the fundamentals of heat conduction, convection, and radiation. The design and applications of heat transfer apparatus. (ITEM-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-442, ITEM-405)  
 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 kinetics, the energy conservation principle, dimensional analysis and fluid momentum. Also covered are laminar and turbulent flow in pipes and ducts, fluid machinery, fluid meters and lifting vanes. (ITEM-440)  
 Class 4, Credit 4

**ITEM-465** **Thermofluid Laboratory**  
**Registration #0610-465**  
 Laboratory experiments in thermodynamics, fluid mechanics and heat transfer, including computer-aided data reduction. (ITEM-440, ITEM-460, ITEM-461)  
 Class 1, Lab. 3, Credit 3

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

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

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

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

**Logic Control Systems****ITEM-521****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

**HAVC Control Systems****ITEM-522****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. (ITEM-542)

Class 4, Credit 4

**ITEM-530****Instrumentation****Registration #0610-530**

The basic approach to calibration and use of pressure, temperature, flow, humidity and liquid level measurement instruments. Techniques of test, calibration and proper use of instruments will be demonstrated. Principles of experimentation and computerized data reduction are examined. (ITEE-411, ITEM-460, SMAT-422)

Class 3, Lab. 2, Credit 4

**ITEM-540****Thermal Technology****Registration #0610-540**

Application of thermodynamics to internal combustion engines, compressors, steam cycles, refrigeration, air conditioning, psychometrics and combustion processes. (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 ventilating. Thermodynamics of vapor compression refrigeration cycles, air conditioning, psychometrics; 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-440)

Class 4, Credit 4

**ITEM-560****Pipe and Duct Design****Registration #0610-560**

Theory and application methods for designing hydronic, refrigerant, steam, and compressed air piping and air handling ducts. The use of computer-aided methods is emphasized. (ITEM-460, ITEM-542)

Credit 4

**ITEM-575****Computer Aided HVAC Systems Design****Registration #0610-575**

Use of computer programs for evaluating system sizing, annual operating cost analysis, and system optimization will be emphasized while studying the impact of various architectural and HVAC designs on energy utilization. Current professionally used design programs will be used including the Carrier Corporation E-20 Series of programs and the McClintock Corp. MC2 series, main frame programs accessible through Trane Corp. and APEC. (ITEM-542)

Class 3, Lab. 3, Credit 4

**ITEM-580****Power Plant Design****Registration #0610-580**

Description of power plants and their components; boilers, turbine, pumps, condenser, heat exchangers, nuclear reactors. Relevant analytical tools; cycle calculations, heat balances, gas analysis, fuel analysis. Also, internal combustion power plants and cogeneration plants are covered. (ITEM-440)

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 common packaging materials. 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 common packaging materials. Emphasis is on paper, paperboard, wood, and glass used in packaging applications. (IPKG-201)

Class 3, Credit 3

**IPKG-321** **Container Systems I**  
**Registration #0607-321**  
 A detailed study of primary packages. History, manufacturing processes, characteristics, and applications for containers in direct contact with the product. Structural design, chemical compatibility and suitability of container for intended use will be analyzed for basic container types. Students will practice structural design and testing of prototype containers. Primary emphasis will be on rigid paper-board, glass, plastic and metal containers. (IPKG-301, 311,312)

Class 2, Recitation 1, Lab. 2, Credit 4

**IPKG-322** **Container Systems II**  
**Registration #0607-322**  
 Corollary course for 321. Primary emphasis will be on flexible paper, foil, plastic, and laminated materials, and selected processing techniques. (IPKG-301, 311, 312)

Class 2, Recitation 1, Lab 2, 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 1, Credit 1

**IPKG-420** **Technical Communication**  
**Registration #0607-420**  
 Introduction to the principles of effective written technical communication for the packaging professional. Topics include: memos, business letters, summary activity reports, 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-315)

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-315)

Class 2, Lab. 4, Credit 4

**IPKG-433** **Packaging for Marketing**  
**Registration #0607-433**  
 The interrelationship between packaging and marketing, detailing how the retail consumer package can be used as a scientific marketing tool. The course concentrates on a systematic approach to developing an optimum package for a given product to meet the demands of the retail market. Advertising, marketing demographics, and the impact of color upon packaging will be considered. Students will gain practice in the development of a complete package system. (IPKG-431, 432)

Class 2, Lab. 4, Credit 4

**IPKG-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. (Professional elective)

Class 3, Recitation 1, Credit 4

**IPKG-524** **Packaging Economics**  
**Registration #0607-524**  
 A study of firm behavior with concentration on production costs and revenues. Market structures will be analyzed in order to develop an understanding of how packaging fits into the general economy. Students will be instructed in the use of basic economic reference materials for research purposes. A paper is required. (Professional elective)

Class 4, Credit 4

**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. (Professional elective)

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; Professional elective)

Class 3, Lab. 2, Credit 4

**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; Professional 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 ties, 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, PPRM-403 or department approval, depending on major.)

Class 2, Lab. 4, Credit 4

**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. (Independent study total credit allowed is limited to a maximum of 8 credits.)  
 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.  
 Credit 4

**IPKG-752** **The Legal Environment**  
**Registration #0607-752**  
 An intensive study of federal, state, and local regulation that affects packaging. Individualized study and research on an interest basis.  
 Credit 4

**IPKG-763** **Packaging for End Use**  
**Registration #0607-763**  
 An intensive study of package 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** **Computer Applications**  
**Registration #0607-770**  
 Study 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** **Packaging Dynamics**  
**Registration #0607-783**  
 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 interests.  
 Credit 4

**IPKG-798** **Independent Study**  
**Registration #0607-798**  
 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-799** **Advanced Package Design**  
**Registration #0607-799**  
 Advanced package design projects selected in consultation with the instructor. Individual study appropriate to area of interest and background of student. (Consent of department)  
 Credit variable 1-4

**IPKG-890** **Graduate Thesis**  
**Registration #0607-890**  
 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)

## 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-402** **Dietetics Environment**  
**Registration #0620-402** **(Coordinated Dietetics Program)**  
 Introductory dietetics course for students to interact and communicate with a representative sampling of the various categories of personnel in the general field of dietetics to study all major components of a total system in which a registered dietitian might function. (ISMF-215, ISMD-213)  
 Class 1, Credit 4 Clinical hours by arrangement.

**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 status, role of the diet and dietetics in metabolic gastrointestinal, renal, musculoskeletal, cardiac, endocrine, febrile, and other diseases. (ISMD-213, SCHG-203, SBIG-212)  
 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 project involving nutrition care in a clinical facility in the community is required. Assignments are arranged by the instructor. (ISMD-213, ISMD-526 or ISMD-562)  
 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. (ISMF-215)

Class 1, Credit 8 Practicum in hospital by arrangement.

**ISMD-554** **Nutrition 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, SBIG-212)

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

## Food and Beverage Management

**ISMF-210** **Introduction to Food, Hotel**  
**Registration #0621-210** **and Tourism Management**

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. Uniform required.

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 ISMD, ISMF, and ISMH majors)

**ISMF-321** **Menu Planning and Merchandising**  
**Registration #0621-321**

Recognizing, analyzing, research 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, preparation, and service of high quality food. Recognizing, analyzing, planning, scheduling, solving and evaluating problems related to all aspects of food production and management based on scientific, technological, economic, and social factors. Students will assume various operational positions found in commercial feeding facilities by operating the department's 80-seat restaurant. Students will be instructed in utilizing the Remanco Computer System. Students in the Coordinated Dietetics program will have hospital practicum arranged. (ISMF-215,321)

Class 1. Lab. 12, Credit variable, 4-5

**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. Students will utilize computerized dispensing equipment. (Open to sophomores and juniors only, age 19 or older)

Class 3, Credit 3

**ISMF-341** **Beverage Operations Lab**  
**Registration #0621-341**

Course will allow experience in the actual operation of Henry's beverage center. Students will become familiar with Remanco and Sweda electronic liquor control system. Open to sophomores and juniors only, age 19 or older. (ISMF-340)

Lab. 4, Credit 2

**ISMF-416** **Product Development**  
**Registration #0621-416**

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-314, ISMF-331, ISMD-213)

Class 2, Lab 6, Credit 4

**ISMF-424** **Food and Labor Cost Control**  
**Registration #0621-424**

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. Analysis of sales activity and current inventory data will be done on the Remanco System. (BBUA-302, ISMF-425, ISMF-331)

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, 215)

Class 3, Credit 3

**ISMF-426** **Personnel and Training**  
**Registration #0621-426**

Course includes employee relations: recruitment, 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. (ISMF-210, 331)

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-311, 314, 341, 416, 424, 425, 426, 435)

Class 1, Lab. 12, Credit 5



**ISMF-435** **Purchasing and inventory**  
**Registration #0621-435** **Control Laboratory**  
 Computer applications and analysis of restaurant activity will be formalized into a management reporting system. (ISMF-425)  
 Class 3, Credit 2

**ISMF-499** **Cooperative Education**  
**Registration #0621-499**  
 Career-related work experience. Employment within the food, hotel, tourism industry monitored by the Center for Cooperative Education and Career Services 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. Freshmen begin Co-op in the summer following their first-year studies. 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. Open to seniors only. (ISMF-331, 340, 341, 424, 425)  
 Class 1, Lab 12, Credit 4

**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 1

**ISMF-555** **Research Problems**  
**Registration #0621-555**  
 Independent study of research problems in food and hospitality management. Senior students only with faculty sponsorship.  
 Credit Variable 1-8

## Hotel and Resort Management

**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 courses ISMH-401 to 406 for specific enterprises.  
 Class 4, Credit 4

**ISMH-401** **Ski Resort Management**  
**Registration #0622-401**  
 The development, marketing and management of ski resorts will be studied with micro-computer applications. (ISMH-400)  
 Class 1, Credit 1

**ISMH-402** **Marina Management**  
**Registration #0622-402**  
 The development, marketing and management of marinas will be studied with micro-computer applications. (ISMH-400)  
 Class 1, Credit 1

**ISMH-403** **Golf Course Management**  
**Registration #0622-403**  
 The development, marketing and management of golf courses will be studied with micro-computer applications. (ISMH-400)  
 Class 1, Credit 1

**ISMH-404** **Campground Management**  
**Registration #0622-404**  
 The development, marketing and management of campgrounds will be studied with micro-computer applications. (ISMH-400)  
 Class 1, Credit 1

**ISMH-405** **Theme Park Management**  
**Registration #0622-405**  
 The development, marketing and management of theme parks will be studied with micro-computer applications. (ISMH-400)  
 Class 1, Credit 1

**ISMH-406** **Resorts and Condominium Management**  
**Registration #0622-406**  
 The development, marketing and management of resorts and condominiums will be studied with micro-computer applications. (ISMH-400)  
 Class 1, Credit 1

**ISMH-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. Computer research applications are utilized.  
 Class 4, Credit 4

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

**ISMH-412** **Maintenance and Engineering Systems**  
**Registration #0622-412** **of Hotel/Resort Properties**  
 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. Computer energy monitoring systems are evaluated.  
 Class 4, Credit 4

**ISMH-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. (ISMH-423)  
 Class 4, Credit 4

**ISMH-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; computerized reservation systems, ethics, security and on-the-job application of operational problems. (ISMF-210, BBUA-301, Junior standing)  
 Class 5, Credit 5

**ISMH-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. Students will utilize the department's American Airlines' Sabre System which will emphasize its applicability in planning convention sales for various market segments, and in providing convention services at the meeting site. (ISMH-423, BBUM-463)  
 Class 4, Credit 4

## Travel Management

**ISMT-201** **Travel Lab. I**  
**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 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 the application of fares, baggage allowances, currency regulations and adjustments, and fare construction principles utilizing the Mileage System. Documentation requirements for international travel are also reviewed. (ISMT-201)

Class 2, Credit 2

**ISMT-210** **Introduction to A.A. SABRE Reservations****Registration #0623-210**

An operational proficiency of American Airlines' SABRE reservation system is acquired by the student. Utilizing Sabre's Training mode, course topics include: PNR retrieval, availability, name and phone fields, ticketing field, remarks field, fare quotes, itinerary pricing, PNR queues, flight information AA/OA. This course is equally divided between lecture and Travel Lab simulations.

Class 4, Credit 4

**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, hotel, etc.) marketing strategies and operations. Emphasis is placed on 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-310** **Intermediate SABRE Applications****Registration #0623-310**

Utilization of Phase IV faring, pre-paid ticket advice, queue printing, currency conversion/rates, STARS, segments and accounting data entries, invoicing/itineraries.

Class 4, Credit 4

**ISMT-320** **Passenger Transportation Systems****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-350** **SABRE Applications to Non-Airline Information Systems****Registration #0623-350**

Utilization of SABRE's non-airline information system. Topics include: car sale option fields, hotel index-descriptions, hotel availability, selling from hotel availability, immigration-customs guide.

Class 4, Credit 4

**ISMT-370** **Passenger Transportation****Policy Registration #0623-370**

An examination of the development of transportation policy as it relates to the various modes of passenger transportation. The role of regulatory policy is discussed with emphasis on 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 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 interests of the students enrolled. (ISMT-220 or Permission of Instructor)

Credit 4, Credit 4

**ISMT-421** **Tour Operations****Registration #0623-421**

The operation 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/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 destination. 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 American Airlines SABRE computer reservation system used in passenger transportation is conducted. Application of the ASTA manual and several computer accounting systems, such as Holiday and ADS Nova IV, are examined. (Permission of Instructor)

Class 4, Credit 4

**ISMT-550** **Seminar in Travel Management****Registration #0623-550**

A survey of the current issues faced by the travel industry. The course is designed as a capstone course for travel management majors, and only to seniors who have completed all of their co-op requirements. Various topics are discussed and different orientations are taken corresponding to the interests of the students and issues of current relevance in the travel industry.

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. (SMAM-225)

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 on its collection. (BBUA-301)

Credit 4

#### **BBUA-408,409** **Intermediate Accounting I, II** **Registration #0101-408, 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, Junior Status)

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 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. (Junior status)

Credit 4

### Management

#### **BBUB-201** **Management Concepts** **Registration #0102-201**

A basic course in management theory and practice. The student is introduced to organizational structure and to the application of the behavioral sciences. Particular attention is paid to management's roles in its relations with employees, ownership, government and community.

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.

Credit 1

#### **BBUB-301, 302** **Business Law I & II** **Registration #0102-301, 302**

An introduction to legal principles and their relationships to business practices. Topical cases and examples are used as a guide to the observation of legal requirements, the avoidance of infractions, the utilization of professional services, and for familiarity with legal nomenclature. Representative topics include contracts, bankruptcies, and product liability.

Credit 4

#### **BBUB-310** **Career Seminar II** **Registration #0102-310**

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. (BBUB-210)

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.

Credit 4

**BBUB-402 CPA Business Law****Registration #0102-402**

A preparatory course in law for those planning careers as CPA's. Topics include contracts, agency, Uniform Commercial Code, sales, letters of credit, bulk transfers, investment securities, estates, trusts, suretyship and guaranty, creditor's rights, corporation and partnership law. (CBCB-302 or BBUB-302)

Credit 4

**BBUB-403 Transportation Law****Registration #0102-403**

Legal problems of transportation and traffic including evolution, construction, interpretation, and applications of the Interstate Commerce Commission Act. The Organization of the Interstate Commerce Commission and a review of its decisions are presented. (CBCB-302 or BBUB-302)

Credit 4

**BBUB-420 Principles of Management****Registration #0102-420**

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. (Junior Status)

Credit 4

**BBUB-427,428 Health Institutions Management I, II****Registration #0102-427, 0102-428**

Introductory survey of administration in health care facilities including roles, functions, and responsibilities; organization structure; health care focusing on patient care, education and research; supervisory management for hospitals and related care facilities, emphasizing managerial planning, span of supervision, financing and coordination of public and private efforts. (Junior Status)

Credit 4

**BBUB-429 Legal Aspects of Health Care Administration****Registration #0102-429**

An overview of legislation as it applies to health facilities. All levels of law — federal, state and local discussed. Social Security, National Labor Relations, New York State Disability and Workmen's Compensation, minimum wage, and Code of the New York State Health Department are examples of regulatory procedures to be analyzed. The role of the state and local governments in licensing and accrediting, and the standard of accreditation by major professional bodies will be reviewed. (Junior Status)

Credit 4

**BBUB-430 Organizational Behavior****Registration #0102-430**

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-420)

Credit 4

**BBUB-435, 436 Health Administrative Functions I, II****Registration #0102-435, 0102-436**

Course examines contemporary issues in health care management. Emphasis is placed on the daily operational situations and decisions encountered in managing a health care unit, including personnel administration, financial management, and organization planning and administration. (Junior Status)

Credit 4

**BBUB-455 Personnel and Human Resource Management****Registration #0102-455**

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, safety and health, performance evaluation, compensation systems, the management of ineffective performance, and equal employment opportunity. Emphasis is placed on the legal aspects of managing human resources. (BBUB-420)

Credit 4

**BBUB-470 Compensation and Performance Appraisal****Registration #0102-470**

An intensive study of two 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 a 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****Registration #0102-475**

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-480 Training and Development****Registration #0102-480**

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 coaching, simulation, leadership training, team building, transactional analysis, assertiveness training, computer-assisted instruction, skill-building, and career development programs. (BBUB-455)

Credit 4

**BBUB-485 Employee and Labor Relations****Registration #0102-485**

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, the 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****Registration #0102-490**

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. (Junior Status)

Credit 4

**BBUB-507 Business Environment****Registration #0102-507**

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)

Credit 4

**BBUB-534 Purchasing****Registration #0102-534**

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****Registration #0102-536**

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-420)

Credit 4

**BBUB-547 Small Business Administration****Registration #0102-547**

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 Status)

Credit 4

**BBUB-551 Integrated Business Analysis****Registration #0102-551**

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, BBUQ-460)

Credit 4

**BBUB-554 Management Seminar****Registration #0102-554**

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 Intermediate 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 Intermediate 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****Registration #0103-408**

Forecasting  
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. (Junior status)

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. (BBUQ-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, theories of leverage and dividend policy, and capital budgeting. (BBUF-441)

Credit 4

**BBUF-450 Mathematics of Finance****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 (offered upon demand)

**BBUF-503** **Financial Problems**  
**Registration #0104-503**  
 An examination of problems encountered in many areas of corporate finance. The emphasis is on analytical and decision making techniques used to develop acceptable solutions. The case approach is used extensively. (BBUF-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 rates system, international capital movements, exchange, restrictions, and international monetary experience. (BBUF-445)  
 Credit 4 (offered upon demand)

**BBUF-507** **Security Analysis**  
**Registration #0104-507**  
 The course is introductory and provides background in the field of securities investment. It is both descriptive and analytical in nature. The course coverage emphasizes the securities markets, type 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

**BBUM-426** **Distribution Management**  
**Registration #0105-426**  
 Provides students with knowledge of all "Distribution Management" areas, e.g. finished goods inventory control, warehousing, packaging, materials handling, transportation, plus the critical interface/trade-offs between these functions and the sales department. Impacts on the market place and distribution cost savings methods are also covered. (BBUM-463)  
 Credit 4

**BBUM-428** **Traffic and Transportation Management**  
**Registration #0105-428**  
 An overview of the practical aspects of the day-to-day administration of a typical traffic organization. Selected field trips and outside speakers are included. (Junior status)  
 Credit 4

**BBUM-463** **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. (BBUA-301, GSSE-302)  
 Credit 4

**BBUM-505** **Consumer Behavior**  
**Registration #0105-505**  
 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

**BBUM-510** **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

**BBUM-550** **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-553, BBUM-560)  
 Credit 4

**BBUM-551** **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, BBUM-352)  
 Credit 4

**BBUM-553** **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

**BBUM-554** **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)

**BBUM-555** **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

**BBUM-556** **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, BBUM-352)  
 Credit 4

**BBUM-557** **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)

**BBUM-560** **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

**BBUM-565** **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

**BBUM-570** **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

**BBUQ-334** **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-226, ICSS-200, BBUQ-351)  
 Credit 4

**BBUQ-351, 352** **Applied Statistics I, II**  
**Registration #0106-351, 352**  
 Interpretation and application of statistical techniques in business. Topics include descriptive statistics, probability, sampling distributions, 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. (SMAM-225, ICSS-200)  
 Credit 4

**BBUQ-363** **Programming Systems Design**  
**Registration #0106-363**  
 This course is designed to be the capstone course for previous programming courses. Topics include: project design and project development, review of top-down design, structured programming, and program documentation. A team programming project will be assigned that requires the student to apply these topics in the design and implementation of the solution to the assigned problem. (ICSP-303) (Not offered in 1984—85)  
 Credit 4

**BBUQ-406** **Quality and Productivity Management**  
**Registration #0106-406**  
 Examines the concepts of quality and productivity and the relationships between them. Distinguishes between the objectives of control and improvement and studies the managerial and technical tools needed to pursue each. (BBUQ-460)  
 Credit 4

**BBUQ-407** **Inventory Management and Material Control**  
**Registration #0106-407**  
 Principles of inventory management and material control, emphasizing the independent demand environment. Allocation of planning and control effort. Types of control systems. System dynamics. When and how much to order; discounts; safety stock; record accuracy; physical handling, storage and security. Zero inventories quest. (BBUQ-460)  
 Credit 4

**BBUQ-408** **Priority and Capacity Planning**  
**Registration #0106-408**  
 Emphasizes the dependent demand environment and its interface with independent demand. Project planning - PERT, CPM, load profiles, Line of Balance; forecasting. Resource planning for the long-run, especially facilities. The production plan; Master production scheduling and rough-cut capacity; material requirements planning and capacity requirements planning; distribution requirements and resources planning. (BBUQ-460)  
 Credit 4

**BBUQ-409** **Priority and Capacity Control**  
**Registration #0106-409**  
 Order release; dispatching; requisitions and purchase orders; order follow-up; shop floor reporting; backlog and lead time control; KANBAN and other just-in-time execution systems. (BBUQ-408)  
 Credit 4

**BBUQ-453** **Business Forecasting**  
**Registration #0106-453**  
 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

**BBUQ-460** **Operations Management**  
**Registration #0106-460**  
 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

**BBUQ-463** **Systems Analysis and Design**  
**Registration #0106-463**  
 The system development process, with emphasis on the analysis of information and logical design of a system. Topics include: the life cycle of a computer—based system, the role of the systems analyst, systems analysis tools and techniques, system performance analysis and feasibility analysis. (ICSP-303) (Not offered in 1984—85)  
 Credit 4

**BBUQ-474** **Micro/Mini Computer Applications**  
**Registration #0106-474**  
 A survey of current micro and mini computer systems, available hardware and software, and their applications. Microcomputer applications in small businesses will be emphasized. Word processing is discussed. (ICSP-208) (Not offered in 1984—85)  
 Credit 4

**BBUQ-478** **Systems Simulation**  
**Registration #0106-478**  
 The development of system models and their manipulation using simulation. Topics include: statistical review, sampling of random events, elementary queuing theory, data collection and analysis for simulation modeling and model validation. A special purpose simulation language, such as GPSS, will be used in team projects that simulates a production process. (BBUQ-352, ICSP-210) (Not offered in 1984-85)  
 Credit 4

**BBUQ-505 Decision Support Systems****Registration #0106-505**

An analysis and development of decision support systems which serve users in management. This system provides qualitative and quantitative information derived from data bases and used by managers in decision-making. Theory and applications will be blended in course projects. (BBUB-420, BBUF-441, BBUM-463, BBUQ-460)

Credit 4

**BBUQ-553 Information Systems Senior Project  
Registration #0106-553**

Students will select an information systems development project, identifying an associated problem, present a solution proposal, solve and implement the solution, and present the results. Oral and written presentation techniques are required. (BBUQ-363, 463 and ICSP-300, 303, 483) (Not offered in 1984-85)

Credit 4

**BBUQ-554 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

## Center for Retail Management

**BRER-201 Introduction to 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.

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.

Credit 1

**BRER-301 Retail Accounting and Merchandise Control  
Registration #0109-301**

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.

Credit 4

**BRER-401 Retail Store Operations and Management  
Registration #0109-401**

A detailed examination of the operation of a retail enterprise including fixturing, 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**

An extension of basic 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-301)

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 retailers' 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 buyers' 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  
Registration #0109-431**

An overview of interior design principles for the home furnishings retailer. Topics include basic principles of design, color theory, floor plans, electrical plans and furniture history.

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 fashion and 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

##### **BBUA-703** Accounting Concepts for Managers **Registration #0101-703**

An introduction to financial and managerial accounting concepts, with particular emphasis placed on their use for managerial decision making. Topics covered will include: financial statements, transaction analysis, measuring economic values, responsibility accounting, budgeting, decentralized and divisional performance measurement.

Credit 4

##### **BBUA-704** Accounting Theory I **Registration #0101-704**

A comprehensive exposure at an intermediate level to accounting theory and practice. Emphasis is placed on applying underlying accounting theory to complex accounting problems. The effects of alternative methods are considered throughout the entire course. (BBUA-703)

Credit 4

##### **BBUA-705** Accounting Theory II **Registration #0101-705**

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

Credit 4

##### **BBUA-706** Cost Accounting **Registration #0101-706**

A thorough study of the principles and techniques used to accumulate costs for inventory valuation and managerial decision making. Includes problems and procedures relating to job order, process, and standard costs systems, with particular attention to the problems of overhead distribution and control. (BBUA-703)

Credit 4

##### **BBUA-707** Advanced Accounting and Theory **Registration #0101-707**

Analysis and evaluation of current accounting thought relating to the nature, measurement and reporting of business income and financial position; concepts of income in relation to the reporting entity; attention to special areas relating to consolidated statements, foreign currency statement translation, governmental and not-for-profit accounting. (BBUA-705)

##### **BBUA-708** Auditing **Registration #0101-708**

The theory and practice of auditing examined; critical study of auditing procedures and standards in the light of current practice; measurement and reliance of internal control covered by case studies; modern auditing techniques by statistical sampling and electronic data processing applications. (BBUA-705)

Credit 4

##### **BBUA-709** Basic Taxation Accounting **Registration #0101-709**

Study of federal income taxation of individuals, partnerships and corporations. Problems of the S Corporation and corporate accumulations are examined. Income tax and accounting concepts affecting revenues and deductions are compared, including concepts of gross income, basis, recognition of gain and loss, capital asset transactions, exemptions, deductions and credits. (BBUA-703)

Credit 4

##### **BBUA-810** Advanced Taxation Accounting **Registration #0101-810**

A study of federal income taxation as it relates to corporate and partnership tax planning particularly in reorganization, merger, and liquidation. Problem areas in property transactions including non-taxable exchanges and valuation will be explored. Family tax planning including the use of trusts, and other income shifting devices in the environment of estate and gift taxes is examined. Emphasis will be on the need for tax planning in the complex business or personal situation. (BBUA-709 or admission to the MS in accountancy)

Credit 4

##### **BBUA-811** Auditing Theory **Registration #0101-811**

Advanced course in auditing where classical auditing cases, uses of computer and statistical accounting techniques, current official auditing pronouncements and changes in legal and ethical considerations are fully explored. (BBUA-708 or equivalent)

Credit 4

##### **BBUA-812** Accountancy Seminar **Registration #0101-812**

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 equivalent)

Credit 4

##### **BBUA-813** Financial Accounting Theory **Registration #0101-813**

An advanced course in financial accounting theory that examines the basic assumptions, principles and postulates upon which current practice rests; and alternative theories of valuation and measurement. Critical analysis of the historical cost model and the several major current value models is the main emphasis throughout discussions of financial statements and their individual components. (BBUA-707 or equivalent)

Credit 4

##### **BBUA-814** Accounting Information Systems **Registration #0101-814**

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. (BBUA-703)

Credit 4

### Economics Group

##### **BBUE-711** Microeconomics **Registration #0103-711**

This is an intermediate microeconomic theory course with applications. The fundamentals of consumer behavior theory, market demand, and the theory of the firm are stressed with applications. Also, resource allocation and product distribution are fundamentals to management and to understanding the role of a firm in an economy. (BBUQ-780)

Credit 4

##### **BBUE-712** Macroeconomics **Registration #0103-712**

This is an intermediate macroeconomic theory course with applications. A basic framework of product and money market equilibrium is explored with applications in fiscal and monetary policy. An understanding of major aggregate economic relationships is developed, as well as economic policy. (BBUE-711)

Credit 4

##### **BBUE-713** Advanced Microeconomic Theory **Registration #0103-713**

An advanced study of the fundamental economic principles underlying the nature of a business firm. Topics include: theories of demand and revenue; theory of costs and production analysis in both the short-run and the long-run; equilibrium of demand and supply and efficiency of competition; market structures and their characteristics; pricing and output under perfect competition, pure monopoly, imperfect competition, and oligopoly; resource allocation and product distribution. Business applications are given along with the exposition of the theory. (BBUE-711)

Credit 4

**BBUE-714 Advanced Macroeconomic Theory****Registration #0103-714**

An advanced study of the fluctuations and growth of economic activity in a modern complex society. Topics include measuring macroeconomic activity; modeling economic activity; microeconomic foundations in macroeconomic theory (the labor, the commodity, the money, and the bond markets); a parallel discussion of the complete classical and Keynesian macroeconomic models; recent criticism of the two models; the general equilibrium; the phenomena of inflation and unemployment and the way business can forecast them; the impact of fiscal and monetary growth; reality and macroeconomic disequilibrium; and wage-price policies. (BBUE-712)

Credit 4

**BBUE-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, BBUE-711, BBUQ-782)

Credit 4

**BBUE-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. (BBUQ-782, BBUA-703, BBUE-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 leasing, 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****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****BBUB-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 experimental learning.

Credit 4

**BBUB-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 organizational structure and design, organizational effectiveness, organizational change, organizational analysis, and bureaucracy. (BBUB-740)

Credit 4

**BBUB-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. (BBUB-740)

Credit 4

**BBUB-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. (BBUB-740)

Credit 4

**BBUB-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. (BBUB-740, BBUE-710)

Credit 4

**BBUB-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. (BBUB-740, BBUB-782)

Credit 4

**BBUB-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, BBUB-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 practicum this course does not have regularly scheduled class hours. Instead students confer with their faculty member on an as-needed basis. (BBUA-703, BBUB-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, BBUB-750)

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. (BBUB-740, BBUB-741)

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

Credit 4

**BBUB-771 Research Option**  
**Registration #0102-771**  
 A practicum of 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 or BBUE-711)

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 (offered upon demand)

**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 perse, but rather on showing how quantitative approaches can be used to contribute to a better decision-making process. (BBUQ-781 or equivalent)  
 Credit 4

**BBUQ-781** **Introduction to Statistics**  
**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** **Applied Statistical Analysis**  
**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 or equivalent)  
 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(s). Single 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 in-depth 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. (Permission of Instructor)  
 Credit 4 (offered upon demand)

## 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.

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. (BBUH-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. (BBUH-712)

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 problem 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. (BBUH-731)

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. (BBUH-732)

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. (BBUH-733)

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, counterculture, 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

### CQAS-711 Fundamentals of Statistics I Registration #0280-711

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 random variables and their associated probability models; meaning and practical use of the Central Limit Theorem. (Consent of the department)

Credits 3 or 4 (offered each quarter)

### CQAS-712 Fundamentals of Statistics II Registration #0280-712

Continuation of CQAS-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) (CQAS-711 or equivalent)

Credit 3 or 4 (offered each quarter)

### CQAS-721 Quality Control: Control Charts Registration #0280-721

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)

### CQAS-731 Quality Control: Acceptance Sampling Registration #0280-731

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)

### CQAS-761 Reliability Registration #0280-761

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. (CQAS-712 or equivalent)

Credit 3 (offered in Spring Quarter)

### CQAS-801 Design of Experiments I Registration #0280-801

How you design and analyze experiments in any subject matter area; What you do and why.

Topics: basic statistical concepts, scientific experimentation, completely randomized design, randomized complete block design, nested and split plot designs. Practical applications to civil engineering, pharmacy, aircraft agronomy, photoscience, genetics, psychology, and advertising. (CQAS-712 or equivalent)

Credit 3 (offered in Winter, Spring and Summer Quarters)

### CQAS-802 Design of Experiments II

Registration #0280-802

Continuation of CQAS-801

Topics: factorial experiments; factorial, three level, mixed; response surface exploration. Practical applications to: medical areas, alloys, highway engineering, plastics, metallurgy, animal nutrition, sociology, industrial and electrical engineering. (CQAS-801)

Credit 3 (offered in Fall, Spring, and Summer Quarters)

### CQAS-821 Theory of Statistics I Registration #0280-821

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)

### CQAS-822 Theory of Statistics II Registration #0280-822

Continuation of CQAS-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)

### CQAS-830 Multivariate Analysis I Registration #0280-830

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. (CQAS-801, 802)

Credit 3 (offered in Spring Quarter)

### CQAS-831 Multivariate Analysis II Registration #0280-831

A continuation of CQAS-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. (CQAS-830)

Credit 3 (offered in Summer only)

### CQAS-841 Regression Analysis I Registration #0280-841

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. (CQAS-802 or equivalent)

Credit 3 (offered in Winter Quarter)

### CQAS-842 Regression Analysis II Registration #0280-842

A continuation of CQAS-841.

Topics: selection of best linear models; regression applied to analysis of variance problems; nonlinear estimation and model building. (CQAS-841 or equivalent)

Credit 3 (offered in Spring Quarter)

### CQAS-851 Nonparametric Statistics Registration #0280-851

Distribution-free testing and estimation techniques with emphasis on applications.

Topics: sign tests; Kolmogorov-Smirnov statistics; run tests; Wilcoxon test; Mann-Whitney test; chi-square tests; rank correlation; rank order tests; quick tests. (CQAS-712 or equivalent)

Credit 3 (offered in Fall, Spring, and Summer Quarters)

**CQAS-853 Managerial Decision Making****Registration #0280-853**

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. (CQAS-881 or equivalent)

Credit 3 (offered in Winter Quarter)

**CQAS-856 Interpretation of Data****Registration #0280-856**

Advanced topics related to use of statistics in investigational analysis, including narrow limit gauging, practical designs of experiments, analysis of small sample data, analysis of means, identifying assignable causes and other methods for trouble shooting with statistical methods. (CQAS-712 or equivalent)

Credit 3 (offered in Spring Quarter)

**CQAS-871 Sampling Theory and Applications****Registration #0280-871**

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. (CQAS-712 or equivalent)

Credit 3 (offered in Winter and Summer Quarters)

**CQAS-873 Time Series Analysis****Registration #0280-873**

A methods course in modeling and forecasting of time series with emphasis on model identification, model fitting and diagnostic checking.

Topics: survey of forecasting methods, regression methods, moving averages, exponential smoothing, analysis of forecast errors, Box-Jenkins models, transfer function models, case studies. (CQAS-841 or equivalent)

Credit 3 (offered in Fall Quarter)

**CQAS-875 Empirical Modeling****Registration #0280-875**

A course in model building based on the application of empirical data gathered through appropriate experimental design and analyzed through regression techniques.

Topics: response variable construction, experimental design methods, and related analysis techniques. (CQAS-802, -842)

Credit 3 (offered in Winter Quarter)

**CQAS-881 Bayesian Statistics****Registration #0280-881**

An introduction to Bayesian statistics and Decision Making which explores Bayes Theorem in its relation to classical and Bayesian methodology.

Topics: probability, Bayes Theorem, assessment of prior probabilities and likelihoods, hypothesis testing, and the multi-variable case. (CQAS-712)

Credit 3 (offered in Fall and Spring Quarters)

**CQAS-886 Sample Size Determination****Registration #0280-886**

The question most often asked of an industrial statistician is "What size sample should I take?" This course answers that question for a wide variety of practical investigational projects. Techniques for the full use of the optimal sample evidence are also offered. (CQAS-712 or equivalent)

Credit 3 (offered in Summer Quarter)

**CQAS-891, 892, 893 Special Topics in Applied Statistics**

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)

**CQAS-M5 Statistics Seminar****Registration #0280-895**

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 RIT (or other colleges) to provide special training in statistics for students who desire an independent study program in partial fulfillment of graduate degree requirements. (Consent of all departments involved.)

Credit 3 (offered each quarter)

**CQAS-896, 897, 898 Thesis****Registration #0280-896, -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-265** **Foundations of Discrete Math**  
**Registration #0306-265** **for Computer Engineers**  
 This course is an introduction to the fundamental concepts, terminology and manipulative skills associated with combinatorial structures and logic which are necessary to an effective understanding of modern computer science and engineering. Topics include: Symbolic logic, naive sets, relations and functions, mathematical induction, recursive definition, introduction to infinity and an invitation to graph theory and its applications.

Class 4, Credit 4 (Spring)

**EECC-341** **Introduction to Digital Systems**  
**Registration #0306-341** **for Computer Engineers**  
 This course will study the combinatorial 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. A study of the organization and design of a classical digital computer system including instruction fetch, decode, and execution. (Working knowledge of some representative assembly language and SMAM 265 or EECC-265)

Class 3, Lab 2, Credit 4 (W)

**EECC-550** **Computer Architecture I for**  
**Registration #0306-550** **Computer Engineers**  
 This course provides the understanding of the information transfer and transformations which occur in a computer with emphasis on the relations between computer architecture and organization. Topics to include: design levels and their respective primitives, modules and descriptive media; register transfer and microoperations; basic computer organization and design; control processor organization; control unit and microprogramming; memory organization; input-output organization; computer architecture—defining the hardware software interface; and from architecture to organization (one to many). (EECC-341, ICSS-440)

Class 4, Credit 4 (S/Sr)

**EECC-551** **Computer Architecture II**  
**Registration #0306-551** **for Computer Engineers**  
 This course provides knowledge about many important architectural issues of a computer system, with emphasis on the interaction between software and hardware. Student projects will be required. Topics to include: the impact of VLSI on computer architecture; the influence of software and applications on computer architecture; data representations; instruction set (the introduction of instructions to enhance operating system performance and high-level language processing will be emphasized); stack machines; control design channels and I/O processors; memory hierarchy and memory protection; multiprocessor computer systems; and fault-tolerant computer systems. (EECC-550)

Class 4, Credit 4 (F/W)

**EECC-560** **Interface and Digital Electronics**  
**Registration #0306-560**  
 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. (4th year status in Computer Engineering)

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

**EECC-561** **Digital System Design**  
**Registration #0306-561** **for Computer Engineers**  
 This course explores the methods of digital design used at the MSI and LSI level. It introduces the structure of a digital hardware problem solution from the architectural view, through data flow concepts and control flow concepts, to implementation. A series of digital design examples that form a framework for showing systematic solutions of common design situations at the MSI level will be investigated. The impact of modern LSI technology, microprogramming, bit slices, and microprocessors on computer design will be studied. Projects will be required. (EECC-341, EECC-560)

Class 4, Credit 4 (S/Sr)

### Projects In Computer Engineering

**EECC-655**  
**Registration #0306-655**

Several detailed projects involving the design of hardware and software will be posed to exercise the students' engineering design creativity and ability to integrate concepts from throughout the curriculum. Some lectures will be presented on real time programming techniques such as interrupt handlers, multitasking concepts, process synchronization, response time considerations, input noise reduction, and debugging techniques. Other topics will also be presented. (5th year standing in computer engineering)

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

### 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 manufacturing of digital systems. Topics covered will include 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-550 or, ICSS-520, 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. (5th year status in Computer Engineering, Computer Science, Electrical Engineering or Microelectronic Engineering)

Class 4, Credit 4 (W, S)

**EECC-722** **Advanced Computer Architecture**  
**Registration #0306-722**

This course will emphasize the impact of VLSI and communication issues on computer architecture. Topics covered will include highly concurrent, multiprocessor and fault-tolerant computer systems as well as data flow architectures. Modeling Techniques for system verification will also be included. (EECC-551 or ICSS-720)

Class 4, Credit 4 (S)

**EECC-758** **Fault-Tolerant Digital 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. (ICSS-400 or EEEE-650 or EEEE-750, EECC-550 or ICSS-720)

Class 4, Credit 4 (S)

**EECC-759** **Digital Interface Circuits**  
**Registration #0306-759**

Standard bus interface — parallel and serial. LSI interface devices. Interface design — peripherals and memory. Data acquisition—A/D & D/A converters, multiplexing. Logic — PIA, ROM based designs, spectral techniques. Error detection and correction. (EECC-560 or permission of instructor)

Class 4, Credit 4 (W)

## 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.

**EEEE-200** **Electrical Engineering Graphics**  
**Registration #0301-200**

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)



**EEEE-240 Introduction to Digital Systems  
Registration #0301-240**

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 to commercially available circuit packages. This course is designed to be taken in the freshman year and is the replacement for EEEE-340 in the revised curriculum.

Class 3, Lab 0, Credit 3 (Fall Quarter)

**EEEE-310 Numerical Modeling  
Registration #0301-310**

The objective of this course is to develop the ability to evaluate many of the common engineering equations through use of the digital computer. Specific topics include making a table of values from a formula; obtaining a formula from a table of values; solving linear, nonlinear and transcendental equations; solving systems of equations; finding the solution of an ordinary differential equation; numerical differentiation.

Class 2, Lab 0, Credit 2 (Fall and Winter Quarters)

**EEEE-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. Kirchhoffs 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 anal 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 inductances; RL circuit with a step input; properties and relationships of capacitance; RC circuit with a step input; pulse response of RC circuits; RLC circuit response with step input. (This vyll 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. Complex Exponential Functions; Phasor concepts; impedance, reactance, resistance; admittance; susceptance, conductance; impedance to admittance conversions; impedance bridges; power.

Class 4, Recitation I, Lab 2, Credit 4 (Spring and Summer Quarters)

**EEEE-352 Circuit Analysis II  
Registration #0301-352**

AC Network Analysis (nodal analysis, loop and mesh analysis) Thevenin'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. (EEEE-351)

Class 3, Recitation 2, Lab 2, Credit 4 (Fall and Winter Quarters)

**EEEE-353 Circuit Analysis III  
Registration #0301-353**

This course has been discontinued. The topics have been integrated into EEEE-351 and EEEE-352 in the revised curriculum.

**EEEE-365 Introduction to Microcomputers  
Registration #0301-365**

Introductory course on microcomputers. Begins with Computer Architecture, including detailed discussions of the memory unit, the central processing unit, its registers and their functions. This is followed by a study of Computer Arithmetic, Logic Operations, Number Systems and Codes. Computer programming is then introduced at the machine and assembly language levels with emphasis on computer instruction sets and addressing modes. Straight line, branching and looping programs are studied and compared. The student is next introduced to computer input/output with emphasis placed on programmed controlled input/output. The course requires extensive hands-on exercises, which range from simple computational programs to more complex programs which use the computer as a digital controller. (EEEE-240)

Class 4, Lab 0, Credit 4 (Fall and Winter Quarters)

**EEEE-453 Linear Systems I  
Registration #0301-453**

Introduction to signal analysis and concepts of linear systems. Fourier series: evaluation of Fourier coefficients. Circuit analysis with periodic inputs.

Exponential form of Fourier series. Relationship between the exponential and trigonometric forms. Differentiation and integration of Fourier series. Fourier transforms: evaluation of Fourier transforms. Linear systems: input and output FT. Energy spectrum and energy spectral density. LaPlace transform: evaluation of LaPlace transform. Inverse LT through partial fraction expansion; application of LT to circuits and systems. Transfer functions (Bode diagrams). Double sided LaPlace transform. (EEEE-352)

Class 4, Credit 4 (Spring and Summer Quarters)

**EEEE-554 Linear Systems II  
Registration #0301-554**

Review of (continuous) linear systems concepts and techniques. Time-frequency signal and system relationships: time-bandwidth products; convolution in time and frequency. Discrete representation of continuous signals: sampling theorem, sample and hold action, A/D and D/A conversion. Elements of discrete signal processing: conceptual view, special sequences, 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 2 transform, the inversion integral, the transfer function, transforms of common sequences, basic theorems, partial fraction expansions. "Frequency Response" of Discrete Systems: sinusoidal input/output, frequency response H (ejw), 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 fraction, 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, the discrete Fourier transform, processing in the frequency domain, intra, to FFT. Quantization Effects: single quantization coefficient quantization, arithmetic quantization, signal scaling and overflow. (EEEE-453)

Class 4, Credit 4 (Fall and Winter Quarters)

**EEEE-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. (EEEE-352 concurrently)

Class 3, Lab. 3, Credit 4

EEEE-441 (Fall and Winter Quarter)

EEEE-442 (Spring and Summer Quarter)

**EEEE-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)

EEEE-461 Class 3, Lab. 3, Credit 4 (Winter and Spring Quarter)

EEEE-462 Class 3, Lab. 3, Credit 4 (Fall and Winter Quarter)

**EEEE-471, 472 Electromagnetic Fields I, II  
Registration #0301-471, -472**

Vector analysis, electrostatics and dielectrics, conduction current fields, magnetics, time varying fields, Maxwell's equations and wave equations. Concepts of retarded potentials. Electromagnetic propagation in waveguides, free space and transmission lines. Concepts of reflection, transmission and impedance matching. (SMAM-328)

EEEE-471 Class 4, Credit 4 (Spring and Summer Quarter)

EEEE-472 Class 3, Lab. 3, Credit 4 (Fall and Winter Quarter)

**EEEE-531 Electromechanical Energy Conversion  
Registration #0301-531**

A development of the basic relationships of field energy, magnetic force, torque and generated voltage in an electromechanical device and expansion of these fundamentals into an understanding of the operational characteristics of the electrical machine. (EEEE-352)

Class 3, Lab. 3, Credit 4 (Fall and Winter Quarter)

**EEEE-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

**EEEE-513 Introduction to Classical Controls**  
**Registration #0301-513**  
 A one-quarter study of linear control systems and their physical behavior including stability and transient response. This is approached through the classical methods of the Laplace domain; Routh's Criterion, Nyquist, Bode and Nichols charts and root locus. Lead and lag compensators are introduced using these tools. Analog computation techniques are studied and used, in laboratory, as a means of verifying the analysis and design of complex systems. (EEEE-453, SMAM-420 desirable)

Class 3, Lab. 3, Credit 4 (Spring and Summer Quarter)

**EEEE-534 Introduction to Communication Systems**  
**Registration #0301-534**  
 Review of linear systems as applied to communication signal processing. Non-linear devices in communication systems. Introduction to the Fourier transform and its role in spectral analysis of signals and systems. Introduction to amplitude modulation—DSB-SC, AM, SSB, NSB and their applications. Introduction to frequency and phase modulation techniques. Noise theory and the role of noise in communications systems. (SMAM-351, EEEE-453)

Class 4, Credit 4 (Spring and Summer Quarter)

**EEEE-544 Physics of Electronic Devices**  
**Registration #0301-544**  
 This course will provide an understanding of the physical mechanisms which govern the operation of semiconductor devices. The relationships between the physical, structural parameters of the device and its electrical performance will be studied. Topics include semiconductor fundamentals, pn junction diodes, bipolar transistors, field and MOS field effect transistors. (EEEE-442)

Class 4, Lab. 0, Credit 4

**EEEE-545 Digital Electronics**  
**Registration #0301-545**  
 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 models; and JFETs and MOSFETs in the saturation and triode regions. The following logic families are covered in considerable detail: RTL, V L, DTL, T<sup>2</sup>L, ECL, CMOS, NMOS, and PMOS. A discussion of the applications and characteristics of analog switches concludes the course. (EEEE-240, 352, 544, SMAM-306)

Class 3, Lab. 3, Credit 4 (Spring and Summer Quarter)

**EEEE-645 Special Semiconductors**  
**Registration #0301-645**  
 The study of a variety of semiconductor devices generally used for purposes other than signal processing, including thyristors, unijunction transistors, opto-couplers, and power MOS. The applications stressed are concerned with the user of electrical power for control of lighting, motion, and hear. Particular attention is given to switching mode power supplies and regulators and to class D switching amplifiers. (EEEE-545)

Class 3, Lab. 3, Credit 4

**EEEE-650 Design of Digital Systems**  
**Registration #0301-650**  
 This course is concerned with the design of larger digital systems. LSI and VLSI components are largely used as building blocks. Top down design and the use of algorithmic state machine flow charts as design aids are stressed. The design aspects of microprogramming are discussed in detail. (EEEE-240)

Class 4, Credit 4 (Spring Quarter)

**EEEE-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 structure. Computer instruction sets and addressing methods are discussed and then applied to the machine language programming of computers. Software and hardware aspects of input/output are discussed along with consideration of special I/O chips. The course concludes with discussions of 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. (EEEE-240, or consent of instructor and ICSP-220)

Class 3, Lab. 3, Credit 4 (Summer and Fall Quarter)

**EEEE-666 Microcomputer Systems II**  
**Registration #0301-666**  
 This course will cover the effective application of 8-bit and 16-bit microprocessors in the design of digital systems. It will develop an understanding of assembly language programming and hardware design techniques. The role of macro-assemblers, editors, linking loaders, and other systems software aids used in microcomputer development systems to produce efficient modular code will be covered. Several aspects of hardware/software organization of input/output programs will be considered including interrupts and direct memory access. The use of special LSI interface devices to connect a microcomputer with peripheral devices such as 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, incircuit emulators, and logic analyzers in developing and testing a microcomputer design. (EEEE-665)

Class 3, Lab. 3, Credit 4 (Winter and Spring Quarter)

**EEEE-670 Introduction to Microelectronics**  
**Registration #0301-670**  
 Introduction to the physics and chemistry of fabricating integrated circuits. Topics include maskmaking, epitaxial layer growth, diffusion, oxidation, ion implantation, and metallization. The course includes a design project where the student designs an analog integrated circuit including the circuit layout and process specification. Students will also use computer modeling and simulation programs such as SPICE, BISIM, and SUPREME. This course is a prerequisite for EEEE-676, I.C. Processing Laboratory, in which integrated circuits are actually made.

Class 4, Credit 4 (Summer and Fall Quarter)

**EEEE-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)

**EEEE-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. (EEEE-453)

Class 4, Credit 4

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

Class 4, Credit 4 (Spring Quarter)

## Technical Elective Courses Offered Upon Sufficient Demand

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

**EEEE-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. (EEEE-441, EEEE-531 or concurrent registration for EEEE-531)  
 Class 3, Lab. 3, Credit 4

**EEEE-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. (EEEE-453,531)  
 Class 3, Lab. 3, Credit 4

**EEEE-614** **Design of Control Systems**  
**Registration #0301-614**  
 This course continues the analytical skills developed in EEEE-513 and extends them to sampled data systems and digital control systems. The stress throughout is on system design and compensation. The Z-transform is thoroughly discussed, and both root locus and frequency design techniques are described. The student is expected to utilize the available computer aided design packages in both the lab and the course. (EEEE-513)  
 Class 3, Lab. 3, Credit 4

**EEEE-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. (EEEE-471, 472)  
 Class 3, Lab. 3, Credit 4

**EEEE-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 modulation, optical detection, and noise problems associated with optical components will be discussed. Applications to fiber optic, integrated optic, and solar systems will be considered. A demonstration lab complements course activities. (SPSP-314, 315; EEEE-471, 472—concurrent)  
 Class 3, Lab. 3, Credit 4

**EEEE-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. Fundamentals as well as design applications will be discussed: light wave characteristics; fiberoptical waveguide fundamentals and selection; fiber optical coupling. Source and detector characteristics and selection will be considered. Examples of fiber systems employed by various organizations will be analyzed. A project lab assignment will be selected and will complement course content. (EEEE-672)  
 Class 3, Lab. 3, Credit 4

**EEEE-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-30/TR48 analog/hybrid computer. (EEEE-513)  
 Class 4, Credit 4

**EEEE-676** **I.e. 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 semi-conductor fabrication, diffusion, solar cell fabrication, MOS transistor fabrication, wire bonding and packaging. Each laboratory exercise requires extensive preparation on the part of the student, in the form of research, reading, computations and device design. (EEEE-670)  
 Class 2, Lab. 6, Credit 4

**EEEE-677** **Digital Filters and Signal Processing**  
**Registration #0301-677**  
 This course deals with the analysis and design of systems which are discrete in nature. General topics include difference equation description of discrete systems, definition of linearity, impulse response and 7-Transform analysis. Digital signal processing topics will include the definition and design of digital filters and the use of Fast Fourier Transforms (FFT) in signal processing. The effects of 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. (EEEE-453 and consent of instructor)  
 Class 4, Credit 4

**EEEE-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. (EEEE-531)  
 Class 4, Credit 4

**EEEE-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. (EEEE-453, EEEE-442, EEEE-472 or suitable equivalents)  
 Class 4, Credit 4

**EEEE-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 antennas. A project type laboratory and computer simulation problem are included. (EEEE-442, EEEE-534, 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 fifth year students and have already completed the prerequisites. The permission of the director of graduate programs 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, deep and shallow impurities and properties of silicon, GaAs, Ge and other semiconductors.  
 Credit 4

**EEEE-724 Physics of Semiconductor Devices I**  
**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, resistors, MOS capacitors, isolation techniques, and inprocess 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 pnpn 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, -670, and a course in computer architecture)

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 manufacturers' specifications and basic applications with emphasis on practical aspects. (EEEE-442, -754, -755)

Credit 4

**EEEE-730 Advanced Analog I.C. Design**  
**Registration #0301-730**  
 An advanced course in analog integrated circuit design. Students will study Bipolar and MOS realization of Op Amps, Analog multipliers, A to D and D to A converters, and more. The students will participate in design projects including circuit design, layout, and SPICE simulation (EEEE-726)

Class 4, Lab. 0, 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 role of macro-assemblers, editors, linking loaders, and other system software aids used in microcomputer development systems to produce efficient modular code will be covered. Several aspects of hardware/software organization of input/output programs will be considered including interrupts and direct memory access. The use of special LSI interface devices to allow a microcomputer 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 I, II**  
**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, dc motor and stepper motor controllers, real-time systems, microcomputer bus standards, and the local networks. Lab work may include temperature, pressure, and optical controllers, stepper motor controllers, and robotics control Intel 8086 microcomputer is used. (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. The LaPlace transform, its existence and convergence; use in the solution of differential equations; the transfer function and its properties.

The Z transform and the solution of difference equations. Relationship between the LaPlace and the Z transforms.

Credit 4 (Offered every fall)

**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.

Credit 4 (Offered every winter)

**EEEE-756 Analytical Techniques III**  
**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.

Credit 4 (Offered every spring)

**EEEE-757 Network Theory**  
**Registration #0301-757**  
 Classification of networks, network topology, equilibrium equations, network theorems. Properties of one-port and two-port networks. Stability and passivity of two-port networks. Scattering matrix, Gain-phase analysis. The treatment will be on a formal and rigorous level. (EEEE-754, 755)

Credit 4

**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 RD&E 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 Modem 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-754, -755, -613)

Credit 4

**EEEE-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 piecewise-linear and analytical nonlinear systems. (EEEE-761)

Credit 4

**EEEE-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. (EEEE-756, -761)

Credit 4

**EEEE-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. (EEEE-754, -755)

Credit 4

**EEEE-765 Optimal Control****Registration #0301-765**

Introduction of calculus of variations: conditions of optimality; optimizing transient performance by statistical and variational procedures, dynamic programming and by Pontryagin's maximum principle; design of optimal linear systems with quadratic criteria. (EEEE-761)

Credit 4

**EEEE-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-converters; 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

**EEEE-772, -773, -774 Special Topics in****Registration #0301-772, -773, -774****Electrical Engineering**

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)

**EEEE-775 Optical Engineering I****Registration #0301-775**

An introduction to the properties of optical components and their combination into systems, primarily from a geometrical optics point of view, but with reference to the wave nature of light where appropriate. Refracting 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

**EEEE-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. (EEEE-775, -471)

Credit 4

**EEEE-777 Optical Engineering II****Registration #0301-777**

A continuation of EEEEE-776, Electro-optics, that emphasizes the application of wave optics to optical systems. Interference and interferometers. Thin films. Diffraction. Partial coherence. Fourier optics. Discussion of holography, optical data processing, imaging and other topics of current interest. (EEEE-776)

Credit 4

**EEEE-778 Fiber Optics****Registration #0301-778**

The objective of this course is to educate the engineer in the applied optics 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 optical systems. Applications to communications and other areas will be discussed. (EEEE-775, -776, -777)

Credit 4

**EEEE-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, and edge enhancement techniques; topics in image reconstruction to include causes of image degradation, deblurring procedures, and homomorphic filters; 3D image reconstruction from 2D projections. (EEEE-754, -755, 677)

Credit 4

**EEEE-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

**EEEE-781 Electromagnetic Fields****Registration #0301-781**

Development of electromagnetic theory from basic postulated 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

**EEEE-782 Boundary Value Problems****Registration #0301-782**

Techniques for solving boundary value problems. Numerical methods, analog and relaxation methods. Green's function, special methods making use of symmetries, images, inversion, and conformal mapping; introduction to integral equations. Wiener-Hopf and Watson transformations. Saddlepoint integration. Variational techniques. (EEEE-754, -755, -756)

Credit 4

**EEEE-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. (EEEE-781)

Credit 4

**EEEE-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. (EEEE-781)

Credit 4

**EEEE-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

**EEEE-786****Microwave Devices****Registration #0301-786**

Theory of interaction between electron beams and electromagnetic waves. Microwave tubes: klystron, magnetron, traveling-wave tubes. Solid state devices: microwave transistors, tunnel diodes, Gunn diodes. IMPATT diodes LSA diodes.

Credit 4

**EEEE-787****Radar Engineering****Registration #0301-787**

Radar system and radar equations; electronic scanning radar systems, microwave radar antennas. Atmospheric effects in radio wave propagation, synthetic aperture radar. Signal detection and parameter estimation for radar applications. (EEEE-754, -755, -756)

Credit 4

**EEEE-790****Random Signals and Noise****Registration #0301-790**

Functions of two random variables. Mean square estimation. Orthogonality principle. Sequences of random variables. Central limit theorem. Random processes; correlation functions; spectrum of periodic functions and periodic random processes; spectral densities; the Gaussian random process; noise through linear systems. (EEEE-755, -756)

Credit 4

**EEEE-791****Topics in Signal Analysis and Processing**

Signal representation of orthogonal functions; analytic signals and Hilbert transforms; optimum filters (matched, maximum fidelity, Wiener); discrete representation of continuous signals (sampling theorems); the discrete Fourier transform; linear discrete filters; introduction to homomorphic signal processing. (EEEE-790)

Credit 4

**EEEE-792****Advanced Topics in Signal Analysis****Registration #0301-792**

A continuation of EEEEE-791. Topics chosen from: signal and system parameter estimation pole-zero modeling; maximum likelihood methods, maximum entropy methods; Prony's method; pencil of functions method; quantization effect in discrete processing techniques; spectral estimation; windowing; generalized transforms including Walsh-Hadamard. (EEEE-791)

Credit 4

**EEEE-793****Error Detecting and Error Correction****Registration #0301-793**

This course covers linear block codes and convolutional codes. The major linear block codes to be covered are Hamming, BCH, Golay, and Reed-Solomon codes. The fundamental structure of linear block codes will be developed and applied to performance calculations. The structure of cyclic codes will be developed and applied to encoders and decoders. The major error correction methods, including error trapping, majority logic decoding and the BCH algorithm will be developed and the Viterbi and sequential decoding algorithms will be studied. Questions of system performance, speed, and complexity will be examined. (EEEE-756)

Credit 4

**EEEE-794****Information Theory****Registration #0301-794**

An introduction to the fundamental concepts of information theory; entropy, equivocation, transinformation, and redundancy; coding for binary channels; measurement of signal parameters in the presence of noise; bandwidth vs. accuracy. (EEEE-756)

Credit 4

**EEEE-800****Graduate Paper****Registration #0301-800**

This course number is used to fulfill the graduate paper requirement under the non-thesis option for the MS degree in electrical engineering. The student must obtain the approval of an appropriate faculty member to supervise the paper before registering for this course.

Credit 5

**EEEE-890****Master's Thesis****Registration #0301-890**

An independent engineering project or research problem to demonstrate professional maturity, preferably involving the reduction of theory to practice. A formal written thesis and an oral defense are required. The student must obtain the approval of an appropriate faculty member to guide the thesis before registering for the thesis. A thesis may be used to earn a minimum of 6 credits and a maximum of 12 credits. The usual number is 9 credits.

Credit variable

## Industrial Engineering

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

**EIEI-201****Introduction to Industrial Engineering****Registration #0303-201**

A first course in industrial engineering for freshmen. The course describes what engineering is, what current and projected opportunities exist for engineers. The course material is concerned with the general principals of engineering design. (F)

Class 3, Lab. 1, Credit 4

**EIEI-202****Computing for Industrial Engineers****Registration #0303-202**

A first course in computer programming for engineers and in particular industrial engineers. The course involves extensive development of programming skills required in the engineering disciplines. (W)

Class 4, Credit 4

**EIEI-301****Computer Tools for increased Productivity****Registration #0303-301**

This course is designed to expose the student to the range of computer software tools and packages that are available on the VAX. The student will learn how to use this software to improve his/her productivity in all the courses that will follow. It will also review and sharpen the student's skills in using the VAX/VMS system and the FORTRAN language. (EIEI 202 or consent of instructor) (W)

Class 2, Credit 2

**EIEI-401****Introduction to Operations Research I****Registration #0303-401**

An introduction to the methodology of mathematical problem formulation. Investigation of mathematical programming techniques including linear programming and special types of linear programming problems such as the transportation and assignment algorithms. (SMAM-308 or consent of instructor) (F)

Class 4, Credit 4

**EIEI-402****Introduction to Operations Research II****Registration #0303-402**

A survey of elementary mathematical models within the field of systems and industrial engineering. Areas of study include queuing theory, network analysis, and inventory theory. (SMAM-351, SMAM-306) (F)

Class 4, Credit 4

**EIEI-415, 516****Human Factors I, II****Registration #0303-415, 516**

A survey of human factors from 1) physiological constraints of the human; 2) behavioral/psychological characteristics of the human; and 3) the psycho-motor skills ability of the human. Emphasis is placed on practical applications of each area. (SMAM-352 or consent of instructor) (F-516, Sp-415)

Class 3, Lab. 2, Credit 4

**EIEI-420****Work Measurement and Analysis I****Registration #0303-420**

Methods of measuring and analyzing work, human capabilities, micromotion, memomotion study, process and operation analysis. Emphasis placed on methods of operation analysis as applied to the design and evaluation of man-machine systems. (F) (Consent of instructor)

Class 3, Lab. 2, Credit 4

**EIEI-422****Systems & Facilities Planning****Registration #0303-422**

A basic course in plant layout. Topics covered include project-quantity analysis, flow of materials, relationship charts, activity charts, material handling systems, and factors influencing the layout design. The course includes basic drafting application as well as state of the art computer aided layout design. (EIEI-401 or consent of instructor) (Sp)

Class 3, Lab. 2, Credit 4

**EIEI-481****Management Theory and Practice****Registration #0303-481**

Development of the fundamental principles of the industrial enterprise. Internal organization as well as general economic conditions are considered. Emphasis is placed on the role of behavioral science. (Sp) (Consent of instructor)

Class 4, Credit 4

**EIEI-503** **Simulation**  
**Registration #0303-503**  
 A first course in simulation emphasizing the role of the computer in developing simulation models. The SLAM simulation language is emphasized (EIEI-202, SMAM-351 or equivalent) (Sp)  
 Class 4, Credit 4

**EIEI-510, -511** **Applied Statistical Analysis**  
**Registration #0303-510, -511** **for Engineers I, II**  
 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

**EIEI-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

**EIEI-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

**EIEI-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.

**EIEI-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. (EIEI-511 or consent of instructor)  
 Class 4, Credit 4

**EIEI-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. (EIEI-511 or consent of instructor)  
 Class 4, Credit 4

**EIEI-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. (EIEI-482)  
 Class 4, Credit 4

**EIEI-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. (EIEI-401, 402 or consent of instructor)  
 Class 4, Credit 4

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

**EIEI-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

**EIEI-545** **Techniques of Systems Engineering**  
**Registration #0303-545**  
 LaPlace, Fourier and Z transforms; transform methods for solving differential, difference and differential-difference equations; feedback networks; classical optimization techniques; search techniques; theory of graphs (5th year I.E. standing or consent of instructor)  
 Class 4, Credit 4

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

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

**EIEI-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

**EIEI-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. (EIEI-503, consent of instructor)  
 Class 3, Lab. 3, Credit 4

**EIEI-690** **Seminar in Computer Integrated Manufacturing**  
**Registration #0303-690**  
 This course is designed to provide a broad overview of current technology and management practice and trends related to the evolving factory of the future. It is designed as a multi-disciplinary offering for upper-division undergraduate and graduate students enrolled in any RIT program. The course follows a seminar format. Topics of discussion include Quality Assurance, Robots, CAD, Group Technology, MRP, Flexible Manufacturing Systems, Material Handling, and Systems Integration through Computer Application.  
 Class 3, Credit 3

## Graduate Courses

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

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

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

Credit 4

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

**EIEI-601** **Value Analysis**  
**Registration #0303-601**

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

Credit 4

**EIEI-701** **Principles of Operations Research I**  
**Registration #0303-701**

Applied linear programming. Computational techniques for solving constrained optimization problems. Linear programming, the Simplex method and variations, duality and sensitivity testing.

Credit 4

**EIEI-702** **Mathematical Programming**  
**Registration #0303-702**

Application of non-linear programming techniques. Classical optimization techniques; quadratic, stochastic, integer programming and dynamic programming. Applications to industry. (EIEI-701)

Credit 4

**EIEI-705** **Survey of Operations Research**  
**Registration #0303-705**

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

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**

Basic functional anatomy and physiology. Human body systems. Anthropometry. Applications on the design for man and man-machine systems. Work physiology. Industrial biomechanics.

Credit 4

**EIEI-731** **Biotechnology and Human Factors II**  
**Registration #0303-731**

Effect of mechanical and physical environment on: physiology, behavior, performance of man. Design considerations to protect man against environmental effects (thermal environment, noise, vibration, acceleration, light, altitude).

Credit 4

**EIEI-732** **Biotechnology and Human Factors III**  
**Registration #0303-732**

Theoretical fundamentals of human body mechanics. Development and applications of biomechanics and biomechanical models. Kinematics of the link system of the body and extremity joints.

Credit 4

**EIEI-733** **Biotechnology and Human Factors IV**  
**Registration #0303-733**

Measurements of human performance. Functions that man performs in man-machine systems. Techniques to quantify man's behavior at work.

Credit 4

**EIEI-734** **Systems Safety Engineering**  
**Registration #0303-734**

Accident study of the human component in occupational systems. Product systems safety analysis. Approaches in accident prevention.

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)

**EENG-777** **Engineering Internship**  
**Registration #0302-777**

This course number is used by students in the master of engineering degree program for earning internship credits. The actual number of credits is to be determined by the student's faculty advisor and subject to approval of the Graduate Committee of the College of Engineering.

Credit variable

## Mechanical Engineering

### Required Courses

**EMEM-201** **Mechanical Engineering Graphics I**  
**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 use of computer graphics is introduced. 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**  
 This course is intended 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, torsion, and bending. (SPSP-311, 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)
- EMEM-335** **Elements of Statics**  
**Registration #0304-335**  
 This course is intended as an introduction to the principles of statics for non-mechanical engineering students. This basic course treats the equilibrium of particles and rigid bodies under the action of forces. Topics include forces, couples, equilibrium, centroids, frames, machines, and friction. (SPSP-311, Corequisite: SMAM-253)  
 Class 2, Credit 2 (W)
- EMEM-336** **Statics**  
**Registration #0304-336**  
 This basic course treats the equilibrium of rigid bodies under the action of forces. It integrates the mathematical subjects of calculus, vector algebra, and simultaneous algebraic equations with the physical concepts of Newton's laws. (SPSP-311, Corequisite: SMAM-253)  
 Class 4, Credit 4 (F)
- EMEM-337** **Strength of Materials I**  
**Registration #0304-337**  
 This basic course in statics of deformable bodies integrates the mathematical subjects of calculus and differential equations with the fundamental physical considerations which govern the mechanics of deformable solids in equilibrium. Topics covered include stress and strain. Hooke's Law, axial loading, torsion, and bending stresses and deflections. (EMEM-336)  
 Class 3, Lab/Rec 2, Credit 4 (F, W)
- EMEM-338** **Strength of Materials II**  
**Registration #0304-338**  
 A continuation of Strength of Materials to include pressure vessels, superposition of stresses, transformation of stress, Mohr's Circle, failure theories, energy techniques, and column theory. (EMEM-337)  
 Class 3, Lab/Rec 2, Credit 4 (Sp, Su, F\*)
- EMEM-340** **Mechanical Engineering Graphics II**  
**Registration #0304-340**  
 The objective of this course is to study advanced engineering graphics. The laboratory sessions are devoted to working drawings, shop processes, mechanical elements, tolerances and fits, assembly and detail drawings, and an introduction to computer graphics. (EMEM-201 or equivalent)  
 Class 2, Credit 2 (W, Sp)
- EMEM-341** **Introduction to Fortran Programming**  
**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, SP)
- EMEM-343** **Materials Processing**  
**Registration #0304-343**  
 This course involves 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 (conventional and non-conventional), 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** **Materials Science**  
**Registration #0304-344**  
 This course deals with 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 and their behavior in service environments. (SCHG-208)  
 Class 3, Lab. 2, Credit 4 (W, Sp)
- EMEM-349** **Elements of Dynamics**  
**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 (W, Sp)
- EMEM-413** **Thermodynamics I**  
**Registration #0304-413**  
 A basic course that introduces the mathematical theory of thermodynamics via a series of classical experiments. After the complete first law analysis of air standard engines and refrigerators (Carnot, Otto, Diesel, etc.), the Clausius and Kelvin statements of the second law are correlated with the concept of entropy. Both real and reversible processes are studied on the pressure vs. specific volume and the temperature vs. entropy coordinate systems. (SMAM-306, EMEM-336)  
 Class 4, Credit 4 (F, W)
- EMEM-414** **Thermodynamics II**  
**Registration #0304-414**  
 The second thermodynamics course begins with a study of phase space and the properties of real gases, liquids and solids. Using a control volume analysis, we use the basic fluid properties, the first and second law of thermodynamics to study and design gas turbine power plants, steam power, steam power plants, and vapor compression refrigeration systems. The properties of gaseous mixtures and combustion shall also be considered. (EMEM-413)  
 Class 3, Lab/Rec 2, Credit 4 (W\*, Sp, Su)
- EMEM-415** **Fluid Mechanics I**  
**Registration #0304-415**  
 Physical characteristics of a fluid: density, stress, pressure, viscosity, temperature, vapor pressure, compressibility. 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 phenomenon. Dimensional analysis: Buckingham's Pi-theorem, similitude, model studies. (EMEM-308, EMEM-413)  
 Class 3, Lab/Rec 2, Credit 4 (Sp, Su)
- EMEM-431** **Thermodynamics**  
**Registration #0304-431**  
 A basic course in thermodynamics for electrical engineering students. Applications of the first and second law to closed and open systems; elementary heat transfer considerations.  
 Class 4, Credit 4 (Sp, Su, F\*)
- EMEM-437** **Introduction to Machine Design**  
**Registration #0304-437**  
 The analysis and theory of machine design and applications to systems design problems; particular emphasis is placed on the design and analysis of machine elements. A discussion of engineering professionalism and ethics. (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 impact are derived. Kepler's three laws of planetary motion are used to derive Newton's Universal Law of Gravitation. The central force problem 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)

**Dynamics I****EMEM-440****Registration #0304-440**

This course involves a study of the numerical methods for solving engineering problems using computers, and to interpret and analyze the numerical results obtained. Topics include roots of algebraic and transcendental equations, solution of homogeneous and non-homogeneous systems of linear algebraic equations, numerical integration and differentiation, and ordinary differential equations. Problems will be taken from student's background in statics, strength of materials, dynamics, mathematics and thermodynamics. Students are expected to write a number of programs. (EMEM-341, or equivalent computer experience, and third-year standing)

Class 4, Credit 4 (Sp, Su)

**Numerical Modeling for Engineers****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, pressure, temperature, flow rate, vibration, etc., and transient response of transducers. In addition to standard laboratory exercises and experiments, an original experiment to measure a particular physical phenomenon is to be designed and implemented by the student either individually or in a small group. (Fourth-year standing)

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

**Mechanical Engineering Laboratory****EMEM-514****Registration #0304-514**

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

Class 4, Credit 4 (F, W)

**Heat Transfer I****EMEM-516****Registration #0304-516**

This course is a continuation of Fluid Mechanics I. However, the analysis is developed with emphasis on the differential rather than the integral approach. Continuity and momentum equations in differential form: stream function, vorticity, velocity potential, fluid rotation and viscosity. Integration of Euler's equation along a streamline for steady flow. Parallel Flows: Analytical solution of Plane Poiseuille, Couette, and pipe flows. Pipe design: Major and minor head loss, single and multipath pipe-line problem. Boundary layer concepts elucidated from vorticity transport and order analysis. Boundary layer thicknesses, Von-Karman momentum integral equation and solutions for laminar and turbulent boundary layers over a flat plate. Pressure and friction drag, streamlining. Lift and drag calculations for external flow. One-dimensional compressible flows: review of thermodynamic fundamentals, stagnation properties, speed of sound, mach cones, critical mach number, nozzle flows, normal shockwaves. (EMEM-415, SMAM-306)

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

**Fluid Mechanics II****EMEM-543****Registration #0304-543**

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

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

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

**Dynamics II****EMEM-544****Registration #0304-544**

A basic course in the dynamics of electrical, mechanical, thermal, and fluid lumped parameter systems. Classical and mobility analogs that relate these systems are defined and used. Singularity functions, using Clebsch's notation, are introduced and used to force first and second order lumped parameter systems with varied damping in the second order systems. Convolution integral is introduced and used to obtain the response of these systems to various inputs. Sinusoidal inputs along with the definitions of the transfer function, the root locus method, and bode plots are placed on these systems. Fourier series, Fourier integrals, and Laplace transforms are defined and used for more general periodic and transient inputs. In-class displays are accomplished by a portable oscilloscope, x-y plotter and analog computer system. Homework problems include the use of the digital computer using FORTRAN. (EMEM-543)

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

**Dynamics of Physical Systems****EMEM-599****Registration #0304-599**

An assigned project encompassing both analytical and experimental work integrating the student's education in mechanical engineering.

Class variable, Credit variable (F, W, Sp, Su)

**Independent Study****Group I Courses**

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

**EMEM-601****Registration #0304-601**

Emphasis on the technical aspects of solar and wind energy. Wind characteristics and site analysis, aerodynamics of horizontal and vertical axis rotors, and the economics of wind power. Fundamentals of solar radiation, solar hot water heating and solar space heating, and the economics of solar utilization. Included, but to a lesser extent, are tidal power, wave power, geo-thermal energy, ocean thermal gradient, and energy from waste. Individual term projects are required. (EMEM-514)

**Alternative Energy Sources**

## SO

### **EMEM-652 Fluid Mechanics of Turbomachinery** **Registration #0304-652**

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

Class 4, Credit 4 (Sp, Su)

### **EMEM-658 Engineering Vibrations** **Registration #0304-658**

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

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

### **EMEM-660 Refrigeration and Air Conditioning** **Registration #0304-660**

A basic course in the principles and the applications of refrigeration and air conditioning involving mechanical vapor compression and absorption refrigeration cycles, associated hardware, psychrometrics solar radiation, heat transmission in buildings, and thermodynamic design of air conditioning systems. Students are expected to do a design project. (EMEM-514)

Class 4, Credit 4 (F, W)

### **EMEM-672 Dynamics of Machinery** **Registration #0304-672**

The course treats the fundamentals of dynamic design of machinery. Topics include complete cycle dynamic analysis of mechanisms, graphical kinematics, the method of virtual work applied to dynamical systems, cam design and balancing. The digital computer and the ZETA plotter are used. (EMEM-543)

Class 4, Credit 4 (Sp, Su)

### **EMEM-694 Stress Analysis** **Registration #0304-694**

This course deals with numerical and experimental analyses of stressed mechanical components. The governing state properties are reviewed and definitions and relationships between stress, strain, and deformations; two- and three-dimensional coordinate transformations are discussed. The Finite-Element method is introduced and the student is presented with simple instructional software programs which demonstrate the Finite-Element analysis and computer graphic pre- and post-processing of data files. Commercial Finite-Element programs are discussed and demonstrated. A design project is assigned. Experimental methods are presented including strain gages, photoelasticity, and brittle coating. (EMEM-437)

Class 4, Credit 4 (Sp, Su)

## Group II Courses

### **EMEM-608 Thermo-Fluids Design & Management Principles** **Registration #0304-608**

This course consists of a team oriented design project supplemented with class lectures and discussion on the industrial design and development process. The project consists of the design, performance, and economic analyses, of the complete system with particular emphasis on the analysis of mechanical components contributing to the fluid processes of the system. The project includes a formal written project report and an oral. Students may elect to continue their work in the second thermal design course offered in the spring quarter. (EMEM-414, EMEM-516, EMEM-652)

Class 4, Credit 4 (F, W)

### **EMEM-610 Thermo-Fluids Project Design and Analysis** **Registration #0304-610**

This course involves the development of a pragmatic approach to engineering design with particular emphasis in the area of thermal and fluid sciences. The course introduces basic engineering design methodology illustrated by examples from existing designs. The course contents include the design of workable systems, selection from alternative designs, and design optimization from the process and economic considerations. Engineering principles and computer analysis will be used in practical, open-ended design problems such as heating systems, cooling systems, fluid machinery, and other thermal and fluid flow systems and components. (EMEM-414, EMEM-516, EMEM-635)

Class 4, Credit 4 (Sp)

### **EMEM-620 Introduction to Optimal Design** **Registration #0304-620**

The student is introduced to some basic optimizational techniques for engineering design with emphasis on real 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 optimal design, geometric programming, method of Lagrangian multipliers, and the use of digital computers. Summary comparison of various optimization techniques. Many real problems and industrial examples are covered. Selection of a factor of safety for optimal design use. (EMEM-440, EMEM-543, EMEM-437)

Class 4, Credit 4 (T.B.A.)

### **EMEM-625 Creative Design of Mechanical Devices** **Registration #0304-625** **and Assemblies**

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 along with many industrial examples of application, including a description of patents received where applicable. Also covered are decision table techniques for selecting the optimum configuration. (EMEM-543, EMEM-437)

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 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 professionalism and ethics of engineering are discussed. 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-665 Thermal Fluid Design** **Registration #0304-665**

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. Situations involving engineering ethics are discussed. 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-612 Gas Kinetics and Vacuum Engineering Registration #0304-612

A basic course in the principles of statistical thermodynamics and the kinetic theory of gases with applications to the science and design of vacuum systems. Topics to be covered include the kinetic theory of gases, transport phenomena, molecular flow, and sorption of gases and vapors by solids. Following this introduction to the nature of gases, the course will focus on high-vacuum engineering. Topics will include vacuum pumps, vacuum system design and performance, vacuum measurements, and leak detection. Current applications of vacuum technology will be treated and will correspond to the areas of interest expressed by the class. (EMEM-413 or equivalent)

Class 3, Lab/Rec 2, Credit 4 (T.B.A.)

### EMEM-61S Robotics Registration #0304-615

This is an applied course in the fundamentals and applications of industrial robots. Topics include computer vision, sensors, gripper design, safety, economics, flexible manufacturing systems, and case studies. A major emphasis is placed on a term project involving an actual industrial problem. (EMEM-543)

Class 4, Credit 4 (F, W)

### EMEM-618 Computer-Aided Engineering Registration #0304-618

This course introduces the mechanical engineering student to the procedures and techniques used to integrate the computer into the industrial design and manufacturing cycle. The student is exposed to the computer hardware and software used in the design phase (i.e., mechanical drawing, solids modelling, etc.), and the manufacturing phase (i.e., NC machining, mold-flow analysis, heat-transfer analysis, robotics, work-cell simulation, etc.). The students are also instructed in the design of interactive software programs for the graphic display. A design project is selected from one or more of the topics covered. (Fifth-year standing)

Class 4, Credit 4 (F, W)

### 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 inlets, diffusers, wind tunnels. Oblique shocks and applications. Prandtl Meyer expansion fan and reflections of shocks. Two and three-dimensional compressible flows. Theory of characteristics. Linearized flows. Thin airfoil theory, supersonic nozzle design. (EMEM-516)

Class 4, Credit 4 (T.B.A.)

### EMEM-651 Viscous Flows Registration #0304-651

An advanced course in fluid mechanics covering incompressible laminar and turbulent boundary layers. General properties of Navier-Stokes equations, some exact solutions. Boundary layer equations, some exact and approximate solutions for two-dimensional steady flows. Boundary layer controls. Three-dimensional boundary layers. Transition of boundary layers. Theories of turbulence. (EMEM-516)

Class 4, Credit 4 (T.B.A.)

### EMEM-669 Introduction to Water Pollution Registration #0304-669

Hydrologic cycle; water supply requirements and sources; waste water generation volumes 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-680 Advanced Thermodynamics Registration #0304-680

This course involves an in-depth study of the second law of thermodynamics and its consequences. The course further deals with thermodynamics of reacting and non-reacting mixtures, chemical equilibrium, thermochemistry, Nernst theorem, and Onsager relations. (EMEM-414)

Class 4, Credit 4 (T.B.A.)

### EMEM-685 Advanced Strength of Materials

#### Registration #0304-685

Statically indeterminate problems for beams; frames; continuous beams; beams of variable cross section, reinforced-concrete beams; beams on elastic foundation; stability of columns; plastic deformation in bending and torsion; limit analysis; energy methods with applications to beams, curved bars, and frames; rotating disks; introduction to bending of plates. (EMEM-338)

Class 4, Credit 4 (T.B.A.)

### EMEM-687 Engineering Economy

#### Registration #0304-687

An engineering approach to deal with the economic aspects of proposed engineering designs and/or in-service engineering installations. Also considered are economic factors in the operation of systems and equipment, such as: cash flow, rate of return, present worth, future worth, valuation and depreciation, and benefit cost analysis.

Class 4, Credit 4 (T.B.A.)

### EMEM-689 Patent Law and Protection

#### Registration #0304-689

A study of protection of intellectual property including study of patent rights, inventions, procedures for obtaining patents as well as a study of the law and drafting techniques of patents and their claims. Insights to invention protection and legal ramifications of inventor's and attorney's activities will be included.

Class 4, Credit 4 (T.B.A.)

### EMEM-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.)

### EMEM-692\* Analysis for Engineers

#### Registration #0304-692

Partial differentiation, chain rule, and total differential; multiple integration and manipulation of multiple integrals; linear constant coefficient ordinary differential equations; vector algebra and differentiation of vectors or complex variables.

Credit 4 (F)

*\*Offered upon sufficient demand (at least 12 students registered) to students wishing to enter the graduate program.*

## Graduate Courses

### EMEM-693\* Thermo Fluid System Analysis

#### Registration #0304-693\*

Thermodynamic properties and processes, ideal and real gas, vapors and gases; laws of thermodynamics and selected power cycles; fluid statics; control volume and conservation of mass, momentum and energy; Bernoulli's equation; viscosity, loss of heat due to friction (flow through pipes), concept of boundary layer; basic law of conduction; convection; radiation.

Credit 4 (T.B.A.)

### EMEM-697\* Applied Mechanics System Analysis

#### Registration #0304-697\*

Methods currently employed in component and system analysis of the static and dynamic behavior of rigid and elastic bodies. The topics will include a review and advanced studies of vector statics and dynamics of rigid and elastic bodies and systems.

Credit 4 (T.B.A.)

*\*These courses are provided for students who have been out of school for a number of years and feel it necessary to review or update their educational background.*

**EMEM-810 Introduction to Continuum Mechanics****Registration #0304-810**

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**

Stress-strain relations and formulation of boundary value problems. State of plane strain, state of plane stress. Solutions by potentials, Airy stress function. Torsion of bars with circular, elliptic, rectangular cross-sections. Stresses and displacements in thick cylinders, disks, and spheres. Contact stress problems. (EMEM-BIO)

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-685 or equivalent)

Credit 4 (T.B.A.)

**EMEM-815 Experimental Stress Analysis****Registration #0304-815**

Experimental methods of analysis of structural machine members, including strain gages and instrumentation, photoelastic methods, brittle coating, 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 sub-problem 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**

Vibration of discrete multi-mass systems using matrix methods. Normal mode theory, and matrix eigenvalue extraction procedures. Matrix forced response. Practical examples using two-and-three degrees of freedom. Vibration of continuous systems. Computer simulations. (EMEM-871, EMEM-874)

Credit 4 (T.B.A.)

**EMEM-828, 829 Special Topics in Applied Mechanics****Registration #0304-828, -829**

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. A listing of special courses is found at the end.

Credit variable (maximum of 4 credits/quarter) (T.B.A.)

**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-838 Ideal Flows****Registration #0304-838**

This graduate course introduces the students to the modern analysis of ideal flows. The approach is based on advanced mathematical as well as engineering viewpoint. The applications will be restricted to aerodynamics such as design of airfoils, wings, etc. (EMEM-871)

Credit 4 (T.B.A.)

**EMEM-845 Turbomachinery****Registration #0304-845**

One-dimensional analysis of centrifugal pumps, water turbines, and axial flow turbines and compressors. Emphasis on blending the application of physical principles, dimensional analysis, and empirical data to design turbomachines. (EMEM-516)

Credit 4 (T.B.A.)

**EMEM-848,849 Special Topics in Thermo Fluid Systems****Registration #0304-848, -849**

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. A listing of special courses is found at the end.

Credit variable (maximum of 4 credits/quarter) (T.B.A.)

**EMEM-871 Mathematics for Engineers****Registration #0304-871**

Topics include linear constant coefficient ordinary differential equations; partial differentiation, including the chain rule, Jacobians and optimization problems; multiple integration including change of coordinates and surface integrals; vector analysis, including the directional derivative, the gradient, the Divergence Theorem and Stokes' Theorem; Laplace Transforms; and an introduction to Fourier Series and Integrals.

Credit 4 (F)

**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. The vibration of discrete multi-mass systems includes the formulation and eigen-value solutions by computer, and the method of finite elements are included. The vibration of continuous systems and discrete modeling is introduced. (EMEM-871 and EMEM-543)

Credit 4 (W)

**EMEM-873 Heat Transfer****Registration #0304-873**

Formulation of the heat conduction equation, solution of the one-dimensional, unsteady heat conduction equation by separation of variables; Sturm-Liouville system, orthogonal functions, generalized 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. (EMEM-514 and EMEM-871)

Credit 4 (W)

**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 (F)

**EMEM-875 Instrumentation and Experimental Analysis**  
**Registration #0304-875**

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

Credit 4 (Sp)

**EMEM-880 Independent Study**  
**Registration #0304-880**

An opportunity for the advanced student to undertake an independent investigation in a special area under the guidance of a faculty member. A written proposal is to be forwarded to the sponsoring faculty member and approved by the department head prior to the commencement of work.

**EMEM-890 Thesis, Design Project, or Literature Search**  
**Registration #0304-890**

In conference with an advisor, a topic is chosen. The work may involve a thesis, design project, or literature search. Periodic progress reports and a final written document with an oral examination are required.

Credit variable (5 to 12 credits total) (F, W, Sp, Su)

**SESM-701 Introduction to Material Science**

See course description under Materials Science and Engineering in the graduate catalog.

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  
 Advanced Optimal Design

## 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 2, Lab. 2, Credit 2

**EMCR-215 Intro, to Microelectronics (Transfer)**  
**Registration #0305-215**

This course contains approximately 75% of the material in EMCR-210 and EMCR-340. For transfer students.

Class 3, Lab. 3, Credit 3

**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 2, 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-550 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

# College of Fine and Applied Arts

## School of Art and Design

In September 1982, the Communication Design program name was changed to Graphic Design, and Environmental Design was changed to Industrial and Interior Design.

See **Packaging Science** for **Packaging Design** course descriptions.

### **FADC-301, -302, -303** Introduction to Graphic Design **Registration #0402-301, -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 communications. The relationship of typography and photography to graphic design is included. (Foundation program or equivalent)

Recommended co-related courses include introductory photography, introductory typography, photomechanics, motion picture, and television. No special sequence required. Prerequisite for major in Graphic Design.

Lab. 9, Credit 3 (offered each year)

### **FADC-401, -402, -403** Graphic Design (Junior Major) **Registration #0402-401, -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 building a working knowledge of communication media areas such as print, photography, typography, etc. Media Center facility available for extension and application of studio experiences. (FADC-301, -302, -303 or equivalent)

Lab. 12, Credit 6 (offered each year)

### **FADC-411,412, 413** Graphic Design **Registration #0402-411, -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)

### **FADC-501, -502, -503** Graphic Design (Senior Major) **Registration #0402-501, -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 identify, signage, audio-visual, packaging or computer graphics.

Lab. 18, Credit 9 (offered each year)

### **FADC-511, -512, -513** Graphic Design **Registration #0402-511, -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)

### **FADC-520** Professional Design Business Practices **Registration #0402-520** and Ethics

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 - Exhibit Design  
312 - Industrial Design  
313 - Interior 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 value 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 - Industrial: Packaging — Graphics  
Interior: Space — Materials  
402 - Industrial: Product — Human Factors  
Interior: Space — Decorative Arts  
403 - Industrial: Product — Materials and Processes  
Interior: Space — 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.

### **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 - Industrial: Product — Computer  
Interior: Space — Computer  
502 - Industrial: Product — Furniture  
Interior: Space — Furniture  
503 - Industrial: Product — Professional Practices  
Interior: Space — Professional Practices

Lab. 18, Credit 9 (offered each year)

### **FADF-201, 202, 203** Design (Crafts Majors) **Registration #0404-201, -202, -203**

The elements of design and color and their structural relationship as applied to problems in two and three dimensions.

Lab. 6, Credit 3 (offered each year)

### **FADF-205, 206, 207** Creative Sources **Registration #0404-205, -206, -207**

This course is designed to make students aware of their environment, their physical being and their experiences as tools for creative problem solving. This will be accomplished through lectures, individual and group assignments and demonstrations.

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

### **FADF-210, 211, 212** Drawing **Registration #0404-210, -211, -212**

A basic foundation in drawing as a form of creative expression and a means to communicate information. Through the use of organic and inorganic materials attention is given to individual response to "seeing" as interspersed with all sensory conditioning. The figure is utilized in the analysis of action, structure, and gesture through quick sketches.

Lab. 9, Credit 4 (offered each year)

### **FADF-221, 222, 223** Design for Photo I **Registration #0404-221, -222, -223**

Study of principles of two- and three-dimensional design as a means of communication and expression.

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

### **FADF-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 using a variety of media.

Lab. 6, Credit 3 (offered each year)

- FADF-241, 242, 243** **3-D Design**  
**Registration #0404-241, -242, -243**  
 The elements of design and color and their structural relationship as applied to problems in three dimensions. A variety of media are used.  
 Lab. 6, Credit 3 (offered each year)
- FADF-261, 262, 263** **Drawing (Crafts Majors)**  
**Registration #0404-261, -262, -263**  
 Drawing in a variety of media. Introduction to line form, and color as elements of pictorial expression. Organic and inorganic materials are used.  
 Lab. 6, Credit 3 (offered each year)
- FADF-321, 322, 323** **Design for Photo II**  
**Registration #0404-321, -322, -323**  
 Emphasis upon problems which are related to visual phenomena, fundamentals, and communications. Expression through image making viewing and discussion.  
 Class 1, Lab. 2, Credit 2 (offered each year)
- FADP-301, -302, -303** **Drawing and Painting**  
**Registration #0405-301, -302, -303** **(Sophomore Core)**  
 Emphasis is placed upon drawing and the objective mastery of form and space from a variety of visual sources including the human figure. Development of basic techniques, materials and concepts of painting media. Prerequisite for major in Painting; 301 and 302 for Medical Illustration.  
 301 - Drawing — Media  
 302 - Drawing — Composition  
 303 - Drawing — Illustration  
 Lab. 6, Credit 3 (offered each year)
- FADP-313** **Medical Illustration Carbon Dust Technique**  
**Registration #0405-313** **(Sophomore Major)**  
 Introduction to carbon dust illustration techniques. Beginning sequence of illustrative techniques leading to mastery of medical illustration. Emphasis upon a professional approach.  
 Lab. 6, Credit 3 (offered each year)
- FADP-320** **Color**  
**Registration #0405-320**  
 One-quarter course dealing with the examination of basic color phenomena by visual comparison. Study the differences between light and pigment. Class problems exploring such relationships as intensity, vibration, temperature, after-image, spatial effects and image-ground distortion.  
 Class 3, Lab. 3, Credit 3 (offered each year)
- FADP-321, -322, -323** **Illustration**  
**Registration #0405-321, -322, -323**  
 One-quarter course exploring the art of illustrators; their relation to audience, publishers, and media. Studio problems will develop and expand basic concepts of illustration.  
 Studio sessions will be devoted to illustrative problems that reflect the class study for that period. Class critiques at appropriate times.  
 Class 3, Lab. 3, Credit 3 (offered each year)
- FADP-401, 402, 403** **Painting**  
**Registration #0405-401, -402, -403** **(Junior Major)**  
 Second year of Painting in a three-year degree sequence. Development of mastery of painting media. Emphasis placed upon individual solutions and expression. Completion of a specialized project during the Spring Quarter.  
 Lab. 12, Credit 6 (offered each year)
- FADP-411, 412, 413** **Painting**  
**Registration #0405-411, -412, -413**  
 An elective providing the opportunity for exploration of personal expression through a painting medium.  
 Lab. 6, Credit 3 (offered each year)
- FADP-421, 422, 423** **Medical Illustration Applications**  
**Registration #0405-421, -422, -423** **(Junior Major)**  
 Development of range and mastery of medical illustration techniques. Laboratory sessions scheduled in bio-medical illustration. (Lab orientation sessions to be scheduled in operating room facilities.)  
 Lab. 6, Credit 5 (offered each year)  
 Lab. 12, Credit 8, Winter, Spring (offered each year)
- FADP-450** **Drawing Problems**  
**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)
- FADP-501, 502, 503** **Painting**  
**Registration #0405-501, -502, -503** **(Senior Major)**  
 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. 18, Credit 9 (offered each year)
- FADP-511, 512, 513** **Painting**  
**Registration #0405-511, -512, -513**  
 An elective that provides further exploration of personal expressive styles through a painting media.  
 Lab. 6, Credit 3 (offered each year)
- FADP-531, 532, 533** **Advanced Medical Illustration**  
**Registration #0405-531, -532, -533** **(Senior Major)**  
 Advanced medical illustration techniques. Graphic design related to illustrative and photographic practice. Lab sessions to be scheduled in operating room facilities.  
 Jointly sponsored between RIT and the University of Rochester.  
 Lab. 18, Credit 6 (offered each year)
- FADR-301, -302, -303** **Drawing and Printmaking**  
**Registration #0406-301, -302, -303** **(Sophomore Core)**  
 Emphasis is placed upon drawing and the objective mastery of form and space from a variety of visual sources including the human figure. Development of basic techniques, materials and concepts of printmaking, including woodcut, etching and lithography. Prerequisite for major in Printmaking.  
 301 - Drawing — Media  
 302 - Drawing — Composition  
 303 - Drawing — Illustration  
 Lab. 9, Credit 4 (offered each year)
- FADR-401, 402, 403** **Printmaking**  
**Registration #0406-401, -402, -403** **(Junior Major)**  
 Development of printmaking techniques through personal statements in lithography, intaglio and relief printing. For junior printmaking students and transfer students. Expansion and development in combined and complex print forms including papermaking and non-silver photo techniques are encouraged.  
 Lab. 12, Credit 6 (offered each year)
- FADR-411, 412, 413** **Printmaking**  
**Registration #0406-411, -412, -413**  
 An elective providing the opportunity to explore personal statements through one of the following: lithography, etching, woodcut, paper-making.  
 Lab. 6, Credit 3 (offered each year)
- FADR-501, -502, -503** **Printmaking**  
**Registration #0406-501, -502, -503** **(Senior Major)**  
 Continuation of third-year printmaking, expanding the technical involvement in paper making and non-silver photo techniques in etching and lithography. Opportunity is presented for involvement in developing a more concentrated and personal art form through any singular technique or any combination. A limited edition portfolio project is developed with the participation of all students. (FADR-401, 402, 403) Encouragement is offered for students to exhibit professionally in regional and national exhibitions and emphasis is placed on preparing a strong professional body of prints for future use in seeking job placement and admission to graduate study.  
 Lab. 18, Credit 9 (offered each year)
- FADR-511, 512, 513** **Printmaking**  
**Registration #0406-511, -512, -513**  
 An elective that provides further exploration of printmaking with emphasis on personal statement.  
 Lab. 6, Credit 3 (offered each year)



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

## School for American Craftsmen

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

**FSCC-251, 252, 253** **Ceramics Elective I**  
**Registration #0409-251, -252, -253**  
 An elementary course in design and techniques in ceramics. Hand built pottery and primitive firing techniques.  
 Lab. 6, Credit 3 (offered each year)

**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 problems. Mold-making, slip casting, jiggering and decorative techniques. Ceramic raw materials, sources of supply, use and maintenance of equipment 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 construction. Materials and sources of supply. Development of bodies and glazes for specific purposes. Problems requiring new uses, adaptations, and applications. Independent study, papers, reports.  
 Lab. 15, Credit 5 (offered each year)

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

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

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

**FSCF-310** **History of Crafts**  
**Registration #0410-310**  
 Explores creative thinking and designing in the area of crafts through the ages with special emphasis on clay, fibers, glass, metal and wood. The course highlights the artistic achievements of the craftsmen of the past to enable present students to view their own time in its historical perspective and thereby understand more thoroughly their creative heritage and the efforts of contemporary craftsmen.  
 Class 3, Credit 3 (offered each year)

**FSCF-320** **History of Art Criticism**  
**Registration #0410-320**  
 A study of what makes art "good," (philosophical theories of art and the aesthetic experience) and what art criticism is and does (types and principles of art criticism) with direct applications to the life and work of the artist and craftsman/designer.  
 Class 3, Credit 3 (offered each year)

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

**FSCF-340** **Symbols and Symbol-Making**  
**Registration #0410-340**  
 A concentrated study of symbols, legends and myths and their creation 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**  
 A study of the art of India, China, and Japan in the area of painting, printmaking, sculpture, architecture and the crafts with emphasis on their implications for contemporary artists/designer and craftsmen.  
 Class 3, Credit 3 (offered each year)

**FSCF-360** **18th & 19th Century Art**  
**Registration #0410-360**  
 The development of the arts in these two centuries in the areas of painting, printmaking, sculpture, architecture, and the crafts with emphasis on their influence of 20th century styles and focusing on their impact on the artist/craftsmen/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 1960'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)**  
 A sequential course for three quarters providing fundamentals of glassworking. The function and use of hand and machine glassworking tools. An analysis of glass as a material: its history, chemical make-up, intrinsic qualities and potential. Fundamental techniques of stained glass and glass fabrication. An introduction to the use of coldworking techniques: slump molds, lamination, non-glass surface decoration, etching, sandblasting, grinding, polishing.  
 Lab. 15, Credit 5 (offered each year)

**FSCG-251, 252, 253** **Glass Elective I**  
**Registration #0411-251, -252, -253**  
 A survey course emphasizing furnace glassblowing and stained glass as a means of personal expression and appreciation. A portion of the course is a basic investigation of the history, chemistry, techniques and technical aspects of glass.  
 Lab. 6, Credit 5 (Offered each year)

**FSCG-300** **Glass Materials and Processes**  
**Registration #0411-300** **(Sophomore Major)**  
 A sequential course for three quarters providing an analysis and discussion of glass design and problems of fabrication with emphasis on surface decoration. The formulation and adjustment of various glass batches with in-depth analysis of color. Explores the history of ancient through contemporary glass with studies at the Corning Museum of Glass and its collections. The use and construction of studio equipment, museum visits, papers and reports.  
 Lab. 15, Credit 5 (offered each year)

**FSCG-351, 352, 353** **Glass Elective II**  
**Registration #0411-351, -352, -353**  
 Pre-requisite: Glass Elective 251, 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 and may involve slumping, casting, blowing, cutting, polishing or sculptural construction.  
 Lab. 6, Credit 3 (offered each year)

**FSCG-400** **Glass Materials and Processes**  
**Registration #0411-400** **(Junior Major)**  
 A sequential course for three quarters treating the organization and design of the glass studio. The development of production techniques for blowing and forming glass. The development of unique approaches to visual self-expression, papers and reports.  
 Lab. 15, Credit 5 (offered each year)

**FSCG-500** **Glass Techniques and Thesis**  
**Registration #0411-500** **(Senior Major)**  
 A sequential course for three quarters providing individual research in technical problems culminating in a thesis. The student will organize and present a senior exhibition of work related to the thesis, papers, lectures and demonstrations.  
 Lab. 24, Credit 8 (offered each year)

**FSCG-520** **Stained Glass**  
**Registration #0411-520**  
 An elective relating advanced individual exploration using structural elements of color design and visual expression. Fabricating techniques involve cutting, shaping, soldering, leading, foiling, glazing stained glass.  
 Lab. 6, Credit 3 (offered each year)

**FSCM-200** **Metalcrafts Materials and Processes**  
**Registration #0412-200** **(Freshman Major)**  
 Sequential course for three quarters, introducing basic exercises in the use of equipment and metalcrafts techniques through holloware and jewelry design in various metals. Included will be the discussion and metal design utilizing the techniques of fabrication, forging, raising and casting.  
 Lab. 15, Credit 5 (offered each year)

**FSCM-251, 252, 253** **Metalcrafts Elective I**  
**Registration #0412-251, -252, -253**  
 An elective course providing an opportunity for introductory study in metals either holloware or jewelry.  
 Lab. 6, Credit 3 (offered each year)

**FSCM-300** **Metalcrafts Materials and Processes**  
**Registration #0412-300** **(Sophomore Major)**  
 Sequential course for three quarters, introducing stone setting, repousse and chasing and moldmaking. Analysis of design and production problems relating to holloware and jewelry.  
 Lab. 15, Credit 5 (offered each year)

**FSCM-351, 352, 353** **Metalcrafts Elective II**  
**Registration #0412-351, -352, -353**  
 An elective course providing an opportunity for more advanced study in metals either holloware or jewelry.  
 Lab. 6, Credit 3 (offered each year)

**FSCM-400** **Metalcrafts Materials and Processes**  
**Registration #0412-400** **(Junior Major)**  
 Sequential course for three quarters, introducing flatware, spinning and machine tool processes. Introduction to industrial manufacture and precious metal work in gold and platinum.  
 Lab. 15, Credit 5 (offered each year)

**FSCM-500** **Metalcrafts Techniques and Thesis**  
**Registration #0412-500** **(Senior Major)**  
 Sequential course for three quarters, providing individual research in technique and design. A final presentation, to include a resume, photographs and renderings of work, is required.  
 Lab. 24, Credit 8 (offered each year)

**FSCT-200** **Textile Materials and Processes**  
**Registration #0413-200** **(Freshman Major)**  
 Sequential course for three quarters, providing fundamentals of fabric design, yarn calculation, and pattern drafting. Analysis of equipment and problems. Practice in basic weaves. Experiment in design and weaving of sample warps of drapery, linens, upholstery, and suiting fabrics. Study of qualities and color combinations of various yarns. Yardage weaving. Printing procedures; silk screen techniques.  
 Lab. 15, Credit 5 (offered each year)

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

**FSCT-300** **Textile Materials and Processes**  
**Registration #0413-300** **(Sophomore Major)**  
 Sequential course for three quarters, providing an analysis of fabrics. Advanced pattern drafting. Study and analysis of fibers. Advanced techniques of weaving, with related problems in design. Continued experience in sample warps and yardage weaving. Practice in the use of various types of eight- to ten-harness looms. Experiments and research with novelty fibers. Independent study, papers, reports.  
 Lab. 15, Credit 5 (offered each year)

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

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

**FSCT-500** **Textile Techniques and Thesis**  
**Registration #0413-500** **(Senior Major)**  
 Sequential course for three quarters, covering the design of fabrics in selected fields such as household fabrics, fashion fabrics or accessories with concentration on items having production merit. A thesis is included.  
 Lab. 24, Credit 8 (offered each year)

**FSCW-200** **Woodworking Materials and Processes**  
**Registration #0414-200** **(Freshman Major)**  
 Sequential course for three quarters, covering function and care of hand and machine woodworking tools. Wood as a material: history, kinds, qualities, sources. Fundamental techniques of wood fabrication, including basic joinery, turning, and finishing.  
 Lab. 15, Credit 5 (offered each year)

**FSCW-251, 252, 253** **Wood Elective I**  
**Registration #0414-251, -252, -253**  
 An elementary course in design and techniques in woodworking. Hand and power tools will assist in the small scale making of wood objects.  
 Lab. 6, Credit 3 (offered each year)

**FSCW-300 Woodworking Materials and Processes  
Registration #0414-300 (Sophomore Major)**

Sequential course for three quarters, covering advanced design, layout and construction. Plywood construction, chairmaking and chest of drawers technique. Limited production of small accessories including jigs, and pricing. Historical development of furniture and interiors, papers, reports.

Lab. 15, Credit 5 (offered each year)

**FSCW-351, 352, 353 Wood Elective II  
Registration #0414-351, -352, -353**

An elective course providing an opportunity for more advanced study in wood. Hand and power tools will assist in the small scale making of wood objects.

Lab. 6, Credit 3 (offered each year)

**FSCW-400 Woodworking Materials and Processes  
Registration #0414-400 (Junior Major)**

Sequential course for three quarters covering advanced concepts in furniture and woodworking, wood sculpture, and veneering. Analysis of construction problems in both traditional and contemporary furniture, papers, reports.

Lab. 15, Credit 5 (offered each year)

**FSCW-500 Woodworking Techniques and Thesis  
Registration #0414-500 (Senior Major)**

Sequential course for three quarters, allowing each student, with the approval of the instructors, either to specialize in one branch of wood-working or to develop a particular design trend. This culminates during the final quarter in the completion of a thesis project.

Lab. 24, Credit 8 (offered each year)

## Graduate Courses

### School of Art and Design

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

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

### Art Education

**FADA-701, 702 (MST) Methods and Matrials in Art Education  
Registration #0401-701, -702 (Major)**

Intensive study of curriculum in terms of teaching materials for both studio and appreciation aspects of elementary, early secondary and high school art education. Includes studio and elementary school teaching experience.

Class 2, Lab. 9, Credit 5 (offered every year-Fall, Winter)

**FADA-820 (MST) Seminar in Art Education  
Registration #0401-820 (Major)**

Evaluation and study of the practice teaching experience. Discussion of the professional role of the art teacher in terms of professional associations, supervision, teacher training, and research. A final project on some intensively studied aspect of art education is required.

Lab. 25, Credit 3 (offered every year-Spring)

**FADA-860 (MST) Practice Teaching in Art  
Registration #0401-860 (Major)**

A seven-week full-time practice teaching experience in secondary school, including professional duties of the art teacher in humanities courses, publication advising, audiovisual work, and supervision. Supplements the studio-theoretical education. Meets the state education requirements.

Credit 9 (offered every year-Spring)

### Graphic Design

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

**FADC-750 (elective, minor) Graphic Design  
Registration #0402-750**

Advanced creative problem solving experiences in graphic design imagery. Professional problems in visual techniques for communication media. Media Center facility available for extension of studio problems.

Lab. 6, Credit 3 (offered every quarter)

**FADC-780 Graphic Design  
Registration #0402-780 (Major)**

Advanced creative problem-solving experiences relating to graphic design imagery. Formal design values are emphasized and utilized in communications applications. Studio involvement is directed toward the solution of individual, group and assigned graphic design problems. Specification of the program is developed in accordance with the professional goal of the individual student and work leading toward the master's thesis. Media Center facilities are available for application of studio imagery.

Lab. 9-27, Credit 3-9 (offered every quarter)

### Computer Graphics Design

**FADG-780 Introduction to Computer Graphics Design  
Registration #0432-780 (MFA Major)**

An introduction to programming for the design of computer graphics. Basic familiarity with using the keyboard, CRT, disk drive, tablet, printer, plotter and image digitizer to create imagery. Emphasis on creating shape files, pictures and writing simple programs.

Lab. 9, Credit 3 (offered each year)

**FADG-781 Two-Dimensional Computer Graphics Design  
Registration #0432-781 (MFA Major)**

Exposure to computer graphic algorithms, design heuristics, design methodology, language data structures, and program structures for two-dimensional imagery. Projects involve complex programming.

Lab. 9, Credit 3 (offered each year)

**FADG-782 Three-Dimensional Computer Graphics Design  
Registration #0432-782 (MFA Major)**

Extension of previous experience to include three-dimensional objects, hidden lines and surfaces, solid modelling, perspective, etc. Projects involve complex programming.

Lab. 9, Credit 3 (offered each year)

**FADG-783 Visual Semiotics/Graphic Design  
Registration #0432-783 (MFA Major)**

The application of syntactic, semantic and pragmatic levels of visual design activities. These concepts will be applied to creative projects utilizing the computer as the primary tool.

Lab. 9, Credit 3 (offered each year)

**FADG-784 Digital Typography  
Registration #0432-784 (MFA Major)**

A study of the evolution of typography, typesetting and typesetting systems from metal type through photo typesetting to today's digital typesetting. Hands-on experiences in production typesetting including photo typesetting, digital typesetting, word processing and pre-press planning for accurate typographic reproduction.

Lab. 9, Credit 3 (offered each year)

**FADG-785 Computer-Generated Slide Design  
Registration #0432-785 (MFA Major)**

The design of slides for business graphics and audio-visual presentations. Hands-on experience with a sophisticated computer graphics system for the generation of high resolution slides. Emphasis on both commercial production concerns and creative problem solving.

Lab. 9, Credit 3 (offered each year)

**FADG-786** **Computer-Generated Animation**  
**Registration #0432-786** **(MFA Major)**  
 Extension of computer generated slide design using keyframe animation techniques to automatically create frames for film, video or multi-image slide presentations.

Lab. 9, Credit 3 (offered each year)

**FADG-787** **Advanced Computer Graphics Design**  
**Registration #0432-787** **(MFA Major)**  
 Advanced explorations of computer graphic applications. Projects include such topics as computer generated layout, digital type development, computer-aided instruction lessons, TV and electronic mail promotions and computerized animation.

Lab. 18, Credit 6 (offered each year)

## Industrial and Interior Design

**FADD-750 (elective, minor)** **Industrial and Interior Design**  
**Registration #0403-750**  
 The reasoned application of theoretical and practical background to advanced projects in industrial and interior design.

Lab. 6, Credit 3 (offered every quarter)

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

Lab. 9-27, Credit 3-9 (offered every quarter)

## Painting

**FADP-750 (elective, minor)** **Painting**  
**Registration #0405-750**  
 The study of the techniques and concepts of present day painting and its relation to the great sweep of the painting of the past for those who intend to paint and to teach.

Lab. 6, Credit 3 (offered every quarter)

**FADP-751** **Drawing Problems**  
**Registration #0405-751** **(elective painting minor)**  
 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)

**FADP-780** **Painting**  
**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)

## Printmaking

**FADR-750 (elective, minor)** **Printmaking**  
**Registration #0406-750**  
 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 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** **Printmaking**  
**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** **Sculpture**  
**Registration #0407-750**  
 Sculptural concepts are approached through a variety of processes and materials. The studio work is executed in paper, wood, fabrics, metal, stone, clay and plastics.

Lab. 6, Credit 3 (offered each year)

## Medical Illustration

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

Lab. 6, Credit 3 (offered each year)

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

Lab. 6, Credit 3 (offered each year)

**FADM-783** **Medical Illustration Surgical I**  
**Registration #0408-783** **(MFA Major)**  
 Students will apply their knowledge of anatomy to illustrating operative procedures. Emphasis will be placed on techniques for surgical illustration and situations wherein those techniques are appropriated. Students will learn to simplify and highlight complex procedures. Finally, they will select illustrative techniques best suited for reproduction in medical journals, texts, motion pictures and television.

Lab. 6, Credit 3 (offered each year)

**FADM-784** **Medical Illustration Surgical II**  
**Registration #0408-784** **(MFA Major)**  
 A continuation of Surgical Illustration I, wherein students: work and communicate closely with the surgeon. Interpret medical terminology and recognize relevant issues and problems affecting the illustration. Develop an analysis of theoretical concepts when planning, executing, and evaluating surgical illustrations for the doctor and the publisher.

Lab. 6, Credit 3 (offered each year)

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

Lab. 6, Credit 3 (offered each year)

**PPHB-781** **Medical Illustration Photography**  
**(MFA Major)**

See description under School of Photography

## Thesis

**FAD (C, D, P, R, M or G-890)** **Research and Thesis Guidance**  
**Registration #040 (2, 3, 5, or 8)-890** **(Major MFA only)**  
 The development of a thesis project instigated by the student and approved by a faculty committee and the Special Assistant to the Dean for Graduate Affairs. Primary creative production, the thesis must also include a written report.

Lab. 27, Credit 3-14 (offered every quarter)

**FASA-785** **Forms of Inquiry**  
**Registration #0402-785** **(Required for MFA)**  
 The exploration and organization of forms of inquiry in the fields of art, craft and design.

Class 2, Credit 2 (offered each year)

**FASA-790** **Graduate Forum**  
**Registration #0402-790** **(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

## Graduate Courses

### School for American Craftsmen

#### Ceramics and Ceramic Sculpture

**FSCC-750 (elective, minor)** **Ceramics and Ceramic Sculpture**  
**Registration #0409-750**

Basic instruction and experience in ceramic design, fabrication and production of ceramic forms is undertaken. This study provides ceramic technology and terminology and gives experience with clays along with fundamental forming techniques. The development of design awareness is encouraged through lectures and critiques.

Lab. 6, Credit 3 (offered every quarter)

**FSCC-780** **Ceramics and Ceramic Sculpture**  
**Registration #0409-780** **(Major)**

A program structured on the basis of individual needs, interests and background preparation as they may be determined through faculty counseling. There will be a strengthening of ceramic techniques, design fundamentals and encouragement of personal ceramic expression. The student will be encouraged to evaluate new techniques, materials and concepts. This sequence leads to the master's thesis, suggested by the student and approved by the faculty.

Lab. 9-27, Credit 3 (offered every quarter)

#### Glass

**FSCG-720 (elective minor)** **Stained Glass**  
**Registration #0411-720**

An elective providing exploration of personal approaches to visual expression and techniques in flat glass. Technical processes may incorporate all hot and cold processes used in glass.

Lab. 6, Credit 3 (offered each year)

**FSCG-750** **Glass**  
**Registration #0411-750** **(elective, minor)**

Collaborative work with the student's major area of study and glass fabrication is encouraged. Various techniques, both hot and cold will be considered: casting, slumping, fusing, blowing, cutting electroplating, lamp working and sculptural construction. Course emphasis on personal, independent development encouraging contemporary thought and concept.

Lab. 6, Credit 3 (offered every quarter)

**FSCG-780** **Glass**  
**Registration #0411-780** **(Major)**

A program structured on the basis of individual needs, interests and background preparation as they may be determined through faculty counseling. All technical processes and techniques are to be considered relevant. The course is structured to provide a foundation for professional activity and to encourage exploration of personal concepts relating to the presentation of a body of visual work. This sequence leads to the master's thesis, suggested by the student and approved by the faculty.

Lab. 9-27, Credit 3-9 (offered every quarter)

#### Metalcrafts and Jewelry

**FSCM-750 (elective, minor)** **Metalcrafts and Jewelry**  
**Registration #0412-750**

This is the study and manipulation of metals for hollow ware/jewelry. Design sensitivity and concepts are approached through the raising, forming and planishing or casting, forging, and fabricating techniques.

Lab. 6, Credit 3 (offered every quarter)

**FSCM-780** **Metalcrafts and Jewelry**  
**Registration #0412-780** **(Major)**

A program structured on the basis of individual needs, interests and background preparation as they may be determined through faculty counseling. Both hollow ware and jewelry areas will be explored. It is designed to give the student a broad exposure to metal working 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)

#### Weaving and Textile Design

**F SCT-750 (elective, minor)** **Weaving and Textile Design**  
**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)

**F SCT-780** **Weaving and Textile Design**  
**Registration #0413-780** **(Major)**

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, finn-weave, Ikat, multiple layer, dyeing, non-loom, pile rug, printed surface, silk-screen, tapestry, and soft sculpture. Design concepts are compliments to the techniques. This sequence leads to the master's thesis, suggested by the student and approved by the faculty.

Lab. 9-27, Credit 3-9 (offered every quarter)

#### Woodworking and Furniture Design

**FSCW-750 (elective, minor)** **Woodworking and Furniture Design**  
**Registration #0414-750**

This is a course in woodworking techniques and procedures. It enables the student to gain design competency through wood and an individual solution to wood projects based on suggested needs.

Lab. 6, Credit 3 (offered every quarter)

**FSCW-780** **Woodworking and Furniture Design**  
**Registration #0414-780** **(Major)**

A program structured on the basis of individual needs, interests and background preparation as they may be determined through faculty counseling. This provides an opportunity for technical, aesthetic and design competency to grow through the exploration of hand and machine tools; solid wood theory, joinery and practice; veneer theory, and practice; production theory; chair, table, cabinet design and construction. This sequence leads to the master's thesis, suggested by the student and approved by the faculty.

Lab. 9-27, Credit 3-9 (offered every quarter)

#### Thesis

**FSC (C, G, M, T, or W)-890** **Research and Thesis Guidance**  
**Registration #04 (09, 11, 12, 13 or 14)-890** **(Major MFA only)**

Research and presentation of an acceptable thesis with a focus on technique, design, production, or a combination of these approved by the faculty. The thesis subject will be chosen by the candidates with the approval of the faculty advisor. The thesis will include a written summation or report of the research and a thesis show.

Lab. 27, Credit 3-14 (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 are offered at least once annually, except as noted.

### Fine Art Photography

**PPHA-207, 208, 209**  
**Registration #0921-207, -208, -209**

#### Still Photography

In the first quarter the students become familiar with the 35mm camera, processing and printing. The work is restricted to black-and-white photography. The aesthetics and basic understanding of photographic practice is covered. The second and third quarters deal with more advanced techniques and principles of photography. This series of courses is available for students who are not majoring in photography.

Class 1, Lab 6, Credit 3/Qtr.

**PPHA-301,302, 303** **History of Aesthetics and Photography**  
**Registration #0921-301, -302, -303**

Covering the history and aesthetics of photography from 1839 to the present, with special emphasis on the development of photographic seeing, and its related effect on other media. A survey of the numerous processes and how their development affected the image-making of their particular period, i.e., daguerreotypes, calotypes, ambrotypes, etc. Student projects are designed to illuminate phases of photographic history best understood by personal visual exploration.

Class 3, Credit 3/Qtr.

**PPHA-401, 402, 403** **Photography As a Fine Art I**  
**Registration #0921-401, -402, -403**

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. (PPHL-313)

Class 2, Lab 8\*, Credit 4/Qtr.

**PPHA-460** **Photo for Printers**  
**Registration #0921-460**

A workshop in black-and-white and color photography for non-photography majors. Technical and aesthetic information will be given to enhance the non-vocational photographers' use of their equipment. Darkroom work will be limited to the black-and-white negative and print. Color work will emphasize improvement of camera techniques.

Class 2, Lab 4, Credit 4

**PPHA-501, 502, 503** **Photography as a Fine Art II**  
**Registration #0921-501, -502, -503**

Emphasis is placed on the student's setting of goals, selection of assignments and projects, and expansion of work on his or her own terms. Lectures and experiences are oriented to encourage awareness of shared concepts in the other arts, goals set by working artists, and the relevance of the history of the visual arts to the student's work. (PPHA-403)

Class 2, Lab 8, Credit 4/Qtr.

**PPHA-506, 507, 508** **Photo Media Workshop**  
**Registration #0921-506, -507, -508**

Photo Media Workshop emphasizes problem solving utilizing alternative photographic processes. The first quarter features work with emulsions on various surfaces; the second deals with visual books; and the third quarter covers generative systems including electrostatic and offset printing and other methods of altering images. The course is best when taken in order, but students may join at any quarter.

Class 2, Lab 4, Credit 4/Qtr.

**PPHA-521, 522, 523** **Color Photography Workshop**  
**Registration #0921-521, -522, -523**

Emphasis is on the creative and aesthetic aspects of color photography and other color imaging systems. Students are provided an opportunity to explore the variety of ways in which color photographs can be produced, reproduced, sequenced, displayed and preserved. A personal portfolio of work presented as color prints, color transparencies, a slide presentation, an exhibition, or as an art book is required for each quarter. (Basic color prerequisite)

Class 2, Lab 4, Credit 4/Qtr.

**PPHA-531** **Picture Researching**  
**Registration #0921-531**

An introductory course surveying current practices, procedures, techniques and resources employed in picture researching for collections, exhibitions, publications, motion pictures, and television. Students explore the variety of ways photography is used in communications; to establish what pictures are needed, to discover how they may be found (or produced), and to make arrangements. A personal picture researching project will be produced by each student.

Class 4, Credits 4

**PPHA-535** **Gallery Management**  
**Registration #0921-535**

A workshop involvement in the various aspects of a gallery operation including the preparation and display of photographs, arrangement for announcements and publicity and financial considerations.

Class 1, Credit 1

**PPHA-538** **Photographic Careers Seminar**  
**Registration #0921-538**

This seminar examines career options available to photography graduates. Students develop skills in resume preparation, interview practices and techniques, and personal goal setting. Students attend three special sessions offered by the Center for Cooperative Education and Career Services.

Class 2, Credits 2

**PPHA-560** **Semiotics and Photography**  
**Registration #0921-560**

An introductory course which emphasizes the application of selected semiotic principles to the practice of photography. Semiotics is the study of signs and symbols and what they signify.

Class 4, Credit 4

**PPHA-551** **Special Topics**  
**Registration #0921-551**

An exploratory course offered at the discretion of an instructor and the interest of the students to extend and broaden existing curriculum.

Credits 1-9

### 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, research 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 photomacrography, 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. Student will produce slide presentations 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**  
 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 approach offered on demand when adequate numbers of students and faculty desire to investigate specialized topics not normally offered in the regular curriculum. Available to upper level students.

Credit variable.

**PPHB-599 Independent Study**  
**Registration #0901-599**  
 A student proposed advanced project sponsored by an instructor. Approval of the proposal by the department chairperson and the director of the school. Available to upper level students with a G.P.A. of 3.0 or greater.

Credit variable

**PPHB-781 Medical Illustration Advanced Photography**  
**Registration #0901-781 (MFA Major)**  
 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-201 Structuring the Moving Image and Conceptual**  
**Registration #0902-201 Film Production**  
 A fundamental course in Conceptual Film Production. Film making as a means of interpretation and expression. Film as a medium of communication, as a structural unity, the main elements of structure, organizational principles, with special application to the conceptual film form. A combined theoretical-practical approach to the dynamics of the film medium. The student is expected to demonstrate the techniques in film assignments. Production will be in non-sync (Super 8) format. Students furnish film processing; equipment is furnished by the department. (Elective to all undergraduate 3rd and 4th year Photographic Illustration or Professional Photography students, and other students by special permission)

Class 3, Lab 4, Credit 5

**PPHF-202 Narrative Film Production**  
**Registration #0902-202**

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-201 or a satisfactory equivalent or by permission of instructor)

Class 3, Lab 4, Credit 5

**PPHF-203 Fiction and Dramatic Short Film Production**  
**Registration #0902-203**

A fundamental course in Fiction and Dramatic Short Film Production. Film making as a process of interpretation and expression with an emphasis in the narrative 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 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 a non-sync (Super 8) format. Students furnish film and processing; equipment is furnished by the department. (PPHF-202 or a satisfactory equivalent)

Class 3, Lab 4, Credit 5

**PPHF-204, 205, 206 Film History and Aesthetics**  
**Registration #0902-204, -205, -206**

Survey of developments in film from the early beginnings to the present. Objective is to explore the uses of the medium within a historical, cultural and theoretical context. Each quarter will emphasize a different film form: 407 fiction feature, 408 documentary, 409 experimental and animation. No prerequisites. Admission during any quarter of the academic year.

Class 3, Credit 3/Qtr.

**PPHF-207 Introduction to Portable Video I**  
**Registration #0902-207**

A basic course for novices. Emphasis is on video as an interpretive and expressive medium. There is no restriction on the choice of image, style or content. Learning will take place in a communal, participatory environment so that ideas and experiences can be shared.

Two short video projects are required. 1/2" beta equipment, including editing facilities, is provided by RIT. Students must purchase a minimum of two 60-minute, 1/2" video cassettes.

Class 3, Lab 3, Credit 4 (Fall and Spring)

**PPHF-206 Introduction to Portable Video II**  
**Registration #0902-208**

In this course the student applies the basic video skills acquired in PPHF-207 to the design and realization of mature narrative imagery (1/2" beta). Progress is supervised by the instructor through regular screenings and conferences with the student. (PPHF-207)

Class 3, Lab 3, Credit 4 (Winter)

**PPHF-210 Materials and Processes of the Moving Image I**  
**Registration #0902-210**

This course is primarily designed to familiarize students with the basic technical concepts of film making. By taking this course, students should gain an understanding of the technical procedures required to commit an image to the medium of film in a professional manner.

Credit 2

**PPHF-310 Materials and Processes of the Moving Image II**  
**Registration #0902-310**

A technical survey of the tools and materials used in video production. (PPHT-210, PPHF-203)

Credit 2

**PPHF-311 Portable Video Production****Registration #0902-311**

A rigorous "hands-on" introduction to both the practical-technical and aesthetic considerations of portable video production. The emphasis is on single system shooting and post production editing. This includes visual continuity, storyboarding, graphics design, camerawork, portable lighting, sound work and off-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 production experience.

Class 2, Lab 4, Credit 4

**PPHF-312 Studio and Documentary Video****Registration #0902-312**

An introduction to studio "real time" television. Acquiring skills in preproduction planning, scriptwriting, staging, lighting, studio producing and directing skills. Lectures include broadcast history, rating, cable and satellite television, the viewing and discussion of several commercial and independent productions and a tour of a local broadcast affiliate. In addition to individual studio productions and a "lab" news show, each student is expected to refine the skills learned in the first quarter by producing an independent mini-documentary due at the end of the quarter. (417 or permission of instructor)

Class 2, Lab 4, Credit 4

**PPHF-313 Electronic Field Production****Registration #0902-313**

Lab work explores television remotes, advanced studio lighting, the still and motion picture interface, the technical limits of the video image, advanced editing, video art and image processing. Lectures include production budgeting, public broadcasting, copyright, the job market, educational/industrial television, experimental video and computer interfacing. The major spring project, a final "portfolio production," concludes the broad-based, three-quarter program. (PPHF-312)

Class 2, Lab 4, Credit 4

**PPHF-321, 322 Writing for Film and Television****Registration #0902-321, -322**

This course explores the writing of non-fiction and fiction for theatrical and non-theatrical films and television. Experience in the writing of fiction concentrates on the elements of dramatic construction. The exploration of non-fictional writing examines information gathering techniques and methods of investigation. Both non-fiction and fiction are treated as expository, story-telling forms. Students are responsible for writing film or television scripts on subjects of their own choosing and for completing several brief written exercises in areas such as character, dialogue, the interview, suspense, and plot. Although this course is designed primarily to meet the needs of film and television majors, it is not restricted to those students.

Class 2, Lab 3, Credit 3 (Winter and Spring quarters)

**PPHF-324, 325, 326 Animation and Graphic Film Production****Registration #0902-324, -325, -326**

An introduction to the techniques and practice of graphic and animated film production. This course provides training and practical experience in a wide variety of approaches to single frame motion picture production. Students produce a number of short film exercises utilizing both existing and original artwork. Some techniques covered in the course are: optical printer, direct modification of the film surface, cell, ink, and paint animation, and kinestasis. Screenings of professionally made films will illustrate each technique. In the third quarter students produce a short animated film with sound using techniques of their own choosing.

Proficiency in drawing is not required. No prerequisites.

Class 3, Lab 2, Credit 4 (Fall, Winter, Spring)

**PPHF-404 Senior Project Seminar****Registration #0902-404**

A required course for 3rd year film/video majors and the prerequisite for PPHF-541, Senior Project. Students will discuss and generate a written plan for their senior film and/or video projects and will select an advisor from among the film/video faculty. (PPHF-412)

Class 1, Credit 1

**PPHF-405 Advanced Video****Registration #0902-405**

A thorough survey of the state-of-the-art methods and the hardware involved with electronic imaging. Large format computer editing and field recording, digital frame grabbing & store, computer imaging and animation are some of the topics covered. (PPHF-303, -310)

Class 3, Credit 3

**PPHF-406 Film Directing****Registration #0902-406**

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-203, 313, 413 or equivalents)

Class 3, Credit 3

**PPHF-410 Materials and Processes of the Moving Image III****Registration #0902-410**

The course introduces the student to 16mm film technology and production systems that apply to other media production as well. (PPHF-203, -310)

Class 1, Lab. 2, Credit 2

**PPHF-411 Visualization and Commercial****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 5

**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 5

**PPHF-413 Film Project with Sound****Registration #0902-413**

A short (5-10 min. suggested) film is produced by student teams. Advanced sound editing, sound mixing and A&B roll conforming are included; Cameras, lighting and editing equipment are provided but students are expected to provide sensitized goods and processing.

Class 2, Lab. 6, Credit 5

**PPHF-420 Sound Recording****Registration #0902-420**

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 3, Credit 3

**PPHF-521 Visualization for Film and Television****Registration #0902-521**

A basic course in the mechanics and aesthetics of visualization for film and television. Emphasis is on editing, camera, and subject dynamics and their interrelationship. Combined theoretical-practical approach to the development of visual images for film and television.

Class 2, Credit 2

**PPHF-541 Senior Production I (Film/Television)****Registration #0902-541**

Continuation of the introduction to business and legal factors begun in the basic film and Video Production activities. The course assists the student in detailed budgeting and shooting, script preparation and breakdown. Final project shooting begins in this quarter. (PPHF-413)

Credit 6



**PPHF-542 Senior Production II (Film/Television)**  
**Registration #0902-542**  
 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 6

**PPHF-543 Post Production (Film/Television)**  
**Registration #0902-543**  
 Completion of senior projects. Includes a review of post production techniques. (PPHF-542)  
 Credit 4

**PPHF-551, 552, 553 Special Topics in Film & Video**  
**Registration #0902-551, -552, -553**  
 A seminar approach offered on demand when adequate numbers of students and faculty desire to investigate specialized topics not normally offered in the regular curriculum. Available to upper level students.  
 Credit variable

**PPHF-599 Independent Study**  
**Registration #0902-599**  
 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

## General Photography

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

## Master of Fine Art Photography

**PPHG-701,702 History and Aesthetics of Photography**  
**Registration #0903-701, 702**  
 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-704 Minor White Seminar**  
**Registration #0903-704**  
 A study of the photography and philosophy of Minor White and his contribution to photographic publications, photographic education and photography as an art form.  
 Credits 3

**PPHG-707, 708, 709 Rim History and Aesthetics**  
**Registration #0903-707, -708, -709**  
 An extended comparative survey of the history & aesthetics of film that will explore the four basic forms of the medium: fiction, documentary, animated and experimental. Emphasis is on determining the unique characteristics of the medium and how those characteristics are used as a means of interpretation and expression.  
 Credits 4/Qtr.

**PPHG-719 Early Photographic Processes**  
**Registration #0903-719**  
 This is a non-laboratory technical course which surveys the structure and deterioration mechanisms of major historical photographic processes. It examines the technical basis of preservation strategies within a museum or archive, and presents an approach to preservation which is integral with collection management and curatorial functions.  
 Credits 3

**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. Work is critiqued weekly by the instructor.  
 Credit 4/Qtr.

**PPHG-730, 731, 732 Cinematography**  
**Registration #0903-730, -731, -732**  
 Film making workshop. Individually planned studies in cinematography, as determined by faculty-student consultation, group critiques, seminars, studio and laboratory practice, field trips.  
 Credit 3-9/Qtr.

**PPHG-740, 741, 742 Photographic Museum Practice**  
**Registration #0903-740, -741, -742**  
 Museum internship workshop, still or motion picture; research, assigned projects, seminars in history, function and administration of museums, with emphasis on photographic curatorial duties; practice in exhibition planning and development; field trips. This cannot be selected as a minor concentration.  
 Credit 3-9/Qtr.

**PPHG-750, 751, 752 Special Topics Workshop**  
**Registration #0903-750, -751, -752**  
 Advanced topics of current or special interest designed to broaden and intensify the student's ability to use photography as a means of communication and expression.  
 Credit 3-9/Qtr.

**PPHG-753 Photographic Workshop for Teachers**  
**Registration #0903-753**  
 A graduate course concerned with the art and craft of teaching photography in a formal and informal setting. Emphasis is on the practice of teaching photography based on accepted learning principles.  
 Credit 4/Qtr.

**PPHG-755 Applied Sensitometry**  
**Registration #0903-755**  
 This course presents relevant sensitometry and photographic theory, principles and practices in a manner sensitive to the background and needs of a fine art photographer.  
 Credit 4/Qtr.

**PPHG-756 Zone System Principles**  
**Registration #0903-756**  
 An applied course of selected sensitometric, statistical and perceptual principles to the understanding and practice of the Zone System. The principles are taught so that they can be generalized and transferred to the understanding and practice of other image-forming systems such as film making, video, graphic arts printing, screen printing, etc.  
 Credit 4

**PPHG-760 Perception & Photography**  
**Registration #0903-760**  
 An advanced course which provides an applied psychological framework for the ways we select, code, organize, store, retrieve and interpret visual images and explores how photographs relate to art and perception.  
 Credit 4

**PPHG-762, 763, 764****Alternative Processes****Registration #0903-762, -763, -764**

An advanced course in the production and presentation of images using historical and contemporary visual imaging processes. Emphasis is on extending the students' experience in image making by incorporating alternatives to conventional photography into their work. Processes to be covered include various light sensitive emulsions, the production of visual books, and generative systems such as electrostatics and offset lithography.

Credits 4/Qtr.

**PPHG-877****Museum internship****Registration #0903-877**

Experiential learning is provided in collections management, cataloguing and classification, exhibition preparation and exhibitions, research and critical writing.

Credits 1-8/Qtr.

**PPHG-889****Research Seminar****Registration #0903-889**

The seminar serves as a basis for exchanging ideas for research work and for a general orientation of the procedures and requirements for the completion of a successful thesis.

Credit 2 (Spring only)

**PPHG-890****Research and Thesis****Registration #0903-890**

The thesis is designed and proposed by the candidate. It is considered his culminating experience in the program, involving research, a creative body of work, an exhibition or suitable presentation, and a written illustrated report.

Credit 1-12

**Professional Photographic Illustration****PPHL-201, 202, 203****Applied Photography I****Registration #0904-201, -202, -203**

An introduction to the major in Applied Photography which will give the student broad experience in various areas of photography, to assist in making vocational decisions and understanding visual communications. The curriculum emphasizes both craft and visual problem solving during the first two quarters. The third quarter continues the attitudes of the previous quarters and allows the student to concentrate in an area of interest from an offering of courses established by the department.

Class 4, Studio 4, Lab 4, Credit 7/Qtr.

**PPHL-205, 206****Creative Problems****Registration #0904-205, 206**

This course is designed to make students aware of their own creative problem solving potential. Emphasis is placed on students' personal environments, enthusiasms and experiences. Attention is given to individual thinking and seeing. This will be accomplished through lectures, individual group assignments and demonstrations.

Class 3, Credit 3/Qtr.

**PPHL-207****Introduction to Color****Registration #0904-207**

A one-quarter course introducing color as a new element in making photographs. The course will offer a theoretical, technical and aesthetic foundation in color photography. The student will gain familiarity with the materials through shooting assignments. Emphasis will be placed on developing printing skills.

Class 2, Lab 4, Credit 3/Qtr.

**PPHL-300****Photography II, BFA Transfer****Registration #0904-300**

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 15 (Pending)

**PPHL-311, 312, 313****Applied Photography II****Registration #0904-311, 312, 313**

Advanced applied photography in black and white and color with emphasis on craftsmanship, problem solving, and visual communications. Major technical emphasis and introduction to studio electronic flash and large format photography. Further emphasis is placed on the development of the student's ability to apply creative thinking and contemporary techniques in executing meaningful and effective photographs.

Class 4, Studio 5, Credit 5/Qtr.

**PPHL-315****Colloquia****Registration #0904-315**

A lecture/presentation offering the specific interests and passions of the faculty. The range is academically wide and varied.

Class 1, Credit 1

**PPHL-411, 412, 413****Photojournalism I****Registration #0904-411, 412, 413**

Journalistic photography for mass media publication with emphasis on the development of specialized skills in projects dealing with various aspects of reportage and all related editorial problems from caption writing, law and history, to organizational structures, printing processes, layout and design. Special emphasis is placed on the story as a total concept from inception to finished layout. Research and origination of material as well as the study of publications is explored. (PPHL-313)

Class 3, Field 4, Credit 4/Qtr.

**PPHL-416, 417, 418****Narrative/Documentary/****Registration #0904-416, 417, 418****Editorial Photography I**

This course will explore the use of the photographic image in narrative, documentary and editorial form. The emphasis of the course will allow the students a variety of experiences. There will be emphasis on publication and public need.

Class 4, Field 5, Credit 5/Qtr.

**PPHL-421, 422, 423****Nature Photography****Registration #0904-421, 422, 423**

A course designed to help students become more concerned with 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. (PPHL-203)

Class 2, Field 4, Lab 4\*, Credit 4/Qtr.

**PPHL-431, 432, 433****Illustration Photography I****Registration #0904-431, 432, 433**

Advanced and extended study of the making of photographs in the studio and on location. Emphasis is on the growth of the imagination and aesthetic aspects of creating illusions. Investigation into the photographic medium as a means of communicating ideas. The development of individual vision and self-expression through the disciplines of photography, both in black and white and color images. (PPHL-311, 312, 313)

Class 4, Studio 4, Credit 4/Qtr.

**PPHL-437, 438, 439****Visual Communications Workshop****Registration #0904-437, 438, 439**

Primarily a photographic course; however, emphasis is placed on experimental approaches to communications. Visual and psychological purpose 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.

**PPHL-441, 442, 443****Contemporary, Illustrative****Registration #0904-441, 442, 443****and Commercial Photography I**

A course in visual problem solving with photography. Studio and other controlled environments are stressed. Advertising and editorial solutions and applications are explored. The skills involved with both product rendering and concept illustration will be covered.

Class 4, Studio 5, Credit 5/Qtr.

**PPHL-505 History of Applied Photography**  
**Registration #0904-505**

A chronological investigation into many areas of applied photography, including advertising, documentation, illustration, news, portraiture, scientific, and travel. The works of major photographers and the influence of specific publications and events upon the style and use of photography will be examined.

Class 3, Credit 3

**PPHL-511, 512, 513 Photojournalism II**  
**Registration #0904-511, 512, 513**

A workshop course with emphasis on the production and editing of view, photographs for publication in the media; newspapers, magazines and photographic books. (PPHL-413)

Class 4, Field 4, Lab 4\*, Credit 4/Qtr.

**PPHL-516, 517, 518 Narrative/Documentary/**  
**Registration #0904-516, 517, 518 Editorial Photography II**

This course will explore and expand the use of the photographic image in the narrative/documentary and editorial point of view. Emphasis will be upon publication and professional use of the image.

Class 4, Field 5, Credit 5/Qtr.

**PPHL-531, 532, 533 illustration Photography II**  
**Registration #0904-531, 532, 533**

Advanced individual creative approaches to visual problem solving. Conceptual ideas employing the photographic medium are stressed. The student is encouraged to find a personal photographic approach and to develop a portfolio. (PPHL-433)

Class 2, Lab 8\*. Credit 4/Qtr.

**PPHL-541, 542, 543 Contemporary, Illustrative**  
**Registration #0904-541, 542, 543 and Commercial Photography II**

A course that brings together the artistic and technical input of the first three years of the program and directs the student towards the application of the acquired skills through a series of professionally oriented assignments.

Class 4, Studio 5, Credit 5/Qtr.

**PPHL-551 Special Topics**  
**Registration #0904-551**

Advanced topics of current or special interest, varying from quarter to quarter, selected from the field of professional photographic illustration. Special topics announced in advance.

Credit varies (Not offered every quarter. Consult coordinator of the Professional Photographic illustration Program)

**PPHL-599 Independent Study**  
**Registration #0904-599**

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.

Class, Credit: variable

## 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, sensitometry 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 of Production Photographic**  
**Registration #0905-204 Processing and Finishing**

This course is designed to provide the photo management Freshman with an orientation to the facilities, equipment, practices 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 of 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, sensitometry 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 Processing and Finishing**

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**  
**Registration #0905-320, -321 Hardware**

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 of**  
**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 work. Procedures for obtaining employment, i.e., preparing resumes, taking interviews, plant visitations, etc., will be covered in detail, information on the latest business practices and procedures will be discussed in depth as well as the current condition of the processing and finishing market. Prerequisite: senior standing.

Class three times a quarter for three quarters. Credit 1

**PPHM-506 Theory of Corrective Color Printing**  
**Registration #0905-506**

A study of characteristics of color negatives as they relate to corrective color printing. Theory and methods of color and density correction will be presented. The attributes of high, low and variable correction levels will be discussed. Various approaches to automatic classification will be studied. The students will be introduced to matrix control of color printing as utilized in digital computer controlled printing equipments. (PPHM-301, 302)

Class 2, Credit 2, (Spring only)

**PPHM-510 Finishing Lab Operations Management**  
**Registration #0905-510**

This course is designed to provide Photographic Processing and Finishing Management students with the background knowledge which is necessary to plan, set up, and operate a finishing laboratory. Included in this course will be a study of production methods, work flow, layout, and equipment complements which lead to efficient operation. Cost analysis of a laboratory operation will be presented and optimization techniques for cost reduction and scheduling will be discussed.

Class 4, Credit 4

**PPHM-511,512,513 Advanced Production Processing**  
**Registration #0905-511, -512, -513 and Finishing**

This course taken during the last year of study provides the student with an opportunity to study in depth, on an independent basis, those areas of processing and finishing which the student finds most interesting. This course may also be used to strengthen those areas of interest in which the student feels a weakness (PPHM-303 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 techniques in programmed learning, demonstrative hands-on experience, and lectures so that the student will be able to operate and perform basic care and maintenance on major pieces of processing and finishing equipment. Broad principles learned here will be applicable over a wide range of equipment. (PPHM-Senior standing)

Lab. 3, Credit 1 (Winter only)

**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**

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 #0906-406**

Introduction to special or unusual methods particularly useful in technical, scientific, or research photography. Emphasis is on the student's development of innovative solutions to a set of photographic problems.

Class 2, Lab 4, Credit 4

**PPHP-409 Corporate and Special Interest Publications**  
**Registration #0906-409 of Photography**

A survey of this type of publication with particular emphasis on the photographic problems involved. Skill building assignments to improve competence and an introduction to the problems of the art director, editor, printer, layout person, and writer form the basis of the course content. (PPHP-303, PPHP or PPHL-313)

Class 2, Lab 8', Credit 4

**PPHP-421,422, 423 Advertising Photography**  
**Registration #0906-421, -422, -423**

A course built strictly to the standards of professional photography. Only those students who seriously aspire to be professional 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-213)

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. (PPHT-312 or equivalent) (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-408 to a greater depth on a seminar basis. (PPHP-408 or permission of the instructor)

(b) Corporate and Special Interest Publications: a continuation (PPHP-409 or permission of the instructor)

Class 2, Lab 3, Studio 5, Credit 4/Qtr.

**PPHP-521, 522, 523 Advanced Color Seminar**  
**Registration #0906-521, -522, -523**

This course offers the student an opportunity to work relatively independently to complete majors in advertising, architectural, illustration photography or portraiture. Individual growth and the development of personal style are stressed. The student is assisted in preparing a portfolio of professional 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 combines the individual aspects of independent study with the advantages of shared class critiques, lectures and other profession related experiences. (PPHP-303 and PPHP-313, or PPHL-213 and permission of instructor)

Class 3, Studio 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, make-up, camera techniques, mounting and communication. (PPHP-303, PPHP-313 or PPHL-213)

Lecture 3, Studio 2, Credit 4 (Fall, Winter, Spring)

**PPHP-542 Advanced Portrait Photography**  
**Registration #0906-542**

Introduction to color harmony, use of "props" backgrounds, vignetting, candid wedding, bridal portraiture, full lengths, groups, multiple exposure, business procedures, sales, pricing, and public relations. (PPHP-541)

Lecture 3, Studio 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, Studio 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.

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

## Imaging and Photographic Science

The two courses, PPHS-200 and PPHS-210, are special intensive summer courses designed for students transferring into the Imaging and Photographic Science Program at the third year level, and for others who desire a background in photographic science and instrumentation at an introductory engineering level. Students normally take both courses concurrently.

**PPHS-200 Fundamentals of Photographic Science I****Registration #0907-200**

An intensive course presenting the subject matter normally taken by imaging and photographic science 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.

Class 4, Lab 3, 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 4, Lab 4, Credit 5/Qtr.

**PPHS-210 Fundamentals of Photographic Science II****Registration #0907-210**

An intensive course presenting the subject matter normally taken by photographic science and instrumentation students during their second year. Topics include the chemistry and physics of black-and-white and color materials and processes as a continuation of topics covered in PPHS-200. (Permission of the department and PPHS-200)

Credit 9 (Summer only)

**PPHS-303 Photographic Instrumentation****Registration #0907-303**

Introduction to the use of photographic recording methods to obtain space and time information from object fields; principles for selection of camera, lens parameters, recording material and recording rate; the use of time and space references to facilitate date retrieval. (PPHS-203)

Class 2, Lab 6, Credit 4

**PPHS-312 Applied Processing****Registration #0907-312**

Problems in applied processing and the application of analytical chemical techniques to the control of black-and-white and color processing solutions. Processing faults, and image restoration, trouble shooting, archival permanence, ecology and processing machine operation. Statistical techniques application to machine control. (SCHG-206, PPHS-203)

Class 2, Lab 6, Credit 4

**PPHS-313 Color Systems****Registration #0907-313**

Introduction to color and color imaging systems; systems of color specification; additive and subtractive trichromatic systems of color recording and reproduction; the technology of color photography; sensitometry and densitometry of color materials; introduction to graphic reproduction and electronic systems. Laboratory work in the exposure and evaluation of color photographic materials. (SMAM-305, PPHS-201 through PPHS-312)

Class 3, Lab 3, Credit 4

**PPHS-401 Radiometry****Registration #0907-401**

The course serves as an introduction to the physics of light, its generation, propagation, absorption and measurement. This is combined with an introduction to the human visual process, to general photometry and radiometry, to light sources and to light receivers. (SMAM-205, SPSP-313)

Class 3, Lab 6, Credit 4

**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; consideration in data collection and analysis; written and oral presentations. (Third-year status in Imaging and Photographic Science 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; probability functions and distributions. (SMAM-305, Computer Programming)

Class 2, Lab 2, Credit 3

**PPHS-412 Design of Experiments****Registration #0907-412**

Basic designs for experiments, objectives, conclusions, error estimation, data analysis, continuation of analysis of variance and regression analysis; response surfaces and factorials. (PPHS-411)

Class 2, Lab 2, Credit 3

**PPHS-413 Statistical Quality Control****Registration #0907-413**

Basic probability, control charts, sampling plans, power and O.C. curves, and modern applications of product and process control. (PPHS-412)

Class 2, Lab 2, Credit 3

**PPHS-421, 422, 423 Photographic Chemistry****Registration #0907-421, -422, -423**

The chemistry and photographic properties of photographic emulsions and developer solutions at the intermediate level; topics in physical, organic, and analytical chemistry necessary to the continued study of photographic science. (PPHS-312, SCHG-207)

Class 3, Lab 3, Credit 4/Qtr.

**PPHS-501, 502, 503 Research****Registration #0907-501, -502, -503**

An investigation of a problem in imaging and 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 images recording systems; objective and subjective evaluation techniques and their correlation. The use of convolution, correlation, autocorrelation, and Fourier methods in the analysis of the image recording systems. Laboratory work in the design of photo-optical systems. (PPHS-402, SMAM 305, SPSP-313)

Class 2, Lab 6, Credit 4 (Fall)  
 Class 2, Credit 2 (Winter and Spring)

**PPHS-531, 532, 533 Theory of the Photographic Process**  
**Registration #0907-531, -532, -533**

An advanced course in photographic theory: sensitivity, emulsions, latent image, and processing of both black-and-white and color materials; chemistry and physics of selected non-silver and other non-conventional processes. (PPHS-423, SPSP 313)

Class 3, Credit 3/Qtr.

**PPHS-551, 552, 553 Special Topics In Imaging and**  
**Registration #0907-551, -552, -553 Photographic Science**

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 chairperson and the director of the school. Available to upper level students with a G.P.A. of 3.0 or greater.

Class, Credit: variable

## Master of Science

**PPHS-711, 712, 713 Theory of the Photographic Process**  
**Registration #0907-711, -712, -713**

Physical structure and optical properties of the silver halide emulsion and their relations to the characteristic curve; chemistry and preparation of emulsions; treatment of theory of sensitivity and latent image formation; chemistry and kinetics of processing; chemistry and physics of selected non-silver processes.

Class 3, Credit 3/Qtr.

**PPHS-721, 722 Mathematics and Statistics for**  
**Registration #0907-721, -722 Photographic Systems**

A special graduate course in mathematics and applied statistics involving those areas of direct concern in design, analysis, and evaluation of photographic systems.

Credit 4/Qtr.

**PPHS-731, 732, 733 Instrumental and Photographic Optics**  
**Registration #0907-731, -732, -733**

The principles of geometrical and physical optics with application to photographic instrumentation systems. First-order imaging, aberrations and geometrical image evaluation, mirror and prism systems, basic instrument systems, electromagnetic waves, polarization, interference and function description of imaging performance.

Class 3, Credit 3/Qtr.

**PPHS-741, 742, 743 Analysis and Evaluation of Imaging Systems**  
**Registration #0907-741, -742, -743**

Complex variables and Fourier analysis with application to the evaluation of imaging systems; properties of optical images, structure of photographic images; methods of photo-optical system evaluation.

Class 2, Lab 6, Credit 4 (Winter)  
 Class 3, Credit 3 (Fall and Spring)

**PPHS-751, 752, 753 Special Topics in Photographic Science**  
**Registration #0907-751, -752, -753**

Advanced topics of current or special interest, varying from quarter to quarter, selected from the field of photographic science. Specific topics announced in advance. (Not offered every quarter. Consult coordinator of the Imaging and Photographic Science Graduate Program)

Credit varies

**PPHS-761, 762, 763 Principles of Remote Sensing & Image**  
**Registration #0907-761, 762, 763 Analysis**

The principles of electromagnetic imaging, image processing and image analysis as they apply to remotely sensed information. Photogrammetry, aerial photography, aerial photometry, thermography, multispectral image analysis and satellite image analysis are treated. Overall emphasis is on extraction of quantitative information from remotely sensed data.

Class 3, Lab 3, Credit 4

## Technical Photography

**PPHT-201, 202, 203 Photography I**  
**Registration #0920-201, -202, -203**

A study of the fundamentals of photography with emphasis on the development of the necessary creativity, craftsmanship, theory, and visual communications to undertake advanced study in the medium. The theory and technical aspects are taught as they relate to solving photographic problems.

Class 4, Studio 4, Lab 4, Credit 12

**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**

Chemical concepts of black-and-white and color processing to control and produce desired effects are presented. The theory and application of the chemistry of developers, stop baths, and fixing baths and washing constitute the basis of investigative laboratory experiments. Proper technical writing of the laboratory projects is required.

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-305 Portrait Retouching**  
**Registration #0920-305**

The study of different techniques, materials and processes used in portrait retouching of negative and prints. Projects making use of these techniques, materials and processes will be required.

Class 2, Lab 2, Credit 3

**PPHT-306 Commercial Retouching**  
**Registration #0920-306**

Study of the techniques, materials and processes used in commercial retouching. Projects making use of these techniques, materials and processes will be required.

Class 2, Lab 2, Credit 3

**PPHT-307 Basic Airbrushing**  
**Registration #0920-307**

Study of the different types of air brushes and their uses. A series of lessons to develop skill in the handling of the airbrush; when and how the brush is used to retouch photographs.

Class 1, 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 of 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 differences, color rendering properties of light sources and evaluation of color gamuts.

Class 2, Lab 4, Credit 4

**PPHT-410 Architectural Photography****Registration #0920-410**

An image-making course for advanced students with a specific interest in architectural exterior and interior photography. Assignments are designed to emphasize the development and exploration of professional attitudes and techniques while providing a comprehensive study of the subject. All required work will be on color transparency materials. Prerequisite: Completion of second year courses in the Applied or Technical Photography programs or permission of the instructor.

Class 9

**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, pressure-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

**PPHT-421 Basic Holography****Registration #0920-421**

This course is intended to be an introduction to holography theory and techniques. Lectures and demonstrations will cover the materials, processes, and applications of fundamental types of holograms and laser photography. Labs will give hands-on experience with the construction and playback of transmission, reflection, and focused image hologram types.

**PPHT-431 Reversal Color Printing****Registration #0920-431**

A one-quarter course on color reversal printing procedures, printing and processing. The student will gain proficiency in using reversal print material.

Class 1, Lab 4, Credit 3

**PPHT-441 Introduction to Dye Transfer****Registration #0920-441**

An introduction to the Dye Transfer process with emphasis on the understanding of its theoretical principles, and on the mastery of basic transfer techniques. This includes the preparation of transfer prints from the student's color negatives. Prerequisite: 0920-312 or equivalent

Class 1, Lab 6, Credit 4

**PPHT-442 Advanced Dye Transfer I****Registration #0920-442**

A continuation of the Dye Transfer Process with emphasis on the understanding and mastery of masking and color separation (analysis) of a color transparency. The synthesis is accomplished by the making of a Dye Transfer print. Prerequisite: 0920-441, 0920-312 or equivalent

Class 1, Lab 6, Credit 4

**PPHT-443 Advanced Dye Transfer II****Registration #0920-443**

This quarter of the Dye Transfer program is devoted to variations of standard techniques and further extension of improvement of procedures. Difficulty of procedure will determine number of assignments required. Prerequisite: 0920-442 or equivalent

Class 1, Lab 6, Credit 4

**PPHT-444 Reversal Color Printing****Registration #0920-444**

A one-quarter course on color reversal printing procedures, printing and processing. The student will gain proficiency in using reversal print material. Prerequisite: PPHT-312, Color Print Theory OR PPHL-207, Introduction to Color OR Faculty Approval

Class 1, Lab. 4, Credit 3

**PPHT-502 Introduction to Research****Registration #0920-502**

This course leads to a completed Research Proposal in preparation for the Research Project (course #0920-503). It guides the students in preparing formal proposals for their research projects, including selection of topics, searching the literature, and proposal evaluation.

**PPHT-503 Research Project****Registration #0920-503**

Investigation of a topic in the area of applied, technical, or scientific photography, involving camera and/or laboratory work, evaluation, oral presentation of the results, and a written report in a standard format.

Class 1, Lab 4, Credit 3

**PPHT-504 Survey of Non-Conventional Imaging****Registration #0920-504**

A survey of imaging methods and imaging systems not normally encountered in other technical photography courses, including UV, IR, 3D, holography, electro-photography, x-ray, and non-silver applications.

Class 2, Lab 3, Credit 3

## School of Printing

All courses in the School of Printing are offered at least once annually, except as noted.

### Management Courses

**PPRM-201 Introduction to Technical Writing****Registration #0910-201**

Basic approach to fundamentals of modern technical writing; review of English and writing skills; consideration of principles, techniques, form and style.

Class 3, Credit 3

**PPRM-210 Financial Controls I****Registration #0910-210**

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

**PPRM-301 Application of Computers to the Graphic Arts****Registration #0910301**

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

**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

**PPRM-305 Magazine Writing and Design****Registration #0910-305**

A discerning look at what goes on in the competitive world of magazine publishing. An overview of the history, the business side, and the production side of the magazine industry. One week will be devoted mainly to writing techniques, and the second week to the design techniques.

Credit 3

**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

**PPRM-320 Introduction to Magazine Publishing and Management****Registration #0910-320**

A survey course designed to give the student insights into the editorial, production, management, fulfillment and distribution processes vital to success of any magazine. Leaders from the magazine publishing industry are invited to present 3-hour guest lectures on a major aspect of their profession. Graduates of the printing program who have attained prominence within the industry are often the guest speakers, encouraging interaction between current and former students.

Class 3, Credit 3

**PPRM-340 Electrostatic and Electronic Printing Technology****Registration #0910-340**

The course will cover printing methods using electrostatic technology as practiced on high-speed production copier machines.

Along with theory of operation, the course will include: how these devices fit in the in-plant, commercial, and quick print installations; cost factors; quality; profitability in comparison to offset.

Ink jet printing theory, types of basic equipment, limitations, and quality will also be discussed as well as electronic printing using lasers.

A lab training session will also be held using a modern high-speed, high-quality copier.

Credits 3

**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 press 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

**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. (PPRM-301, PPRM-401, PPRT-312)

Class 4, Credit 4 (F, W)

**PPRM-403 Printing Production Management I****Registration #0910-403**

Examines the non-technological 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 conceptual and problem solving viewpoints without emphasis on mathematics beyond college algebra.

Class 4, Credit 4

**PPRM-420 Electronic Communications In the Printing and****Registration #0910420**

**Publishing Industries**  
Presentation of an overview of electronic communication theory and its application to the publishing industry. The course provides the student with the background necessary to relate publishing requirements to electronic system parameters. Several practical newspaper systems are discussed. (#1016-204, College Algebra and Trigonometry)

Credit 4

**PPRM-450 Expense & Capital Project Budgeting & Control****Registration #0910450**

Studies plant accounting systems as a tool for improving production management decisions. Topics include inventory, equipment, job cost, standard cost and analysis of variance, budgeting and control techniques, financial analysis of projects, proposal development.

Class 4, Credit 4

**PPRM-460 Leadership and Conference Management****Registration #0910-460**

Leadership and leadership skills are considered the foundation stones for good management. This course is designed to examine the principles and apply them. There is a concentration on the priority skills of communications, motivation, and conference management. The course is structured as a "Conference on Leadership" with the details of managing a seminar running in parallel. The "Case Method" of study is followed. A review of three books and a short term paper is required. We guarantee no boredom. Course will be taught by Mr. Warren Daum.

Credit 4

**PPRM-502 Financial Controls II****Registration #0910502**

Cost accounting systems; measurement and allocation of manufacturing and non-manufacturing costs; uses of full cost information; differential accounting and alternative choice decisions; budget preparation, standard cost, variance analysis and management control process. (PPRM-210)

Class 4, Credit 4

**PPRM-506 Business Law****Registration #0910-506**

Elements of the laws of contracts, agency, sales, negotiable instruments, partnerships, corporations, taxes, insurance, libel, copyright, and other laws pertaining to business, printing and publishing.

Class 3, Credit 3



**PPRM-507 Computer Estimating Workshop****Registration #0910-507**

The design and 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 operation 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**

Microeconomic study of factors in printing production systems. Supply-and-demand theories are applied to printing system inputs and outputs.

Class 4, Credit 4

**PPRM-510 Personnel Relations II****Registration #0910-510**

Principles of operations discipline, hiring and firing, are studied from the viewpoint of management.

Class 4, Credit 4

**PPRM-511 Labor Relations in Graphic Arts****Registration #0910-511**

History and background for organized labor movement; make-up 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-513 Sales in the Graphic Arts****Registration #0910-513**

Explores economic, psychological and sociological bases of selling, with emphasis on customer and salesman interplay as well as techniques and practices of creative salesmanship in graphic arts companies. This course aims at benefiting both students considering a career in sales and those who will otherwise work with salesmen, either by supporting their company's salesmen in plant action or by buying from outside salesmen.

Class 4, Credit 4

**PPRM-514 Newspaper Management****Registration #0910-514**

Consideration of personnel, organization, finance, maintenance, 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 United States Supreme Court decisions under the First Amendment to the United States Constitution, plus the limitations of libel, obscenity, privacy and conflicts of rights between citizens; cameras in the courtroom; state and federal relations all as they relate to the graphic arts industry.

Class 4, Credit 4

**PPRM-516 Marketing in the Graphic Arts****Registration #0910-516**

Emphasizing a printing industry viewpoint, the class explores the marketing concept (finding out what customers want and organizing to produce it profitably). Marketing functions are studied in regard to practical application in the printing industry.

Class 4, Credit 4

**PPRM-518 Purchasing In the Graphic Arts****Registration #0910-518**

Role of the purchasing agent in the printing plant. Methods of procurement, purchasing policies and sources of supply. Characteristics of graphic arts materials and supplies; quality assurance; inventory control; economic order quantity determination; make or buy decisions; blanket orders, capital investment decisions; and the purchase order as a legal document.

Class 3, Credit 3

**PPRM-551 Special Topics-Printing****Registration #0910-551**

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/Qtr.

**PPRM-590 Senior Seminar****Registration #0910-590**

Consideration of related graphic arts areas not normally covered in regular courses; investigation 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**

Student selects and develops, with approval from a faculty sponsor, an independent study project of his or her own design. Project and amount of credit assigned must have final approval from the director of the School of Printing. (Generally seniors with qualifying grade point average)

Credit 1 to 5

**Technical Courses****PPRT-200 Introduction to Printing****Registration #0911-200**

For packaging science students; study of different printing processes; 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**

Conventional rules of good traditional typography are reviewed through familiarization with basic terminology, type classification and typeface recognition; course includes lectures and laboratory exercises.

Class 2, Lab 3, Credit 3

**PPRT-202 Composition Technology****Registration #0911-202**

A study of the use, operation, and application of machine principles and mechanisms as related to 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****Registration #0911-203**

Practical application of analyzing original copy and applying design, typographic, and communication concepts to problem solving. Traditional rendering techniques are introduced illustrating reading and non-reading images depicting their interpretation into printing technology. Project discussions demonstrate how design planning and mathematics must agree, also how creative thinking is within individual control of the machine. Emphasis is on the translation of images into various reproduction procedures. Content is to stimulate the creative process giving visual instructions to printing production, copy preparation, estimators, sales and client. Content direction is on offset lithography. Presentation guidelines are presented assisting individual portfolio.

Class 2, Lab 3, Credit 3

**PPRT-204 Flexography****Registration #0911-204**

A basic course in the principles and practices of the flexographic printing process. Emphasis is placed on 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 into the newest major printing process in the graphic arts.

Class 2, Lab 3, Credit 3

**PPRT-205 Gravure Printing****Registration #0911-205**

Introductory course designed to survey the gravure printing process and the study of related information regarding applications, techniques, equipment, materials and supplies. The course is conducted by means of lectures, class discussions, demonstrations and supervised laboratory exercises using a 4-color Champlain web press.

Class 2, Lab 3, Credit 3

**PPRT-206 Reproduction Photography****Registration #0911-206**

A basic course in the fundamental principles, procedures, techniques, and applications of the photographic process as it is related to the production of film negatives or film positives for the major printing processes.

Class 2, Lab 3, Credit 3

**PPRT-207 Printing Plates****Registration #0911-207**

An introductory course in the principles and practices of platemaking for letterpress, flexographic, planographic, and gravure printing processes. It covers a survey of major printing processes with emphasis on their plate characteristics and platemaking requirements; important physical as well as chemical 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****Registration #0911-208**

An introductory study of the principles and methods of offset presswork; press functions; operations and care of presses; exercises in running simple jobs.

Class 2, Lab 3, Credit 3

**PPRT-209 Screen Printing****Registration #0911-209**

Theory and practice of screen printing covering areas such as 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****Registration #0911-210**

An introduction to major presses used to produce both weekly and daily newspapers. Letterpress and offset presses will be considered, along with gravure presses used for the production of newspaper supplements.

Class 2, Lab 3, Credit 3

**PPRT-213 Principles of Copy Preparation****Registration #0911-213**

A basic course involving theory of camera copy requirements through lecture, examples and project work. Includes projects in black and white and color, register, veloxes, silhouettes cropping, "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****Registration #0911-301**

Emphasis is put upon finished typographic problems. Topics included in lectures are typographic movements, design concepts, analysis of current typographic practices, private presses, and bookmaking. The lab work is designed to present interesting and challenging problems to the serious student of typography. (PPRT-210)

Class 2, Lab 6, Credit 4

**PPRT-302 Composition Systems****Registration #0911-302**

Detailed study of photocomposition with emphasis on systems approach; introduction to use of computers in composing rooms, and operation of specialized equipment. (PPRT-202)

Class 2, Lab 3, Credit 3

**PPRT-303 Layout and Printing Design II****Registration #0911-303**

Typical printing design problems with emphasis on typographic arrangements, pictorial arrangement with consideration of production follow through. Includes design of complete booklet dummy and other commercial items for black-and-white and color reproduction from roughs to comprehensive layout.

Class 2, Lab 6, Credit 4

**PPRT-306 Tone Reproduction Photography****Registration #0911-306**

The photographic process as it relates to the measurement and reproduction of tones for the major printing processes. The emphasis will be on the scientific analysis of a complete system of halftone sensitometry and process control. (PPRT-206)

Class 2, Lab 6, Credit 4

**PPRT-308 Lithographic Press Problems****Registration #0911-308**

An advanced course in the theory, practice, and problems of offset presswork; development of technical knowledge of materials and equipment; practice in running multicolor work. (PPRT-208)

Class 2, Lab 6, Credit 4

**PPRT-309 Advanced Screen Printing****Registration #0911-309**

Further study of the theory and practice of screen printing covering areas such as experiments with fabrics or screens; stencil forming materials and the effects these have on finished product. Further study into the inks and substrates that are common to the screen printer. Introduction to and running of screen printing presses, including automatic cylinder screen printing press and container press capable of printing cylindrical, conical and flat objects. (PPRT-209)

Class 2, Lab 3, Credit 3

**PPRT-310 Advanced Image Carriers****Registration #0911-310**

Advanced study of technological requirements involved in producing letterpress and flexographic plates and gravure cylinders. Extensive laboratory project work is devoted to molded rubber platemaking for flexography, photopolymer plates for both letterpress and flexography and both flat plate and cylinder imaging for gravure. 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****Registration #0911-311**

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. Problem 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. Room light 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 shooting copy on camera, stripping and proofing; proper instructional specification writing. Design and production of individual 4-color process pre-separation. (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. (PPRT-204)  
 Class 2, Lab 6, Credit 4
- PPRT-315** **Ink and Color**  
**Registration #0911-315**  
 Theory of light and color; basic theory of process color and correction; use of color comparator and spectrophotometer; the study of color systems and color matching systems; theory and application of various ink systems; practice in standard ink mixing and color matching emphasizing offset and letterpress processes; correlation of ink properties with applications; emphasis on relationship of ink to paper and press; study of ink problems and their correction.  
 Class 2, Lab 3, Credit 4
- PPRT-317** **Calligraphic Forms**  
**Registration #0911-317**  
 An introduction to the basics of calligraphy, exercises in use of broadedge pen to develop primary forms of Italic, Roman Capitals, and Uncial letter styles. Evolution of letter forms. Consideration of historical origins of letters, use of basic tools, understanding of methods and disciplines stressed.  
 Class 2, Lab 3, Credit 3
- PPRT-319** **Newspaper Design**  
**Registration #0911-319**  
 A study of the methods of designing modern newspaper pages; a look at a variety of front page design methods as well as inside pages; placement of editorial content and ads; problems involved in designing section pages and special pages and editions; the standard format vs. the tabloid format; page sizes, column widths, and space between columns.  
 Class 2, Lab 3, Credit 3
- PPRT-320** **Newspaper Production**  
**Registration #0911-320**  
 A study of the methods of producing a newspaper by the use of photocomposition systems and the offset process. Students organize a staff, design a newspaper, set type, paste up paper, go to camera, make plates and go to press.  
 Class 2, Lab 3, Credit 3
- PPRT-321** **Web Offset**  
**Registration #0911-321**  
 An analytical study of the technological development in web offset; emphasis on the interrelationship of procedures, materials, and 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 newsprint.  
 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)  
 Class 2, Lab 3, Credit 3 (Once a year)
- 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-331** **Bookbinding**  
**Registration #0911-331**  
 An introductory class to the basic skills used in binding books and portfolios. Content will cover methods of binding such as sewing, adhesive double fanning and other structures of bound products. Restoration and library binding, including reinforcing techniques and materials used are studied and practiced. No pre-requisite is required. However, a good coordination of hand and mind is desired. Students should bring several books of their own for rebinding.  
 Credit 4
- 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 3, Credit 3
- PPRT-335** **The Printed Book in America**  
**Registration #0911-335**  
 This course traces the main currents in the development of the printed book in America by closely examining the books themselves. In addition, close study of the lives and works of the great printers, their equipment and available technology, and their aesthetic viewpoints is undertaken to determine their impact on their own times and their relevance for today. Classes are held in the Melbert B. Cary, Jr., Graphic Arts Collection.  
 Class 3, Credit 3
- PPRT-337** **Art of the Printed Book 1455-1955**  
**Registration #0911-337**  
 This course presents masterpieces of the printer's art from the past five centuries. The lives and works of great European printers from Gutenberg to Mardersteig are examined, and their historical impact on Western civilization discussed with a view toward determining new perspectives for today's graphic artisan and book printer. Classes are held in the Melbert B. Cary, Jr., Graphic Arts Collection.  
 Class 3, Credit 3
- PPRT-401** **Typographic Workshop**  
**Registration #0911-401**  
 Allows students to create and solve typographic problems of their own choice. Complete freedom is given and experimentation is encouraged, giving the student opportunities to meet his or her own objectives and satisfaction. (PPRT-301)  
 Class 2, Lab 6, Credit 4

**PPRT-402 Applications of Electronics to Graphic Arts**  
**Registration #0911-402**

A basic course in the fundamentals of electricity and electronics covering DC, AC and semiconductors. Theory and application are combined as major topics and studied, implicating numerous graphic arts machines and devices. Students will perform laboratory experiments using basic electronic components and instruments.

Class 2, Lab 3, Credit 3

**PPRT-403 Layout and Printing Design**  
**Registration #0911-403**

A project course with design problems which involves students in converting their designs into the actual camera copy, trying various media, learning to identify art techniques and printing processes; more individualized approaches emphasized, more advanced principles applied. Less structured class sessions and more individual initiative required. (PPRT-313 or -213 and -303 and instructor permission)

Class 2, Lab 6, Credit 4

**PPRT-406 Color Separation Photography**  
**Registration #0911-406**

Color separation and color correction methods in the graphic arts industry; color theory, masking requirements, tone reproduction for color, color proofing systems, electronic scanner operation.

Class 2, Lab 3, Credit 3

**PPRT-410 Introduction to Paper**  
**Registration #0911-410**

This course begins with a discussion of papermaking fibers, pulping procedures, papermaking machines, and proceeds to show how they affect paper properties and printing characteristics. Laboratory experiences include stock preparation, making paper, sizing and coating paper, physical and optical testing of paper and paper identification.

Class 3, Lab 2, Credit 3

**PPRT-500 Quality Control in the Graphic Arts**  
**Registration #0911-500**

A study of the methods and instrumentation necessary to produce a product consistent with the appropriate quality level. Topics will include process variability, waste reduction, problem analysis, materials testing, process control, process optimization, and quality assurance. (Students should have completed all required 200-level technical courses in the School of Printing or have consent of the instructor)

Class 3, Credit 3

**PPRT-501 Development of Printing Types**  
**Registration #0911-501**

A lecture course that investigates the historical development of the type faces that we use in our everyday work as typographers and designers. In addition to the historical development of typeface examples, type face recognition, type face classification, type designers, foundries and manufacturers are also discussed.

Class 3, Credit 3

**PPRT-506 Advanced Color Reproduction**  
**Registration #0911-506**

Further study of color measurement and color reproduction. The emphasis will be on optimizing of a color reproduction system using such tools as color measurement instrumentation, visual color evaluation, color tone reproduction, and process control. (PPRT-406)

Class 2, Lab 3, Credit 3

**PPRT-551 Special Topics - Printing**  
**Registration #0911-551**

This course presents and investigates technological topics which normally are not covered in the regular curriculum on a one-time basis. Guest lecturers such as industry leaders as well as regular faculty are used to conduct this course. Topics to be covered are announced in advance.

Credit Varies/Qtr.

**PPRT-560 Chemistry Preparation for Graduate Study**  
**Registration #0911-560**

Basic principles of chemistry intended for students who have had no previous chemistry and who are making up deficiencies prior to entering the MS program. Not for credit for undergraduates of School of Printing.

Credit 4

**PPRT-591 Reproduction Photography**  
**Registration #0911-591**

An intensive course designed to enable photography students to gain a basic understanding of the various printing processes, the application of photography to each, with an emphasis on problems involved in obtaining optimum tone and color reproduction of their photographs.

Class 2, Lab 3, Credit 3

**PPRT-592 Printing Plates**  
**Registration #0911-592**

A specialized course for photography students to develop understanding of various imaging methods and characteristics, processing steps, applications, and major problems of platemaking.

Class 2, Lab 3, Credit 3

**PPRT-593 Printing Presses - Lithographic**  
**Registration #0911-593**

Course offered for photography students; theory and practice of the methods of planographic processes.

Class 2, Lab 3, Credit 3

**PPRT-594 Printing Presses - Screen**

Course offered for photography students; theory and practice of the methods of screen processes.

Class 2, Lab 3, Credit 3

## Graduate Courses

### Master of Science in Printing Technology

**PPRM-702 Computers in Management**  
**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-orientated production control techniques. (PPRM-301)

Credit 4

**PPRT-701 Research Methods in Graphic Arts**  
**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 theory of scientific methods including induction, deduction, hypothetico-deduction, hypothesis formation, theory development, etc.

Credit 4

**PPRT-702 Graphic Reproduction Theory**  
**Registration #0911-702**

Analysis of the basic theories of graphic reproduction and study of the principles underlying prevalent and proposed printing processes; special topics such as classification and description of the various light-sensitive systems as applied to the graphic arts, ink transfer theory, present and proposed systems of printing based on electrostatics; electrolysis, magnetism and lasers; study of hybrid systems and the significance and application of interdisciplinary methods.

Credit 4

**PPRT-703 Statistical Inference**  
**Registration #0911-703**

Descriptive statistics, patterns of variability, measures of variability, working with the normal curve, tests of hypotheses for means, tests of hypotheses for variance, internal estimates for means, internal estimates for variance, sample size for variables, introduction to analysis of variance, and applications of applied statistics to graphic arts.

Credit 4

**PPRT-704 Design of Experiments**  
**Registration #0911-704**

Analysis of variance, components of variance, crossed vs. nested experiments, studying individual effects, introduction to matrix algebra, regression analysis, planning experiments from a statistical point of view, basic experimental designs, factorial experiments, fractional factorials, determination of optimum conditions, introduction to nonparametrics and quality control concepts (as time allows).

Credit 4

**PPRT-708** **Introduction to Systems Analysis**  
**Registration #0911-708**  
 Problems of systems analysis in printing operations for the highest quality product at the minimal cost including optimal floor designs and methods of study. (PPRM-301)  
 Credit 4

**PPRT-709** **Trends in Printing Technology**  
**Registration #0911-709**  
 A study of the forces which have influenced the development of printing with emphasis upon the technological factors involved; examinations of the relationships of aesthetics and craft concepts to modern industrial techniques.  
 Credit 4

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

**PPRT-713** **Photo Typography Procedures**  
**Registration #0911-713**  
 Utilizing phototypesetting equipment, the student shall learn to develop typographic skills. Coding, format planning and development shall be taught so that the student can be competent in the creation of finished typographic problems. The lectures include the aesthetics and the technical information necessary to make judgments about existing phototypesetting equipment.  
 Credit 4

**PPRT-722** **Ink, Color and Substrates**  
**Registration #0911-722**  
 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-850** **Research Projects**  
**Registration #0911-850**  
 Individual research projects in which independent data is collected by the student, followed by analysis and evaluation. A comprehensive written report is required. Consent of advisor is required.  
 Credit variable 1-4

**PPRT-890** **Research and Thesis Guidance**  
**Registration #0911-890**  
 An experimental survey of a problem area in the graphic arts.  
 Credit 8

# College of Liberal Arts

## Criminal Justice

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

**GCJC-203** **Criminology**  
**Registration #0501-203**  
 A survey of the field of criminology with emphasis on major forms of contemporary crime, definition of crimes and criminality, theories of criminality, the extent of crime, criminal typologies, and fundamental aspects of the social control of crime.  
 Class 3, Credit 4 (offered annually)

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

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

**GCJC-207** **Corrections**  
**Registration #0501-207**  
 The course is designed to introduce the student to the basic organizations of the correctional system, their functions and performance. Prisons and jails, as well as probation and parole agencies, will be discussed within the context of historical and contemporary philosophy. Attention will also be focused on decision making functions, the role of various personnel within the correctional system and the population of offenders within it. Strategies for rehabilitation and their effectiveness will be surveyed. (GCJC-201)  
 Class 3, Credit 4 (offered annually)

**GCJC-301** **Fundamental Concepts of Criminal Law**  
**Registration #0501-301**  
 The subject matter of this course consists of an introduction to the fundamental principles upon which substantive criminal law is based. The basic characteristics and requirements of criminal conduct are examined. Included in the scope of this course are the following topics: the nature of criminal conduct, the meaning of criminal 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-306 Introduction to Para-Legals****Registration #0501-306**

The course deals with criminal and civil law, matrimonial law, legal research, counseling, problem solving techniques, and lawyers' ethics as well as a study of community resources available to assist the client. (GCJC-201)

Class 3, Credit 4 (offered on sufficient demand)

**GCJC-307 Investigative Techniques****Registration #0501-307**

The course examines the investigative function and process in the public and private sectors, which would include the history and theory of criminal investigation, crime scene searches, collection and presentation of physical evidence, the obtaining of testimony and confessions, scientific laboratory methods and the admissibility of evidence in a court of law. (GCJC-303)

Class 3, Credit 4 (offered on sufficient demand)

**GCJC-309 Juvenile Justice****Registration #0501-309**

The philosophical, historical and operational aspects of the juvenile justice system; evaluation of the social and personal factors related to juvenile delinquency; the role of police, the courts, corrections and community programs in delinquency prevention, control and treatment. (GCJC-201)

Class 3, Credit 4 (offered annually)

**GCJC-401 Scientific Methodology****Registration #0501-401**

This course provides a foundation in the uses of quantitative social science research methods with special reference to utilization of data bases and examples from criminal justice, human services and public policy. Strers will be on the deducting hypotheses from theoretical frameworks, identification of the relationships among variables, establishment models, creation of null hypothesis, quantitative methods of data collection and analysis using both parametric non-parametric methpds. Research methods presented range from traditional questionnaires to computer based information and techniques.

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 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 the field of corrections. This developmental evaluation is followed by a presentation of certain principles and philosophies concerning agency administration which have proved effective in business, industry, and many elements of government, with the intention of discussing their applicability to prisons, probation, parole, and other community correctional programs (GCJC-201, 207)

Class 3, Credit 4 (offered on sufficient demand)

**GCJC-411 Seminar in Corrections****Registration #0501-411**

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

Class 3, Credit 4 (offered annually)

**GCJC-412 Social Control of Deviant Behavior****Registration #0501-412**

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

Class 3, Credit 4 (offered on sufficient demand)

**GCJC-413 Civil Disobedience and Criminal Justice****Registration #0501-413**

A survey of the philosophy and history of civil disobedience, civil 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-415 Domestic Violence****Registration #0501-415**

This course is designed for social work students, criminal justice students, and professionals who are interested in examining the problems related to domestic conflict and violence. Included will be a study of the dynamics of violence as reflected in child abuse, incest, marital rape, spouse and parental abuse, and violence among siblings.

Credit 4 (usually offered summers for one week)

**GCJC-505 White Collar Crime****Registration #0501-505**

An examination of the extent and character of white collar crime, with special emphasis upon business and professional deviance. (GCJC-201, 203)

Class 3, Credit 4 (offered on sufficient demand)

**GCJC-506 Evidence****Registration #0501-506**

This course is designed to provide the student with an awareness of what types of evidence are 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 illegally obtained evidence (GCJC-201)

Class 3, Credit 4 (offered on sufficient demand)

**GCJC-510 Counseling in the Criminal Justice System**

This course is designed to instruct the student in the various, accepted contemporary dynamics of interviewing and counseling criminal justice and related human service agencies. Issues to be discussed will revolve around counseling and supervision strategies and conflicts among agencies, between administrators and staff, and between staff and clients. This course will present both the practical and theoretical aspects of these issues as well as devote attention to sun/eying prospective counseling strategies for accomplishing desired behavioral change. (GCJC-201)

Class 3, Credit 4 (offered on sufficient demand)

**GCJC-511 Alternatives to Incarceration****Registration #0501-511**

The course analyzes possible sentencing options available to the criminal courts as well as pre-adjudicatory alternatives for both adults and juvenile offenders. The variety of dispositions evaluated include; probation, parole, half-way houses, work-release, study-release, prison furloughs, pre-trial release, pre-probation alternatives (fines, suspended sentences, conditional discharge, and a variety of diversion programs). Special emphasis is placed on a critical evaluation of the alternatives as they compare to the more traditional methods of handling offenders. Field trips and guest lecturers from non-traditional programs are typically included in the course. (GCJC-207) (GCJC-411)

Class 3, Credit 4 (offered on sufficient demand)

**GCJC-512 Minority Groups and the Criminal Justice System**

The course will examine the role traditionally attributed to the members of minority groups as criminals and analyze their interaction with the criminal justice system. Heavily relying on the conflict perspective, the course will review the literature on the creation of laws, the breaking of laws, and the processing of minority members in the criminal justice system (GCJC-201, 203)

Class 3, Credit 4 (offered on sufficient demand)

**GCJC-514 Planning and Change in the Criminal Justice System**

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-203) (GCJC-401)

Class 3, Credit 4 (offered annually)

**GCJC-516 Court Administration****Registration #0501-516**

A course designed to explore the management aspects of the court and court process. There is a focus on the structure of the several levels of court that typically exist in modern urban America. Related to this structure are the various other criminal justice agencies that interact with the court at various stages of the process. In addition, operational problems such as the bail process, record keeping, jury service and selection methods, and calendar management will receive significant attention.

Class 3, Credit 4 (offered on sufficient demand)

**GCJC-517 Comparative Criminal Law****Registration #0501-517**

The course examines, in a comparative analysis, the criminal system 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 Police/Community Relations****Registration #0501-518**

Police-public contact; uses of the communications media in projecting the police image; responsibilities of police in dealing effectively with minority groups, civil rights, civil disorder, and public protection. An exploration of the role and function of the police in intergroup relations. (GCJC-303)

Class 3, Credit 4 (offered on sufficient demand)

**GCJC-520 Sentencing Process****Registration #0501-520**

This course is intended to provide the student with a broad overview of the law of sentencing and the alternatives presently available in this area. Emphasis will be placed on the traditional methods of punishment now available in the courts, including, but not necessarily restricted to: fines, 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 Victimless Crime and the Law****Registration #0501-522**

The course is designed to familiarize the student with many of the implications and ramifications of efforts to control "victimless" crimes. Course discussions concentrate on the illegal activity associated with prostitution, gambling, homosexuality, drug use and pornography. In this course the social, moral, legal and practical consequences of legalizing such activities are examined and evaluated (GCJC-201, 203, 301)

Class 3, Credit 4 (offered on sufficient demand)

**GCJC-523 Crime and Violence****Registration #0501-523**

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

Class 3, Credit 4 (offered on sufficient demand)

**GCJC-525 Institutional Security****Registration #0501-525**

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 Seminar in Law Enforcement****Registration #0501-526**

A critical analysis of some of the current issues, problems and concerns in the area of law enforcement; emphasis on basic police functions as it relates to the courts, corrections and the community. Conflicts between theory and practice are examined and analyzed, and future trends in law enforcement will be explored. (GCJC-303)

Class 3, Credit 4 (offered annually)

**GCJC-527 Advanced Criminal Law****Registration #0501-527**

The course will investigate assumptions and concepts of criminal law. The course will emphasize major crimes against the person and major crimes relating to property. (GCJC-201, 203, 301)

Class 3, Credit 4 (offered on sufficient demand)

**GCJC-528 Etiology of Crime****Registration #0501-528**

This course is a comprehensive survey of the sociological, psychological, and psychiatric views of the etiology of crime and other forms of deviant behavior. 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 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, also are examined. (GCJC-201)

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**

The course is designed to define the role of security in natural and man-made disasters. Flood, earthquakes, fire, labor disturbances, sabotage, bomb and bomb threats, extortion, executive protection, civil strife, war and terrorism will be examined, with emphasis upon formulating plans and methods to effectively deal with these events.

Class 3, Credit 4 (offered on sufficient demand)

**GCJC-532 Retail Security****Registration #0501-532**

This course provides an analysis of major security problems found within retail operations. Subjects examined include internal and external theft prevention and detection, shoplifting techniques, the use of undercover personnel and shopping services, security audit, and training of security and non-security personnel. Warehousing and cargo controls are examined. Emphasis will be placed upon methods, techniques and programs to protect assets.

Class 3, Credit 4 (offered on sufficient demand)

**GCJC-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**

This course, designed for seniors completing criminal justice degree requirements with a concentration in security, will focus on critical issues, problems, and concerns in the area of security that are not otherwise covered directly or in depth in established security courses. Topics are expected to vary from offering to offering.

Class 3, Credit 4 (offered on sufficient demand)

**GCJC-537 Legal Aspects of Security****Registration #0501-537**

An examination of the federal and state case law and statutory provisions that regulate the private security field. The distinction between public and private enforcement; as well as the possible criminal and civil liabilities of private security personnel under the law of 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 and the data to a file on the VAX/VMS, the use of application software (e.g. SPSS, MINITAB, DATAPLOT), and preparation of a final report. (GCJC-401)

Class variable, Credit 4 (offered annually)

**GCJC-542 Field Research Techniques****Registration #0501-542**

The course combines the use of both qualitative and quantitative research methods and applies them to the collection and analysis of data from field settings. Emphasis is placed on the use of multiple samples and the techniques of multivariate analysis. Students will draw upon social science theory to develop a research design, analyze data and prepare a report on a topic from Human Services, Criminal Justice or Public Policy. (GCJC-401)

Class 3, Credit 4 (offered on sufficient demand)

**GCJC-599 Independent Study****Registration #0501-599**

A combined student/faculty member effort on a chosen topic beyond the normal sequence of course selections. It provides the qualified self-motivated student with a creative orientation, the opportunity to develop an autonomous and personal sense of academic growth and achievement.

Class variable, Credit variable (offered annually)

## Social Work

### Core Courses

**GWSW-210 The Professional Social Work Role****Registration #0516-210**

Designed to assist students in making decisions regarding their careers in social work. The course covers basic exercises for developing self-awareness and professional self-assessment, explores various fields of social work and helps students begin to build their concepts of social work as a profession.

Class 3, Credit 4

**GWSW-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; GWSW-302, or concurrent)

Class 3, Credit 4



**GSWS-215** **The Family From a Social Work Perspective**  
**Registration #0516-215**

This course is designed to give the social work student a basic understanding of the family. The course will emphasize the various approaches to intervention with the contemporary American family, including its structure, functions and the interaction and roles of family members both within the family and between family and society. (GSSP-210, 203)

Class 3, Credit 4

**GSWS-302** **Social Welfare: History**  
**Registration #0516-302**

Designed to explore social welfare institutions and processes and their history, philosophy and relationship to other social institutions in the United States. Emphasis is on the role of social work in various interrelated social work institutions.

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 programs for minority groups, 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 types of groups (prevention, rehabilitation), group development, composition, group processes (problem solving, decision-making, affection), programming, leadership, communication, structure, and modes of intervention are covered. The course provides the knowledge base for the later development of practice skills in working with groups. (Second year standing)

Class 3, Credit 4

**GSWS-411** **Interviewing and the Helping Relationship (Methods I)**  
**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 differential use of social work techniques (e.g., interviewing skills, assessment, problem-solving) and interventive skills in a variety of client systems.

Through lectures, discussions, reading, lab simulations and case analysis, it is the overall objective of the sequence to provide the student with the knowledge, skill and self-awareness for beginning professional social work practice. The development of this knowledge, skill and awareness is seen as a progressive process underlying and underpinning the three-course sequence. (GSWS-210,211, 302, 315, 356 or concurrent)

Class 4, Lab. 4, Credit 4

**GSWS-412** **Assessment and Problem Solving (Methods II)**  
**Registration #0516-412**

See GSWS-411 (GSWS-411. concurrent with GSWS-421 and GSWS-433)

Class 3, Credit 4

**GSWS-413** **Intervention Strategies (Methods III)**  
**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 11 comprise a 20-week, 30 hr./week supervised field placement. Under the guidance of an instructor, the student is placed in a cooperating social, governmental or education agency in order that he or she may gain firsthand experience with its organization, programs and client assignments. Closely supervised work at the agency is supplemented by seminars designed to integrate theory and practice. (GSWS-411, concurrent with GSWS-412 and 433)

Field 300, Credit 5

**GSWS-422** **Field Instruction II**  
**Registration #0516-422**

See GSWS-421. (GSWS-412, 421 and 433; concurrent with GSWS-413 and 434).

Field 300, Credit 5

**GSWS-433** **The Supervisory Process**  
**Registration #0516-433**

A seminar taken during the first term of field placement. Topics include staff structure, work distribution, the responsibilities of supervisor and supervisee, the ethics of supervision, and professional growth. Students will focus on the supervisory processes within their field placement agencies. (GSWS-411, concurrent with GSWS-412, 421)

Class 2, Credit 4

**GSWS-434** **Managing Community Services**  
**Registration #0516-434**

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

Class 2, Credit 4

**GSWS-532** **Professional Issues**  
**Registration #0516-532**

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

Class 3, Credit 4

**GSWS-533** **Social Welfare: Policy & Planning**  
**Registration #0516-533**

For social work students who have completed field experience. Course will explore the development of social welfare services as it proceeds from the determination of social need through program design to implementation. Concepts of policy process, large system change, and grant and proposal writing are considered. (GSWS-413, 422 and 434)

Class 3, Credit 4

**GSWS-534** **Research Methods**  
**Registration #0516-534**

Introduction to the methodology of research in behavioral and social sciences. Stress will be 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' process, as well as participate in a helping process with other class members. (GSWS-312, 413, 422, and 434)

Class 3, Credit 4

## Social Work Electives

### GSWS-212 Self-Awareness in the Helping Role

#### Registration #0516-212

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

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

Class 3, Credit 4

### GSWS-213 Gerontology

#### Registration #0516-213

An introductory study of the second half of the life span with a design to increase understanding of the processes of social accommodation, socialization and social change of the aged as they interact with the community and others. (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 varieties of drug abuse, drugs and the social scene. Emphasis is placed on a variety of treatment modalities to be used by the social worker when working with drug abusers.

Class 3, Credit 4

### GSWS-313 Sexism and Sexual Identity in Social Work Practice

#### Registration #0516-313

This course is designed to sensitize social work students to sexism as it occurs in contemporary culture. The course will focus on gender identity and specific problems and issues related to the worker-client relationship.

Class 3, Credit 4

### GSWS-321 Alcoholism: interventive Skills and Techniques

#### Registration #0516-321

Teaches a variety of interventive skills to those giving care to alcoholics, their families and communities. Emphasis is on the method of use of these skills. Role play, video tape and case study will be included. (Second-year standing)

Class 3, Credit 4

### GSWS-322 Alcoholism: Rehabilitation Modalities and Community Resources

#### Registration #0516-322

The course analyzes symptoms and diagnosis of the alcoholic and current methods of rehabilitation. Explores structure, function and use of community resources. (Second-year standing)

Class 3, Credit 4

### GSWS-330 Rural Social Services

#### Registration #0516-330

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

Class 3, Credit 4

### GSWS-340 Fundamentals of Deafness

#### Registration #0516-340

The purpose of this course is to provide the student with a basic understanding of deafness. This overview includes an historical perspective, techniques and tools for diagnosis and remediation, philosophies and communication as well as the impact on the social, psychological, and vocational development of the individual as a result of deafness.

Class 3, Credit 4

### GSWS-341 Psychosocial Implications of Deafness

#### Registration #0516-341

The purpose of this course is to provide the student with an indepth examination of the psychosocial implications of deafness *for the individual*. The various systems with which the deaf individual interacts as well as within which s/he interacts, will be examined for their relevance to the development and functioning of the individual. We will also examine how the individual and these systems impact and influence each other. These systems will include family, school, service delivery systems and society. (GSWS-340)

Class 3, Credit 4

### GSWS-342 Intervention Strategies with the Deaf

#### Registration #0516-342

The purpose of this course is to build skills in applying the knowledge base (developed in the prerequisite courses) to case situations. Students demonstrate collection and recognition of pertinent information, and development and implementation of appropriate intervention plans. Legal and political issues as well as methods of assessing local resource networks are considered. Professional roles and intervention goals are discussed as they relate to interfacing systems, including individual, family, school, medical, mental health, rehabilitation, and employment. (GSWS-340, 341)

Class 3, Credit 4

### GSWS-357 Mental Health and Mental Illness from a Social Work Perspective

#### Registration #0516-357

This course is designed to give social-work students a basic understanding of mental health, mental illness and mental retardation from a social-work perspective. The role of the social worker in working with mentally ill and mentally retarded individuals and their families will be included. Students will also be given a general understanding of our current mental hygiene systems. (GSWS-210, GSSP-210)

Class 3, Credit 4

### GSWS-360 Social Work with the Disabled

#### Registration #0516-360

This course provides an examination of psychosocial aspects of disabilities. The course stresses the effects of disability on the individual's development and functioning and the attendant stress on the family and society in attempts to respond to their needs. Interventive strategies and critical times for intervention by the social worker are examined.

Class 3, Credit 4

### GSWS-370 Child Protective Services

#### Registration #0516-370

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

Class 3, Credit 4

### GSWS-380 Social Work and the Law

#### Registration #0516-380

The main purpose of the legal orientation of 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)

Class 3, Credit 4

### GSWS-431 Social Work Management

#### Registration #0516-431

Management of a social work agency is a complex and multi-faceted position. This course focuses on many of the knowledge, attitudes and skill areas required of a manager. These include the traditional management skills, their relationship to the non-profit sector and the unique requirements of management in the not-for-profit sector.

Class 3, Credit 4

**GSWS-432 Supervision In Social Work****Registration #0516-432**

This course identifies and teaches the supervisory skills required in social work and related agencies. Different methods and techniques are explored. Role play and video tape are used.

Class 3, Credit 4

**GSWS-455 Contemporary Issues in Social Work****Registration #0516-455**

This course is designed to offer students an opportunity to examine and discuss contemporary issues in the field of social work. Course content will vary from quarter to quarter dependent on current issues and student interest. Areas related to expressed student interest, faculty expertise and developments in the field will be examined. Specific readings will be assigned with classroom discussions, special speakers, films, field trips or role plays included depending on the nature of the issues being addressed.

Class 3, Credit 4

**GSWS-509 Services for Children and Their Families****Registration #0516-509**

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.

Class 3, Credit 4

**GSWS-512 Advanced Intervention with Individuals****Registration #0516-512**

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-413, 422, and 434)

Class 3, Credit 4

**GSWS-513 Advanced Intervention with Families****Registration #0516-513**

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, 413, 422, 434)

Class 3, Credit 4

**GSWS-522 Advanced Intervention in Communities****Registration #0516-522**

This course examines community intervention as a social work method. The roles and functions of the community intervention practitioner and alternative models of practice are analyzed such as locality development, social planning and social action. The course will investigate specific applications of community intervention theory to political influence processes, coalition, neighborhood associations and regionalization. (GSWS-413, 422, and 434)

Class 3, Credit 4

**GSWS-523 Advanced Intervention with Groups****Registration #0516-523**

This course examines social treatment as one form of group work practice. There are different service procedures and approaches which center on the use of client groups, and each may have utility in pursuing distinct service objectives. The course will investigate the scope, techniques and function of the group work concept as practiced in such diverse settings as social service agencies, business, correctional institutions and communities. (GSWS-413, 422, and 434)

Class 3, Credit 4

**GSWS-525 Grantwriting****Registration #0516-525**

This course introduces the student to guidelines and procedures employed in grant writing. Grantwriting is designed to provide the student with a series of readings and experiential exercises necessary for writing a grant proposal.

Class 3, Credit 4

**GSWS-599 Independent Study****Registration #0516-599**

A combined student/faculty effort on a chosen topic beyond the normal sequence of course selections. It provides the self-motivated student with a creative orientation, the opportunity to develop an autonomous and personal sense of academic growth and achievement. Independent Study may include independent work in an agency setting.

Credit variable

## Liberal Arts Courses

### Language and Literature

**GLLC-220 English Composition****Registration #0502-220**

This course develops the language skills needed to write effectively. It should be taken in the freshman year.

Class 3, Credit 4 (offered quarterly)

**GLLC-440 Human Communication****Registration #0502-440**

Human Communication is an overview of the field of communication, including the contexts of interpersonal, group, mass, and public communication. This course is part of the Language Concentration and may also be taken as an elective. (0502-220 or equivalent)

Class 3, Credit 4 (offered annually)

**GLLC-441 Small Group Communication****Registration #0502-441**

Practice in analysis of a variety of small group discussion techniques focusing on phenomena such as processes of interaction, decision making, norms structure and development, membership, and theory of group development. This course is part of the Language Concentration and may also be taken as an elective. (0502-220 or equivalent)

Class 4, Credit 4 (offered annually)

**GLLC-442 Persuasion****Registration #0502-442**

A study in depth of the theories, practices, effects and ethics of persuasion. Persuasion is defined as human communication designed to influence one's beliefs, values, attitudes, and actions. This course is part of the Language Concentration and may also be taken as an elective. (0502-220 or equivalent)

Class 3, Credit 4 (offered annually)

**GLLC-443 Writing and Thinking****Registration #0502-443**

This course develops the reasoning and advanced language skills needed to carry out applied logic and applied problem-solving writing processes. This course is part of the Language Concentration and may also be taken as an elective. (0502-220 or equivalent)

Class 3, Credit 4 (offered annually)

**GLLC-501 Effective Speaking****Registration #0502-501**

The development of the techniques of formal public speaking as an aid to self-confidence in modern social and business situations. Weekly practice talks with emphasis on organization, clarity, vocal expression, poise.

Class 3, Credit 4 (offered annually)

**GLLC-514 Mass Communication****Registration #0502-514**

An introduction to the study of the mass media. The focus of the course is on the history, development, and law and regulation of the mass media in the United States.

Class 3, Credit 4 (offered annually)

**GLLC-515 Uses and Effects of the Mass Media****Registration #0502-515**

An analysis of the "effects" and the "uses and gratifications" of mass communication research with focus on building mass communication theory. (Note: Students may find GLLC-514 a useful introduction to this course)

Class 3, Credit 4 (offered annually)

- GLLC-517** **Registration #0502-517** **Newswriting**  
Practicum in basic techniques of news writing and gathering for the daily press. Emphasis will be primarily on writing for the print media. Emphasis on frequent writing against a deadline.  
Class 3, Credit 4 (offered annually)
- GLLC-518** **Registration #0502-518** **Creative Writing**  
Students are introduced to the craft of writing poems, stories, scripts, and personal essays.  
Class 3, Credit 4 (offered annually)
- GLLC-519** **Registration #0502-519** **Advanced Creative Writing**  
Students who have completed Creative Writing or who have satisfied the instructor, normally by presentation of a writing sample, of their readiness to undertake the course will be given an opportunity to explore in depth a literary genre, subject or theme chosen by the individual student in conference with the instructor. The acceptability of the student's project will be determined on the basis of its intrinsic literary merit and its potential value to the student's development as a writer.  
Class 3, Credit 4 (offered occasionally)
- GLLC-520** **Registration #0502-520** **College Vocabulary Skills**  
Application to the process of vocabulary building of the various disciplines of language study will be provided. Included among these will be applications of dictionary study, etymology, semantics, and structural linguistics. In addition, literary works, periodicals, and newspapers will be examined to strengthen the student's awareness of the contextual variation in the meaning of words. Ineffective and faulty devices of language usage will also be discussed.  
Class 3, Credit 4 (offered annually)
- GLLC-521** **Registration #0502-521** **Intercultural Communication**  
This course is an examination of the role of culture in face-to-face interaction. There are no prerequisites, but students may find a basic background in communication, anthropology, or psychology useful.  
Class 3, Credit 4 (offered annually)
- GLLC-522** **Registration #0502-522** **Rhetoric of Social Change**  
Readings and analysis of selected public speeches and essays advocating or opposing major issues of social change in the United States from the 18th century through contemporary advocacy.  
Class 3, Credit 4 (offered occasionally)
- GLLC-530** **Registration #0502-530** **German I**  
This course will introduce students with no prior exposure to the language to some control of natural modern German. A strong emphasis is placed on speaking and reading skills. Besides language, students will also study contemporary life and culture in the German-speaking countries. Although this is the first course of a three-course sequence, the course may be taken separately.  
Class 4, Credit 4 (offered annually)
- GLLC-531** **Registration #0502-531** **German II**  
This course is designed to give students further control of natural, modern German. A strong emphasis is placed on speaking and reading skills. Besides language, students will also study contemporary life and culture in the German-speaking countries. Although this is the second course of a three-course sequence, the course may be taken separately. (0502-421 or equivalent)  
Class 4, Credit 4 (offered annually)
- GLLC-532** **Registration #0502-532** **German III**  
This course is designed to give students more advanced control of natural, modern German. A strong emphasis is placed on speaking and reading skills. Besides language, students will also study contemporary life and culture in the German-speaking countries. Although this is the last course of a three-course sequence, the course may be taken separately. (0502-422 or equivalent)  
Class 4, Credit 4 (offered annually)
- GLLC-533** **Registration #0502-533** **Spanish I**  
This course will introduce students with no prior exposure to the language to some control of modern Spanish. A strong emphasis is placed on speaking and reading skills. Besides language, students will also study contemporary life and culture in Spanish-speaking countries.  
Class 3, Credit 4 (offered annually)
- GLLC-534** **Registration #0502-534** **Spanish II**  
This course is designed to give students further control of modern Spanish. A strong emphasis is placed on speaking and reading skills. Besides language, students will also study contemporary life and culture in Spanish-speaking countries. Although this is the second course of a three-course sequence, the course may be taken separately. (0502-431 or equivalent)  
Class 3, Credit 4 (offered annually)
- GLLC-535** **Registration #0502-535** **Spanish III**  
This course is designed to give students more advanced control of modern Spanish. Besides language, students will also study contemporary life and culture in Spanish-speaking countries. Although this is the last course of a three-course sequence, the course may be taken separately. (0502-432 or equivalent)  
Class 3, Credit 4 (offered annually)
- GLLC-536** **Registration #0502-536** **American Sign Language I**  
This course presents a study of the origins, nature, and development of American Sign Language (ASL), and its variants, as used by the deaf population of North America. Integral to the course is the linguistic structure of ASL and the nature of signing as a linguistic modality.  
Class 3, Credit 4 (offered annually)
- GLLC-553** **Registration #0502-553** **Creative Interpretation in Sign**  
Creative approaches to the interpretation of selected literary classics (prose, poetry, fiction, drama) through the visual medium of sign (sign language and sign-mime).  
Class 3, Credit 4 (offered annually)
- GLLC-558** **Registration #0502-558** **Technical Writing**  
An exploration of technical writing skills with emphasis on regular writing assignments. Class periods will be devoted to discussions of the requirements of technical writing and to analysis and evaluation by students of their writing. The aim of the course is to enable students to fulfill technical writing demands with prose that is unified, coherent, and accurate. Students enrolling in this course should have command of written English and the ability to write clear and logical prose. The course is primarily intended for students who have written at work or with some other experience in practical or technical writing.  
Class 3, Credit 4 (offered annually)
- GLLL-332** **Registration #0504-332** **Literature**  
The students study some of the great literary works of our culture to enrich their lives and reinforce their analytical abilities. The students read representative poems, dramas, and narratives drawn from the Ancient, Medieval-Renaissance, and Modern Periods.  
Class 3, Credit 4 (offered quarterly)
- GLLL-337** **Registration #0504-337** **Literature: Poetry & Drama**  
The students study some of the great literary works of our culture to enrich their lives and reinforce their analytical abilities. The students read representative poems and dramas, drawn from the Ancient, Medieval-Renaissance, and Modern Periods. This two credit course and the companion two credit course 0504-338 are the only required literature courses in the student's career.  
Class 2, Credit 2 (offered fall)

**GLLL-338** **Literature: Prose Fiction**  
**Registration #0504-338**  
 The students study some of the great literary works of our culture to enrich their lives and reinforce their analytical abilities. The students read representative prose fiction drawn from the Ancient, Medieval-Renaissance, and Modern Periods. This two credit course and the companion two credit course 0504-337 are the only required literature courses in the student's career.

Class 2, Credit 2 (offered winter)

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

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered annually)

**GLLL-443** **The Novel**  
**Registration #0504-443**  
 The Novel course provides a close reading and analysis of several novels selected to show the range of narrative techniques, methods of characterization and plot construction, and styles representative of the genre. This course is part of the Literature Concentration and may also be taken as an elective. (0504-332 or equivalent)

Class 3, Credit 4 (offered annually)

**GLLL-444** **Film as Literature**  
**Registration #0504-444**  
 The course examines the nature of narrative in both film and literature, the various aspects of adaptation of literature into film, and the relationship between social reality and storytelling in documentary film. The course is a non-technical, non-chronological study of film with a balance of roughly 50% literature and 50% film. This course is part of the Literature Concentration and may not be taken as an elective. (0504-332 or equivalent)

Class 3, Credit 4 (offered annually)

**GLLL-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 aspiration, 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 Women's Studies Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered annually)

**GLLL-501** **Speculative Fiction**  
**Registration #0504-501**  
 Speculative fiction is a survey course in contemporary literature presenting conjectural views of man, his world, his society and his beliefs. 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)

**GLLL-502** **Modern Latin American Literature**  
**Registration #0504-502**  
 Reading short stories, novels, and poetry of modern Mexico, Central and South America reveals a literature and culture wherein the mythic functions as an integral part of the modern world view and the poetic functions as a potent political power. The impressive vitality of modern Latin American literature can be attributed to its indigenous roots and to its branches that, stemming from a common language and a shared continent, overarch national boundaries and political regimes to form an international literary community.

Class 3, Credit 4 (offered occasionally)

**GLLL-503** **Great World Drama**  
**Registration #0504-503**  
 A chronological survey of the major periods of theatrical evolution, with emphasis on the physical theatre and production techniques which influenced the playwrights' works within respective periods.

Class 3, Credit 4 (offered annually)

**GLLL-504** **Shakespeare: Comedy and History**  
**Registration #0504-504**  
 Several of Shakespeare's comedy and history plays are read and analyzed to reveal their literary excellence and their theatrical power.

Class 3, Credit 4 (offered annually)

**GLLL-505** **The American Spirit in Literature**  
**Registration #0504-505**  
 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)

**GLLL-506** **Literary Symbolism In Short Fiction**  
**Registration #0504-506**  
 Emphasis is on defining literary symbolism and in recognizing this device when it is employed in literary works, with special attention given to the accurate interpretation of symbolic works.

Class 3, Credit 4 (offered annually)

**GLLL-515** **Contemporary American Novel**  
**Registration #0504-515**  
 The course will cover American fiction written after World War II. Works by contemporary American writers will be examined, with special emphasis being placed on these writers' relation to contemporary American culture.

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered annually)

- GLLL-517** **Literature of the Bible**  
**Registration #0504-517**  
 A close and rapid reading of selected Old and New Testament books to show the range and variety of literary genres and styles in the Bible.  
 Class 3, Credit 4 (offered occasionally)
- GLLL-522** **Mark Twain and the American Dream**  
**Registration #0504-522**  
 The course will consist of readings from the bitter comic writings of the last part of Twain's career, focusing on his philosophy of total determinism, his disenchantment with the "damned human race" 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)
- GLLL-524** **Contemporary Film**  
**Registration #0504-524**  
 A study of contemporary world films, to be drawn from those presently showing in the Rochester area (theaters, television, film festivals). Emphasis will be on both technical and aesthetic aspects of the films.  
 Class 3, Credit 4 (offered annually)
- GLLL-527** **Shakespeare: Tragedy and Romance**  
**Registration #0504-527**  
 A generous sample of Shakespeare's tragedy and romance plays is investigated to reveal their literary excellence and their theatrical power. Reference is made to the poems; to the sources of the plays; to the world of Shakespeare's time, its intellectual preconceptions, political stresses, and religious rivalries, and to the theatre and its traditions.  
 Class 3, Credit 4 (offered annually)
- GLLL-528** **Great World Novels**  
**Registration #0504-528**  
 A careful reading and analysis of novels selected from the best examples of the genre. The novels are selected to exhibit a wide range of techniques of narration, methods of characterization, and approaches to plot construction.  
 Class 3, Credit 4 (offered occasionally)
- GLLL-531** **American Literature of the 1920s and 1930s**  
**Registration #0504-531**  
 A study of American writers of the 20th century with particular attention to the beginnings of realism, naturalism and symbolism.  
 Class 3, Credit 4 (offered annually)
- GLLL-535** **Technology in American Literature**  
**Registration #0504-535**  
 A study of 19th and 20th century American literature (short stories, an essay, poems, and novels) commenting upon the impact of technology upon society. The works selected reflect mostly the sceptical response of American writers to the technological **Utopia**.  
 Class 3, Credit 4 (offered annually)
- GLLL-538** **The Nightmare of Technology: Studies in 19th Century British Writing**  
**Registration #0504-538**  
 A study of 19th century British prose and poetry. Attention will be devoted to the effects of industrialism on a changing English society. The course will study in general the various social problems confronting 19th century England, and how various writers responded to these problems through their writing.  
 Class 3, Credit 4 (offered occasionally)
- GLLL-539** **The Romantic Vision**  
**Registration #0504-539**  
 A study of 19th century European prose and poetry (primarily British) with particular attention paid to the collapse of the Romantic vision, and its gradual absorption into the aesthetic and decadent literary traditions of late nineteenth century European literature.  
 Class 3, Credit 4 (offered occasionally)
- GLLL-542** **Literature of Violence**  
**Registration #0504-542**  
 An evaluation of the promoting forces, the types, and the effects of violence as it occurs in literary themes from different periods and backgrounds.  
 Class 3, Credit 4 (offered annually)
- GLLL-545** **The Deaf in Fiction**  
**Registration #0504-545**  
 A study of the literature of deafness, with special emphasis on literary works which identify and illuminate "the deaf experience."  
 Class 3, Credit 4 (offered annually)
- GLLL-548** **Modern Poetry**  
**Registration #0504-548**  
 A close examination of poems of important English and American poets of the 19th and 20th centuries, including several living poets.  
 Class 3, Credit 4 (offered annually)
- GLLL-550** **Jonathan Swift and the Age of Satire**  
**Registration #0504-550**  
 Vicious satirical writings of Jonathan Swift and other early 18th century authors will be read and analyzed, focusing on the intrigue and scandals marking the political and religious environment of the age.  
 Class 3, Credit 4 (offered alternate years)
- GLLL-551** **World Literature in English**  
**Registration #0504-551**  
 The course will cover short stories and novels written in English by Australian, African, Asian, and West Indian authors. The selection will be discussed against the background of the social, political, and cultural milieu in which the authors worked.  
 Class 3, Credit 4 (offered occasionally)
- GLLL-556** **Athens & Rome: The First Moderns**  
**Registration #0504-556**  
 A trip to the beginnings of our culture and an exploration of the first artistic expressions of "modern" sensibility, primarily through reading of the chief authors of Classical Greece and Rome.  
 Class 3, Credit 4 (offered occasionally)
- GLLL-557** **Chaucer and His Times**  
**Registration #0504-557**  
 A close reading of the major poetry of Geoffrey Chaucer and The Pearl Poet in modern English Translation, and a brief introduction to the history of the English language.  
 Class 3, Credit 4 (offered occasionally)
- GLLL-560** **Art of the Cinema**  
**Registration #0504-560**  
 A critical examination of certain films as an integral part of modern culture.  
 Class 3, Credit 4 (offered annually)
- GLLL-561** **Rites of Passage**  
**Registration #0504-561**  
 A survey of literary works providing a variety of insights into growing up, especially from adolescence into young adulthood, which take the reader from the humorously reminiscent to the devastatingly brutal and which provide the reader with a better understanding of and appreciation for this phase of life.  
 Class 3, Credit 4 (offered occasionally)
- GLLL-562** **Literature of Suspense**  
**Registration #0504-562**  
 An introduction to stories of mystery and suspense whose literary mode has aesthetic merit, whose plots, characters, and/or settings are uniquely entertaining, and whose authors have evolved rare styles of story telling.  
 Class 3, Credit 4 (offered occasionally)
- GLLL-563** **Myth, Legend, Folklore**  
**Registration #0504-563**  
 Scholarly investigation into the rationale, origins and sources of myths, legends and folklore of the western world and the affect these primary forms have had on our literature.  
 Class 3, Credit 4 (offered annually)

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

**GLLL-565** **Black Literature**  
**Registration #0504-565**  
 The course traces the literary contributions of selected black writers in the various genres from its roots in the African heritage through slavery to the present day.  
 Class 3, Credit 4 (offered annually)

**GLLL-566** **Viking Myth and Saga**  
**Registration #0504-566**  
 Reading the myths, sagas, and folktales of the Viking world reveals the values of a people that created the world's oldest extant democratic society. Both women and men fiercely defend their honor and their freedom, willing to risk death rather than to bow in submission. The sagas are analyzed as compelling narrative structures and as documents of a culture that continues significantly to shape Western civilization.  
 Class 3, Credit 4 (offered occasionally)

**GLLL-567** **Ibsen: Drama and Film**  
**Registration #0504-567**  
 Reading and/or viewing ten plays of Henrik Ibsen, the father of modern drama, enables attentive examination of values and structures of modern society that form and formulate the lives of women and men. Ibsen argues that the possibility of individual freedom and creativity can only be won by seeing beyond and acting in despite of formidable forces. The texts and films are analyzed for visual as well as verbal information.  
 Class 3, Credit 4 (offered occasionally)

**GLLL-568** **Landscape In American Literature**  
**Registration #0504-566**  
 Advanced study of great American landscape literature.  
 Class 3, Credit 4 (offered occasionally)

**GLLL-569** **Dramatic Tragedy**  
**Registration #0504-569**  
 A critical examination of representative dramatic tragedies from ancient Greece to the modern era. In examining the texts, we will analyze the individual vision of each play, the relationship of the play to the cultural context in which it was produced, and the common characteristics that define the genre.  
 Class 3, Credit 4 (offered occasionally)

## 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)

**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 annually)

**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 1850 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 artists, selected women artists and their work, relation of their work to the art of their period, current issues and status of women artists. This course is part of the Women's Studies Concentration and may also be taken as an elective.  
 Class 3, Credit 4 (offered annually)

**GSHF-501** **Craftsmanship In Gothic Art**  
**Registration #0505-501**  
 A survey of religious and secular art in Europe from about 1100 to 1500 A.D. and its antecedents. Media to be studied include manuscript illumination, sumptuous objects, and church architecture (including associated sculpture, mosaics, paintings and stained glass).  
 Class 3, Credit 4 (offered occasionally)

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

**GSHF-S12 Master Drawings Since the Renaissance**  
**Registration #0505-512**  
 A study of drawings from the 15th to the 20th century, including the work by Leonardo da Vinci, Michaelangelo, Durer, Rembrandt and Picasso.

Class 3, Credit 4 (offered occasionally)

**GSHF-513 Oriental Art**  
**Registration #0505-513**  
 A survey outlining the development Of art in India, China, Japan and examining the philosophical circumstances that distinguish Eastern artistic traditions. There will be opportunity for each student to pursue special interests in depth.

Class 3, Credit 4 (offered occasionally)

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

Class 3, Credit 4 (offered annually)

**GSHF-515 Semiotics of Computer-Aided Human Activity**  
**Registration #0505-515**  
 Computer technology is only part of what is called "computer civilization." Actually, the essential component is the man-machine relation. Semiotics deals with every interface activity and is perfectly suited to considering the various aspects of computer-aided human activity. The course will focus on a generalized concept of interfacing and also address topics related to artificial intelligence. To enroll in this course, students must receive permission from the professor.

Class 3, Credit 4 (offered occasionally)

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

Class 3, Credit 4 (offered annually)

**GSHF-520 Picasso**  
**Registration #0505-520**  
 The life and work of one of the most influential artists of our century.

**GSHF-524 Music Theory I**  
**Registration #0505-524**  
 This course is 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)

**GSHF-526 Twentieth Century Music**  
**Registration #0505-526**  
 A survey of major 20th century composers and their works. Emphasis will be placed on the development of music in the classical tradition, experimental music and jazz.

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered occasionally)

**GSHF-530 Art and Human Values**  
**Registration #0505-530**  
 This course investigates the nature and value of the arts and their relation to other areas of human activity such as religion, economics, science and technology and personal freedom.

Class 3, Credit 4 (offered annually)

**GSHF-532 African Tribal Art**  
**Registration #0505-532**  
 After an investigation of the world of "primitive" man and the function of art in a tribal environment, this course will focus on preliterate societies of sub-Saharan Africa.

Class 3, Credit 4 (offered occasionally)

**GSHF-534 Renaissance and Baroque Art**  
**Registration #0505-534**  
 This course examines the stylistic development of painting in Europe from 1420 to 1650. 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)

**GSHF-536 Music and the Stage**  
**Registration #0505-536**  
 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)

**GSHF-537 Beethoven**  
**Registration #0505-537**  
 This course introduces the music of Beethoven in the psychological, political and philosophical contexts that gave it shape and force. Using the classical style of Haydn and Mozart as background, it focuses on the development of the "Dionysian" personality in Beethoven's compositions and the creation of the sublime in music.

Class 3, Credit 4 (offered occasionally)

**GSHF-538 Bach and the Baroque**  
**Registration #0505-538**  
 This course is devoted to a study of Johann Sebastian Bach, his life and times, and his music in the context of Baroque styles and aesthetics. Compositions from each of the major periods of his creative life will be examined and discussed, particularly as they serve the social and religious purposes for which they were written, and as they reveal the psychology of so-called "Rhineland mysticism."

Class 3, Credit 4 (offered occasionally)

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

Class 3, Credit 4 (offered quarterly)

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

Class 3, Credit 4 (offered quarterly)

**GSHH-440 United States: Its People and Its Institution**  
**Registration #0507-440**  
 This course will examine the American people, their society and their culture, in relation to the nation's institutions: government, courts, business, labor and political and private associations. The interplay between the American people and the institutions which structure their lives sheds light on the dynamic forces which shape American history and help to explain the present. Instead of detailing day-to-day chronology, this study will highlight the sweep of major trends and movements over longer periods of the American experience. This course is part of the History Concentration and may also be taken as an elective. (0507-301 or 0507-302 or equivalent)

Class 3, Credit 4 (offered annually)



**GSHH-441** **20th Century American Diplomatic History**  
**Registration #0507-441**

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

Class 3, Credit 4 (offered annually)

**GSHH-442** **The Contemporary Middle East**  
**Registration #0507-442**

This course analyzes the making of the contemporary Middle East from the rise of Islam to the present with special emphasis on the patterns of political development in the twentieth century. This course is part of the History Concentration and also the International Relations Concentration and may also be taken as an elective. (0507-301 or 0507-302 or equivalent for the History Concentration; 0513-211 or 0513-215 or equivalent for the International Relations Concentration)

Class 3, Credit 4 (offered annually)

**GSHH-443** **European Social and Intellectual**  
**Registration #0507-443** **History Since 1600**

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

Class 3, Credit 4 (offered annually)

**GSHH-444** **European Diplomatic History, 1871-1945**  
**Registration #0507-444**

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

Class 3, Credit 4 (offered annually)

**GSHH-445** **Modern Latin America**  
**Registration #0507-445**

This course surveys the historical development of the Hispanic and Portuguese areas of the Americas from independence to the mid-twentieth century. The movement towards independence, the problems that emerged during the nineteenth century of forming unified nations, and the problems of modernization in the twentieth century are all covered. The histories of selected countries are used to illustrate these issues. This course is part of the History Concentration and may also be taken as an elective. (0507-301 or 0507-302 or equivalent)

Class 3, Credit 4 (offered annually)

**GSHH-480** **History of American Women**  
**Registration #0507-480**

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

Class 3, Credit 4 (offered annually)

**GSHH-483** **Christianity in the West**  
**Registration #0507-483**

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

Class 3, Credit 4 (offered annually)

**GSHH-501** **United States Community History**  
**Registration #0507-501**

Students will study how people lived 1850-present in different kinds of local communities in the United States, such as working associations, private organizations and political communities.

Class 3, Credit 4 (offered occasionally)

**GSHH-502** **Europe Since 1918**  
**Registration #0507-502**

A study of the European states and peoples in the inter-war period, the diplomatic and military history of World War II, the reconstruction of Europe, the Cold War, Detente, and contemporary Europe.

Class 3, Credit 4 (offered occasionally)

**GSHH-503** **The History of Russia**  
**Registration #0507-503**

A study of the historical context and development of Russian society and the factors leading to the emergence of the Soviet regime.

Class 3, Credit 4 (offered occasionally)

**GSHH-504** **Foundations of Asian Civilizations**  
**Registration #0507-504**

This course is primarily a study of the Confucian/Buddhist world in East Asia with the focus on China and Japan, their origins, their peoples, and their cultural characteristics.

Class 3, Credit 4 (offered occasionally)

**GSHH-505** **Japan In the Modern World**  
**Registration #0507-505**

An examination of social, economic, political and intellectual developments of Japan in the nineteenth and twentieth centuries with an analysis of how Japan has reached such a significant status in the contemporary world.

Class 3, Credit 4 (offered occasionally)

**GSHH-506** **History of Chinese Communism**  
**Registration #0507-506**

An analysis of the main characteristics of Chinese Communism, its native roots, Marxist/Leninist elements, and Maoist innovations. The course will also examine the causes for the rise of Communism in modern China, the context and process of its development, as well as contributions and problems Communism brought forth to the Chinese people. In addition, China and the world will be examined.

Class 3, Credit 4 (offered occasionally)

**GSHH-507** **The World, 1914-1945**  
**Registration #0507-507**

This course aims to give continuity (interpretation of cause and effect relationships) to the major developments of the period 1914-1945. The course notes the impact of classical liberal economic theories in a period of rapid mechanization and industrialization. Rising social expectations in the period of exploding democratic and later social liberalism are observed in their relationship to revolution and reaction. This course considers the causes of World War I and examines the military operations in some detail.

Class 3, Credit 4 (offered occasionally)

**GSHH-508** **History of England**  
**Registration #0507-508**

A political and constitutional history of England from the Anglo-Saxon period to the present.

Class 3, Credit 4 (offered on sufficient demand)

**GSHH-514** **Race and Society**  
**Registration #0507-514**

A social, historical, political, religious and anthropological appraisal of the factors which have produced the differences between social appearances and social attainments of the world's population.

Class 3, Credit 4 (offered occasionally)

**GSHH-516** **The Middle Ages and the Rise of Europe**  
**Registration #0507-516**

The Medieval society and its political, religious, economic, and social problems and achievements will be analyzed as the foundation and the cradle of our modern society.

Class 3, Credit 4 (offered annually)

**GSHH-519** **United States-Latin America**  
**Registration #0507-519** **Diplomatic Relations**

The emphasis in this course will be on analyzing the United States' relations with Latin America from independence to the present.

Class 3, Credit 4 (offered annually)

**GSHH-S20** **Crime, Violence, and Urban Crisis**  
**Registration #0507-520**

The course will analyze the causes of the outbreak and rapid increase of violent and criminal trends in the world as the most serious realities of the 20th century. The course will be a comparative study on America's and the world's problems of violence, crime, and urban crisis.

**GSHH-524** **The Italian American Experience**  
**Registration #0507-524**

Examines the history and culture of the Italian Americans from the colonial period to the present. 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)

**GSHH-526** **The United States and The Third World**  
**Revolutions in the 20th Century**  
**Registration #0507-526**

One of the dominant features of the 20th century has been the revolution of rising expectations in the countries of the Third World. This course will study the underlying causes of these revolutions and the reaction of the United States government to this revolutionary ferment in Latin America, Asia and Africa.

Class 3, Credit 4 (offered annually)

**GSHH-528** **The History of Popular Culture in America**  
**Registration #0507-528**

American myths, icons, heroes, and institutions as represented in American popular culture from the late nineteenth century to the present. Examines the history of popular entertainment and the mass media in the United States.

Class 3, Credit 4 (offered annually)

**GSHH-529** **Military History**  
**Registration #0507-529**

An analysis of the causes and nature of war.

Class 3, Credit 4 (offered on sufficient demand)

**GSHH-530** **19th Century American Diplomatic History**  
**Registration #0507-530**

An examination of American diplomacy from the early years of American independence to the emergence of the United States as a world power. The War of 1812, Monroe Doctrine, and Manifest Destiny are among the topics considered.

Class 3, Credit 4 (offered annually)

**GSHH-531** **Black Experience in America**  
**Registration #0507-531**

Examines the history of Blacks in America, treating the subject primarily from a social and cultural perspective. Studies the impact of Whites on Black Americans and describes the contribution of Blacks to the development of the United States.

Class 3, Credit 4 (offered annually)

**GSHH-532** **Civil Liberties in American History**  
**Registration #0507-532**

The course will teach the history of civil liberties in America. Emphasis will be placed on the current state of civil liberties. Students will make philosophical as well as historical analyses of cases.

Class 3, Credit 4 (offered annually)

**GSHH-536** **History of Mexico**  
**Registration #0507-536**

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)

**GSHH-538** **Social Justice and the Constitution**  
**Registration #0507-538** **In American History**

The course will analyze how well the constitution has met the social and political expectations of citizens. Emphasis will be placed on analyzing Supreme Court cases that explain the current state of social justice. This is a companion course to GSHH-532, Civil Liberties in American History.

Class 3, Credit 4 (offered annually)

**GSHH-540** **Selected Problems in Black History**  
**Registration #0507-540**

A seminar approach to the thought of key black leaders (Washington, Garvey, King) and the study of the civil rights and black power movements.

Class 3, Credit 4 (offered occasionally)

**GSHH-541** **Modern Germany**  
**Registration #0507-541**

A study of Germany in the 19th and 20th centuries. 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 these three "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:**  
**Registration #0507-553** **Patterns in Recent American History 1945 to the Present**

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 collectivization, the terror and purges, the process of de-stalinization under Khrushchev 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 revival of the western culture and heritage.

Class 3, Credit 4 (offered occasionally)

**GSHH-557 Communism, Fascism & Democracy in their Theoretical Foundations**

A political and historical appraisal of these philosophies. Emphasis is placed upon the claims they make with regard to the individual and the state, and the changes they demand for the future.

Class 3, Credit 4 (offered occasionally)

**GSHN-211 Science, Technology and Values****Registration #0508-211**

This course explores the concepts and effects of science and technology in society, analyzes the relationship between science and technology, examines how each has come to play a major role today, and looks at how science and technology have been affected by our values. Science and technology are often assumed to be value free, yet people, guided by individual and societal values, develop the science and technology. In turn, the choices people make among the opportunities provided by science and technology are guided by their individual values.

Class 3, Credit 4 (offered quarterly)

**GSHN-440 History of Science****Registration #0508-440**

This course presents a study of the origins, nature, and development of Western science, and its social, economic, and cultural context. This course is part of the Social Impacts of Science and Technology Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

**GSHN-441 Science and Technology Policy****Registration #0508-441**

This course will examine how local, state, Federal, and international policies are developed to influence innovation, the transfer of technology, and industrial productivity in the United States and other selected nations. This course is part of the Social Impacts of Science and Technology Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

**GSHN-442 History of American Technology****Registration #0508-442**

This course presents an examination of the cultural context of American technology and its influence on American social, economic, political, and cultural institutions. This course is part of the Social Impacts of Science and Technology Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

**GSHN-443 Face of the Land****Registration #0508-443**

This course is a case study in the relationship of technology and society, focusing on the interaction of land, people and technology. By considering the natural landforms of the United States and other countries as appropriate, students will see how the nature of land determines its value. As technological innovations are made and introduced, old relationships with the land are altered, sometimes irreversibly. Through this study students have a concrete example of the positive and negative effects of technology on the social structure. This course is part of the Social Impacts of Science and Technology Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

**GSHN-444 Social Consequences of Technology****Registration #0508-444**

Modern society is increasingly based on technology. With each advance due to technology, unanticipated problems are also introduced. Society must define and solve these problems or the advances may be diluted or lost. In this course we will study several interactions between technology and the world in which we live. We will investigate how various technologies developed and compare the expected effects of the new technologies with the actual results. This course is part of the Social Impacts of Science and Technology and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

**GSHN-481 Man, Nature and Technology****Registration #0508-481**

This course seeks to make students aware of the environmental consequences of modern technology by investigating to what degree various technological systems conflict with the basic ecological principles. This course is part of the Environmental Studies Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

**GSHN-482 Energy and the Environment****Registration #0508-482**

In this course we will look at the current situation, its environmental implications, and try to determine how we got here, why we got here, and where we may be able to go in the next 20-50 years. We will look at the nature, uses, and relative importance of our sources of energy system; high technology and low or appropriate technology, hard energy paths and soft energy paths. We will look especially at the role of government policy in the energy area. This course is part of the Environmental Studies Concentration and may not be taken as an elective.

Class 3, Credit 4 (offered annually)

**GSHN-483 Environmental Values****Registration #0508-483**

We seek to identify, interpret, and trace the values associated with concern for the environment, and the factors that induced change in these values. Concern with the environment is not a new concept; its history reaches to ancient times, but the values related to this concern have drastically changed. Understanding environmental values helps one become a better prepared participant in the environmental decision making. This course is part of the Environmental Studies concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

**GSHN-484 Environmental Legislation, Regulation, and Enforcement**

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 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-S07 Community Energy Planning****Registration #0508-507**

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)

**GSHP-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 Philosophy of Science****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 those "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-501 Anthropological Research Methods: Explorations In Subcultural Diversity****Registration #0510-501**

This course is designed to expose students from a variety of backgrounds to an alternative means of understanding human behavior through the methods of the cultural anthropologist and to demonstrate that variations in cultural patterning exist in our presumably homogenous society. The primary emphasis in the course will be 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)

**GSSA-502 American Culture: The Archaeology of Us****Registration #0510-502**

American history and contemporary American society are examined through the only unexpurgated record of our behavior, the material remains. This course illustrates how the techniques of archaeology can throw new light on the lives of our Pilgrim forebearers, the founding fathers, on slaves and free blacks, on the American industrial revolution, and even on the contemporary middle-class of a city like Tucson, Arizona.

Class 3, Credit 4 (offered annually)

**GSSA-503 Culture in Crisis****Registration #0510-503**

The Chinese proverb "may you be cursed to live in interesting times" sets the tone for this course. Change in all subsystems of human culture is the hallmark of the 20th century. The stress and strain that accompany change challenge every traditional way of life in the world today. From peasant revolutions and millenarian movements, to the feminist activism of the past generation, causes and consequences are explored in historical and cross-cultural perspective. (0510-210 or permission of instructor)

Class 3, Credit 4 (offered annually)

**GS5A-504 American Culture: The Anthropology of Us**  
**Registration #0510-504**

Call them Nacirema, American backward. This course takes an anthropologist's eye view of the "Nacirema" way of life now, what they say and think about themselves, and how they actually act, their myth, ritual, music, humor, religion, class structure, regional subcultures, and ethnic groups. (0510-210 or permission of instructor)

Class 3, Credit 4 (offered annually)

**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 economizing 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 the 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. Potential topics are labor force participation, economics of employment discrimination, primary and secondary education, higher education, distribution of income and wealth, poverty and income maintenance, manpower planning, and microeconomic analysis of the work/leisure decision. 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 macroeconomics effects of trade on domestic economics, and the effects of domestic business fluctuations on international trade and finance of each country. Though the course is basically a theory course in economics, the applied aspects of international trade and finance are emphasized. This course is part of the Economics Concentration and may also be taken as an elective. (0511-210 or 0511-301 & 0511-302 or equivalent)

Class 3, Credit 4 (offered annually)

**GSSE-443 Current American Macroeconomic Problems**  
**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 incomes policies, wage-price controls. This course is part of the Economics Concentration and may also be taken as an elective. (0511-210 or 0511-301 & 0511-302 or equivalent)

Class 3, Credit 4 (offered annually)

**GSSE-444 Public Finance**  
**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. (0511-201 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. Through the analysis of some economic models and their application to real world situations, it is shown that the social, political, and individual equality of women depends, to a great extent, on their economic role in family and society. This course is part of the Women's Studies Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

**GSSE-481 Environmental Economics**  
**Registration #0511-481**

The course will examine the relationship and apparent conflict between economic growth and environmental quality, the economics of environmental issues and policy, the environment as a resource and a public good, and the ability and lack of ability of free markets and the government to deal adequately with pollution and other environmental problems. This course is part of the Environmental Studies Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

**GSSE-520 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-521 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-522 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-523 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 includes consideration of monetary theory, the development and current characteristics of monetary institutions in the American economy, and the use of the tools of monetary analysis to evaluate alternative monetary policies. The course will conclude with an evaluation of the neo-Keynesian and Monetarist positions. (0511-210 or 0511-301 or equivalent)

Class 3, Credit 4 (offered occasionally)

**GSSE524 Industrial Organization****Registration #0511-524**

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)

**GSSE-525 Economics of the Less Developed Countries****Registration #0511-525**

This course introduces the students to the economic problems of the less developed countries (LDC). Students study the historical causes of underdevelopment, the development gap between developed and underdeveloped countries, and the theories and policies aimed at accelerating the rate of growth in LDC. In addition, the role of international organizations in the economic development of LDC is discussed. (0511-210 or 0511-301 or equivalent)

Class 3, Credit 4 (offered occasionally)

**GSSE-526 Research Methods for Economics****Registration #0511-526**

This course develops the skills used by the applied economist in computer-based research. Exercises and research projects for the course will be chosen to illustrate the kind of problems actually dealt with by the contemporary applied economist. (0511-302, 0601-210, 0106-352)

Class 3, Credit 4 (offered occasionally)

**GSSE-527 Seminar in Applied Economics****Registration #0511-527**

A senior-level case course emphasizing applications of economic analysis and quantitative methods to economic decision-making. Cases will be drawn from both the private and public sector of the economy, (limited to B.S. in Economics degree seniors)

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-440 international Relations****Registration #0513-440**

This course critically analyzes the structure and principles of the international system with emphasis on the tensions between the imperatives of power politics and the requirements of law and justice. 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-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 primary emphasis will be the study of the U.S. Congress, but some attention will also be directed to state legislatures. Topics to be studied include elections, party organization, committees, interest group activities, and executive-legislative relations. This course is part of the American Politics Concentration and may also be taken as an elective. (0513-211 or 0513-215 or equivalent)

Class 3, Credit 4 (offered annually)

**GSSM-452 The American Presidency****Registration #0513-452**

This course is a study of the role of the presidency in the American Political System. Among the topics to be considered are: the nomination and election process, evolution, expansion and limitation of presidential powers, factors in decision making, and the various leadership functions performed by the American Presidency. This course is part of the American Politics Concentration and may also be taken as an elective. (0513-211 or 0513-215 or equivalent)

Class 3, Credit 4 (offered annually)

**GSSM-453 American Foreign Policy****Registration #0513-453**

A study of the formulation and execution of American foreign policy, including the examination of the instruments, procedures and philosophies shaping the development and implementation of foreign policy. This course is part of the American Politics Concentration and may also be taken as an elective. (0513-211 or 0513-215 or equivalent)

Class 3, Credit 4 (offered annually)

**GSSM-504 Twentieth Century America****Registration #0513-504**

An examination of the major political, social, and economic developments affecting the United States in the 20th century. Emphasis will be placed upon the reactions of the various presidential administrations to conditions in both the domestic and foreign fields.

Class 3, Credit 4 (offered annually)

**GSSM-510 Comparative 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 Democracies, Communist or Third World. Particular attention is paid to the governmental structure, current leadership, and major issues of public policy of those selected political systems under review.

Class 3, Credit 4 (offered annually)

**GSSM-514 Theories of Political Systems****Registration #0513-514**

An examination of the basic questions in political theory, a survey of the major political philosophers, and an inquiry into the major political ideologies.

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)

**GSSM-524 The Judicial Process****Registration #0513-524**

This course examines the structure and function of the state and federal courts in the American political system.

Class 3, Credit 4 (offered annually)

**GSSM-525 Politics and Public Policy****Registration #0513-525**

This is a course in the politics of the policy process. The basic questions of the course are: How do public problems get to the agenda of government? How does government formulate policy alternatives? How does government legitimate public policy? How does government implement public policy? How does government evaluate public policy?

Class 3, Credit 4 (offered occasionally)

**GSSP-210 Introduction to Psychology****Registration #0514-210**

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)

**GSSP-440 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 the individual 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**

This 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-480 Psychology of Women****Registration #0514-480**

This course examines the relevance and applicability of present psychological theory and research to the understanding of the development and behavior of women. Major topics covered include: psychological and biological sex differences, psychological theories of women's development, the relationship between female personality development and various sociocultural factors, women's place in society, women and their bodies, and women and mental health. This course is part of the Women's Studies Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

**GSSP-483 Social Psychology of Religion****Registration #0514-483**

This course examines religions as cultures which, like other "ways of life," face the task of attracting or creating new members, maintaining their loyalty, providing them with a coherent world view and satisfying their basic needs. It will examine the way religions use education, ritual, rewards, punishment, symbols and other mechanisms of social control and cohesion 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 information, 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 draw 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 under 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**

The 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 every-day 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)

**GSSP-519 Psychology of Altered States of Consciousness****Registration #0514-519**

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)

**GSSP-520 Psychology of Creativity****Registration #0514-520**

A psychological investigation of the creative process and creative individuals with a focus on techniques which stimulate creativity. (0514-210 or equivalent)

Class 3, Credit 4 (offered occasionally)

**GSSP-521 Psychology and Politics****Registration #0514-521**

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 occasionally)

**GSSP-522 Psychology of Art****Registration #0514-522**

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 occasionally)

**GSSS-210 General Sociology****Registration #0515-210**

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)

**GSSS-440 Contemporary American Social System****Registration #0515-440**

Capitalizing on sociological theory and research, this 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 are 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 or instructor's permission)

Class 3, Credit 4 (offered annually)

**GSSS-441 The Changing American Family****Registration #0515-441**

This sociology course examines contemporary patterns in the courtship, marital and family systems of the United States with special reference to gender role definitions, participation in the workplace and variations in social class. This course is part of the American Society in the Transition Concentration and may also be taken as an elective. (0515-210 or 0510-210)

Class 3, Credit 4 (offered annually)

**GSSS-442 The Urban Experience****Registration #0515-442**

This sociology course analyzes social and spatial characteristics of cities and considers reasons for urban development, ecological factors, types and networks of settlements, and urbanism as a way of life. It also examines the issues of neighborhoods, subareas, "ghetto" enclaves, metropolitan regions, urban social and political structures, problems, services, and regions, urban social and political structures, problems, services and planning. This course is part of the American Society in Transition Concentration and may also be taken as an elective. (0515-210 or 0510-210)

Class 3, Credit 4 (offered annually)

**GSSS-443 Work and Society****Registration #0515-443**

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 or instructor's permission)

Class 3, Credit 4 (offered annually)



# College of Science

## Biology

### SBIB-201 General Biology

#### Registration #1001-201

Characteristics and origin of life; basic principles of modern cellular biology including cell organelle structure; physiological processes of gas exchange, internal transport, and osmoregulation and excretion.

Class 3, Credit 3 (F)

### SBIB-202 General Biology

#### 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 General Biology

#### Registration #1001-203

A study of cellular and organismal reproduction, the principles of genetics and developmental biology, introduction to evolution and ecology.

Class 3, Credit 3 (S)

### SBIB-205, 206, 207 General Biology Laboratory

#### 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. (Corequisite SBIB-201, 202, 203)

Lab. 3, Credit 1 (F-205, W-206, S-207)

### SBIB-250 introduction to Biotechnology

#### Registration #1001-250

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 Invertebrate Zoology

#### 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 (offered upon sufficient request)

### SBIB-302 Vertebrate Zoology

#### Registration #1001-302

Morphology, physiology, behavior, classification, and ecology of chordates. (One year of general biology)

Class 3, Lab. 3, Credit 4 (offered upon sufficient request)

### SBIB-303 Comparative Vertebrate Anatomy

#### Registration #1001-303

A comparative study of the organ systems of representative members of the vertebrates with emphasis on structural changes which occur during evolution. (One year of general biology)

Class 3, Lab. 3, Credit 4 (offered upon sufficient request)

### SBIB-304 Botany

#### 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 Physiology and Anatomy

#### Registration #1001-305

An integrated approach to the structure and function of the nervous, endocrine, integumentary, muscular and skeletal systems. Laboratory exercises include histological examination, anatomical dissections and physiology experiments with human subjects. (One year of general biology, SCHG-217 or permission of instructor)

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

### SBIB-306 Physiology and Anatomy

#### Registration #1001-306

An integrated approach to the structure and function of the gastrointestinal, cardiovascular, immunological, respiratory, excretory and reproductive systems with an emphasis on the maintenance of homeostasis. Laboratory exercises include histological examinations, anatomical dissections and physiological experiments using human subjects. (SBIB-305 or permission of the instructor)

Class 3, Lab. 3, Credit 4 (S)

### SBIB-310 Plant Physiology

#### Registration #1001-310

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)

Class 3, Lab. 3, Credit 4 (S)

### SBIB-320 Histology

#### Registration #1001-320

Detailed studies on the structure and function of normal human tissues. (One year of general biology)

Class 3, Lab. 3, Credit 4 (offered upon sufficient request)

### SBIB-330 Small Animal Laboratory Techniques

#### Registration #1001-330

A course designed to prepare the student for small animal handling, biological administrations and preparations, minor surgery and autopsies. (3rd, 4th, 5th year status and permission of the instructor)

Class 1, Lab. 3, Credit 3 (F, S)

### SBIB-340 General Ecology

#### Registration #1001-340

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)

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

### SBIB-350 Molecular Biology

#### Registration #1001-350

The study of the structure, function, and organization of proteins, nucleic acids and other biological macromolecules. (One year of general biology)

Class 3, Lab. 3, Credit 4 (S)

### SBIB-360 Horticulture

#### Registration #1001-360

A basic introduction to horticulture with a study of the interconnections of plants, gardens and their environment and discussion relating to applications of principles to indoor and outdoor gardening, (co-requisite 1001-361)

Class 3, Credit 3 (offered upon sufficient request)

### SBIB-361 Horticulture Laboratory

#### Registration #1001-361

Experiments relating to the basic principles of horticulture, (co-requisite 1001-360)

Lab. 3, Credit 1 (offered upon sufficient request)

### SBIB-402 Immunology

#### Registration #1001-402

Investigation of the basic concepts of immunology (antigens, antibodies, immunologic specificity, antibody synthesis, and cell-mediated immunity) and the applications of immunology to infectious diseases, allergic reactions, transplantations, tumors, autoimmune diseases, immunosuppression and tolerance. (One year of general biology, one quarter of organic chemistry)

Class 3, Credit 3 (F, W)

### SIBI-403 Cell Physiology

#### Registration #1001-403

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)

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

**SBIB-404** **Introductory Microbiology****Registration #1001-404**

Principles of anatomy, biochemistry, genetics, taxonomy, ecology of viruses, bacteria, molds, algae and protozoa. Useful and harmful activities. Basic laboratory techniques, microscopy, staining, counting, identifying. (One year of general biology, one year of organic chemistry)

Class 3, Lab. 4, Credit 5 (F, W)

**SBIB-406** **Virology****Registration #1001-406**

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)

Class 4, Credit 4 (F) (offered upon sufficient request)

**SBIB-407** **Microbial and Viral Genetics****Registration #1001-407**

The study of the molecular genetics of bacteria, bacteriophages, fungi, and eucaryotic viruses. (SBIB-350, SBIB-421, SCHO-334)

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

**SBIB-412** **Parasitology****Registration #1001-412**

Ecology, structure, life cycle metabolism, pathology and control of human parasites. Insects, protozoa, nematodes, flukes and tapeworms of medical importance. Chemotherapy and immunology of human parasites. Emphasis on recognizing human parasites.

Class 3, Lab. 3, Credit 4 (S) (offered upon sufficient request)

**SBIB-413** **Comparative Animal Physiology****Registration #1001-413**

A comparative study of the physiological mechanisms of the animal kingdom. An interpretation of the physiological variations in terms of evolutionary significance, morphological variation and ecological conditions. (One year of general biology, one year of organic chemistry)

Class 3, Lab 3, Credit 4 (offered upon sufficient request)

**SBIB-417** **Industrial Microbiology****Registration #1001-417**

Use of yeasts, molds, and bacteria for fermentations of economic importance. Industrial aspects of strain selection, cultivation, assay, production and recovery of fermentation products. Microbiology, biochemistry, chemistry and engineering aspects. (SBIB-404, SCHO-334)

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

**SBIB-420** **Plant Ecology****Registration #1001-420**

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)

Class 3, Lab. 3, Credit 4 (offered upon sufficient request)

**SBIB-421** **Genetics****Registration #1001-421**

Introduction to the principles of inheritance; the study of genes and chromosomes at molecular, cellular, organismal, and population levels. (SBIB-404)

Class 3, Lab. 3, Credit 4 (S)

**SBIB-422** **Developmental Biology****Registration #1001-422**

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)

Class 2, Lab. 3\*, Credit 4 (offered upon sufficient request)

**SBIB-430** **Radiation Biology****Registration #1001-430**

Effects of radiation upon living tissue, both harmful and beneficial. Morphological changes, genetic effects, and pathological changes in both plant and animal tissues. Use of radioisotopes in plant and animal research. (Minimum of 20 credits in biological science)

Class 2, Lab. 6, Credit 4 (F)

**SBIB-431** **Histological Techniques****Registration #1001-431**

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)

Class 1, Lab. 4, Credit 3 (offered upon sufficient request)

**SBIB-442** **Hybridoma Techniques****Registration #1001-442**

Designed to acquaint each student with the basic methods employed in the production of hybridoma cell lines and monoclonal antibodies. To include preparation of viable cell suspensions, cell culture fusion techniques, cloning, and monoclonal antibody production and characterization. (SBIB-445, one quarter of organic chemistry) Corequisite SBIB-402

Lab. 3, Credit 1 (W)

**SBIB-445** **Tissue Culture****Registration #1001-445**

Study of the techniques and applications of culturing cells, tissues, and organs *in vitro*. Emphasis on mammalian systems. (One year of general biology)

Class 2, Lab. 3, Credit 3 (F)

**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 effect 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 (offered upon sufficient request)

**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 (offered upon sufficient request)

**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 (S)

**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 results are presented in written and oral formats. (Third-year status with a GPA of 2.5 in science and mathematics courses, and consent of faculty)

Class variable, Credit variable (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, (W, S)

**SBIB-559** **Special Topics - Biology**  
**Registration #1001-559**

Advanced courses which are of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary course and have specified prerequisites, contact hours and examination procedures.

Class variable, Credit variable (offered upon sufficient request)

**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 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 therapeutic chemicals 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 (offered upon sufficient request)

**SBIB-740** **General Toxicology**  
**Registration #1001-740**

The study of the science of poisons (the harmful actions of chemicals on biologic tissue) through the examination of biological and chemical mechanisms, their implications for biological systems, and detection. (Physiology, Anatomy, Organic Chemistry or permission of the instructor. Genetics recommended. Laboratory a corequisite for biology majors)

Class 3, Credit 3 (offered upon sufficient request)

**SBIB-741** **General Toxicology Laboratory**  
**Registration #1001-741**

Laboratory work to accompany the lectures in General Toxicology. (Corequisite SBIB-740)

Lab. 3, Credit 1 (offered upon sufficient request)

**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 biodynamic and biomechanical characteristics of organ systems as well as cardiovascular and respiratory physiology.

Class 3, Credit 3, or class 3, Rec. 1, Credit 4 (W)

**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 emphasized 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 culturing, handling and identification of microorganisms with special emphasis on the relationship of bacteria to food handling and preservation, the production of food products by bacteria, and the prevention of food-borne diseases. (Corequisite SBIG-210)

Lab. 3, Credit 1 (F)

**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 #1004-232**

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, bioethics.

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. (SBIB-203 or equivalent)

Class 2, Credit 2 (W)

# Chemistry

## SCHA-261 Introduction to Chemical Analysis I Registration #1008-261

An introduction to quantitative analysis: solubility of ionic compounds and the equilibria involved; activity concepts; statistical treatment of data. Laboratory experiments include gravimetric and precipitation methods. SCHC-251 is a corequisite.

Class 2, Lab. 5, Credit 3 (offered every year) (F)

## SCHA-262 Introduction to Chemical Analysis II Registration #1008-262

Systematic treatment of acid-base equilibria, titrations, analytical oxidation-reduction processes; complexometric methods. SCHC-252 is a corequisite. (SCHA-261)

Class 2, Lab. 5, Credit 3 (offered every year) (W)

## SCHA-263 Introduction to Chemical Analysis III Registration #1008-263

Introduction to electrochemical and spectroscopic methods, potentiometric and spectrometric titrations. Electrodeposition and pH measurements included in lab. SCHC-253 is a corequisite. (SCHA-262)

Class 2, Lab. 5, Credit 3 (offered every year) (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. (SCHC-253)

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

## SCHA-312 Analytical Chemistry-Separations Registration #1008-312

Inorganic and organic separations; Raoult's and Henry's Laws; phase rules; distillation; extraction; absorption and surface effects; chromatography including gas, liquid, column, paper, thin layer, and ion exchange. SCHA-319 is a corequisite. (SCHC-253)

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. (SCHC-253)

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 (HPLC, thin layer, paper, ion exchange, gas, gel filtration). Laboratory report writing is emphasized. SCHA-312 is a corequisite. (SCHC-253)

Lab. 4, Credit 1 (offered every year) (S, SR)

## SCHB-334 Biochemistry Registration #1009-334

Introduction to biological chemistry. An in-depth survey of the molecular organization, physiological functions and bio-energetics principles of the molecular components of cells; amino acids, proteins, enzymes, carbohydrates, lipids, and nucleic acids. Emphasis is on the structure-function relationships, solution behavior, and metabolism of biomolecules. (SCHO-233)

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

## SCHC-200 Chemical Safety Registration #1010-200

Discussion and demonstration of protective devices and equipment techniques for safely handling chemicals, glassware, and performing chemical reactions. Emphasis on flammable solvents, explosives, cryogenics and toxic materials; radiation hazards; storage of chemicals; waste disposal.

Class 1, Credit 1 (offered every year) (F)

## SCHC-230 Introduction to Co-op Seminar

### Registration #1010-230

Exploration of co-operative education opportunities; practice in writing letters of application; resume writing, and interviewing procedures.

Class 1, Credit 1 (offered every year) (F, W)

## SCHC-251 General Chemistry I Registration #1010-251

A detailed study of fundamental tools of chemistry; atomic theory and nuclear chemistry; stoichiometry (elements, compounds, reactions); properties of gases and thermochemistry (First Law). SCHA-261 is a corequisite.

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

## SCHC-252 General Chemistry II Registration #1010-252

Structure and properties of the atom; periodic relationships; basic concepts of chemical bonding, kinetics, and equilibrium; thermodynamics (free energy, Second and Third Laws). SCHA-262 is a corequisite. (SCHC-251)

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

## SCHC-253 General Chemistry III Registration #1010-253

Oxidation-reduction and electrochemistry; descriptive chemistry of selected elements; properties of liquids and solids; chemical bonding theories; transition elements and coordination chemistry; introduction to organic chemistry, biochemistry and polymers; introduction to the use of chemical literature. SCHA-263 is a corequisite. (SCHC-252)

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

## SCHC-401 Chemical Literature Registration #1010-401

Instruction will be given on the use of chemical literature resources such as Chemical Abstracts, Science Citation Index, Beilstein, etc., as well as an introduction to computer-based information retrieval. Research presentations will be given by faculty; students will be expected to prepare written and oral documentation regarding the use of chemical literature. (SCHO-433, SCHP-442; may be taken concurrently).

Class 2, Credit 2 (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 with no previous background in chemistry. Fundamentals of matter and energy, the atomic theory, chemical structure and bonding, ionic species and solutions, and acid-base chemistry are covered. SCHG-221 is a corequisite.

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 for an understanding of biological molecules, biochemistry, and the basics of polymer chemistry. Topics covered include alkanes, alkenes, aromatics, alcohols, ethers, aldehydes, ketones, carboxylic acids and derivatives, amines, and addition and condensation polymers. SCHG-222 is a corequisite. (SCHG-201 or equivalent)

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

**SCHG-203** **Biochemistry****Registration #1011-203**

Structure and reactions of the major classes of biomolecules are studied. Topics include amino acids and proteins, lipids, carbohydrates and nucleic acids. (SCHG-202 or equivalent)

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

**SCHG-204** **Biochemistry****Registration #1011-204**

The fundamentals of the metabolism of major classes of biomolecules are covered. Topics include biochemical energetics, the metabolism of carbohydrates, lipids and proteins, and the functions of nucleic acids. (SCHG-203 or equivalent)

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

**SCHG-205, 206, 207** **Chemical Principles Laboratory****Registration #1011-205, -206, -207**

A laboratory course for photoscience and science majors and others who are taking General Chemistry (SCHG-211, 212) and introduction to Organic Chemistry (SCHG-213) 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** **College Chemistry I****Registration #1011-208**

Primarily for, but not limited to, engineering students. Topics include an introduction to some basic concepts in chemistry, stoichiometry, first law of thermodynamics, thermochemistry, electronic theory of composition and structure, chemical bonding.

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

**SCHG-209** **College Chemistry II****Registration #1011-209**

A continuation of SCHG-208. Topics include chemical equilibrium, properties of acids and bases, aqueous equilibria, free energy, entropy and equilibrium, electrochemistry, nuclear chemistry and the chemistry of metals. (SCHG-208)

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

**SCHG-211, 212** **General Chemistry****Registration #1011-211, 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. SCHG-205, -206 laboratory is a corequisite.

Class 3, Credit 3 (offered every year) (211-F, 212-W)

**SCHG-213** **Introduction to Organic Chemistry****Registration #1011-213**

Introduction to the structure and reactivities of organic molecules for physical science majors. An overview of the structure, nomenclature, bonding, and reactivities of major functional groups. Special topics will include spectroscopy, organometallics, polymers, and biomolecules. SCHG-207 is a corequisite. (SCHG-212)

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

**SCHG-221** **General Chemistry Laboratory****Registration #1011-221**

Laboratory course to accompany SCHG-201. Emphasis on introduction to methods of chemical analysis, qualitative and quantitative techniques.

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

**SCHG-222** **Organic Chemistry Laboratory****Registration #1011-222**

Laboratory course to accompany SCHG-202. Emphasis is on representative examples of typical organic techniques and synthesis. (SCHG-221 or equivalent)

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

**SCHG-215** **General & Analytical Chemistry****Registration #1011-215**

General chemistry for students in biology, medical technology and the life sciences. Introduction to chemical symbols, formulas, equations, stoichiometry, atomic structure, chemical periodicity and bonding. Emphasis is on an early introduction to solutions, concentrations, acid-base and precipitation reactions; analytical chemistry problem-solving applications are stressed. (SCHG-225 is a corequisite.)

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

**SCHG-216** **General & Analytical Chemistry****Registration #1011-216**

Introduction to quantitative gravimetric analysis, oxidation-reduction, nomenclature, chemical equilibrium and equilibria in aqueous solutions. Particular emphasis on solution equilibria including weak acids, bases, buffers, hydrolysis, pH titrations and heterogeneous equilibria. SCHG-226 is a corequisite. (SCHG-215)

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

**SCHG-217** **General & Analytical Chemistry****Registration #1011-217**

The concepts of polyprotic equilibria, spectrophotometry instrumentation and analyses, electrochemistry, nuclear chemistry and chemical kinetics are presented with an emphasis on the analytical applications of these principles to the life sciences. SCHG-227 is a corequisite. (SCHG-216)

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

**SCHG-225, -226, -227** **General & Analytical Chemistry****Registration #1011-225, -226, -227**

Laboratory sequence to accompany SCHG-215, -216, -217. Experiments in inorganic chemistry, separation techniques, classical titration and gravimetric analysis, and quantitative instrumental analysis including UV-visible spectrophotometry, atomic absorption, gas chromatography, and potentiometry.

(225-F, Lab. 3, Credit 1)

(226-W, Lab. 3, Credit 1)

(227-S, Lab. 6, Credit 2)

(offered every year)

**SCHG-271** **Chemistry of Water****Registration #1011-271**

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

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

**SCHG-272** **Chemistry of Water****Registration #1011-272**

Chemistry of organics, metals, construction materials, radioactive and other environmental pollutants, and other substances related to 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 #1011-275**

Laboratory to be taken concurrently with SCHG-217. General chemistry and volumetric techniques will be covered.

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

**SCHG-276** **Chemistry of Water Lab****Registration #1011-276**

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 #1011-281, 282, 283**  
 For printing students. Aspects of general chemistry of widest applicability to graphic arts technology; first quarter includes definitions of terms, basic concepts and laws; second quarter devoted to properties of solutions and organic materials; third quarter deals with applications in ink, paper, photolithographic processes and other topics as time allows. 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 #1011-285, -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 #1011-289\***  
 This course examines a broad range of contemporary scientific topics with a chemical basis. These include nuclear power, alternative energy sources, nuclear wastes and nuclear safety. The biological effects of radiation, nuclear medicine, recombinant DNA, and medicinal drugs are also covered. Class 4, Credit 4 (F, W, S)
- SCHO-231, -232** **Organic Chemistry**  
**Registration #1013-231, -232**  
 Survey of the structure names, reactions, and synthesis of the major functional groups. Mechanisms of main classes of reactions are discussed. (SCHG-216, or SCHG-212, or SCHG-209) Class 3, Credit 3 (offered every year) (231-F, 232-W)
- SCHO-233** **Organic Chemistry**  
**Registration #1013-233**  
 Structure, nomenclature, reactions, and properties of the important classes of bio-organic molecules (carbohydrates, lipids, amino acids, proteins, and nucleic acids) are covered in depth. Emphasis is on structure and reactivity in relation to biochemical processes. (SCHO-232) Class 3, Credit 3 (offered every year) (S)
- SCHO-235, 236, 237** **Organic Chemistry Lab**  
**Registration #1013-235, -236, -237**  
 Laboratory work emphasizes techniques, preparations, and analyses. SCHO-237 emphasizes reactions and properties of biomonomers and polymers. To be taken concurrently with SCHO-231, -232, -233. Lab. 3, Credit 1 (offered every year) (235-F, 236-W, 237-S)
- SCHO-431** **Organic Chemistry I**  
**Registration #1013-431**  
 A rigorous survey of the reactions of major organic functional groups, emphasizing alkanes, alkenes, alkyl halides, and alkynes. Stereochemistry is also included. SCHO-435 is a corequisite. (SCHC-253) Class 3, Credit 3 (offered every year) (S, SR)
- SCHO-432** **Organic Chemistry II**  
**Registration #1013-432**  
 A continued survey of reactions of major organic functional groups, including aromatic compounds, alcohols, ethers, aldehydes, and ketones. Organometallics and spectral analysis (IR, UV, NMR) are also included. SCHO-436 is a corequisite. (SCHO-431) Class 3, Credit 3 (offered every year) (F, W)
- SCHO-433** **Organic Chemistry III**  
**Registration #1013-433**  
 A continued survey of reactions of major organic functional groups, including carboxylic acids, carboxylic acid derivatives, amines, and enolate anions. Structure, nomenclature, reactions, and properties of important classes of bio-organic molecules are also included. SCHO-437 is a corequisite. (SCHO-432) Class 3, Credit 3 (offered every year) (S, SR)
- SCHO-435, 436** **Preparative Organic Chemistry**  
**Registration #1013-435, -436**  
 Synthesis of organic compounds utilizing a variety of laboratory techniques. Purification techniques and spectral characterization will be routinely used. (SCHC-253) (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 #1013-437**  
 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 #1014-340**  
 Properties of gases, kinetic theory of gases, energy and the first law; thermochemistry; entropy and the second and third laws; introduction to Helmholtz and Gibbs free energy, gas equilibrium (SCHC-253, SMAM-252, SPSP-311 concurrent) Class 3, Credit 3 (offered every year) (F, W)
- SCHP-441** **Physical Chemistry I**  
**Registration #1014-441**  
 Review of the thermodynamic laws; criteria for equilibrium and spontaneity; chemical equilibrium; phase rule; equilibrium in ideal and non-ideal solutions; electrochemistry. SCHP-445 should be taken concurrently. (SCHP-340) Class 3, Credit 3 (offered every year) (S, SR)
- SCHP-442** **Physical Chemistry II**  
**Registration #1014-442**  
 Introduction to quantum mechanics and spectroscopy, radioactivity; Planck's law; photoelectric effect; the Bohr atom; DeBroglie, Schrodinger, and Heisenberg theories; eigenvalue/eigenfunction equations; variation and perturbation theory; quantum statics; Heitler-London theory of covalent bonds; selection rules and spectroscopy. SCHP-446 should be taken concurrently (SMAM-306 and SCHP-441) Class 3, Credit 3 (offered every year) (F, W)
- SCHP-443** **Physical Chemistry III**  
**Registration #1014-443**  
 Kinetic molecular theory; transport properties of gases; chemical kinetics; surface chemistry; photochemical kinetics; irreversible processes in solution. SCHP-447 should be taken concurrently. (SCHP-441) Class 3, Credit 3 (offered every year) (S, SR)
- SCHP-445** **Physical Chemistry Laboratory I**  
**Registration #1014-445**  
 Introduction to physical chemistry laboratory; chemical thermodynamics and equilibrium (SCHP-441 should be taken concurrently). Lab. 3, Credit 1 (offered every year) (S, SR)
- SCHP-446** **Physical Chemistry Laboratory II**  
**Registration #1014-446**  
 Experiments in the application of quantum chemistry; atomic and molecular spectroscopy, and in radioactivity measurements. (SCHP-442 should be taken concurrently) Lab. 3, Credit 1 (offered every year) (F, W)
- SCHP-447** **Physical Chemistry Laboratory III**  
**Registration #1014-447**  
 Laboratory experiments in chemical dynamics. (SCHP-443 should be taken concurrently) Lab. 3, Credit 1 (offered every year) (S, SR)
- SCHT-243** **Chem Tec III (Organic)**  
**Registration #1015-243**  
 Techniques of handling organic compounds; recrystallization and melting points, distillation, extraction. Refractive index and optical activity. Reactions of functional group classes. Infra-red spectrophotometry. (SCHT-242) Class 3, Lab. 9, Credit 6 (offered every year) (SR, F)
- SCHT-244** **Chem Tec IV (Organic)**  
**Registration #1015-244**  
 Continuation of classes and reactions of organic compounds, synthetic techniques, vacuum distillation, gas chromatography, and NMR spectroscopy. (SCHT-243) Class 3, Lab. 9, Credit 6 (offered every year) (W, S)

**SCHT-305 Chemical Specialty (Spectrometry)****Registration #1015-305**

Quantitative analysis including trace analysis by spectroscopic methods involving visible, ultra-violet, atomic absorption, flame photometric and luminescent instrumentation. Techniques of sample preparation, instrument construction and operation, spectral measurement and interpretation are utilized. (SCHT-244)

Class 2, Lab. 6, Credit 4 (offered every year) (SR, F)

**SCHT-306 Chemistry Specialty****Registration #1015-306**

The final academic quarter of the Chem Tec curriculum is designed so that students are given the opportunity to develop more definite options as to their own individual goals. The student may elect to branch-off into one of three areas of specialization; advanced instrumental techniques, the development of synthetic techniques in organic chemistry and polymer technology. (SCHT-305)

Class 2, Lab. 6, Credit 4 (offered every year) (W, S)

**SCHT-307,308 Research Familiarization****Registration #1015-307, -308**

A chemical technician does exploratory work following general directions with little or no formal supervision and is often encouraged to innovate after consultation with his or her supervising chemist or engineer. In this context each student will have the opportunity to work alongside one of our faculty or graduate students and perform a number of tasks related to the progress of a research operation. The choice of a faculty supervisor is left to the student. (SCHC-402)

Credit variable (offered every year) (307-F, SR), (308-W, S)

**SCHT-309 Glass blowing Techniques****Registration #1015-309**

This course is designed to introduce and train each student in small scale scientific glassblowing techniques. Proficiency will be developed in rod manipulation, ring seals, construction of apparatus, annealing, use of a simple lathe and hand-torch work.

Lab. 4, Credit 2 (offered every year) (W, S)

## Graduate Courses

**SCHA-711 Instrumental Analysis****Registration #1008-711**

Theory, applications and limitations of selected instrumental methods in qualitative, quantitative, and structural analysis. Topics covered include mass spectroscopy, nuclear magnetic resonance, electrochemistry, surface methods and new analytical methods. (SCHA-312)

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

**SCHA-720 Instrumental Analysis Lab****Registration #1008-720**

Lab accompanying SCHA-711. Experiments include AA, fluorimetry, coulometry,  $^{13}\text{C}$  and  $^1\text{H}$  NMR, polarography. Assignments depend on student background. SCHA-711 is a corequisite.

Lab. 6, Credit 2 (offered every year) (F, W)

**SCHB-702 Biochemistry - Biomolecular Conformation****Registration #1009-702**

Introduction to biological chemistry. Chemical structures, reactions, molecular organization and physiological functions of the molecular components of cells: amino acids, proteins, enzymes, enzyme kinetics, co-enzymes, biochemical thermodynamics, carbohydrates and lipids, membrane structure, and active transport. Emphasis is on the structure-function relationships of biomolecules, their solution behavior and dynamics. (SCHO-433 and SCHP-340 or SCHP-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; metabolic diseases. (SCHB-702)

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

**SCHB-704 Biochemistry—Nucleic Acids****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)

**SCHC-870 Chemistry Seminar****Registration #1010-870**

Credit 1 (offered every year)

**SCHC-879 Research and Thesis Guidance****Registration #1010-879**

Hours and credits to be arranged. Chemical research in a field chosen by the candidate, subject to approval of the department head and advisor.

Credit variable (offered every year)

**SCHC-899 Independent Study—Chemistry****Registration #1010-899**

Credit variable (offered every year)

**SCHI-762 Inorganic Chemistry I: Composition & Structure**

Techniques for determining composition and structure, nomenclature and symbolism of inorganic compounds, modern electronic theories of composition, bonding, geometry, magnetic, electrical, mechanical and spectral properties of inorganic compounds (main group and transition elements). (SCHO-433, SCHP-442)

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

**SCHI-763 Inorganic Chemistry II: Stability & Reactivity**

Acid-base and other classifications of inorganic reactions; thermodynamic and kinetic aspects of controlling inorganic reactivity at both the laboratory and industrial level; nonaqueous solvent systems; use of isoelectronic and pseudoatom concepts in synthesis design. (SCHI-762, SCHP-442)

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

**SCHI-764 Inorganic Chemistry III: Chemical Periodicity**

An integrated survey of descriptive inorganic chemistry (including industrial applications and geochemical origins) based on the periodic table and the structure and reactivity concepts developed in SCHI-762 and SCHI-763. (SCHI-762, -763).

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

**SCHI-765 Preparative Inorganic Chemistry****Registration #1012-765**

Laboratory oriented course designed to illustrate the characterization techniques presented in SCHI-762 and the various synthetic applications of thermodynamics and kinetics presented in SCHI-763. (SCHI-762; SCHI-763 may be taken concurrently)

Class 1, Lab. 6, Credit 3 (offered every year) (F, W)

**SCHO-730 Chemical Toxicology****Registration #1013-730**

Xenobiotic mechanism, chemical carcinogenesis, drug-induced toxicology, environmental and genetic toxicology, teratology and bioassay/biometrics. (SCHO-433)

Class 3, Credit 3 (offered upon sufficient request)

**SCHO-736 Spectrometric Chemical Identification of Organic Compounds**  
**Registration #1013-736**  
 Theory and application of proton and carbon nuclear magnetic resonance, infrared, mass spectrometry, and ultraviolet spectra as applied to organic structure determination. (SCHO-433)  
 Class 3, Credit 3 (offered every year)

**SCHO-737 Advanced Organic Chemistry**  
**Registration #1013-737**  
 Several of the following advanced topics in organic chemistry are covered: polyfunctional compounds, modern synthetic methods, stereochemistry, conformational analysis, free radical reactions, natural products, new synthetic reagents. (SCHO-433)  
 Class 3, Credit 3 (offered every year)

**SCHO-739 Advanced Organic Chemistry**  
**Registration #1013-739**  
 Selected topics in physical organic chemistry including: techniques for elucidation of mechanism (kinetic, linear free energy relationships, isotope effects), molecular orbital theory, electrocyclic reactions. (SCHO-433 and SCHO-443)  
 Class 3, Credit 3 (offered every year)

**SCHO-832 Stereochemistry**  
**Registration #1013-832**  
 Advanced treatment of steric relationships and stereoisomerism in organic compounds. (SCHO-433, SCHO-443)  
 Class 3, Credit 3 (offered upon sufficient request)

**SCHO-833 Heterocyclic Chemistry**  
**Registration #1013-833**  
 The preparation, properties, and reactions of heterocyclic systems, especially heteroaromatic rings. (SCHO-433)  
 Class 3, Credit 3 (offered upon sufficient request)

**SCHO-835 Organic Chemistry of Polymers**  
**Registration #1013-835**  
 Introduction to the chemistry of synthetic, high molecular weight polymers and a survey of their diverse structures and properties. Mechanisms of condensation, free radical and ionic polymerization. (SCHO-433)  
 Class 3, Credit 3 (offered upon sufficient request)

**SCHP-741 Chemical Thermodynamics**  
**Registration #1014-741**  
 A study of the basic fundamentals of thermodynamics and their use in deriving the interrelationships of thermodynamic functions. Thermodynamic properties of gases will be calculated based on spectroscopic data. (SCHP-443 and SMAM-306)  
 Class 3, Credit 3 (offered every year)

**SCHP-742 Survey of Physical Chemistry**  
**Registration #1014-742**  
 A study of the fundamental principles of physical chemistry for clinical chemistry and biotechnology students. Kinetic-molecular theory, quantum mechanics, spectroscopy, thermodynamics and kinetics are presented with applications to the life sciences. This course may also serve as a review of physical chemistry for MS chemistry students. Not acceptable for BS in chemistry.  
 Class 3, Credit 3 (offered upon sufficient request) (W)

**SCHP-743 Chemical Kinetics**  
**Registration #1014-743**  
 Methods of investigating the kinetics of chemical reactions and the theories used to interpret their results. Focus on homogeneous reactions in gas and liquid phases. Discussions of references from recent chemical literature. (SCHP-443)  
 Class 3, Credit 3 (offered alternate years)

**SCHP-744 Quantum Mechanics**  
**Registration #1014-744**  
 Matrix formulation of quantum mechanics; variation 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. (SCHP-442)  
 Class 3, Credit 3 (offered alternate years)

**SCHP-746 Physical Chemistry of Polymers**  
**Registration #1014-746**  
 Study of the theoretical and experimental aspects of polymer characterization. In addition, theoretical considerations of the configuration of polymer chains and statistical thermodynamics of polymer solutions will be related to experimental results. (SCHP-443)  
 Class 3, Credit 3 (offered upon sufficient request)

**SCHP-747 Principles of Magnetic Resonance**  
**Registration #1014-747**  
 A development of the principal ideas of magnetic resonance including the theory of resonance line shapes, magnetic interactions, experimental considerations, and spectral analysis. These concepts are discussed in terms of nuclear magnetic, nuclear quadrupole, and electron spin resonance spectroscopy. (SCHP-443)  
 Class 3, Credit 3 (offered upon sufficient request)

## Mathematics

**SMAM-201, 202, 203 Algebra, Trigonometry and Analytic Geometry**  
**Registration #1016-201, -202, -203**  
 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. (High school algebra and geometry)  
 Class 3, Credit 3 (offered every year) (201-F; 202-W; 203-S)

**SMAM-204 College Algebra and Trigonometry**  
**Registration #1016-204**  
 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. (2 years of high school algebra)  
 Class 4, Credit 4 (offered every year) (F, W, S)

**SMAM-205, 206, 207 Introduction to Mathematics for Computing I, II, III**  
**Registration #1016-205, -206, -207**  
 Topics in discrete mathematics, including logic, sets, relations, functions, combinatorics, graphs and trees, probability and queueing theory, with applications to computer technology.  
 Class 4, Credit 4 (F, S-205; W-206; S-207)

**SMAM-210, 211 Freshman Seminar**  
**Registration #1016-210, -211**  
 210: Orientation program for entering applied mathematics and computational mathematics majors. Several 2-3 week modules introducing students to various non-traditional areas of mathematics; brief orientation to co-op.  
 211: Several 2-3 week modules introducing students to various types of technical writing, including resume preparation, technical description and technical report writing.  
 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 of differential equations. (SMAM-214)  
 Class 3, Credit 3 (offered every year) (214-F, W, S; 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, breakeven analysis, matrix and vector operations and applications, solutions of systems of linear equations and inequalities, the simplex method of 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-225**                              **Algebra for Management Sciences**  
**Registration #1016-225**

Introduction to functions including linear, quadratic, exponential, and logarithmic functions with applications to supply and demand, cost, revenue, and profit functions. Additional topics include matrices, solution of simultaneous linear equations, and mathematics of finance. (3 years of high school mathematics)

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

**SMAM-226**                              **Calculus for Management Science**  
**Registration #1016-226**

A course stressing applications of calculus concepts to solving problems in business and economics. Topics include the limit concept, differentiation, partial differentiation and, as time permits, integration. (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, continuity, the derivative and its formulas, and applications of the derivative. (3 years of high school mathematics)

252: Anti-derivatives by various methods, the definite integral with applications to calculation of area, arc length, volumes of revolution, etc., transcendental functions, numerical integration. (SMAM-251)

253: Improper integrals, formal limits of sequences, infinite series, Taylor series, polar coordinates, conic sections. (SMAM-252)

Class 4, Credit 4 (offered every year) (251-F, W, S, SR; 252-F, W, S, SR; 253-F, W, S, SR)

**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, mathematical induction theorem, relations, equivalence classes, functions, one-to-one, onto, discrete functions, counting principles, graphs (trees, networks). (3 years of high school mathematics)

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-300**                                      **Transfer Math**  
**Registration #1016-300**

Course content includes material from both SMAM-253 and SMAM-305. (SMAM-252)

Class 8, Credit 8 (offered every year) (SR)

**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, S, SR)

**SMAM-306**                                      **Differential Equations I**  
**Registration #1016-306**

This course provides an introduction to the study of ordinary differential equations and their application. Common first order equations and linear second order equations are solved. Method of undetermined coefficients, variation of parameters, linear independence and the Wronskian, numerical solution techniques - Runge Kutta, vibrating systems, LaPlace Transforms. (SMAM-305)

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

**SMAM-307**                                      **Differential Equations II**  
**Registration #1016-307**

Second quarter course in ordinary differential equations which includes power series solution to ordinary differential equations about ordinary and regular singular points; Legendre's equation; Bessel's equations; hypergeometric equation; Picard's theorem; solution of systems of linear differential equations; phase plane analysis and stability.

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 population 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)

**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, SR)

**SMAM-318**                                      **Boundary Value Problems**  
**Registration #1016-318**

The course includes: power series solutions of ordinary differential equations about ordinary and regular singular points; Fourier series; separation of variables solution of the wave equation, the 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)

**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 include: matrix operations with applications to the solution of linear systems of algebraic equations; gradient, divergence and curl; line and surface integrals; independence of path and the divergence theorem and Stoke's theorem with discussion of engineering applications. (SMAM-306)

**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,W,S,SR)

**SMAM-352**                                      **Applied Statistics I**  
**Registration #1016-352**

Basic statistical concepts, sampling theory, hypothesis testing, confidence intervals and non-parametric methods. (SMAM-351)

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

- SMAM-353** **Applied Statistics II**  
**Registration #1016-353**  
 Topics in simple linear regression, an introduction to analysis of variance and the use of statistical software packages. (SMAM-352)  
 Class 4, Credit 4 (offered every year) (S, SR)
- SMAM-354** **Introduction to Regression Analysis**  
**Registration #1016-354**  
 A study of regression techniques with applications to the type of problems encountered in real-world situations. Includes extensive use of statistical software. Topics include review of simple linear regression; residual analysis; multiple regression; matrix approach to regression; model selection procedures; various other models as time permits. (SMAM-353 and SMAM-431 (or SMAM-328)).  
 Class 4, Credit 4 (offered every year) (F, W)
- SMAM-355** **Design of Experiments**  
**Registration #1016-355**  
 A study of the design and analysis of experiments. Includes extensive use of statistical software. Topics include: single-factor analysis of variance; multiple comparisons and model validation; multifactor factorial designs; fixed, random, and mixed models; expected mean-square calculations; confounding; randomized block designs; Latin-square designs; other designs and topics as time permits. (SMAM-353)  
 Class 4, Credit 4 (offered every year) (S, SR)
- 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 and economics. (SMAM-352, SMAM-306, SMAM-431)  
 Class 4, Credit 4 (offered every year) (S, SR)
- 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; general functions. (SMAM-265 or permission of instructor)  
 Class 4, Credit 4 (offered every year) (F, W)
- SMAM-410** **Advanced Calculus**  
**Registration #1016-410**  
 In-depth study of vector calculus. Topics will include: scalar and vector fields; the gradient; divergence and curl vectors and their applications to field theories; integration along a path; Green's theorem in the plane; line integrals independent of path; surface integrals; the divergence theorem and Stake's theorem interpretations and applications. (SMAM-306)  
 Class 4, Credit 4 (offered every year) (S, SR)
- SMAM-411, 412** **Real Variables**  
**Registration #1016-411, -412**  
 411: An investigation and extension of the theoretical aspects of elementary calculus. Topics include: mathematical induction, real numbers, functions, limits, continuity, differentiation, l'Hopital's Rule, Taylor's Theorem. (SMAM-305 and either SMAM-265 or permission of the instructor)  
 412: A continuation of SMAM-411 which concentrates on integration; definition of the integral—its existence and its properties, improper integrals, infinite series and sequences and power and series. (SMAM-411)  
 Class 4, Credit 4 (offered every year) (SMAM-411-F, W; 412-S, SR)
- SMAM-420** **Complex Variables**  
**Registration #1016-420**  
 A brief discussion of preliminaries leading to the concept of analyticity. Complex integration. Cauchy's integral theorem and integral formulas. Taylor and Laurent series. Residues. Real integrals by complex methods. (SMAM-305)  
 Class 4, Credit 4 (offered every year) (F, W)
- SMAM-431** **Matrix Algebra**  
**Registration #1016-431**  
 An introduction to the basic concepts of linear algebra, with an emphasis on matrix manipulation. Topics will include Gaussian elimination, matrix arithmetic, determinants, Cramer's rule, vector spaces, linear independence basis, null and column space of a matrix, eigenvalues, and numerical linear algebra. Various applications will be interspersed throughout the course. (Prerequisite SMAM-306)  
 Class 4, Credit 4 (offered every year) (F, W, S, SR)
- SMAM-432** **Linear Algebra**  
**Registration #1016-432**  
 A further development of the basic concepts of linear algebra, including orthogonality. Topics will include similarity, linear transformations, diagonalization, inner products, Gram-Schmidt, quadratic forms, and various numerical techniques. Several applications of these ideas will also be presented. (SMAM-431)  
 Class 4, Credit 4 (offered every year) (F, W, S, SR)
- SMAM-451, 452** **Mathematical Statics 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 and mathematical justification of standard test procedures. (SMAM-352)  
 452: Chi-square test; Neyman-Pearson theory of hypothesis testing; non-parametric methods; sufficient statistics and further topics in statistical inference. (SMAM-451)  
 Class 4, Credit 4 (offered every year) (451-F, W; 452-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 every year) (F, W)
- 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 every year) (S)
- 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, S)
- 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**  
 511: Numerical techniques for the solution of non-linear equations, interpolation, differentiation, integration, initial value problems. (SMAM-306, ICSP-220)  
 512: Continuation of 511 which treats systems of equations, eigenvalue problems, boundary value problems, splines, additional topics at the discretion of the instructor. (SMAM-511)  
 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 interest of the students (SMAM-305, SMAM-352 or permission of instructor).  
 Class 4, Credit 4 (521-S)

**SMAM-531, -532** **Abstract Algebra**  
**Registration #1016-531, -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  $GF(p^n)$ , applications to coding theory or abstract vector spaces, function spaces, direct sums, applications to differential equations, to scientific problems. (SMAM-531)  
 Class 4, Credit 4 (offered every year) (531-F, W; 532-S, SR)

**SMAM-551** **Topics in Algebra**  
**Registration #1016-551**  
 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-552** **Topics In Analysis**  
**Registration #1016-552**  
 Topics in analysis to be chosen by the instructor, either to introduce the student to topics not covered in SMAM-411, -412 or to explore further the topics covered there. (SMAM-265, SMAM-412)  
 Class 4, Credit 4 (offered upon sufficient request)

**SMAM-559** **Special Topics-Mathematics**  
**Registration #1016-559**  
 Course in which topics of special interest to a sufficiently large group of students, and not covered in other courses, may be offered upon request.  
 Class variable, Credit variable (offered upon sufficient request)

**SMAM-561, 562** **Complex Variables**  
**Registration #1016-561, -562**  
 Introduction to the theory of functions of one complex variable. Limits, continuity, differentiability; analytic functions; complex integration; Cauchy integral theorem and formula; sequences and series; Taylor and Laurent series; singularities; residues; analytic continuation; conformal mapping. A more in-depth study of analytic function theory than SMAM-420. (SMAM-305)  
 Class 4, Credit 4 (offered upon sufficient request)

**SMAM-565** **Game Theory**  
**Registration #1016-565**  
 Introduction to the theory of games with solution techniques and applications. Topics include: game trees; matrix games; linear inequalities and programming; convex sets; the minimax theorem; n-per games; and Pareto optimality. (SMAM-431 or permission of instructor)  
 Class 4, Credit 4 (offered every year) (F, W)

**SMAM-566** **Non-Linear Optimization Theory**  
**Registration #1016-566**  
 The theory of optimization of non-linear functions of several real variables. Topics include: unconstrained optimization (Newton-Raphson, steepest ascent and gradient methods); constrained optimization (LaGrange multipliers, Kuhn-Tucker theorem, penalty concept, dynamic programming); and computational aspects (rates of convergence, computational complexity). (SMAM-305 and SMAM-432)  
 Class 4, Credit 4 (offered upon sufficient request)

**SMAM-571,572** **Topology**  
**Registration #1016-571, -572**  
 Metric spaces, topological spaces, separation axioms, compactness, connectedness, product spaces. (SMAM-412 or permission of instructor)  
 Class 4, Credit 4 (offered upon sufficient request)

**SMAM-599** **Independent Study-Math**  
**Registration #1016-599**  
 Faculty directed study of appropriate topics on a tutorial basis. This course will generally be used to enable an individual to pursue studies of existing knowledge available in the literature.  
 Class variable, Credit variable (offered every year)

**SMAM-620** **The Fourier Transform**  
**Registration #1016-620**  
 This course provides an introduction to an important mathematical tool for the analysis of linear systems. Topics covered are: a Fourier integral theorem; the Fourier transform and its inverse; an introduction to generalized functions; the Dirac delta functions; evaluating transforms; convolution, serial 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 every year) (S)

**SMAT-420** **Calculus for Technologists I**  
**Registration #1019-420**  
 The first course in a calculus sequence covering essential concepts and manipulations. Topics include: limits, derivative, indefinite and definite integrals, and numerical approximation. Applications to physical problems are stressed. (SMAM-204)  
 Class 4, Credit 4 (offered every year) (F, W, SR)

**SMAT-421** **Calculus for Technologists II**  
**Registration #1019-421**  
 A continuation of SMAT-420. Topics covered in this course are applications of the integral calculus; differential and integral calculus of the transcendental functions; and basic techniques of integration with emphasis on applications to engineering technology problems. (SMAT-420 or equivalent)  
 Class 4, Credit 4 (offered every year) (F, W, S, SR)

**SMAT-422** **Solutions of Engineering Problems**  
**Registration #1019-422**  
 A continuation of SMAT-421. Course covers selected applied mathematics topics including: differential equations through second order linear, Laplace transforms, Taylor series, and other appropriate topics. Emphasis is on the application of these topics to engineering technology problems (SMAT-421 or equivalent)  
 Class 4, Credit 4 (offered every year) (F, W, S, SR)

## Physics

**SPSP-200** **Physics Orientation**  
**Registration #1017-200**  
 An introduction to the nature and scope of physics for freshmen interested in physics as a profession. Topics include: (a) what is physics? (b) professional opportunities in physics; (c) the physics profession; (d) the literature of physics; (e) communicating in physics. Laboratory includes safety instruction; measurement and recording techniques; graphical analysis; error analysis and report writing. Each student will present a formal written or oral report on some topic of interest at the end of the course.  
 Class 1, Lab. 2 Credit 2 (offered every year) (F)

**SPSP-201, 202** **Physics In the Arts**  
**Registration #1017-201, -202**  
 A study of topics from the world of art in which the underlying physical laws have influenced the art form and its development. A weekly laboratory will allow study of the relation of an art form to basic optical, mechanical, and electrical physics and in addition will provide time for the development of student projects.  
 Class 2, Lab. 2, Credit 3 (offered upon sufficient request) (W, S)

**SPSP-211** **College Physics I**  
**Registration #1017-211**  
 An elementary course in college physics. Mechanics: Newton's laws of motion, momentum, rotational motion, energy. (SMAM-203 or SMAM-223) (See SPSP-271 for laboratory)  
 Class 3, Credit 3 (offered every year) (F, W)

**SPSP-212** \* **College Physics II**  
**Registration #1017-212**  
 Heat and thermodynamics, fluids, wave motion, sound. (SPSP-211) (See SPSP-272 for laboratory)  
 Class 3, Credit 3 (offered every year) (W, S)

**SPSP-213** College Physics III**Registration #1017-213**

Geometrical and wave optics, electricity and circuits, magnetism, some elements of modern physics. (SPSP-211) (See SPSP-273 for laboratory)

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

**SPSP-271** College Physics Lab I**Registration #1017-271**

This laboratory course includes experiments related to the principles and theories discussed in the corresponding lecture, (coregistration or credit in SPSP-211)

Lab. 2, Credit 1 (offered every year) (F, W)

**SPSP-272** College Physics Lab II**Registration #1017-272**

This laboratory course includes experiments related to the principles and theories discussed in corresponding lectures, (credit or coregistration in SPSP-212)

Lab. 2, Credit 1 (offered every year) (W, S)

**SPSP-273** College Physics Lab III**Registration #1017-273**

This laboratory course includes experiments related to the principles and theories discussed in corresponding lectures, (credit or coregistration in SPSP-213)

Lab. 2, Credit 1 (offered every year) (F, S)

**SPSP-289\*\*** Contemporary Science—Physics**Registration #1017-289**

Introductory science for non-science students. One or more topics such as astronomy, space exploration, relativity, nuclear energy, and lasers are discussed and explained simply, to give an appreciation of the significance of physics in our contemporary technological society. A minimum of mathematics is used. A laboratory or discussion option may be Offered for 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** University Physics I**Registration #1017-311**

An intensive course in general physics, using calculus, for majors in the sciences and engineering. Mechanics: kinematics and dynamics of a particle and of a rigid body, work and energy, momentum and impulse, rotational motion, oscillatory motion, gravitation. (Coregistration or credit in SMAM-252) (See SPSP-371 for three-hour lab, SPSP-375 for two-hour lab)

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

**SPSP-312** University Physics II**Registration #1017-312**

Fluids and elastic properties, heat and thermodynamics, wave motion, sound, geometrical and physical optics. (SPSP-311) (See SPSP-372 for three-hour lab, SPSP-376 for two-hour lab)

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

**SPSP-313** University Physics III**Registration #1017-313**

Electrostatics, Gauss's law, electric field and potential, dielectrics, dc circuits, magnetic fields, Ampere's law, Faraday's law, inductance and capacitance, magnetism in matter, ac series circuits. (SPSP-311) (See SPSP-373 for three-hour lab, SPSP-377 for two-hour lab)

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, deBroglie 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)

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; operation principles of diodes, bipolar junction transistors, and MOS-FETs. (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; electronic properties of conductors and semiconductors; characteristics of metal-metal, metal-semiconductor, and p-n junctions; operating principles of solid state devices; theory and application. (SPSP-315 and permission of instructor)

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

**SPSP-321** Introduction to Laboratory Techniques**Registration #1017-321**

An introduction to equipment and procedures common to the physics research laboratory. The oscilloscope and ac circuit analysis, statistics, vacuum systems including vacuum pumps and gauges, the laboratory notebook, and writing for publication. (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** Radiation Physics I**Registration #1017-351**

Introductory modern physics emphasizing radiation phenomena. Atomic physics, nuclear physics, radioactivity, production of radionuclides, interaction of charged particles and neutrons with matter. (SPSP-213, SMAM-223 required; SMAM-309 recommended)

Class 4, Lab. 3, Credit 5 (offered every year) (F)

**SPSP-352** Radiation Physics II**Registration #1017-352**

Interaction of x-rays and gamma-rays with matter. Radiation detectors; scintillation detectors, solid state detectors. Radionuclide imaging instrumentation. (SPSP-351)

Class 4, Lab. 3, Credit 5 (offered every year) (W)

**SPSP-353** Radiation Physics III**Registration #1017-353**

Principles of radiation protection. Radiation protection instrumentation. Internal and external dose calculations. Practical radiation health physics. Introduction to electronics, including laboratory. (SPSP-352)

Class 4, Lab. 3, Credit 5 (offered every year) (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** **University Physics Lab I**  
**Registration #1017-371**

This laboratory course includes experiments related to the principles and theories discussed in the corresponding lectures. (Credit or coregistration in SPSP-311) (See SPSP-375 for a 2-hr lab for University Physics)

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

**SPSP-372** **University Physics Lab II**  
**Registration #1017-372**

This laboratory course includes experiments related to the principles and theories discussed in the corresponding lectures. (Credit or coregistration in SPSP-312) (See SPSP-376 for a 2-hr lab for University Physics)

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

**SPSP-373** **University Physics Lab III**  
**Registration #1017-373**

This laboratory course includes experiments related to the principles and theories discussed in the corresponding lectures. (Credit or coregistration in SPSP-313) (See SPSP-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 experiment X-ray diffraction; optical diffraction and interference; atomic spectroscopy; electron microscopy; nuclear spectroscopy; radioactive half-life; Millikan oil drop; black-body radiation. Students enrolled in SPSP-315 may include experiments in semiconductor solid state physics. (SPSP-314)

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

**SPSP-375** **University Physics Lab I**  
**Registration #1017-375**

This laboratory course includes experiments related to the principles and theories discussed in the corresponding lectures. (Credit or coregistration in SPSP-311) (This course recommended for all students in the University Physics lectures who are not required to take a 3-hr lab)

Lab. 2, Credit 1 (offered every year) (F, W, S)

**SPSP-376** **University Physics Lab II**  
**Registration #1017-376**

This laboratory course includes experiments related to the principles and theories discussed in the corresponding lectures. (Credit or coregistration in SPSP-312) (This course recommended for all students in the University Physics lectures who are not required to take a 3-hr lab)

Lab. 2, Credit 1 (offered every year) (F, W, S)

**SPSP-377** **University Physics Lab III**  
**Registration #1017-377**

This laboratory course includes experiments related to the principles and theories discussed in the corresponding lectures. (Credit or coregistration in SPSP-313) (This course recommended for all students in the University Physics lectures who are not required to take a 3-hr lab)

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) (401-F; 402-S)

**SPSP-411,412** **Electricity and Magnetism**  
**Registration #1017-411,412**

Electric and magnetic fields using vector methods, Gauss's law, theory of dielectrics, Ampere and Faraday 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, electromagnetism, and the physical optics. (SPSP-314,321 plus co-registration or credit in any one of these: SPSP-401, 411,415,455)

Class I, Lab. 5, Credit 3 (offered every year) (421-F, 422-S)

**SPSP-431,432** **Electronic Measurements**  
**Registration #1017-431, -432**

Laboratory course in electronic measurements and instrumentation, with theory and applications of discrete and integrated circuits in analog and digital electronics. (SPSP-313, SPSP-321)

Class 3, Lab. 3, Credit 4 (offered every year) (431-S, 432-F)

**SPSP-455** **Optical Physics**  
**Registration #1017-455**

Physical optics including interference, diffraction, and polarization. Brief introduction to modern optics. (SMAM-305, SPSP-313)

Class 4, Credit 4 (offered alternate years) (F)

**SPSP-480** **Theoretical Physics I**  
**Registration #1017-480**

An introduction to mathematical topics necessary for a quantitative study of physical phenomena. Topics include: vector analysis including vector differentiation and integration, curvilinear coordinate systems and transformations from one orthogonal coordinate system to another, Fourier series and an introduction to Fourier integrals. Applications of these concepts to physics are presented. (SMAM-307, SPSP-313)

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

**SPSP-501** **Theoretical Physics II**  
**Registration #1017-501**

Application of advanced mathematical methods of 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)

**SPSP-522** **Introduction to Quantum Mechanics**  
**Registration #1017-522**

A study of the concepts and mathematical structure of non-relativistic quantum mechanics. Exact and approximate techniques for solving the Schrodinger equation are presented for various systems. (SPSP-314, SPSP-480; SPSP-315 and SPSP-501 are recommended)

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

**SPSP-531** **Solid State Physics**  
**Registration #1017-531**

The structure of solids and their thermal, mechanical, electrical and magnetic properties. (SPSP-315, SPSP-480, and SPSP-522; SPSP-501 is recommended.)

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

**SPSP-541, 542, 543** **Physics Research**  
**Registration #1017-541, -542, -543**  
 Faculty-directed student projects or research usually involving laboratory work or theoretical calculations that could be considered as of an original nature. (Permission of instructor)  
 Class variable, Credit variable (offered every year)

**SPSP-550, 551** **Physics Seminar**  
**Registration #1017-550, -551**  
 Preparation and presentation of papers based on physics literature search. May include reports on student research projects. Special emphasis on the techniques of physics literature search and on the mechanics of preparation, organization, and presentation of technical papers. (Senior physics major or permission of instructor)  
 Class 1, Credit 1 (offered every year) (F, S)

**SPSP-553** **Nuclear Physics**  
**Registration #1017-553**  
 A study of the structure of the atomic nucleus as determined by experiments and theory. Description and quantum mechanical analysis of nuclear properties, radioactivity, and nuclear reactions. (SPSP-522)  
 Class 4, Credit 4 (offered on sufficient request) (S)

**SPSP-559** **Special Topics—Physics**  
**Registration #1017-559**  
 Advanced courses which are of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and have specified prerequisites, contact hours and examination procedures. Topics could include: introductory statistical mechanics; plasma physics; general relativity; linear integrated circuits; cryogenics; radio astronomy; history of physics; astrophysics; astronomy.  
 Class variable, Credit variable (offered upon sufficient request)

**SPSP-599** **Independent Study—Physics**  
**Registration #1017-599**  
 Faculty-directed study of appropriate topics on a tutorial basis. This course will generally be used to enable an individual to pursue studies of existing knowledge available in the literature.  
 Class variable, Credit variable (offered every year)

## Clinical Sciences

**SCLG-289** **Contemporary Science—Health Sciences**  
**Registration #1026-289**  
 This course will examine areas within the health field, including evolutionary structural development and future projections, with emphasis on methods of diagnostic testing, selected disease conditions and the utilization of computers.  
 Class 4, Credit 4 (W)

**SCLG-301** **Medical Terminology**  
**Registration #1026-301**  
 Emphasizes etymology, definition, pronunciation and correct utilization of medical terms which enables students to develop a vocabulary essential to the understanding of and communication with the various health areas in which allied health professionals will serve. (SBIB-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. (SBIG-306)  
 Credit 4 (S)

**SCLG-559** **Special Topics—Clinical Sciences**  
**Registration #1026-559**  
 Advanced courses which are of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and have specified prerequisites, contact hours and examination procedures.  
 Class variable, Credit variable (offered every quarter)

**SCLG-599** **Independent Study—Clinical Sciences**  
**Registration #1026-599**  
 Faculty directed study of appropriate topics on a tutorial basis. This course will be used to enable an individual to pursue studies of existing knowledge available in the literature.  
 Class variable, Credit variable (offered every quarter)

**SCLB-201** **Introduction to Biomedical Computing**  
**Registration #1027-201**  
 An introduction to the applications of computers in health care. Information concerning career opportunities, and co-operative education will be provided.  
 Class 1, Credit 1 (offered yearly)

**SCLM-210** **Medical Technology Seminar**  
**Registration #1024-210**  
 A discussion group involving current topics in the field of medical technology; orientation toward the role of medical technologists in health care.  
 Class 1, Credit 1 (offered every year) (F)

**SCLM-401** **Hematology/Immunohematology**  
**Registration #1024-401**  
 A study of the blood (erythrocytes, leukocytes, platelets and blood group antigens). Descriptions of the cellular components of the blood in health and in disease. Cellular and immunological functions and their inter-relationships. Hemostasis and coagulation mechanisms. Structures of antigens and antibodies and mechanisms of antigen-antibody reactions. Lab procedures demonstrate cell counting techniques, coagulation studies, antigen-antibody reactions and compatibility testing of various blood groups. (SBIB-306 or instructor's permission)  
 Class 3, Lab. 3, Credit 4 (S)

**SCLM-405** **Diagnostic Bacteriology and Mycology**  
**Registration #1024-405**  
 Study of bacteria and fungi that cause human disease. Lecture and laboratory subjects include microorganism growth, isolation, identification, antibiotic sensitivity, and related human immunological and serological responses. (SBIB-404)  
 Class 3, Lab. 3, Credit 4 (W)

**SCLM-432** **Biology Laboratory Techniques I**  
**Registration #1024-432**  
 Principles of clinical laboratory instruments in the analysis of body fluids. This quarter stresses the 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. (SCHG-217, or equivalent, SBIB-306)  
 Class 2, Lab. 6, Credit 4 (F, W)

**SCLM-433** **Biology Laboratory Techniques II**  
**Registration #1024-433**  
 Principles of clinical chemistry in the analysis of the chemical component of body fluids. This quarter stresses the basic chemistries underlying the classical methodologies and relates them to the disease state. Topics include; liver function tests, renal function tests, carbohydrates, electrolytes, acid base balance, enzymes, lipids, endocrine function tests, drug analysis, and statistical quality control. (SCGH-217, or equivalent, SBIB-306)  
 Class 2, Lab. 6, Credit 4 (S)

**SCLN-401** **Introduction to Clinical Nuclear Medicine**  
**Registration #1025-401**  
 A combination lecture/laboratory course introducing clinical aspects of Nuclear Medicine. Hospital organization is presented as well as the relationship of nuclear medicine services to other hospital services. Laboratories in affiliated hospitals are correlated with lectures on nuclear medicine technology, patient care and emergency procedures. (Fourth year standing in NMT program)  
 Credit 4 (F)

**SCLN-402  
Registration #1025-402      Nuclear Medicine Procedures-  
Central Nervous System**

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  
Registration #1025-501      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  
Registration #1025-502      Nuclear Medicine Procedures-  
Skeletal System**

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  
Registration #1025-503      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  
Registration #1025-510      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  
Registration #1025-511      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  
Registration #1025-512      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  
Registration #1025-513      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 the NMT program)

Credit 1 (S)

**SCLN-514  
Registration #1025-514      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 the NMT program)

Credit 1 (S)

**SCLN-515  
Registration #1025-515      Nuclear Medicine Procedures-  
Hematological and In Vitro Studies**

This course covers 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  
Registration #1025-516      Instrumentation and Computers  
In Nuclear Medicine**

A combination lecture/practicum course covering the various nuclear instrumentation found in the clinical setting. The lectures provide knowledge of the function and characteristics of the basic components of any scintillation detection system necessary to understand its applications in nuclear medicine. Lectures are reinforced through clinical practicums in which the student operates the equipment. Collimation, quality control, computer systems and data processing are covered. (Fourth year standing in NMT program)

Credit 2 (W)

**SCLN-517  
Registration #1025-517      Radiochemistry and Radiopharmacology**

A combination lecture/lab course covering the production and use of radioisotopes in medicine. Radiopharmaceutical compounding, quality control procedures, dose calibration, and licensing regulations regarding the handling and use of radio-pharmaceuticals are covered. (Fourth year standing in NMT program)

Credit 2 (W)

**SCLN-518  
Registration #1025-518      Radionuclide Therapy and Radiation Biology**

A study of the application of radionuclides in the treatment of disease and the study of the biologic changes which occur following irradiation. (Fourth year standing in NMT program)

Credit 1 (W)

**SCLN-519  
Registration #1025-519      Radiation Health Safety**

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  
Registration #1025-520      Radioimmunoassay**

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  
Registration #1025-521      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****Registration #1025-522**

A clinical practicum which gives the student the opportunity to learn and master nuclear medicine procedures through technical and practical experience. Each student is assigned a particular combination of three hospitals and trains approximately four months in each. Students work with patients under the supervision of physicians and technologists on the hospital staff. Student progress and performance is monitored by the R.I.T. nuclear medicine technology clinical coordinator who makes periodic visits to the hospital department. (Fourth year standing in NMT program)

Credit 6 (F)

**SCLN-523 Clinical Nuclear Medicine II****Registration #1025-523**

Continuation of Clinical Nuclear Medicine I. (Fourth year standing in NMT program)

Credit 7 (W)

**SCLN-524 Clinical Nuclear Medicine III****Registration #1025-524**

Continuation of Clinical Nuclear Medicine I1 (Fourth year standing in NMT program)

Credit 7 (S)

**SCLS-411 Intro, to Diagnostic Ultrasound****Registration #1030-411**

A course which surveys the historical development of medical ultrasound technology, the professional and occupational development of sonography and the current major diagnostic used of ultrasound. Registry certification will also be discussed.

Class 2, Credit 2 (F)

**SCLS-412 Ultrasonic Cross-Section Anatomy****Registration #1030-412**

Basic cross-sectional anatomy of the head, neck, abdomen, and pelvis with emphasis placed on sonographic correlation of anatomical structures. (Permission of instructor)

Class 3, Rec. 1, Credit 4 (W)

**SCLS-413 Ultrasound Instrumentation****Registration #1030-413**

Principles of techniques and instrumentation used in medical ultrasound imaging. Topics include: pulsed echo technique; real time scanners; A-, B-, and M-mode instrumentation; Doppler; instrument controls; calibration and quality assurance.

Class 3, Lab. 1, Credit 4 (S)

**SCLS-551 Intro, to Clinical Ultrasound****Registration #1030-551**

A combined lecture/laboratory course introducing clinical aspects of ultrasound technology. Topics include: applied ultrasonic physics and instrumentation, imaging and scanning techniques, nursing procedures, and patient care. Cross-sectional anatomy and pathophysiology will be correlated with ultrasound images. (Fourth year standing in the ultrasound program)

Credit 6 (F)

**SCLS-552 Intro, to Obstetrical Ultrasound****Registration #1030-552**

This course will equip the student with the practical skills and clinical knowledge necessary to perform competent Obstetrical ultrasound scans. Image production, recognition, and acceptability are stressed; examination protocols are outlined. Instruction also includes review of teaching files and discussion of new techniques and research trends. (SCLS-551 and fourth year standing in the ultrasound program)

Credit 5 (F, W, S)

**SCLS-553 Introduction to Gynecologic****Registration #1030553**

This course will equip the student with the practical skills and clinical knowledge necessary to perform competent Gynecologic ultrasound scans. Image production, recognition, and acceptability are stressed; examination protocols are outlined. Instruction also includes review of teaching files and discussion of new techniques and research trends. (SCLS-551 and fourth year standing in the ultrasound program)

Credit 5 (F, W, S)

**SCLS-554 Advanced Obstetrical Ultrasound****Registration #1030-554**

A continuation of Intro, to Obstetrical Ultrasound with refinement of skills and knowledge necessary to perform and evaluate complex obstetrical scans. (SCLS-552 and fourth year standing in the ultrasound program)

Credit 5 (F, W, S)

**SCLS-555 Advanced Gynecologic Ultrasound****Registration #1030-555**

A continuation of Intro, to Gynecologic Ultrasound with refinement of skills and knowledge necessary to perform and evaluate complex gynecologic scans. (SCLS-553 and fourth year standing in the ultrasound program)

Credit 5 (F, W, S)

**SCLS-556 Intro, to Abdominal Ultrasound I****Registration #1030-556**

This course will equip the student with the practical skills and clinical knowledge necessary to perform competent abdominal ultrasound scans. Image production, recognition, and acceptability are stressed; examination protocols are outlined. Instruction also includes review of teaching files and discussion of new techniques and research trends. (SCLS-551 and fourth year standing in the ultrasound program)

Credit 6 (F, W, S)

**SCLS-557 Intro, to Abdominal Ultrasound II****Registration #1030557**

This course will equip the student with the practical skills and clinical knowledge necessary to perform competent abdominal ultrasound scans. Image production, recognition, and acceptability are stressed; examination protocols are outlined. Instruction also includes review of teaching files and discussion of new techniques and research trends. (SCLS-556 and fourth year standing in the ultrasound program)

Credit 7 (F, W, S)

**SCLS-558 Advanced Abdominal Ultrasound****Registration #1030558**

A continuation of Intro, to Abdominal Ultrasound I and II with refinement of skills and knowledge of pathological processes necessary to perform and evaluate complex abdominal scans. (SCLS-557 and fourth year standing in the ultrasound program)

Credit 7 (F, W, S)

**SCLS-560 Seminar in Ultrasound****Registration #1030-560**

A survey of current ultrasound topics and areas of ultrasound usage peripheral to the major specialties. Diagnostic imaging topics of interest to sonography will also be presented. (SCLS-551 and fourth year standing in the ultrasound program)

Class 1, Credit variable (offered W, 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 (S 1984)

On a rotating basis Ad Clin. Chem. I, II, III will be offered two courses per year: one in the fall, another in the spring, and the third the following fall. They are independent courses that may be taken in any sequence.

**SCLC-810 Advanced Clinical Chemistry Laboratory I****Registration #1023-810**

Comparison of current methods for analysis of toxicology samples—gas-liquid chromatography, radioimmunoassay, enzyme multiplied immunoassay. (Permission of instructor, class size limited to 12)

Lab. 4, Credit 1 (offered concurrently with SHPC-820)



**SCLC-821** **Advanced Clinical Chemistry II**  
**Registration #1023-821**  
 Proteins, enzymes, hemoglobins, iron, renal functions, lipids, quality control, automation, and method selection. (Permission of instructor)

2 hr. lecture, 2 hr. seminar, Credit 3 (F 1984)

**SCLC-811** **Advanced Clinical Chemistry Laboratory II**  
**Registration #1023-811**  
 Comparison of current methods for separation and determination of isoenzymes. (Permission of instructor, class size limited to 12)  
 Lab. 4, Credit 1 (concurrent with SHPC-821)

**SCLC-822** **Advanced Clinical Chemistry III**  
**Registration #1023-822**  
 Radioimmunoassay, hormones, fetal-placement unit, integration of laboratory data. (Permission of instructor)

2 hr. lecture, 2 hr. seminar, Credit 3 (F 1985; S 1985)

**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 (concurrent with SHPC-822)

**SCLC-859** **External Clinical Chemistry Research**  
**Registration #1023-859**  
 Credit variable

**SCLC-879** **Clinical Chemistry Research**  
**Registration #1023-879**  
 Credit 1-16

**SCLC-899** **Independent Study**  
**Registration #1023-899**  
 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 1985-86)

**SCLC-705** **Mechanisms of Disease**  
**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 1985-86)

# National Technical Institute for the Deaf

## Department of Educational Support Services Training

### Interpreting

**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-204** **American Sign Language Interpreting I**  
**Registration #0850-204**

Students apply the skills and principles learned in Principles of American Sign Language. The student will practice interpreting from English to American Sign Language (ASL). Practice will include interpreting both live talent and audiotapes. The speed of the spoken message will be between 80-111 words per minute. (0850-203)

Class 3, Lab 2, Credit 3 (Fall, Winter, Spring, Summer)

**NITP-205** **American Sign Language Interpreting II**  
**Registration #0850-205**

The course is built around a series of advanced vocabularies necessary for interpreting in the community and in educational environments. Materials are structured so that students progressively increase transmission skills from 80 to 120 words per minute. Students skills in American Sign Language (ASL) will be enhanced with ongoing critiques. (0850-204)

Class 3, Credit 3 (Winter, Spring)

**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. (NITP-214)

Class 3, Credit 3 (Winter, Spring)

**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, Spring)

**NITP-213** **Voice Interpreting III**  
**Registration #0850-213**

This course continues development of the voicing task. More complex videotaped samples of signed/spoken messages of hearing-impaired persons are delivered at a faster rate than those in Voice I and II. This is a self-paced lab course. (NITP-212)

Class 3, Credit 3 (Fall, Winter)

**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 in a lecture/lab format. (CHGD 0234-211 & 212)

Lab. 6, Credit 3 (Fall, Winter, Spring)

**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 of 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 (offered annually)

**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, -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, reading and lectures.

Class 3, Credit 3 (offered annually)

**NITP-281, 382** **Interpreting Practicum I, II**  
**Registration #0850-281, -382**

These field experiences provide an opportunity to practice and integrate skills acquired in the classroom and laboratories. They include instructional and non-instructional activities on the RIT campus and in the Rochester community, under the supervision of the interpreter manager on site and the instructor responsible for the course. (For 281: NITP-202, 262, 271, 211, 331; For 382: 212, 213, 332, 281.)

Class 15, Credit 5 (available any quarter)

**NITP-283, 384** **Interpreting Seminar I, II**  
**Registration #0850-283, -384**

Designed as part of the field experience, students share their experiences and concerns as practicing interpreters. Panels of interpreters and consumers of interpreting services are used, (co-requisite 281,382)

Class 1, Credit 1 (available any quarter)

**NITP-331, 332** **Expressive Transliterating I & II**  
**Registration #0850-331, 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 (Spring, Fall)

**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 (Fall, Winter, Spring)

**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 (Fall, Winter)

**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: Education 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. (NITP-252)

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 (Spring)

**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 techniques or technology; in-service training programs for faculty and/or 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 (Fall, Winter, Spring)

**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, 0850-262, 0850-331, 0850-391)

Credit variable 1-3 (Winter, Spring, Summer)

*Course descriptions for A.A.S. Diploma, and Certificate programs for deaf students may be found in the NITP-catalog.*

# Military Science and Reserve Officer's Training Corps

All courses are offered annually. AH labs are conducted weekly and are required.

## 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; leadership laboratory; map reading exercise.

(The Physical Ed course—Orienteering Course, XPEF—may be taken in lieu of this course.)

Class 1, Lab. 1, Credit 2

### MMSM—202 Applied Health Dynamics Registration #0701-202

This course 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; leadership lab.

(The Physical Education course—Military Preventive Medicine and First Aid, XPEH—may be taken in lieu of this course.)

Class 1, Lab. 1, Credit 2

### 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; leadership laboratory.

(The Physical Education course—Drill and Ceremonies, XPEF—may be taken in lieu of this course.)

Class 1, Lab. 1, Credit 2

## 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. Geographic 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; leadership lab.

Class 1, Lab. 1, 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; leadership laboratory.

Class 1, Lab. 1, Credit 2

### 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. Leadership laboratory.

Class 1, Lab. 1, Credit 2

### MMSM—310 Registration #0701-310

**History of the Military Art**  
This course examines the evolution of the art of war in the modern period. This course concentrates on World War I, World War II, and selected military experiences, the changing nature of warfare, and civil-military relations.

Class 4-5, Credit 4-5

## Third Year

### MMSM—401 Military Tactics Registration #0701-401

This course stresses practical exercises on basic map reading skills and provides a working knowledge of fundamentals and principles of combat operation as placed for and executed at light infantry squad and platoon level; leadership laboratory.

Class 2, Lab. 1, Credit 3

### MMSM—402 Military Communications and Weaponry Registration #0701-402

This course provides knowledge and training of basic military skills essential as a junior officer; weapons training, an introduction to military communication equipment and techniques; leadership laboratory.

Class 2, Lab. 1, Credit 3

### MMSM—403 Military Operations Registration #0701-403

A continuation of military skills training with emphasis on military intelligence/security, first aid, operations at the small unit level; leadership laboratory; field training exercise.

Class 2, Lab. 1, Credit 3

## Fourth Year

### MMSM—501 Combined Arms Operations Registration #0701-501

The 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 2, Lab. 1, Credit 3

### 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 2, Lab. 1, Credit 3

### MMSM—503 Military Ethos Registration #0701-503

This course examines the ideas and issues that define the role of the military in our larger society. Emphasis is placed on the professional and ethical standards required of the military officer. Other topics include: discussions on the office personnel management system, active duty orientation, preparations for commissioning; leadership laboratory; field training exercise.

Class 2, Lab. 1, Credit 3

### 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