RIT

Courses 1982-83

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.

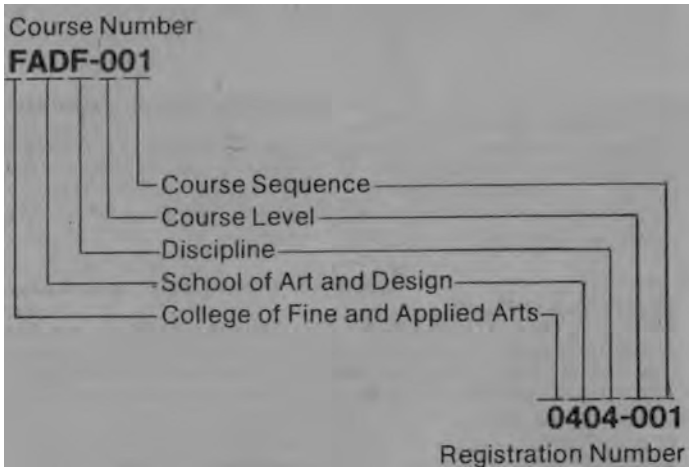
First letter: College offering the course

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 1982-83

Produced by RIT Communications

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This book represents the best academic planning at the time of publication. Course and curriculum changes sometimes occur after the book has been printed, and for this reason Rochester Institute of Technology does not assume a contractual obligation with its students for the contents of this publication.

Table of Contents

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

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

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

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

Credit 4

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

Credit 2

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

Credit 4

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

Credit 4

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

Credit 2

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

Credit 4

'aC-ASO **Audiovisual Program Design II**
gyration #0612-450
'"denis analyze the elements used in design of audiovisual programs and ^jesentations. Emphasis is on the application of the key psychological princ om~*>flrcePtion' memory, experience, attitudes-underlying successful ratin??*u lca.i°ns Students must design a series of presentations incorpo- 9 these principles. Required for all students. (ICIC 440)

Credit 4

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

Credit 3

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

Credit variable (3-4)

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

Credit 4

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

Credit variable (1 -4)

ICIC-501 **Practicum in Audiovisual Program Design**
Registration #0612-501
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 (1-4)

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 -4)

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 (1-4)

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 all students.

Credit: 4

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

Credit 4

ICIC-560 **Media Facilities Design**
Registration #0612-560
Examines major variables influencing the design of such media facilities as media production areas, darkrooms, audio and television studios and control rooms, and training and instructional areas. Topics include acoustics, lighting, ventilation, electrical circuits, space requirements and layouts.

Credit **4**

ICIC-570 **Survey of Audiovisual Equipment**
Registration #0612-570
Permits the student to 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-580 **Producing Multi-Image Presentations I**
Registration #0612-580
Students design, produce, and present multi-image productions (3-6 projectors). Covers both theory and practice of aspects such as synchronization, presentation planning and equipment selection, and the presentation development process. Projects required. (Photography skills, ICIC-489, ICIC-401 or ICIC 421 or equivalent)

Credit 4

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

Credit 4

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

Credit variable (1-4)

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

Credit 3-4

ICIC-595, 596 **Senior Project**
Registration #0612-595, -596
Focus is on the design and production of an interview presentation package based on each 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.

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. To receive 4 credits, the student applies the general search techniques to sources of visual materials and completes a search for primary and secondary sources of prepared visual material relating to training and instruction.

Credit variable (3-4)

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

Credit 4

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

Credit 4

ICIT-715 **I nstructional 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 (1-4)

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

Credit 4

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.

Credit 3

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

Credit 4

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

Credit 4

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

Credit 4

V

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

Credit **4**

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

Credit 3

ICIT-756 Criterion Referenced Instruction and Techical 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 two additional job analyses to receive 3 credits.

Credit variable (2-3)

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

Credit 3

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

Credit 4

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

Credit 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 Organizational Change
Registration #0613-772
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, 751, 757, 770)

Credit 3

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

Credit 2

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

Credit variable (1-3)

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

Credit variable (1-3)

Department of Career and Human Resource Development

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

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

Credit 3

IJCC-702 **Teaching, Learning, Content,**
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-741 **The Nature of Work**
Registration #0615-741
Analysis of the changed meaning of work throughout history with emphasis on the 20th century. Different theoretical and practical approaches to job satisfaction and work motivation will be studied as well as recent efforts to redesign work and/or apply alternative time patterns. New work trends and the changed work-leisure relationship also will be explored.

Credit 3

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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 post-secondary education, differing size business organizations and industrial groups that involve differing levels of technical specialization are studied.

Credit 2

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

Credit 3

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

Credit 3

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

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

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

Credit 3

IJCC-748 **Information Retrieval Systems**
Registration #0615-748 **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 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) to assist people in making decisions in those careers for which insufficient information exists. The ability to assist people in making decisions about the pursuit of a career that is projected to be available several years later will be studied in order to develop a uniform and responsible 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 enviroments, with focus on the various components of the work force such as research, skilled trades, computer-related areas, production supervision, finance and retailing. Students will have presentations from executives, training directors, employment personnel and workers about skills required for entry-level jobs, application and interview procedures, scope of work, economic benefits, salary and wage scales, employment outlook, and worker and employment expectations.

Credit 5

IJCC-752 **Career Education in Colleges &**
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 "attending", listening, guidance, problem solving, and decision making skills needed to plan and moderate such sessions.

Credit 3

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

Credit variable (1-6 credits)

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

Credit variable (1-5 credits)

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

Credit 3

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

Credit 3

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

Credit 3

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

Credit variable (1-5 credits)

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

Credit variable (3-6 credits)

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

Credit variable (1-6 credits)

School of Computer Science and Technology

All 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 specific 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, problem solving techniques, and have an opportunity to study the FORTRAN programming language under a ''modified-PSI" plan. Topics available for study will 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-216 Program Design and Validation/FORTRAN
Registration #0601-216
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

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

Class 4, Credit 4

ICSP-300 Principles of COBOL Programming
Registration #0601-300
A study of elementary COBOL programming, utilizing structured programming/design methodology, and supported by an overview of appropriate data management concepts. COBOL topics covered include program organization, input/output operations with sequential files and basic program control, arithmetic operations and report editing, program logic using the IF statement, control break processing, table handling, and additional statements as time permits. Students will write programs which adhere to specific programming standards. (ICSS-200)

Class 4, Credit 4

ICSS-200 Survey of Computer Science
Registration #0603-200
Topics include problem solving techniques, an introduction to the BASIC programming language, fundamental hardware concepts and the impact of computers on society. Additional topics relevant to the student's major will also be included such as more BASIC programming, pre-packaged software, business and printing systems. The course is modular in nature.

Class 4, Credit 4

ICSS-370 Computer Graphics in Filmmaking
Registration #0603-370
This course will introduce the filmmaking student to the application of computer graphics in filmmaking. Concentration will be on the use of a graphical software package, computer animation, applications in the production of logos and short narrative film sequences, and the computer as an artistic dimension. Computer animated film projects will be required.

Class 4, Credit 4 (Offered upon sufficient demand)

Computer Science Courses

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

ICSP -208 **Introduction to Programming**
Registration #0601-208
Fundamentals of programming using a structured programming language. Topics include basic problem solving methods, algorithm development, elementary data types, expression evaluation, use of basic control structures, and subprograms. Programming projects will be required.

Class 4, Credit 4

ICSP-210 **Program Design and Validation**
Registration #0601-210
Program design, including specification, structured development, advanced data types, procedures and functions, program validation and verification: programming paradigms, including basic internal sorting and searching algorithms. Programming projects will be required. (ICSP-208)

Class 4, Credit 4

ICSP-305 **Assembly Language Programming**
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. (A high-level programming language)

Class 4, Credit 4

ICSP-306 **Advanced Assembly Techniques**
Registration #0601-306
A study of advanced techniques in assembly language programming. Topics include macro definition and invocation, conditional assembly, system macros and supervisor calls, program linkage, reentrant and recursive programs, I/O programming at the interrupt level. Programming projects will be required. (ICSS-315, ICSS-325)

Class 4, Credit 4

ICSP-307 **Business Applications Programming**
Registration #0601-307
The mastery of the techniques and concepts of programming within a business programming environment. Emphasis on algorithmic solutions to business application problems, including report generation, sorting and table processing and generation, and complex I/O processing. Project management, programming teams, tooling and stubbing are used in the course. Structured COBOL is used. Students will also program against a database in a host-embedded programming language. Laboratory emphasis. (ICSS-325)

Class 4, Credit 4

ICSP-319 **Scientific Programming Languages**
Registration #0601-319
The high level programming languages—FORTRAN and APL—will be mastered. Discussion of the langoages includes programming design and style, data structuring, expression formation and evaluation, and I/O. Special topics in FORTRAN include subroutine construction, modularity, and plotting. Special topics in APL include workspace management, report formatting, definition, and recursion. Both scientific and business applications will be programmed. Programming projects will be required. (ICSS 320)

Class 4, Credit 4

ICSP-330 **PL/I Programming**
Registration #0601-330
Topics include elementary data types and control structures, data structuring capabilities (arrays and records), run time error handling, standard built-in functions, text processing, user written functions and subroutines. Emphasis is placed on developing well structured and modular programs. Programming projects will be required. (A high-level programming language)

Class 4, Credit 4

ICSP-350 **Programming Language Concepts**
Registration #0601-350
A study of the syntax and semantics of a diverse set of high-level programming languages. The similarities and differences of the languages chosen are discussed in order to demonstrate general principles of programming language design. Programming projects will be required. (ICSS-320)

Class 4, Credit 4

ICSP-488 **Programming Systems Workshop**
Registration #0601-488
A workshop for the mastery of the techniques and concepts of programming systems specification, design and implementation. Students will work with data modeling, both with and without a database management system product. Students will gain experience with system specification and design charting techniques, project scheduling and management, and programming team experience. Programming projects will be required. (ICSS-307, I CSS-335, I CSS-485)

Class 4, Credit 4

ICSS-202 , **Introduction to Computer Science**
Registration #0603-202
An introduction to the computer: information representation, instruction execution, and the software interface to the user. Topics include integer (binary and decimal) and floating point arithmetic, logical operations; introduction to machine language and assembly language, input/output operations; operating systems and editors.

Class 4, Credit 4

ICSS-315 **Digital Computer Organization**
Registration #0603-315
An introduction to the logical design of a computer. Topics include a review of arithmetic and boolean algebra, combinatorial and sequential circuit design, flip-flops and adders, storage mechanisms and their organization, instruction fetch decode and execution in a simple CPU, input/output subsystems, interrupts, and variations in memory addressing. (ICSP-305)

Class 4, Credit 4

ICSS-320 **Data Structure Analysis**
Registration #0603-320
Information structures: sequential lists, stacks, queues, sequential allocation; linked lists, circular lists, doubly linked lists, linked allocation; trees, tree traversal; lists, orthogonal lists, multilinked structures; dynamic storage allocation and garbage collection. Programming projects will be required. (Either ICSP-210 or ICSP-216, and ICSP-305)

Class 4, Credit 4

ICSS-325 **Data Organization and**
Registration #0603-325 **Management**
This course combines the content associated with file organization (sequential, indexed and direct access physical organization), 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. (ICSS-320)

Class 4, Credit 4

ICSS-335 **Systems Specification, Design**
Registration #0603-335 **and Implementation**
Students are introduced to basic concepts of system specification, design, system implementation and project management. Tools used include PERT/CPM (scheduling tools), structured English, structured flowcharts, and decision trees (description tools), dataflow diagramming (description and design tool), and hierarchical design of programming systems (design tool). Students are also introduced to other tools (e.g., HIPO charts, N-S charts, etc.). An introduction to the structured design methods of Yourdon is included. (ICSS-325)

Class 4, Credit 4

ICSS-340 . **Finite State Machines**
Registration #0603-340 **and Automata**
Topics include finite state models, machine capabilities, descriptive methods, decomposition methods, regular expressions, bilateral analysis and synthesis, sequential iterative systems, and space-time transformations. (ICSS-315)

Class 4, Credit 4

I CSS-355 **The Human Side of Computers**
Registration #0603-355
The impact of computer systems on society is studied using class discussion, lectures and films. Current topics such as the following are covered: the impact of computers on employment, automation and the labor force; overview of computer applications in government; innovative medical applications; computers in education and computer assisted instruction issues, privacy and the Freedom of Information Act; computer abuses and 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

I CSS-360 **Fundamentals of Computer Science**
Registration #0603-360 **for Transfer Students**
Selected topics from ICSS-202, ICSP-208, ICSP-210 and ICSP-305 are presented. This course is required for students transferring into the School of Computer Science and Technology with previous programming experience. **Open only to transfer students;** not to be taken as a computer science elective.

Class 4, Credit 4

I CSS-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

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

Class 4, Credit 4

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

Class 4, Credit 4

ICSS-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-320)

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 3, Lab 2 Credit 4 (Offered upon sufficient demand)

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

Class 4, Credit 4

ICSS-520 **Computer Architecture I**
Registration #0603-520
An introduction to computer architecture. Includes a survey of computer architecture fundamentals exemplified in commercially available computer systems, to include classical CPU and control unit design, register allocation, primary memory organization and access, internal and external bus structures, and virtual memory schemes. Alternatives to classical machine architecture, such as the stack machine and the associative processor, are defined and then compared. Parallel processors are also presented, aiong 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**
Registration #0603-521 **Systems**
An examination of microcomputers and microcomputer applications. Includes the study of microprocessors and their use in the construction of microcomputers. Actual microprocessor systems are used in "hands on" laboratory projects. Several commercially available microcomputer systems are used to explore hardware and software design concepts and considerations. Microcomputer programming is taught. Memory design and I/O interface techniques are studied. Trends in commercial systems are analyzed. Programming projects may be required. (ICSS-315)

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

I CSS-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 specifications, 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-320)

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, 2-0 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-320)

Class 4, Credit 4

ICSS-580 **Language Processors**
Registration #0603-580
To give students exposure to issues in the design of a variety of language processors and translators. The basic concepts will be presented as part of the design of several such programs (e.g., assemblers, compilers, linkage editors, and macro processors). Programming projects will be required. (ICSP-350)

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 computer science topics in greater depth and more detail. (Faculty approval is required prior to registration.)

Class 2-4, Credit 2-4

I CSS-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. (Fifth-year standing; some high-level computer programming language)

Credit 4

Graduate Courses

Undergraduate computer science and technology students may take ICSS 600 level courses as undergraduate computer science electives. They must be fourth- or fifth-year students and have already completed any stated prerequisites or have the consent of the instructor. Undergraduate computer science and technology students may take 700 and 800 level courses only by consent of the school director and the consent of the instructor.

Graduate students must obtain the consent of a graduate advisor in order to enroll in graduate courses not listed in their own program of study.

Computer Science

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

Credit 4

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

Credit 4

I CSS-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. (ICSP-305 and ICSS-320 or ICSM-703)

Credit **4**

ICSS-720 **Computer Architecture**
Registration #0603-720
Brief review of a classical computer architecture. Analysis of internal and external bus structures. Architectural features required to support virtual storage and various replacement policies are discussed. Various types of parallel computers are presented along with analyses of the problems preventing them from achieving an ideal n-fold speedup. (ICSS-320 or ICSM-703 and ICSP-305 prerequisites, ICSS-708 corequisite)

Credit 4

ICSS-721 **Microprocessors and Microcomputers**
Registration #0603-721
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. (ICSS-320 or ICSM-703; 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 Systems Design**
Registration #0603-735
Topics include basic on-line system characteristics, design guidelines, hardware requirements, comparison of systems and languages, file organization concepts, the simultaneous access problem, file security and recovery, error recovery, system evaluation, and case studies. (ICSS-320 or ICSM-703 and ICSP-305; background in systems analysis is recommended)

Credit 4

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

Credit 4

I CSS-740 **Computer Communication Networks**
Registration #0603-740
A study of hardware and software principles of computer communication networks. Topics include network configuration and vocabulary, network hardware components, network software components, network technologies, examples of existing networks, network utilization, measurement and evaluation. (ICSS-720 and Statistics)

Credit 4

ICSS-770 **Fundamentals of Computer Graphics**
Registration #0603-770
Topics include basic concepts, 2-D transformations, windowing, clipping, interactive and raster graphics, 3-0 transformations and perspective, hidden line and hidden surface techniques, graphical software packages and graphics systems. Programming projects will be required. (ICSS-320 or ICSM-703)

Credit 4

I CSS-771 **Advanced Topics in Computer Graphics**
Registration #0603-771
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

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

Credit 4

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

Credit 4

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

Credit 4

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

Credit 4

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

[CSS-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 some limited backtrack parsing algorithms. (ICSS-706)

Credit 4

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

Credit 4

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

Credit 4

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

Credit 4

ICSS-890 **Seminar**
Registration #0603-890
Current advances in computer science.

Credit 2-4

I CSS-895 **MS Thesis**
Registration #0603-895
Capstone of the master's degree program. Student must submit an acceptable thesis proposal in order to enroll.

Credit 4-8

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

Credit 2-4

Computer Systems Management

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

Credit 4

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

Credit 4

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

Credit 4

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

Credit 4

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

Credit 4

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

Information Science

ICSI-722 **Library Automation**
Registration #0616-722 **and Management**
This course summarizes the computer techniques applied to library automation and the study of management techniques and problems in a modern automated library. Case studies in current library systems will be included. Management models in selected libraries will be discussed. (Graduate Computer Science Core)

Credit 4 (Offered upon sufficient demand)

ICSI-733 **Information Media and Design**
Registration #0616-733
A study of current information media and their design. Topics will include microfilm systems, video systems, computer input and output devices, computer interface with media devices, and system design concepts and techniques for applications in libraries and information centers. (Graduate Computer Science Core)

Credit 4 (Offered upon sufficient demand)

School of Engineering Technology

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

Upper-Division Civil Engineering Technology

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.

Class 3, Lab 3, 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.

Class 3, Credit 2

ITEC-432 **Water & Wastewater Transport Systems**
Registration #0608-432
Discussion of surface and groundwater sources. Introduction to well hydraulics. The hydraulic design of sanitary and storm sewer systems, and water distribution systems.

Class 2, Recitation 3, Credit 3

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

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

Class **3,** Credit **3**

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

Credit 0

ITEC-510 **Design of Water Treatment Facilities**
Registration #0608-510
Principles of water treatment plant design; conceptual and hydraulic design of water purification and conditioning facility. Includes: settling, filtration, softening, disinfection, organics, removal, and plant design and construction elements.

Class **3,** Lab 2, Credit **3**

ITEC-513 **Computer Techniques in Civil**
Registration #0608-513 **Engineering Technology**
Introduction to the engineering computing environment, the topics of computer modeling and simulation, and program documentation. Techniques are developed in the lecture and laboratory through the application of software in examining typical engineering problems. (ICSP-205)

Lab 2, Credit 1

ITEC-514 **Land Planning**
Registration #0608-514
The environmental and social aspects of land planning are covered, as well as the engineering and economic considerations. Topics included are zoning concepts, the Master Plan, subdivision planning and regulations, floodplain controls, conservation of open space, protection of wetlands, transfer of developmental rights and agricultural districts. Local development issues will be studied, and either class attendance at a planning board hearing or a field trip is scheduled.

Class 2, Credit 2

ITEC-516 **Analysis and Design of Reinforced**
Registration #0608-516 **Concrete Structures**
Introduction to the analysis of indeterminate flexural members and frames, emphasizing the method of moment distribution. Design of continuous reinforced concrete elements and frames. The accent is on building structures and the use of the ACI Code. The working stress method is briefly covered, but primary emphasis is given to the strength method. (ITEM-404)

Class 5, Credit 4

ITEC-520 **Design of Wastewater**
Registration #0608-520 **Treatment Facilities**
Principles of wastewater treatment plant design; conceptual and hydraulic design of activated sludge and trickling filter plants are studied. Tertiary treatment facilities, such as nitrogen and phosphorous removal will be discussed. Processes, plant design, and construction elements are stressed.

Class **3,** Lab 2, Credit 4

ITEC-527 **Soil Mechanics and Foundations**
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. (ITEM-404)

Class 3, Lab 2, Credit 4

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

Class 3, Credit 3

ITEC-546 **Professional Principles and**
Registration #0608-546 **Practices**
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

Civil Technology Electives

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

Class 3, Credit 3

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

Class 2, Lab 3, Credit 4

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

Class 3, Recitation 2, Credit 4

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

Class 4, Credit 4

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

Credit 1-4

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

Credit 1-8

Construction

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

Class 3, Credit 3 \ /

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

Class 4, Credit 4

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

Class 3, Credit 3

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

Class 3, Credit 3

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

Class 4, Credit 4

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

Class 2, Credit 2

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

Class 2, Credit 1

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

Class 3, Credit 3

Upper-Division Electrical Engineering Technology

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

Class 3, Lab. 3, Credit 4

ITEE-311 ***i*** **Electronical**
Registration #0609-311
Continuation of ITEE-310. A.C. theory of circuits is introduced along with their analysis. Transformers and power supplies are covered. Introduction to circuits used in the 2610 printer and other relevant equipment. (ITEE-310)

Class 3, Lab. 3, Credit 4

ITEE-312 **Electronics II**
Registration #0609-312
Continuation of ITEE-311. Digital devices are introduced along with their use in the 2610 printer and other equipment. The microprocessor, as used in photo equipment, is presented. (ITEE-311)

Class 3, Lab. 3, Credit 4

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 3, Rec. 2, Credit 4

ITEE-404 **Control Systems I**
Registration #0609-404
Analysis of closed loop control systems for stability, accuracy, response time; Routh's and Nyquist's stability criteria, gain and phase margin, static error coefficient, lead and lag compensating networks. (ITEE-402, SMAT-422)

Class 3, Lab. 2, 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, applications of Ohms and Kirchoff s laws in D.C. and A.C. circuits, power and energy concepts, efficiency, and metering, and D.C. motors.

Class 3, Lab. 2, Credit 4

ITEE-412 **Electrical Principles for Design II**
Registration #0609-412
A review of A.C. resonance in series and parallel circuits, P.F. correction three-phase circuits, rotating machines and their application; transformers, semiconductor theory, bridges, power supplies, and phase shifting circuits, and solid state electronic control devices. (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 AC/DC circuit theory, single and 3 phase power distribution, power factor line losses, efficiency, A.C. motors and transformers, energy costs, wiring methods, instrumentation and circuit protection. (SMAT-421)

Class 3, Lab. 2, Credit 4

ITEE-424 **Logic and Digital Devices**
Registration #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, 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
Bipolar and FET transistor biasing are reviewed. Design and analysis of class A amplfiers using small signal h-parameters is presented. Low and high frequency, and mid-band, response of single- and multi-stage amplifiers is included. Also covered are multiple device circuits such as cascade, cascode, differential amplifiers and integrated circuit operational amplifiers.

Class 3, Lab. 3, 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-521 **Electromagnetic Fields and Antennas**
Registration #0609-521*
The time varying fields, Maxwell's equations, characteristic Impedance and radiation patterns of the dipole antenna are explored. Design of antenna arrays for UHF-VHF and microwave application are also discussed; microwave antenna design. (ITEE-520)

Class 3, Lab. 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-526 **Semiconductor Physics**
Registration #0609-526*
Theoretical description of p-n junctions and semi-conductor phenomena; transistor and FET models are developed to obtain parameters; solid state device characteristics are derived. (ITEE-428)

Class 4, Credit 4

ITEE-530 **Application *of* Discrete and Integrated**
Registration #0609-530 **Circuit Elements**
Selected topics in the application of discrete circuit componenets 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 **Communication Systems I**
Registration #0609-534
An introduction to AM, DSB, SSB and FM modulation systems and their spectrums. Circuitry for their generation and demodulation and relationships between time and frequency domains utilizing system block diagrams; Fourier series and their application to communication systems. (ITEE-428)

Class 3, Lab 2, Credit 4

ITEE-535 **Communication Systems II**
Registration #0609-535
The sampling theorem and its application to true division multiplexing. Pulse modulation systems including pulse amplitude modulation, pulse width modulation and pulse position modulation; pulse code modulation as applied to voice and to digital data transmission; Introduction to noise and its effect on communication system performance; Introductory information theory; Fourier transforms and linear system concepts applicable to communication systems.(ITEE-534)

Class 4, Credit 4

ITEE-536 **Control Systems II**
Registration #0609-536*
Design of control systems for specific application and performance criteria; a study of control motors and components for D.C./A.C. control systems; application of control theory to the solution of practical system problems. (ITEE-404)

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**
Registration #0609-543* **Peripherals.**
A study of the most common peripherals used with microprocessors and minicomputers. Peripherals include 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 2, Lab 4, Credit 4

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

Class 3, Lab 2, Credit 4

ITEE-547 **Digital Processing of Signals**
Registration #0609-547
Analog signal processing including the use of microprocessors. Topics include transducers, AD/DA converters, microprocessor programming and I/O devices. Applications include bio-medical, automotive controls and communication signals.

Class 4, Credit 4

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

Class 3, Lab 3, Credit 4

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

Class 3, Lab 3, Credit 4

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

Class 3, Lab 3, Credit 4

ITEE-552 **Power System Stability**
Registration #0609-552*
Voltage regulation and efficiency of transformers, per unit systems, symmetrical components, lightning protection, energy conservation, switching surges, and system voltage regulation are included. Equal area criterion of transient stability is covered. (ITEE-550)

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

Class 3, Lab. 2, Credit 4

ITEE-580 **Senior Project**
Registration #0609-580*
Selected independent study of design project by electrical technology students with the approval of the department. Approval must be granted first week of fall or winter quarter for spring quarter registration.

Class/Lab. as required. Credit 4

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

v
ITEM-407 **Mechanical Engineering**
Registration #0610-407 **Technology Laboratory I**
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 #0610-408
Elements of statics and strength of materials. Topics include plane equilibrium, friction, stress, strain, torsion, and the bending of beams

Class 3, Recitation 2, Credit 4

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

Class 1, Lab. 3, Credit 2

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

Class 3, Credit 3

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

Class 3, Credit 3

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

Class 4, Credit 4

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

Class 3, Lab. 2, Credit 4

ITEM-451 **Vibration and Noise**
Registration #0610-451
A study of the basic concepts of vibration and noise. Designing equipment for survival in vibration and shock environments. Methods of reducing noise in machinery structures. Environmental tests for vibration and shock. Methods of vibration and noise analysis will be demonstrated. (SMAT-422)

Class 4, Credit 4

ITEM-460 **Applied Fluid Mechanics**
Registration #0610-460
A study of the fundamentals of fluid statics and dynamics. Principles and applications of.fluid statics, fluid kinematics, fluid 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-441, 461)

Class 1, Lab. 3, Credit 3

ITEM-499 **Mechanical Technology Co-op**
Registration #0610-499

Class 0, Credit 0

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

Class 2, Lab. 4, Credit 4

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

Class 3, Recitation 2, Credit 4

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

Class 3, Lab. 2, Credit 4

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

Class 3, Lab. 2, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

ITEM-540 **Thermal Technology**
Registration #0610-540*
Application of thermodynamics to internal combustion engines, compressors, steam cycles, refrigeration, and air conditioning. (ITEM-441)

Class 3, Lab. 2, Credit 4

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

Class 4, Credit 4

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

Class 3, Recitation 2, Credit 4

ITEM-543, 544 **Energy Management I, II**
Registration #0610-543, 544
Technical, management, and cost aspects of energy conservation. Technical aspects of reducing energy consumption in utilities, processes, buildings, heating, air conditioning, and ventilation systems. Special topics such as furnace efficiency, heat recovery, heat pumps, pumping and piping, and architectural considerations. (ITEM-540)

Class 4, Credit 4

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

Class 4, Credit 4

ITEM -599 **I ndependent 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)

Manufacturing

ITEF-403 **Machine Elements**
Registration #0617-403
This course covers the basic principles that apply to the design and selection of such frequently used machine elements as bearings, shafts, fasteners, variable speed drives, gears, cams, and springs. Emphasis will be given to applications for manufacturing equipment.

Credit 4

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

Class 4, Credit 4

ITEF-42S **Statistical Quality Control II**
Registration #0617-425
The course will deal with the application of statistical theory to forecasting, process control, sampling, reliability, quality control and quality assurance. The planning, organizing and implementation of quality controls in the industrial setting will be studied. Inspection techniques dealing with destructive and non-destructive testing and computer-aided measurement will be introduced. (ITEF-424)

Class 3, Recitation 2, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

ITEF-471 **Computer Numerical Control**
Registration #0617-471
An advanced course in applications of numerical control. Emphasis will be placed on computer-assisted part programming for contouring in two and three axes. Application of advanced technologies such as CNC and DNC. (ITEF-470)

Class 3, Lab. 2, Credit 4

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

Class 3, Recitation 2, Credit 4

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

Class 2, Lab. 3, Credit 4

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

Class 3, Recitation 2, Credit 4

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

Class 4, Recitation 1, Credit 4

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

Class 4, Recitation 1, Credit

ITEF-499 **Manufacturing Technology Co-op**
Registration #0617-499

Class 0, Credit 0

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

Class 3, Lab. 2, Credit 4

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

Class 3, Lab. 2, Credit

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

Class 3, Lab. **2,** Credit 4

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

Class 4, Recitation 1, Credit 4

ITEF-599 **Independent Study**
Registration #0617-599
A supervised investigation within a manufacturing technology area of student interest. Student must submit written proposal and have it approved prior to registering.

Credit variable (1-4)

Packaging Science

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

IPKG-201 **Principles of Packaging**
Registration #0607-201
An overview of packaging: the historical development of packaging, the functions of packaging, and the materials, processes, and technology employed to protect goods during handling, shipment and storage. A brief review of container types, package design and development, and research and testing will be presented, along with information about economic importance, social implications, and packaging as a profession.

Class 4, Credit 4

IPKG-301 **Engineering Design Graphics**
Registration #0607-301
A basic course in engineering drawing. Topics include, but are not limited to, lettering, line quality, use of instruments, free hand sketching, orthographic projections, pictorials, sections, auxiliary views, and dimensioning.

Class 1, Lab. 3\ Credit 3
4

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

Lab. 4, Credit 2

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

Class 3, Credit 3

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

Class 3, Credit 3

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

Class 2, Lab. 4, Credit 4

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

Class 2, Credit 2

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

Class 3, Credit 3

IPKG-431 **Packaging Production Systems**
Registration #0607-431
A study of package forming and filling, closing, product/package identification, inspection, and other machinery commonly used in packaging, plus consideration of handling and storage/retrieval systems. The characteristics of such equipment, and maintenance programs will be considered. Students will gain practice in setting up complete production lines for packaging various products. (IPKG-311, 312)

Class 2, Lab. 4, Credit 4

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

Class 2, Lab. 4, Credit 4

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

Class 2, Lab. 4, Credit 4

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

Class 3, Recitation 1, Credit 4

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

Class 3, Credit 3

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

Class 2, Recitation 1, Lab. 2, Credit

IPKG-562 **Packaging Regulations**
Registration #0607-562
A detailed study of federal, state, and local regulations that affect packaging. History of the development of packaging law; detailed study of recent packaging regulations, including the Fair Packaging and Labeling Act and the Poison Prevention Packaging Act; consideration of Food and Drug Administration regulation of packaging, hazardous materials packaging regulations administered by the Department of Transportaton; freight classifications, freight claims, the Interstate Commerce Act as it applies to shipment of goods in packages; consumer product safety law, environmental law, and patent, trademark, and copyright law as it applies to packaging.

Class 3, Credit 3

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

Credit variable 3-4

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

Arranged, Credit 4

IPKG-598, 599 **Independent Study**
Registration #0607-598, -599
Independent s'tudy, in consultation with the instructor, on any packaging-related topic.

Arranged, Credit variable 1 **-4**

College of Business

School of Business Administration

Accounting

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4 (offered upon demand)

Management

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

Class 4, Credit 4

BBUB-245 **Business Management**
Registration #0102-245
An introductory survey business course for the non-business major. Designed to familiarize the student with the nature and functions of the business organization and approaches to managerial decision making.

Class 4, Crecflt 4 (offered upon demand)

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

Class 1, Credit 1

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

BBUB-434 **Operations Management**
Registration #0102-434
Theory and practice of operations management utilizing quantitative methods and computer techniques as applied to business problems. (BBUQ-352 or BBUQ-411, ICSS-200)

Class 4, Credit 4

BBUB-450 Multinational Management
Registration #0102-450
Acquaints the student with the characteristics and impact of the multination enterprise. It explores in depth the process of leadership, motivation and performance appraisal in a cross-cultural setting. (BBUB-201 and BBUB-401)

Class 4, Credit 4 (offered upon demand)

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class Variable, Credit 4

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

Variable

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Economics

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit4

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BBUE-407 Managerial Economics
Registration #0103-407
Analysis of the firm. Problems facing management: ecnomizing in the use of resources, optimal combinations of products, pricing, competitive forces in markets affecting the firm. (BBUE-405)

Class 4, Credit 4 (offered upon demand)

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

Class 4, Credit 4 (offered upon demand)

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 4, Credit 4 (offered upon demand)

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

Class 4, Credit 4

Finance

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

Class 4, Credit 4

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

Class 4, Credit 4 (offered upon demand)

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

Class 4, Credit 4

BBUF-504 International Finance
Registration #0104-504
This course is concerned with the monetary aspects of international economic relations. It deals with the following topics: the balance of payments, foreign exhange rates and markets, gold standard, flexible exchange rates system, international capital movements, exchange restrictions, and international monetary experience. (BBUE-381)

Class 4, Credit 4 (offered upon demand)

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, types of issues, the historical investment perspective, and the valuation of different types of securities. (BBUF-441)

Class 4, 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)

Class 4, Credit 4

BBUF-510 **Financial Institutions**
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. (BBUE-381)

Class 4, Credit 4

BBUF-554 **Seminar in Finance**
Registration #0104-554
A seminar covering current policies and problems in financial management, and/or securities and security markets. (Permission of instructor)

Class 4, Credit 4 (maximum 12 hours credit)

Marketing

BBUM-263 **Marketing Principles**
Registration #0105-263
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-210, GSSE-302)

Class 4, Credit 4

BBUM-420 **Consumer Behavior**
Registration #0105-420
A course focusing on the role of the ultimate consumer in the marketing process. Emphasis will be on understanding the psychological, cultural and socioeconomic influences in the consumer decision making process. (BBUM-263)

Class 4, 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-263)

Class 4, 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-552, 553)

Class 4, Credit 4

BBUM-551 **Marketing Research[7]**
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-263, BBUQ-352 or BBUQ-411)

Class 4, Credit 4

BBUM-552 **Advertising**
Registration #0105-552
The role of advertising as a vital function pf the marketing field. Material will be studied from the point of view of the manner in which advertising contributes to the marketing mix, rather than from the creative aspects of production and copy. (BBUM-263)

Class 4, Credit 4

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-263)

Class 4, 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)

Class 4, 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-263)

Class 4, Credit 4

BBUM-556 **Marketing Logistics**
Registration #0105-556
A study of pysical 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-263, BBUB-201)

Class 4, Credit 4 (offered upon demand)

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)

Class 4, Credit 4 (offered upon demand)

Quantitative Methods

BBUQ-290 **Algebra**
Registration #0106-290
A review of the fundamental concepts and operations of algebra that are necessary for BBUQ-291 and other quantitative courses. Topics include relations and functions, rational expressions and equations, special products and factoring, linear and quadratic equations, systems of linear equations, powers and roots, and logarithms.

Class Variable, Credit 4

BBUQ-291, 292 **Mathematics I, II**
Registration #0106-291, 292
The mathematical background required for the increasing use of quantitative methods in management. Topics include coordinate geometry, functional relationships, and the fundamental concepts and methods of differential and integral calculus.

Class 4, Credit 4

BBUB-351, 352 **Statistics I, II**
Registration #0106-351, -352
Interpretation and application of statistical techniques in business, to develop the ability to evaluate the results of statistical research. Introduces student to basic techniques of summarizing and presenting data, probability theory, hypothesis testing, regressions and correlation and non-parametric statistics as applied to management decision making. (BBUQ-291)

Class 4, Credit 4

BBUQ-353 **Statistics III**
Registration #0106-353
Introduces the student to the techniques of rational decision making under conditions of uncertainty and variability. The problem of determining the optimal amount of sampling is also considered. (BBUQ-352 or permission of instructor)

Class 4, Credit 4 (offered upon demand)

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

Class 4, Credit 4

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

Class 4, Credit 4

School of Food, Hotel and Tourism Management

Dietetics

BFAD-213 **Nutrition Principles**
Registration #0107-213
The study of specific nutrients and their functions; physiological, psychological and sociological needs of humans for food; development of dietary standards and guides; application of nutritional principles in planning and analyzing menus for individuals of all ages; survey of current health nutrition problems and food misinformation.

Class 4, Credit 4

BFAD-314 **Sanitation & Safety in Hospital**
Registration #0107-314 **Food Service Operation**
(Coordinated Dietetics Program)
Survey of micro-organisms of importance to the food industry; emphasis on causes and prevention pf food spoilage and poisoning. Responsibilities of administrative dietitians to provide and establish safe working conditions and policies; discussion of current problems confronting the hospitals as a result of recent legislative developments as they relate to safety and health. (BFAM-215)

Class 2, Credit 4
Practicum in hospital by arrangement

BFAb-402 **Dietetics Environment**
Registration #0107-402 **(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. (BFAM-215, BFAD-213)

Class 1, Credit 4
Clinical hours by arrangement

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

Class 4, Credit 4

IJCG-704 **Communication & I nstructionai Techniques**
Registration #0604-704 **(Coordinated Dietetics Program)**
Principles of communication and learning applied to educational programs; study of individual differences, perception, motivation, guidance and evaluation in basic concepts of education; use of television, visual equipment, and teaching materials for training programs for hospital employees.

Class 4, Credit 4
Practicum in hospital by arrangement.

BFAD-525, 526 **Advanced Nutrition and Diet Therapy I & II**
Registration #0107-525, -526
Biological metabolism and interrelationships of nutrients, enzymes, and other biochemical substances in humans. Etiology, symptoms, treatment and prevention of nutritional diseases; evaluation of nutritional diseases; evaluation of nutritional status, role of the diet and dietetics in metabolic gastro-intestinal, renal, musculoskeletal, cardiac, endocrine, febrile, and other diseases. (BFAD-213, SCHG-203, SBIO-306)

BFAD-525 Class 5, Credit 5
BFAD-526 Class 4, Credit 4

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

Credit Variable

BFAD-550 **Community Nutrition**
Registration #0107-550
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. (BFAD-213, BFAD-526 or BFAD-562)

Class 2, Credit 4
Clinical hours by arrangement

BFAD-551 **Management of Food Systems**
Registration #0107-551 **(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 contolling dietetic activities. (BFAM-215)

Class 1, Credit 4
Practicum in hospital by arrangement

BFAD-552 **Geriatric Nutrition**
Registration #0107-552
A course in applied geriatric nutrition. It includes the nutritional needs for the healthy aged person and addresses the nutritional needs caused by chronic health, psychological, economic and environmental problems. Students will be introduced to nutritional programs designed to help meet some of the problems of the aged person. (BFAD-213)

Class 2, Credit 2

BFAD-554 **Maternal & Infant Nutrition**
Registration #0107-554
Application of nutrition during pregnancy and infancy.

Class 2, Credit 2

BFAD-560, 561 **Clinical Dietetics I & II**
Registration #0107-560, -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 (BFAD-560) with clinical experience (BFAD-561) in a hospital setting. Designed for senior students in the Coordinated Dietetics Program. (BFAD-213, SCHG-203, SBIO-305)

BFAD-560 Class 4, Credit 4
BFAD-561 Clinical Hours by Arrangement, Credit 4

BFAD-562, 563 **Clinical Dietetics III & IV**
Registration #0107-562, -563 (Coordinated Dietetics Program)
A continuation of BFAD-560, -561 in the succeeding quarter with the clinical experience being conducted in the hospital. (BFAD-560, 561)

BFAD-562 Class 4, Credit 4
BFAD-563 Clinical Hours by Arrangement, Credit 6

Food, Hotel and Tourism Management

BFAH-400 **Tourist Enterprises**
Registration #0111 -400
A course designed to provide students an understanding of the planning, development, managing, design, marketing and operations of tourist and recreational enterprises. Student will additionally select specific recreational areas to analyze the unique planning and development strategies associated with each type of enterprise. See course BFAH-401, -405 for specific enterprises.

Class 4, Credit 4

BFAH-401 **Ski Resort Management**
Registration #0111-401
The development, marketing and management of ski resorts. (BFAH-400)

Class 1, Credit 1

BFAH-402 **Marina Management**
Registration #0111-402
The development, marketing and management of marinas. (BFAH-400)

Class 1, Credit 1

BFAH-403 **Golf Course Management**
Registration #0111-403
The development, marketing and management of golf courses. (BFAH-400)

Class 1, Credit 1

BFAH-404 **Campground Management**
Registration #0111 -404
The development, marketing and management of campgrounds. (BFAH-400)

Class 1, Credit 1

BFAH-405 **Theme Park Management**
Registration #0111-405
The development, marketing and management of theme park management. (BFAH-400)

Class 1, Credit 1

BFAH-406 **Resorts, Clubs and Vacation Communities**
Registration #0111-406
The development, marketing, and management of resorts, clubs, and vacation communities.

Class 1, Credit 1

BFAH-410 **Tourist Consumption Analysis**
Registration #0111-410
A course designed to analyze the consumption of tourist goods and services. The analysis will include economic, recreation and personality theory in order to fully understand tourism consumption.

Class 4, Credit 4

BFAH-411 **Problem Analysis & Decision-Making**
Registration #0111-411 **for the Tourist I ndustries**
The course is designed to assist the student in constructing a problem-solving framework for the analysis of tourist industry management problems.

Class 4, Credit 4

BFAH-412 **Maintenance and Operation of Tourist**
Registration #0111 -412 **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 the proper maintenance for quality resort development.

Class 5, Credit 5

BFAM-210 **Introduction to Food Management and**
Registration #0111 -210 **Tourist I ndustries**
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 3, Credit 3

BFAM-215 **Food Principles**
Registration #0108-215 *****
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.

Class 3, Lab. 6, Credit 5

BFAM-220 **Career Seminar**
Registration #0108-220
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

BFAM-310 **Mankind in Search of Food**
Registration #0108-310
Survey of foods including composition of foods, basic principles of nutrition, food spoilage, food poisoning, modern food processing, “health foods,” world food problems and their possible solutions, with emphasis on practical application to daily food selection and composition. (Not open to those who have completed BFAD-213)

Class 4, Credit 4 (offered upon demand)

BFAM-311 **Food Systems Design &**
Registration #0111 -311 **Equipment Layout**
Recognizing, analyzing and solving equipment and space problems in layouts of existing institutions and in designing newfood service plans. Consideration of food service equipment; determination of needs; development of specifications; procedures of maintenance, sanitation, and safety. (BFAM-215)

Class 3, Lab. 2, Credit 4

BFAM-314 **Sanitation and Safety in**
Registration #0108-314 **Food Operations**
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. (BFAM-215, SBIG-210)

Class 2, Credit 2

BFAM-321 **Food and Beverage Merchandising**
Registration #0108-321
Recognizing, analyzing, researching and solving fundamental merchandising techniques including menus for food and beverages found in the food service industry. (BFAM-215)

Class 2, Credit 2

BFAM-331, 332 **Food Production Management I & II**
Registration #0108-331, -332
Application of standards, specifications, principles and techniques of equipment selection, purchasing and preparation in quantity and service of high quality food. Recognizing, analyzing, solving and evaluating problems related to all aspects of quantity food production and management based on scientific, technological, economic, and social factors. Emphasis is on operation and maintenance of food service equipment. Application of purchasing principles and cash control; work simplification; planning and scheduling. Students in Coordinated Dietetics Program will have hospital practicum arranged in BFAM-332. (BFAM-215, 321)

BFAM-331 Class 3, Lab. 6, Credit 5
BFAM-332 Class 4, Credit 4

BFAM-333 **Operational Analyses in Food Systems**
Registration #0108-333
This course will deal with industry related problems which will combine classroom study of the fundamental principles of cost controls, as applied by management, with on-location application of financial practices and specialized accounting procedures in solving cost and management problems in the food and beverage operations. (BFAM-332, 423; BBUB-434) Offered in even years.

Class 4, Credit 4

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BFAM-415 **Food Science I**
Registration #0108-415
Consideration of fundamental chemical and physical reactions, the influence of kind and proportion of ingredients; evaluation of food products by sensory and objective methods. Open only to junior and senior students. (BFAM-215; SCHG-202)

Class 2, Lab. 6, Credit 4

BFAM-416 **Food Science II**
Registration #0108-416
Individual study concerning chemical and physical reactions in foods; the influence of kind and proportion of ingredients, with special emphasis on experimental design for problem solving and on written and oral communication skills. (BFAM-415)

Class 1, Lab. 8, Credit 4

BFAM-422 **Hotel/Motel Management**
Registration #0108-422
A study of methods, techniques, and tools of management used in the development and operation of hotels and motels, including ethics and policies.

Class 4, Credit 4 v

BFAM-423 **Management Systems for the**
Registration #0108-423 **Lodging and Tourism Industry**
Analysis and evaluation of systems and operations, franchising; feasibility planning, development, financing and organization of facilities; rate structure determination, front office procedures, guest room salesmanship and analysis of demand; reservation systems, ethics, security and on-the-job application of operational problems (BFAM-210, BBUB-201 - Junior Standing)

Class 4, Credit 4

BFAM-450 **Marketing for Hotel and Tourism Industries**
Registration #0108-450
A study of tourism development, marketing and the interaction between the broad areas of the travel industry and its realtionship to hotels, motels, restaurants, community economy, trade associations, competititive and non-competitive markets. (BFAM-423; BBUM-263, BBUB-434)

Class 4, Credit 4

BFAM-499 **Cooperative Education**
Registration #0108-499
Career-related work experience. Employment within the food, hotel, tourism industry monitored by the Division of Career Education and the Department of Food Administration and Tourist Industries Management. Designed for the student to experience progressive training on the job as related to the academic option.

Junior & Senior year. Graduation Requirement.

BFAM-511 **Advanced Food Service Operation**
Registration #0108-511
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. (BFAM-331, 332) Seniors only

Class 1, Lab. 8, Credit 4

BFAM-554 **Seminar in Food and Hotel/Tourist Industries**
Registration #0108-554
Selected topics associated with food, hotel, resort and travel systems. The focus will be on current management problems to develop analytical and decision-making ability.

Class 4, Credit 4 (offered upon demand)

BFAM-555 **Research Problems**
Registration #0108-555
Independent study of research problems in food and hospitality management. Open to senior students only.

Class and Credit Variable

School of Retailing

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

Class 4, Credit 4

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

Class 4, Credit 4

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

Class 1, Credit 1

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

Class 4. Credit 4

BRER-415 **Junior Retail Seminar**
Registration #0109-415
A core seminar which integrates and builds on the first co-op experiences. Topics are designed to address entry level and first level management problems and situations. The emphasis is on the interpersonal and organizational situations typically encountered in co-operative placements for retailers. Should be taken immediately after a co-op experience.

Class 4, Credit 4

BRER-416 **Senior Retail Seminar**
Registration #0109-416
A required seminar designed to follow the senior year co-op experience. The perspective is that of the store manager or middle level manager. Emphasizes contemporary readings and cases to analyze management strategies and the relationship of the individual to the larger organization objectives.

Class 4, Credit 4

BRER-435 **Advanced Merchandising**
Registration #0109-435
An extension of basic merchandising dealing 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. (Senior standing; BRER-212)

Class 4, Credit 4

BRER-511 **Textiles**
Registration #0109-511
Analysis of textile fibers, weaves, and fabrics; methods of printing, dyeing and finishing; evaluation of fabrics and materials commonly used in home furnishing.

Class 4, Credit 4

BRER-512 **Fashion Fabrics**
Registration #0109-512
Evaluation of fashion fabrics for selection of suitable fabrics for men's, women's, and children's clothing. Knowledge necessary for merchandising fashion goods.

Class 4, Credit 4
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BRER-521 **Fashion History**
Registration #0109-521
Survey of the apparel arts from ancient times to the present. Study is made of the social, political, and economic factors influencing styles and merchandising of apparel throughout the ages and how history influences fashion today.

Class 4, Credit 4

BRER-523 **Current Fashion**
Registration #0109-532
A study of the present-day fashion industry including development of the production of fashion goods. European designers and the operation of the Parisian couture are surveyed in addition to the American fashion industry and American designers.

Class 4, Credit 4

BRER-524 **Fashion Accessories**
Registration #0109-524
Determination of quality, value, and selling points. Government regulations for leather goods, shoes, gloves, handbags, furs, luggage, jewelry, cosmetics, umbrellas, wigs, and other accessories; information necessary for selection and merchandising.

Class 4, Credit 4 (offered upon demand)

BRER-531 **Basic Interior Design**
Registration #0109-531
A study of the basic elements and principles of design. A variety of art media and techniques are explored as applied to interior design.

Lab. 8, Credit 4

BRER-532 **Interior Design I**
Registration #0109-532
Planning the home and its furnishings, with special attention to functional space arrangement; application of concepts of abstract design to the utilitarian object; presentation of plan showing selection of furnishings and colors.

Class 2, Lab. 4, Credit 4

BRER-533 **Interior Design II**
Registration #0109-533
Development of a functional plan for the interior, selection of merchandise and architectural materials; presentation of plan by means of elevations, perspective, renderings, or model; exploration of media for presentation; field trips. (BRER-532)

Class 2, Lab. 4, Credit 4

BRER-534 **Interior Design History**
Registration #0109-534
A study of architecture and furnishings as expressive of social, economic, political, and technological developments. Emphasis on significant and lasting design developments from each period. This course covers the history of interior design from antiquity through the present. (BRER-533)

Class 4, Credit 4

BRER-535 **Advanced Interior Design**
Registration #0109-535
Continuation of Basic Interior Design, BRER-531

Lab. 8, Credit 4

BRER-545 **Color and Design**
Registration #0109-545
Basic principles of design, color harmonies, associations and color schemes as they apply to both apparel and home furnishing. Practical application of these principles to determine the level of good taste.

Class 4, Credit 4 (offered upon demand)

BRER-554 **Seminar in Retailing**
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)

Class 4, Credit 4/Qtr. (maximum 12 credits allowed)

Graduate Business Courses

Business Administration Courses

Acc6unting Group

BBUA-701 **Financial Accounting**
Registration #0101-701
An introduction to financial accounting. Topics covered will include financial statements, transaction analysis; accounting for revenues, costs, and expenses; accounting for assets, liabilities and owner's equity; measurement; and the use of financial statements.

Credit 4 (offered each year)

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

Credit 4 (offered each year)

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

Credit 4 (offered each year)

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

Credit 4 (offered each year)

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

Credit **4** (offered each year)

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

Credit **4** (offered each year)

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

Credit **4** (offered each year)

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

Credit **4** (offered upon sufficient demand)

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

Credit **4** (offered each year)

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

Credit **4** (offered each year)

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

Credit **4** (offered each year)

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 admission to the MS in accountancy)

Credit **4** (offered each year)

Business Group

BBUB-740 **Organizational Behavior**
Registration #0102-740
Organization analysis through the study of individual and group behaviors within organizations. The implications of studies from psychology and social psychology are stressed. Topics include motivation, leadership, group dynamics, conflict, communication, stress, and individual and group development.

Credit 4 (offered each year)

BBUB-741 **Organization and Management**
Registration #0102-741
Develops the analyses of organizations by studying the systems and subsystems that make up the organization. These systems include the technological, structural and managerial subsystems as well as the environmental suprasystem. Included are topics such as organization effectiveness and organization development. (BBUB-740)

Credit 4 (offered each year)

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

Credit 4 (offered upon sufficient demand)

BBUB-743 **Operations Management**
Registration #0102-742
An analytical approach to the theory and application of operations management. Combines quantitative models and qualitative considerations relating to forecasting, inventory management, quality control, and queuing analysis. Statistical reasoning and computer utilization are basic tools in problem solution. (BBUQ-780, -782)

Credit 4 (offered each year)

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

Credit 4 (offered each year)

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

Credit 4 (offered upon sufficient demand)

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

Credit 4 (offered each year)

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

Credit 4 (offered ^ach year)

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

Credit 4 (offered each year)

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

Credit 4 (offered each year)

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

Credit 4 (offered each year)

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

Credit 4 (offered each year)

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

Credit 4 (offered each year)

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

Credit 4 (offered each year)

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

Credit 4 or 8 (option to be developed with selected faculty)

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

Credit 4 (offered upon sufficient demand)

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

Credit 1-4 (variable) (offered subject to review)

Finance and Economics Group

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

Credit 4 (offered each year)

BBUF-722 **Financial Management II**
Registration #0104-722
Liability and equity management receive primary emphasis; to include short and intermediate term financing, long term financing leases, capital structure, dividend policy, and bankruptcy and reorganization. Theory and application approaches are shared. (BBUF-721)

Credit 4 (offered each year)

BBUF-723 **Theory of Finance and Research**
Registration #0104-723
This course involves a study of the current literature and most recent development relating to the theories of investment and valuation, cost of capital, risk and dividend policy. Also considered are specific areas of application and the policy implications of the theories studied. (BBUF-722, BBUF-767)

Credit 4 (offered each year)

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

Credit 4 (offered each year)

BBUF-72S **Securities and Investment Analysis**
Registration #0104-725.
Study of securities and various investment media and their markets. Analysis of investment values based on financial and other data. Considers factors such as return growth, and risk. (BBUF-722)

Credit 4 (offered each year)

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

Credit 4 (offered upon sufficient demand))

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

Credit 4 (offered each year)

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

Credit 4 (offered each year)

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

Credit 4 (offered each year)

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

Credit 4 (offered each year)

BBUF-768 **Advanced Macroeconomic Theory**
Registration #0104-768
An advanced study of the fluctuations and growth of economic activity in a modern complex society. Topics include measuring macroeconomic activity; modeling economic activity; 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. (Foundation courses)

Credit 4 (offered each year)

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. (Foundation courses)

Credit **4** (offered each year)

BBUB-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** (offered each year)

BBUB-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** (offered each year)

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** (offered upon sufficient demand)

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

Credit **4** (offered each year)

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

Credit **4** (offered upon sufficient demand)

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** (offered each year)

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** (offered each year)

Quantitative Group

BBUQ-780 **Quantitative Analysis**
Registration #0106-780
An introduction to quantitative approaches to decision making. Topics covered include linear programming, decision theory, computer simulation, and calculus-based solution procedures. The emphasis is not on the techniques per se, but rather on showing how quantitative approaches can be used to contribute to a better decision making process. (BBUQ-781 or concurrent registration)

Credit- 4 (offered each year)

BBUQ-781 **Statistical Analysis I**
Registration #0106-781
A study of probability and statistics including discrete and continuous probability distributions, sampling distributions, point estimation, and interval estimation. Applications are made to the managerial decision making situation. The use of SPSS in analyzing data will be introduced. (Knowledge of undergraduate algebra is presumed)

Credit 4 (offered each year)

BBUQ-782 **Statistical Analysis II**
Registration #0106-782
A continuation of topics from classical statistics including hypothesis testing, nonparametric tests, analysis of variance, regression and correlation analysis. All students will analyze several data sets using SPSS. (BBUQ-781)

Credit 4 (offered each year)

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

Credit 4 (offered upon sufficient demand)

BBUQ-785 **Applied Regression Analysis**
Registration #0106-785
The primary objective of this course is to teach the student howto effectively utilize a variety of data analysis techniques commonly referred to as regression analysis. Emphasis will be placed on model formulation and analysis. All students will be required to analyze several large data sets using SPSS. Relevant theory will be introduced to enable the student to pursue further study in data analysis. (BBUQ-782)

Credit 4 (offered each year)

BBUQ-786 **Mathematical Programming**
Registration #0106-786
An in-depth investigation of several mathematical programming techniques with an emphasis upon model development and the decison making process. Specific topics include linear programming, goal programming, and integer programming. (BBUQ-780)

Credit 4 (offered upon sufficient demand)

BBUQ-788 **Survey Design and Sampling**
Registration #0106-788
The following topics in survey design and sampling are covered: questionnaire development; types of sampling techniques; determination of sample size; methods for increasing the response rate; interpretation of results and report preparation. Students will be required to design a questionnaire, administer it, and analyze the results. (BBUQ-782)

Credit 4 (offered upon sufficient demand)

BBUQ-789 **Simulation**
Registration #0106-789
An introduction to the various uses of simulation as a management tool for decision making. Models of varying levels of sophistication employing simulation programming languages are constructed. (BBUQ-782)

Credit 4 (offered upon sufficient demand)

BBUQ-793 **Business Forecasting Methods**
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 procedure to use based upon an analysis of problem characteristics. A significant part of the course will involve analyzing several data sets using a set of interactive forecasting or econometric programs such as SIBYL/RUNNER and TSP. (BBUQ-785 or permission of the instructor)

Credit 4 (offered each year)

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 for large-scale data sets. Students will be required to use a standard statistical package (SPSS, BMDP, TSP) to carry out the analytical procedures. A major emphasis is placed on the interpretation of analytic output in terms of the decision making situation underlying the problem being investigated. (BBUA-770)

Credit 4 (offered each year)

BBUQ-795 **Seminar in Decision Sciences**
Registration #0106-795
This course will fake on different content depending on the instructor and quarter when offered. Topics which may be covered are: multivariate analysis, simulation, operations research, linear programming and Bayesian techniques. Specific content for a particular quarter will be announced prior to course offering. (Permission of instructor)

Credit 4 (offered each year)

Human Services Group

BBUH-701 **Economic Environment of**
Registration #0115-701 **Human Services**
Studies of the macroeconomic forces impacting the agency environments, such as funding and service populations, and the microeconomic concepts which can be used to aid agency resource allocation decisions and in the analysis of alternate agency policies. Topics include national income concepts and policies and economic demand for services and benefit/cost considerations. (BBUQ-781)

Credit 4 (offered each year) '

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, BBUH-712)

Credit 4 (offered each year)

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. (BBUB-740)

Credit 4 (offered each year)

BBUH-721 **Organization and Management**
Registration #0115-721 **in Criminal Justice**
Considerations of organization, management, and planning as tools of the administrator with emphasis on bureaucracy, authority, power, decision making, and tactics and strategies of effective management. Special consideration will be given to the problems of management in criminal justice agencies, law enforcement agencies, and correctional institutions. (BBUB-741)

Credit 4 (offered on demand)

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BBUH-722 **Administration in the Social Work Setting**
Registration #0115-722 **/-**
Application of administrative skills and methods applicable to the social worker, with attention to the needs determined by the non-profit organizational structure. Topics include areas of administration and management concerns, planning, development, the various supervisory roles, personnel, evaluation, and special concerns arising from funding considerations. (BBUB-741)

Credit 4 (offered on demand)

BBUH-731 **Intervention in the Community**
Registration #0115-731
Methods of agency intervention in specific problem areas, identified as needed by the community, yvith focus on the role of management. Covers approaches to community intervention with special attention focused on such problems areas as crime, poverty, health, mental health, education, cultural resources, and population conflict. Issues will regard the manner in which agencies formulate Interventive strategies and implementation, particularly as the process involves the management role. (BBUA-712)

Credit 4 (offered each year)

BBUH-732 **Cooperation and Conflict**
Registration #0115-732
Establishing working relationships between various providers of services and the resolution of system conflict. Topics to be covered include: the development of conflict between and within agencies, the evolution of a cooperative system of services, incompatible interest groups, competition among providers, problems of limited funding, and problems associated with the growth or decline of services. Emphasis is placed on the manager in the resolution of conflict. (BBUB-741, BBUH-712)

Credit 4 (offered each year)

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

Credit 4 (offered each year)

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

Credit 4 (offered each year)

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

Credit 4 (offered each year)

College of Continuing Education

Graduate Courses in Applied and Mathematical Statistics

CTAM-711 **Fundamentals of Statistics I**
Registration #0240-711
For those taking statistics for the first time. Covers the statistical methods used most in industry, business and research. Essential for all scientists, engineers, and administrators.

Topics: organizing observed data for analysis and insight; learning to understand probability as the science of the uncertain; concepts of practical use of the Central Limit Theorem. (Consent of the department).

Credit 3 (offered each quarter)

CTAM-712 **Fundamentals of Statistics II**
Registration #0240-712
Continuation of CTAM-711

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

Credit 3 (offered each quarter)

CTAM-721 **Quality Control: Control Charts**
Registration #0240-721
A practical course designed to give depth to practicing quality control personnel.

Topics: statistical measures; theory, construction, and application of control charts for variables and for attributes; computerization procedures for control charts; tolerances, specifications, and process capability studies; basic concepts of total quality control, and management of the quality control function. (Consent of the department.)

Credit 3 (offered in Fall and Spring Quarters)

CTAM-731 **Quality Control; Acceptance Sampling**
Registration #0240-731
Investigation of modern acceptance sampling techniques with emphasis on industrial application.

•Topics: single, double, multiple, and sequential techniques for attributes sampling; variables sampling; techniques for sampling continuous production. The course highlights Dodge-Romig plans, Military Standard plans, and recent contributions from the literature (Consent of the department.)

Credit 3 (offered in Winter and Summer Quarters)

CTAM-751 **Introduction to Decision Processes**
Registration #0240-751
A first course in statistical decision theory featuring concrete situations and realistic problems.

Topics: basic statistical ideas; how to make the best decision prior to sampling, after sampling, sequentially; optimum managerial srategies, practical applications. (Consent of department)

Credit 3 (offered in Fall Quarter)

CTAM-761 **Reliability**
Registration #0240-761
A methods course in reliability practices; what a reliability engineer must know about reliability prediction, estimation, analysis, demonstration, and other reliability activities. Covers most methods presently being used in industry.

Topics: applications of normal, binomial, exponential, and Weibuilt graphs to reliability problems; hazard plotting; reliability confidence limits and risks; strength and stress models; reliability safety margins, truncated and censored life tests; sequential test plans; Bayesian test programs. (CTAM-712 or equivalent)

Credit 3 (offered in Spring Quarter)

CTAM-801 **Design of Experiments I**
Registration #0240-801
How you design and analyze experiments in any subject matter area; What you do and why.
Topics: basic statistical concepts, scientific experimentation, completely randomized design, randomized complete block design, nested and split plot designs. Practical applications to civil engineering, pharmacy, aircraft, agronomy, photoscience, genetics, psychology, and advertising. (CTAM-712 or equivalent.)

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

CTAM-802 **Design of Experiments II**
Registration #0240-802
Continuation of CTAM-801
Topics: fractorial experiments; factional, three level, mixed; response surface exploration. Practical applications to: medical areas, alloys, highway engineering, plastics, metallurgy, animal nutrition, sociology, industrial and electrical engineering. (CTAM-801.)

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

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

Credit 3 (offered in Fall Quarter)

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

Credit 3 (offered in Winter Quarter)

CTAM-830 **Multivariate Analysis**
Registration #0240-831
Deals with the summarization, representation, and interpretation of data sampled from populations where more than one characteristic is measured on each sample element. Usually the several measurements made on each individual experimental item are correlated, so univariate analysis should not be applied to each measurement separately. This course covers the use of the basic multivariate techniques. Computer problem solving will be emphasized. Topics will include multivariate, t-test, ANOVA, regression analysis, repeated measures, quality control and profile analysis. (CTAM-801, 802)

Credit 3 (offered in Spring Quarter)

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

Credit 3 (offered in Summer only)

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

Credit 3 (offered in Winter Quarter)

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

Credit 3 (offered in Spring Quarter)

CTAM-851 **Nonparametric Statistics**
Registration #0240-851
Distribution-free testing and estimation techniques with emphasis on applications.
Topics: sign tests; Kolmogorov-Smirnov statistics; run tests; Wilcoxin-Mann-Whitney test; Chi-Square tests; rank correlation; rank order tests; quick tests. (CTAM-712 or equivalent.)

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

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

Credit 3 (offered in Winter Quarter)

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

Credit 3 (offered in Winter and Summer Quarters)

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

Credit 3 (offered in Fall Quarter)

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

Credit 3 (offered in Summer Quarter)

CT AM-891, 892, 893 **Special Topics in Applied Statistics**
Registration #0240-891, -892, -893
This course provides for the presentation of subject matter of important specialized value in the field of applied and mathematical statistics not offered as a regular part of the statistics program. (Consent of the department.)

Credit 3/Qtr. (offered upon sufficient demand; usually in Fall Quarter)

CT AM-895 **Statistics Seminar**
Registration #0240-895
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)

CTAM-896, 897, 898 **Thesis**
Registration #0240-896, -897, -898
For students working for the MS degree in applied and mathematical statistics who use a research project and thesis for three, six or nine credits. (Consent of the department.)

Credit 3 (offered each quarter)

College of Engineering

Computer Engineering

Required Courses

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

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

EECC-655 **Real-Time Computation**
Registration #0306-655
Principles and applied problems in real-time computation and process control using microprocessors as laboratory equipment. Topics include interrupt handlers, multi-tasking concepts, process synchronisation, response time considerations for interrupt driven and polled I/O and elements of computer communications.

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

EECC-660 **Interface Electronics and Logic**
Registration #0306-660
Introduction to some common transducers, transformations from raw measured quantity to transducer output. Instrumentation amplifiers, analog switching for applications in multiplexors and sample and hold circuits. The analog to digital and digital to analog conversions processes. Analysis and synthesis of sequential machines using asynchronous and synchronous discrete logic as well as programmed logic. (EEE-643)

Class 3, Lab. 3, Credit 4 (S, Sr)

Technical Electives

EECC-731 **Advanced Computer Architecture**
Registration #0306-731
Function, structure and performance of computer systems. Bus systems. Concurrency, multiprocessing. High level language based systems. Dataflow machines. Microsystems. (Computer Architecture HCSS-520 or -720, Computer Architecture IHCSS-545)

Class 4, Credit 4 (S)

EECC-733 **Fault-Tolerant Computer Systems**
Registration #0306-733
Formal models and concepts in fault diagnosis. Test generation and minimisation redundant and self-checking systems. Fault tolerant hardware and software based computer systems. (Switching TheoryHCSS 400 or EEEE-650 or EEEE-750, or Computer Architecture HCSS 520 or 720)

Class 4, Credit 4 (S)

Electrical Engineering

Required Courses and Scheduled Technical Electives

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

EEEE-201 **Introduction to Electrical Engineering**
Registration #0301-201
This course is actually divided into two parts. The first part is an introduction to electrical engineering. It consists of a 3 hr./week lecture-laboratory dealing with various facets of electrical engineering. Each week a topic is discussed with a section of students followed immediately by “hands on” experience in the laboratory.

The second part consists of a 2 hr./week graphics laboratory which stresses elementary graphic communication techniques. The accent here is on the graphical description rather than on drafting methods.

Class 3, Lab. 2, Credit 4 (Fall Qtr.)

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

Class 4, Credit 4 (Fall and Winter Quarter)

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

Class 3, Lab. 3, Credit 4
EEEE-351 (Spring and Summer Quarter)
EEEE-352 (Fall and Winter Quarter)
EEEE-353 (Spring and Summer Quarter)

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

Class 4, Credit 4 (Spring and Summer Quarter)

EEEE-441, 442 **Electronics I, II**
Registration #0301 -441, -422
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 (Fall and Winter Quarter)
EEEE-472 Class 3, Lab. 3, Credit 4 (Spring and Summer 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-353)

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-613 Introduction to Automatic Controls
Registration #0301-613
A one<|uarter 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-430, SMAM-420)

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

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

Class 4, Credit 4 (Fall and Winter Quarter)

EEEE-643 Digital Electronics
Registration #0301-643
The objective of this course is to teach students how to analyse 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, I^2L, DTL, T^2L, ECL, CMOS, NMOS, and PMOS. A discussion of the applications and characteristics of analog switches concludes the course. This course is a prerequisite for EEEE-665. (EEEE-340, 352, 442, SMAM-306)

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

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

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

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

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 analyses the major parts of a computer including the CPU, memory and I/O structure. Computer instruction sets and addressing methods are discussed and then applied to the machine language programming of computers. Software and hardware aspects of input/output are discussed along with consideration of special I/O chips The course concludes with discussions of 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-643, 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 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 system software aids used in microcomputer development systems to produce efficient modular code will be covered. Several aspects of hardware/software organisation of input/output programs will be considered including interrupts and direct memory access The use of special LSI interface devices to connect a microcomputer with peripheral devices such as AID and DIA converters, CRT terminals, floppy disks, etc. will be studied. Laboratory sessions will be used to provide experience in the use of software development systems, incircuit emulators, and logic analysers 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
Hybrid and monolithic microelectronic technology; processes in thick film and thin film circuit fabrication; complementary nature of monolithic and film circuits; impact of fabrication, testing and quality control on microcircuit design. (EEEE-442)

Class 4, Credit 4 (Summer and Fall Quarter)

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

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 ?eros 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-430)

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. (EEEE-634, 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 cicuits 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-430, 531)

Class 3, Lab. 3, Credit 4

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

Class 3, Lab. 1, Credit 4

EEEE-621 Transmission Propagation and Waves
Registration #0301-621 (Applied Electromagnetic Theory)
A course in guided and unguided wave propagation: transmission lines, wave guides, antennas, antenna arrays, radio-frequency, and optical interference and diffraction; aperture effects and beam-forming. (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 familiarise and review optical fundamentals but to introduce state of the art concepts and applications. Fundamental aspects of laser operation, lens system analysis, optical modulation, optical detection, and noise problems associated with optical components will be discussed. Applications to fiber optic, integrated optic, and solar systems will be considered A demonstration lab complements course activities. (SPSP-314, 315; EEEE-471, 472—concurrent)

Class 3, Lab. 3, Credit 4

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

Cljass 3, Lab. 3, Credit 4

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

Class 4, Credit 4

EEEE-676 I.C. Processing Laboratory
Registration #0301-676
This is a laboratory course designed to introduce the student to integrated circuit processing. The following topics will be investigated: safety, vacuum technology and evaporation of metals, artwork generation, photoreduction, photoresist technology, wafer characterisation, wafer cleaning, metal semiconductor fabrication, diffusion, solar cell fabrication, MOS transistor fabrication, wire bonding and packaging. Each laboratory exercise requires extensive preparation on the part of the student, in the form of research, reading, computations and device design. (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 quantisation errors in digital computations will be considered. Digital processing will be related to analog processing through the sampling theorem and a discussion of the methods of sampling, A/D and D/A conversion. Class projects will deal with digital filter design and implementation using microcomputer hardware (EEEE-430 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, equalisation in recording and playback, and an introduction to the application of digital techniques to audio. (EEEE-430, 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-634, EEEE-472)

Class 3, Lab. 3, Credit 4 /

Graduate Courses in Electrical Engineering

The graduate courses in electrical engineering are currently being revised. The following is only a listing of the titles of graduate courses that will become effective Fall, 1982. For course descriptions and related information, the interested student should consult the Graduate Bulletin, 1982/83.

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

All courses are 4 credits unless otherwise stated.

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

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

Credit variable

Industrial Engineering

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

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EI EI-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-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 psychomotor 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 analysing 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)

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

EI EI-481 Management Theory and Practice
Registration #0303-481
Development of the fundamental principles of the industrial enterprise. Internal organisation as well as general economic conditions are considered. Emphasis is placed on the role of behavioral science. (Sp)

Class 4, Credit 4

EIEI-503 Simulation
Registration #0303-503
A first course in simulation emphasising the role of the computer in developing simulation models. The GASP IV simulation language is emphasised. (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)

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

EI EI-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, analyse, 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

EI EI-482 Production Control I
Registration #0303-482
A basic course in production control emphasising 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

EI EI-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

EI EI-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 7 transforms; transform methods for solving differential, difference and differential-difference equations; feedback networks; classical optimization techniques; search techniques; theory of graphs. (5th year I.E. standing or consent of instructor)

Class 4, Credit 4

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

Class 4, Credit 4

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

Class variable, Credit variable

Graduate Courses

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

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

Credit 4

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

Credit 4

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

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

Credit 4

EI EI-701 Principles of Operations Reseach I
Registration #0303-701
Applied linear programming. Computational techniques for solving constrained optimisation 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 optimisation techniques; quadratic, stochastic, integer programming and dynamic programming. Applications to industry. (EIEI-701)

Credit 4

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

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

Credit 4

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

Credit 4

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

Credit 4

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

Credit 4

El EI-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 Factofte I
Registration #0303-703
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
Registration #0303-771, -772, -773, -774 Engineering
This is a variable credit, variable topics course which can be in the form of regular courses or independent study under faculty supervision.

Credit variable (maximum 4 per course number)

Mechanical Engineering

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

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

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

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

Class 4, Credit 4 (F, W)

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

Class 4, Credit 4 (W, Sp)

EMEM-336 Statics
Registration #0304-336
This basic course treats the equilibrium of rigid bodies under the action of forces. It integrates the mathematical subjects of calculus, vector algebra, and simultaneous algebraic equations with the physical concepts of Newton's laws. (SPSP-205; Corequisite: SMAM-253)

Class 4, Credit 4 (F)

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

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

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

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

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

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

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

Class 2, Credit 2 (W)

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

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

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

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

EMEM-413 Thermodynamics I
Registration #0304-413
A basic course that introduces the mathematical theory of thermodynamics via a series of classical experiments. After the complete first law analysis of air standard engines and refrigerators (Carnot,[1]' Otto, Diesel, etc.), the Clausius and Kelvin statements of the second law are correlated with the concept of entropy. Both real and reversible processes are studied on the pressure vs. specific volume and the temperature vs. entropy coordinate systems. (SMAM-306, EMEM-336)

Class 4, Credit 4 (F, W)

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

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

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

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

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

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

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

Class 4, Credit 4 (F, W)

**Extended Day Schedule*

EMEM-439 **Dynamics I**
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-field 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)

EMEM-440 **Numerical Modeling for Engineers**
Registration #0304-440
The solution of engineering problems requiring numerical solution. Included are the formulation of mathematical models of the problems, a study of numerical procedures suitable for their solution, the development of computer programs to carry out the procedures, and the analysis of the results. Problems will be taken from the student's background in solid body mechanics and thermodynamics. Extensive use of the computer is required. (EMEM-341, or equivalent computer experience, and third year standing.)

Class 4, Credit 4 (Sp, Su)

EMEM-501 **Mechanical Engineering Laboratory**
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 2, Lab. 4, Credit 4 (Sp, Su)

EMEM-514 . **Heat Transfer I**
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)

EMEM-516 **Fluid Mechanics II**
Registration #0304-516
A continuation of incompressible flow through pipes and ducts as first considered in Fluid Mechanics I, including an analytical treatment of Poiseuille and Couette flow. Flow measurement using obstruction meters. Boundary layer concepts, von Karman momentum integral equation and the special case of laminar and turbulent boundary layer for a flat plate. Flow about immersed bodies, concepts of lift and drag, circulation. One-dimensional compressible flow: topics include review of thermodynamic fundamentals, insentropic stagnation quantities, converging-diverging nobles and normal shock waves (EMEM-415)

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

EMEM-543 **Dynamics II**
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 analysed by classical methods and by using the analog computer. The laboratory introduces the vibrations of single particle systems. (EMEM-439)

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

EMEM-544 **Dynamics of Physical Systems I**
Registration #0304-544
A basic course in the dynamics of physical systems (vibrations). Singularity functions are defined and introduced in detail. The unit doublet, the unit impulse, the unit step, the unit ramp, and the unit parabolic functions are used to force various second order systems. The sinusoidal function is also used. The response to these inputs of various systems with various degrees of damping are drawn in detail in the classroom as well as in the accompanying laboratory. The root locus method is introduced by using phasors, and the Bode plots are introduced and drawn. The block diagram is used as a means of describing system elements. Classical analogs are used to show the analogous properties of lumped parameter electrical, mechanical, thermal, and fluid systems.

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

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

EMEM-599 **Independent Study**
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)

EMEM-632 **Advanced Mechanical Systems Design**
Registration #0304-632
Structural dynamics considerations in the design of advanced mechanical systems. Principles of modal analysis. Finite element analysis procedures, including concepts, modeling, and problem coding. Experience in the application of a large finite element program to a complex mechanical system. Fracture mechanics procedures and their use in the design process. A design project based on practical engineering situations is required. (EMEM-437)

Class 4, Credit 4 (Sp)

EMEM-635 **Heat Transfer II**
Registration #0304-635
This course studies analytic and numerical solutions to multi-variable problems, heat conduction, convective heat transfer over complex geometries, pool boiling, and condensation of pure substances. Also covered is radiative heat transfer with wavelength dependent characteristics as well as heat exchanger design by LMTD and effectiveness NTU methods. (EMEM-514, EMEM-440)

Class 4, Credit 4 (Sp, Su)

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 (F, W)

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. 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)

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 ^{7}ETA plotter are used. (EMEM-439)

Class 4, Credit 4 (F, W)

**Extended Day Schedule*

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

Class 4, Credit 4 (Sp, Su)

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

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

Class 4, Credit 4 (F, W)

EMEM-620 **Introduction to Optimum Design**
Registration #0304-620
Introduction to some basic optimisation techniques for engineering design with emphasis on real applications in the work of mechanical design synthesis. Topics covered include: basic theory and techniques for optimisation of engineering designs, with emphasis on the method of optimum design, method of linear programming, method of Lagrangian multipliers, and the use of digital computers. Summary comparison of various optimisation techniques. Many real problems and industrial examples are covered. An introduction to system design, and the optimal design of a torsion bar for a vehicle suspension system.

A knowledge of the fields of differential and integral calculus, physics, digital computation programming, statics and dynamics of rigid bodies, and mechanics of materials is needed. (EMEM-440, EMEM-543)

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

EMEM-625 **Creative Design of Mechanical Devices**
Registration #0304-625 **and Assemblages**
Purpose of the course is to study basic problems of creative design, to present explicit techniques for simulating creative action in the work of mechanical design synthesis, and to illustrate applications of the same in real 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.

An elementary knowledge of force equilibrium, kinematics of rigid bodies, physics, and a basic interest in the synthesis of new devices in mechanical engineering design is assumed. (EMEM-543)

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

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

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

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

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

EMEM-679 **Dynamics of Physical Systems II**
Registration #0304-679 •
A continuation of EMEM-544. Review of systems analyses and block diagrams. Introduction to the Laplace transform (one-sided negative transform) and its use in stating transfer functions. Stability criteria using Bode plots. Design of systems using root-locus method. Some real control systems will be discussed and analysed.

One laboratory every other week is devoted to using the analog computer as a tool in the stability criteria of real systems. Each student will be required to undertake a project involving the design, analysis, and fabrication of a device incorporating control and feedback principles. (EMEM-544)

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

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

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

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

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

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

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

EMEM-689 **Patent Law and Protection**
Registration #0304-689
A study of protection of intellectual property including study of patent rights, inventions, procedures for obtaining patents as well as a study of the lawand 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.)

Advanced and special courses offered upon sufficient demand (at least 12 students registered):

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

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

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

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

EMEM-669 **Introduction to Water Pollution**
Registration #0304-669
Water supply requirements and waste water volumes; transportation and waste water systems; physical, chemical and biological processes for treatment of waste water and sludges, unit processes hydraulics and design of sewers; reuse of water

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

EMEM-690 **Environment and the Engineer**
Registration #0304-690
This course will study the role of engineers in society and in particular their responsibility in the analysis and solution of the problems facing the environment in an increasingly technological society. Problems to be studied from a "case study" standpoint will include such things as air, water, and noise pollution, thermal pollution, and the effects of population growth. The course will include field trips, outside expert speakers, and each student will be expected to participate in the in-depth study of one problem of particular interest to him or her and to submit a formal report to the class. Use of the digital and analog computing facilities as a systems simulation tool will be encouraged.

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

Graduate Courses

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

Credit 4 (F)

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

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

Credit 4 (T.B.A.)

EMEM-815 **Experimental Stress Analysis**
Registration #0304-815
Experimental methods of analysis of structural machine members, including strain gages and instrumentation, photoelastic methods, brittle coating, 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. Utilisation of these elements in solving specific structural problems. Introduction to three-dimensional stress analysis. Features of large general-purpose computer programs. (EMEM-694 or equivalent)

Credit 4 (T.B.A.)

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

EMEM-821 **Vibration Theory and**
Registration #0304-821 **Applications**
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. Computer situations.

Credit 4 (T.B.A.)

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

Credit variable (maximum of 4 credits/quarter)

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

Credit 4 (T.B.A.) >

EMEM-845 **Turbomachinery**
Registration #0304-845
One-dimensional analysis of centrifugal pumps, water tubines, 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**
Registration #0304-848, -849 **Fluid Systems**
An opportunity for the advanced student to undertake an independent investigation in the area of thermo fluid systems. Assistance will be given only when the student requests it. The project may be a comprehensive literature investigation, a theoretical study, or an investigation involving laboratory experiment.

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

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

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

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

Credit 4 (T.B.A.)

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

Credit 4 (W) /

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

Credit 4 (Sp)

EMEM-873 **Heat Transfer**
Registration #0304-873
Formulation of the heat conduction equation, solution of the one-dimensional, unsteady heat conduction equation by separation of variables: Sturm-Liouville system, orthogonal functions, generalised Fourier series, Bessel functions. Solution of the two-dimensional, steady heat conduction equation; Cartesian and cylindrical geometry. (SMAM-308, EMEM-514)

Credit 4 (Sp)

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

Credit 4 (F)

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

Credit 4 (W)

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

Credit 4 (R

EMEM-890 **Research and Thesis Guidance**
Registration #0304-890
In conference with a thesis advisor, a topic is decided on, and either a theoretical or laboratory type research program is carried out. Periodic progress reports and final written thesis with oral examination

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

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

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

Microelectronic Engineering

AMCR-210 **Introduction to Microelectronics**
Registration #0005-210
This course will provide the student with introductory and career information about the profession of microelectronic engineering.

Class **1,** Lab. 2, Credit 2

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

Class 1, Lab. 2, Credit 2

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

Class 4, Credit 4

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

Class 4, Credit 4

AMCR-540 **Electromagnetic Fields II**
Registration #0005-540
A study of time varying electromagnetic fields important to optical and 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

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

Class 4, Credit 4

AM CR-630 **Microelectronic Chemistry IV**
Registration #0005-630
A selection of topics from physical and plasma chemistry important to the understanding of integrated circuit processing.

Class 3, Lab. 3, Credit 4

AMCR-640 **Microelectronics**
Registration #0005-640
An intermediate level course in the study of integrated circuit processing.

Class 4, Credit 4

AMCR-650 **Integrated Circuit Processing Lab**
Registration #0005-650
A laboratory course in which the student builds an integrated circuit. The Integrated Circuit Facility is the laboratory for this course.

Class 1, Lab. 9, Credit 4

AMCR-660 **Seminar/Research**
Registration #0005-660
An investigation of a problem in microelectronic processing. Seminars by experts from the various phases of the microelectronic industry.

Class 1, Lab. 3, Credit 2

College of Fine and Applied Arts

School of Art and Design

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

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.

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 specific design topics of study: design for reproduction or computer graphics.

Lab. 6, Credit 3

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 identity, signage, audio-visual, packaging or computer graphics.

Lab. 18, Credit 9 (offered each year)

FADC-511,-512,-513 **z** **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 - Industrial Design
312 - Interior Design
313 - Package/Exhibit Design

Lab. 6, Credit 3 (offered each year)

FADD-320 **Graphic Visualization**
Registration #0403-320
Graphic visualization techniques for the development and presentation of concepts for three-dimensional designs. Familiarization with various media in developing and improving graphic communication skills of values to the designer.

Lab. 6, Credit 3 (offered each year)

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

Lab. **1**2, Credit 6 (offered each year)

FADD-411, -412, -413 **Design Applications**
Registration #0403-411, -412, -413
An elective that provides projects in industrial design, display interiors, and packaging, developed through visuals, materials and processes.

Lab. 6, Credit 3 (offered each year)

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

Lab. **18,** Credit 9 (offered each year)

FADD-511, 512, 513 **Design Applications**
Registration #0403-511, -512, -513
An elective that provides additional emphasis on professional procedures, functions, structure and processes as they apply to the design environment.

Lab. 6, Credit 3 (offered each year)

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FADF-201, 202, 203 **Design (Crafts Majors)**
Registration #0404-201, -202, -203
The elements of design and color and their structural relationship as applied to problems in three dimensions.

Lab. 6, Credit 3 (offered each year)

FADF-205, 206, 207 **Creative Sources**
Registration #0404-205, -206, -207
This course is designed to make students aware of their environment, their physical being and their experiences as tools for creative problem solving. This will be accomplished through lectures, individual and group assignments and demonstrations.

Class 1, Lab. 1, Credit 3 (offered each year)

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

Lab. 9, Credit 4 (offered each year)

FADF-221, 222, 223 **Photo Design I**
Registration #0404-221, -222, -223
The elements of design and color and their structural use as related to problems in two- and three-dimensional applications (One hour lecture)

Lab. 3, Credit 2 (offered each year)

FADF-231, 232, 233 **2-D Design**
Registration #0404-231, 232, 233
The elements of design and color and thetr structural relationship as applied to problems in two dimensions.

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

Lab. 6, Credit 3 (offered each year) V

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

Lab. 6, Credit 3 (offered each year)

FADF-321, 322, 323 **Photo Design II**
Registration #0404-321, -322, -323
Emphasis upon problems which are related to visual phenomena, fundamentals, and communications. (One hour lecture)

Lab. 3, Credit 2 (offered each year)

FADP-301, 302, 303 **Advanced Drawing**
Registration #0405-301, -302, -303
Three-quarter core course for fine arts program in painting and printmaking. Initial emphasis is placed upon objective mastery of form and space from a variety of sources. Study of the human figure including skeletal structure and superficial anatomy. Further development of drawings as a conceptual means with expanded media.

Lab. 6, Credit 3 (offered each year)

FADP-313 **Medical Illustration Carbon Dust Technique**
Registration #0404-313 **(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<|uarter 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, 333 **Illustration**
Registration #0405-321, -322, -333
One-quarter course exploring the art of illustrators; their relation to audience, publishers, and media. Studio problems will develop and expand basic concepts of illustration.
Studio sessions will be devoted to illustrative problems that reflect the class study for that period. Class critiques at appropriate times.

Class 3, Lab. 3, Credit 3 (offered each year)

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

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

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 photgraphic practice. Lab sessions to be scheduled in operating room facilities.

Jointly sponsored between RIT and the University of Rochester.

Lab. 18, Credit 6 (offered each year)

FADR-401, 402, 403 **Printmaking**
Registration #0406-401, -402, -403 **(Junior Major)**
Development of printmaking techniques through personal statements in lithography, etching and relief printing (FADP-301, 302, 303)

Lab. 12, Credit 6 (offered each year)

FADR-411, 412, 413 **Printmaking**
Registration #0406-411, -412, -413
An elective providing the opportunity to explore personal statements through lithography, etching and relief (one per quarter)

Lab. 6, Credit 3 (offered each year)

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

Lab. 18, Credit 9 (offered each year)

FADR-511, 512, 513 **Printmaking**
Registration #0406-511, -512, -513
An elective that provides further exploration of printmaking with emphasis on personal statement.

Lab. 6, Credit 3 (offered each year)

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

Lab. 6, Credit 3 (offered each year)

School for American Craftsmen

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

Lab. 15, Credit 5 (offered each year)

FSCC-251, 252, 253 **Ceramics Elective I**
Registration #0409-251, -252, -253
An elementary course in design and techniques in ceramics. Hand built pottery and primitive firing techniques.

Lab. 6, Credit 3 (offered each year)

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 **Man and His Symbols**
Registration #0410-340
A concentration study of symbols, legends, and myths in the visual arts with emphasis on symbol making for communication.

Class 3, Credit 3 (offered each year)

FSCF-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)**
Sequential course for three quarters, treating the organization and construction of the glass studio, including the design and fabrication of furnaces, annealing ovens, burners, tools, and grinding equipment. The function and care of hand and machine glassworking tools. An analysis of glass as a material: its history, chemical makeup, intrinsic qualities, and potential. Fundamental techniques of glass fabrication, including gathering, marvering, and blowing the bubble; blocking; jacking; and puntying the piece.

Lab. 15, Credit 5 (offered each year)

FSCG-251, 252, 253 **Glass Elective I**
Registration #0411-251,-252, -253
Practical experience with furnace glass blowing is the main topic of this elective course. A portion of the course is a basic survey of the history, chemistry, techniques and technical aspects of glass.

Lab. 6, Credit 5 (offered each year)

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

Lab. 15, Credit 5 (offered each year)

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

Lab. 6, Credit 3 (offered each year)

FSCG-400 **Glass Materials and Processes**
Registration #0411-400 **(Junior Major)**
Sequential course for three quarters, introducing glass materials and their source of supply. An introduction to the mixing of batch glass. The formulation of various glass batches with an in-depth analysis of color and fuming techniques. The development of special glass batches for unique and specific purposes. At this stage the student will have developed a personal direction and rapport with glass

Lab. 15, Credit 5 (offered each year)

FSCG-500 Glass Techniques and Thesis
Registration #0411 -500 (Senior Major)
Sequential course for three quarters, introducing problems related to glass fabrication, culminating in a research and thesis project. The student is expected to organize and present an exhibition of his or her work in a manner to reflect a continuity and growth of style.

Lab. 24, Credit 8 (offered each year)

FSCG-520 Stained Glass
Registration #0411 -520
This elective teaches the basics to stained glass designing, cutting, soldering, leading, glazing and other fabrication techniques.

Lab. 6, Credit 3 (offered each year)

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 jewelry design and production in various metals. Fundamental techniques in hollow ware; raising, forming, and planishing in copper, bronze, and brass. Discussion of design, materials, processes, and equipment.

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 more advanced study in metals either hollow ware or jewelry.

Lab. 6, Credit 3 (offered each yea'r)

FSCM-300 Metalcrafts Materials and Processes
Registration #0412-300 (Sophomore Major)
Sequential course for three quarters, introducing study of jewelry, hollow ware, and flat ware design, with production work in these areas. Analysis and discussion of design and production problems. Independent study, papers, reports.

Lab. 15, Credit 5 (offered each year)

FSCM-352, 352, 353 Metalcrafts Elective II
Registration #0412-351, -352, -353
An elective course providing an opportunity for more advanced study in metals either hollow ware 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, providing individual projects based on techniques presented in the second year. The survey of contemporary practice, including field trips. Lectures and research on decorative techniques. Independent study, papers, reports.

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 technical problems including a summarizing thesis.

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. Advanced veneering and finishing. Estimating and production techniques. Flexibility of machine tools, use of jigs and templates and studies of small shop capacity and layout. Historical development of furniture and interiors. Independent study, 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 construction in veneering, involving at least one marquetry project. Alternative methods of joinery and the flexible use of equipment. Analysis of construction problems in both traditional and contemporary furniture, requiring student research in comparative construction methods. Independent study, 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 Materials in Art Education
Registration #0401-701, -702 (Major)
Intensive study of curriculum in terms of teaching materials for both studio and appreciation aspects of elementary, early secondary and high school art education. Includes studio and elementary school teaching experience.

Class 2, Lab. 9, Credit 5 (offered every year-Fall, Winter)

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

Lab. 25, Credit 3 (offered every year-Spring)

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

Credit 9 (offered every year-Spring)

Graphic Design

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

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

Lab. 6, Credit 3 (offered every quarter)

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

Lab. 9-27, Credit 3-9 (offered every quarter)

Industrial and Interior Design

FADD-750 (elective, minor) Industrial and Interior Design
Registration #0403-750
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-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, or M)-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 G raduate Academic Council representative. Primary creative production, the thesis must also include a written report.

Lab. 27, Credit 3-12 (offered every quarter)

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
This elective explores stained glass designing, cutting, soldering, foiling, leading, glazing, and other fabrication techniques.

Lab. 6, Credit 3 (offered each year)

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

Lab. 6, Credit 3 (offered every quarter).

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

Lab. 9-27, Credit 3-9 (offered every quarter)

Metalcrafts and Jewelry

FSCM-750 (elective, minor) Metalcrafts and Jewelry
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

FSCT-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)

FSCT-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, silkscreen, 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.

Lab. 27, Credit 3-12 (offered every quarter)

College of General Studies

Criminal Justice

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

Class 3, Credit 4 (offered annually)

GCJC-306 **Introduction to Para-Legals**
Registration #0501-306
The course deals with criminal and civil law, matrimonial law, legal research, counseling, problem solving techniques, and lawyers' ethics as well as a study of community resources available to assist the client. (GCJC-201)

Class 3, Credit 4 (offered on sufficient demand)

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

Class 3, Credit **4** (offered on sufficient demand)

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

Class 3. Credit 4 (offered annually)

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

Class 3, Credit **4** (offered annually)

GCJC-403, 404 **Field Experience I & II**
Registration #0501-403, -404
This course is an internship practicum for preservice criminal justice students The course is designed to give the interning student first-hand experience observing and participating in a criminal justice or other appropriate agency in the public and private sector. The closely supervised student intern will acquire professional skills while learning organization, programs, and methods. (See Student Handbook)

Class variable, Credit 5 each (offered annually)

GCJC-405 **Major Issues in the**
Registration #0501-405 **Criminal Justice System**
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)[1]

Class 3, Credit 4 (offered on sufficient demand)

GCJC-409 Legal Rights of Convicted Offenders
Registration #0501-409
This course is designed to present an in-depth study of the substantive and procedural law as it affects convicted offenders. Considerable attention is devoted to the study of constitutional rights and privileges, how they apply to convicted offenders, and the methods employed to secure these rights. Conviction and its consequences are explored, as is the sentencing process. The rights of prisoners, probationers, and parolees are reviewed In addition, the various remedies for enforcement of these rights are discussed, including direct appeals, collateral attacks, and a variety of post-conviction remedies. The course is intended for students who wish to pursue a career in law enforcement, corrections, probation, parole, or law. However, students interested in some other aspect of criminal justice, which deals with convicted offenders, may find this course useful.

Class 3, Credit 4 (offered on sufficient demand)

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

Class 3, Credit 4 (offered on sufficient demand)

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

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered on sufficient demand)

GCJC-413 Civil Disobedience and Criminal Justice
Registration #0501-413
A survey of the philosophy and history of civil disobedience, civil 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-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
Registration #0501-510 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 surveying prospective counseling strategies for accomplishing desired behavioral change. (GCJC-201)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-511 Alternatives to Incarceration
Registration #0501-511
The course analyzes possible sentencing options available to the criminal courts as well as pre-adjudicatory alternatives for both adults and juvenile offenders. The variety of dispositions evaluated include: probation, parole, half-way houses, work-release, study-release, prison furloughs, pre-trial release, pre-probation alternatives (fines, suspended sentences, conditional discharge, and a variety of diversion programs). Special emphasis is placed on a critical evaluation of the alternatives as'they compare to the more traditional methods of handling offenders. Field trips and guest lecturers from non-traditional programs are typically included in the course (GCJC-207) (GCJC-411)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-512 Minority Groups and the
Registration #0501 -512 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
Registration #0501 -514 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 systems and the penal methods of Europe and the United States Major emphasis will be given to the issues of intent, criminal responsibility, individual and public interests, purposes and modes of prevention, repression and punishment, methods of trial, punishment and pardon. (GCJC-201)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-518 **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 ,f0vl°r „ h ,ma)or emphasis on the sociological forms of explanation, the tn nroJw-il ertake a h'storical review of criminality theory and progress (GCUC-201 2O3)OnC0mS °f b°,h etiol°9ical and epidemiological origins.

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 women as victims of crime in the past, present, and future It will focus mainly upon women as criminals, including theories about women in crime, types of crimes committed, patterns of criminality, and the treatment of women within the criminal justice system. Special attention will be given to a discussion and analysis of the changing role of women in crime

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered on sufficient demand)

GCJC-532 **Retail Security**
Registration #0501-532
This course provides an analysis of major security problems found within retail operations Subjects examined include internal and external theft prevention and detection, shoplifting techniques, the use of undercover personnel and shopping services, security audit, and training of security arid non-security personnel Warehousing and cargo controls are examined Emphasis will be place upon methods, techniques, and programs to protect assets

Class 3, Credit 4 (offered on sufficient demand)

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

Class variable, Credit **4** each (offered annually)

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)

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

Class 3, Credit 4 (offered on sufficient demand'

GCJC-537 **Legal Aspects of Security**
Registration #0501-537
An examination of the federal and state case law and statutory provisions that regulate the private security field The distinction between public and private enforcement; as well as the possible criminal and civil liabilities of private security personnel under the law of Wilful Torts including: false arrest and imprisonment; nuisance; defamation; and invasion of privacy

Class 3, Credit 4 (offered on sufficient demand)

GCJC-540 **Field Experience**
Registration #0501-540
This course is an internship practicum for preservice criminal justice students. The course is designed to give the interning student first-hand experience observing and participating in a criminal justice or other appropriate agency in the public and private sector. The closely supervised student intern will acquire professional skills while learning organi7ation, programs, and methods. At the end of the internship each student intern, also, will participate in an intensive one-week seminar which will serve as an additional learning experience, providing the student with an opportunity to share the knowledge and insights of his/her practicum with his/her peers and the faculty supervisor.

Class variable, Credit 8 (Must be taken in conjunction with #0501 -541). (See Student Handbook)

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

Class variable, Credit 4 (See #0501-540)

GCJC-542 **Field Research Techniques**
Registration #0501-542
This course will focus on developing the students' abilities to evaluate, and analy7e data from field settings with special emphasis on the use of qualitative research techniques such as observation, interviewing, content analysis, etc. Students will also have the opportunity to become acquainted with the various computer facilities at RIT as well as the use of the "microcomputer." (Through various projects which will emphasise data collection techniques through an experiential, hands-on approach as well as through lecture, demonstration and discussion.) Students will acquire the skills necessary to conduct social science research in field settings. (GCJC-401)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-599 **Independent Study**
Registration #0501-599
A combined student/faculty member effort on a chosen topic beyond the normal sequence of course selections. It provides the qualified self-motivated student with a creative orientation, the opportunity to develop an autonomous and personal sense of academic growth and achievement.

Class variable, Credit variable (offered annually)

Social Work

Core Courses

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

Class 3, Credit 4

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

Class 3, Credit 4

GSWS-215 **The Family From a Social Work**
Registration #0516-215 **Perspective**
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**
Registration #0516-411 **(Methods I)**
Methods of Social Work is a three-course sequence offered concurrently with laboratory or field experience. Methods of Social Work stresses the basic principles and skills of a generic approach to social work practice, emphasizing the differential use of social work techniques (e.g., interviewing skills, assessment, problem-solving) and Interventive skills in a variety of client systems.
Through lectures, discussions, readings, lab simulations and case analysis, it is the overall objective of the sequence to provide the student with the knowledge, skill and self-awareness for beginning professional social work practice. The development of this knowledge, skill and awareness is seen as a progressive process underlying and underpinning the three-course sequence. (GSWS-210, 21,1, 302, 315, 356 or concurrent)

Class 4, Lab. 4, Credit 4

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

Class 3, Credit 4 ,

GSWS-413 **I ntervention Strategies**
Registration #0516-413 **(Methods III)**
See GSWS-411 (GSWS-412,421 and 433; concurrent with GSWS-422 and 434)

Class 3, Credit 4

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

Field 300, Credit 5

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

Field 300, Credit 5

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

Class 2, Credit 4

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

Class 2, Credit 4

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

Class 3, Credit 4

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

Class 3, Credit 4

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

Class 3, Credit 4

Social Work Electives

GSWS-212 **Self-Awareness in the Helping Role**
Registration #0516-212
This course helps to develop students' helping skills in essentially three broad areas: 1) Skills in noticing or observing; 2) Observing one's professional use of self in the helping relationship and evaluating the appropriateness of such behavior; 3) Observing the client and evaluating the effect one's response has on him/her.
Students are expected and required to increase their awareness skills, and this course offers a unified learning experience where students can concentrate on the theory and practice of awareness skills. (GSWS-210)

Class 3, Credit 4

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

Class 3, Credit 4

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

Class 3, Credit 4

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

Class 3, Credit 4

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

Class 3, Credit 4

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

Class 3, Credit 4

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

Class 3, Credit 4

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

Class 3, Credit 4

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

Class 3, Credit 4

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

Class 3, Credit 4

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

Class 3, Credit 4 •

GSWS-341 **Psychosocial Implications of Deafness**
Registration #0516-341
The purpose of this course is to provide the student with an indepth examination of the psychosocial implications of deafness ***for the individual.*** The various systems with which the deaf individual interacts, as well as within which s/he interacts, will be examined for their relevance to the development and functioning of the individual We will also examine how the individual and these systems impact and influence each other These systems will include family, school, service delivery systems and society. (GSWS-340)

Class 3, Credit 4

GSWS-342 Intervention Strategies with the Deaf
Registration #0516-342
The purpose of this course is to build skills in applying the knowledge base (developed in the prerequisite courses) to case situations. Students demonstrate collection and recognition of pertinent information, and development and implementation of appropriate intervention plans. Legal and political issues as well as methods of assessing local resource networks are considered. Professional roles and intervention goals are discussed as they relate to interfacing systems, including individual, family, school, medical, mental health, rehabilitation, and employment. (GSWS-340, 341)

Class 3, Credit 4

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

Class 3, Credit 4

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

Class 3, Credit 4

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

Class 3, Credit 4

GSWS-380 / Social Work and the Law
Registration #0516-380
The main purpose of the legal orientation of 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 Grantsmanship
Registration #0516-525
This course introduces the student to guidelines and procedures employed in grant writing. Grantsmanship 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-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-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

General Studies Courses

Language and Literature

GLLC-220 **English Composition**
Registration #0502-220
This course develops the language skills needed to write effectively. It should be taken in the freshman year.

Class 3, Credit 4 (offered quarterly)

GLLC-421 **German I**
Registration #0502-421
This course will introduce students with no prior exposure to the language to some control of 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-422 **German II**
Registration #0502-422
This course is designed to give students further control of natural, modern German. A strong emphasis is placed on speaking and reading skills. Besides language, students will also study contemporary life and culture in the German-speaking countries. Although this is the second course of a three-course sequence, the course may be taken separately. (0502-421 or equivalent)

Class 4, Credit 4 (offered annually)

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

Class 4, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered annually)

GLLC-441 **Small Group Communication**
Registration #0502-441
Practice in analysis of a variety of small group discussion techniques focusing on phenomena such as processes of interaction, decision making, norms structure and development, membership, and theory of group development. This course is part of the Language Concentration and may not be taken as an elective. (0502-220 or equivalent)

Class 4, Credit 4 (offered annually)

GLLC-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 not 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 not 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 organisation, clarity, vocal expression, poise.

Class 3, Credit 4 (offered annually)

GLLC-514 **Mass Communication**
Registration #0502-514
Content will cover the theoretical and practical aspects of the mass media with particular emphasis on the relationship between government, the media, and the public.

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-518 **Creative Writing**
Registration #0502-518
Students are introduced to the craft of writing poems, stories, scripts, and personal essays.

Class 3, Credit 4 (offered annually)

GLLC-519 **Advanced Creative Writing**
Registration #0502-519
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 annually)

GLLC-520 **Vocabulary Building**
Registration #0502-520
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-547 **Practical Writing**
Registration #0502-547
An intensive review of ***practical*** writing skills with emphasis on regular writing assignments. Class periods will be devoted chiefly to analysis and evaluation by students of their writing. The aim of the course is to enable students to fulfill their academic and vocational writing demands with prose that is unified, coherent and accurate. By the end of the quarter students should be able to approach a writing assignment with reasonable ease and confidence.

Class 3, Credit 4 (offered quarterly)

GLLC-553 " Creative Interpretation in Sign
Registration #0502-553
Creative approaches to the interpretation of selected literary classics (prose, poetry, fiction, drama) through the visual medium of sign (sign language and sign-mime).

Class 3, Credit 4 (offered annually)

GLLL-332 Literature
Registration #0504-332
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-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 a study of a collection of short stories with critical commentary in order to provide source materials on the nature and development of this genre. This course is part of the Literature Concentration and may also be taken as ***An*** elective. (0504-332 or equivalent)

Class 3, Credit 4 (offered annually)

GLLL-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 aspirations, frustrations, and achievements of women as documented by themselves, as well as the perceptions and representations of women in literature by male writers. Works are examined for their literary value as well as their documentation of broader feminist issues. This course is part of the 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
The course presents the religious experience from the viewpoints of two major Eastern Religions: Hinduism and Buddhism. Drawing upon these traditions, the course examines the psychological and philosophical dimensions of the religious experience. This course is part of the Perspectives on Religion Concentration and may also be taken as an elective

Class 3, Credit 4 (offered annually)

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

Class 3, Credit **4** (offered annually)

GLLL-501 Speculative Fiction
Registration #0504-501
Speculative Fiction is a survey course in contemporary literature presenting conjectural views of man, his world, his society and his beliefs.

Class 3, Credit **4** (offered annually)

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

Class 3, Credit 4 (offered annually)

GLLL-504 Shakespeare: Comedy and History
Registration #0504-504
Several of Shakespeare's comedy and history plays are read and analyzed to reveal their literary excellence and their theatrical power.

Class 3, Credit **4** (offered annually)

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

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered annually)

GLLL-517 Literature of the Bible
Registration #0504-517
A close and rapid reading of selected Old and New Testament books to show the range and variety of literary genres and styles in the Bible

Class 3, Credit 4 (offered occasionally)

GLLL-522 Mark Twain and the American Dream
Registration #0504-522
Focus will be on the bitter-comic writings of the last part of Twain's career and his various "escapisms."

Class 3, Credit 4 (offered annually)

GLLL-524 Contemporary Film
Registration #0504-524 v
A study of contemporary world films, to be drawn from those presently showing in the Rochester area (theaters, television, film festivals). Emphasis will be on both technical and aesthetic aspects of the films.

Class 3, Credit 4 (offered annually)

GLLL-527 Shakespeare: Tragedy and Romance
Registration #0504-527
A generous sample of Shakespeare's tragedy and romance plays is investigated to reveal their literary excellence and their theatrical power.

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered occasionally)

GLLL-531 American Literature of the 1920's and 1930's
Registration #0504-531
A study of American writers of the 20th century with particular attention to the beginnings of realism, naturalism and symbolism.

Class 3, Credit 4 (offered annually)

GLLL-535 Technology in American Literature
Registration #0504-535
A study of 19th and 20th century short fiction and novels criticizing the impact of technology upon society.

Class 3, Credit 4 (offered annually)

GLLL-536 Short Fiction
Registration #0504-536
The short story as a particular form of literature: definition, characteristics and aims.

Class 3, Credit 4 (offered annually)

GLLL-538 The Nightmare of Technology: Studies in
Registration #0504-538 19th Century British Writing
Study of British prose and poetry on the effects of industrialism and the social problems in 19th century England.

Class 3, Credit 4 (offered alternate years)

GLLL-539 The Romantic Vision
Registration #0504-539
A 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 alternate years)

GLLL-542 Literature of Violence
Registration #0504-542
An evaluation of the promoting forces, the types, and the effects of violence as it occurs in literary themes from different periods and backgrounds.

Class 3, Credit 4 (offered annually)

GLLL-545 Deaf Studies in Literature
Registration #0504-545
A study of the literature of deafness, with special emphasis on literary works which identify and illuminate "the deaf experience."

Class 3, Credit 4 (offered annually)

GLLL-546 Philosophy of Justice
Registration #0504-546
Examination of dissent and private conscience in collision with the claims of order and stability in a democratic society.

Class 3, Credit 4 (offered annually)

GLLL-548 Modern Poetry
Registration #0504-548
A close examination of poems of important English and American poets of the 19th and 20th centuries, including several living poets

Class 3^ Credit 4 (offered annually)

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

Class 3, Credit 4 (offered alternate years)

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

Class 3, Credit 4 (offered alternate years)

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

Class 3, Credit 4 (offered occasionally)

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

Class 3, Credit 4 (offered occasionally)

GLLL-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 4j (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 annually)

GLLL-563 Myth, Legend, Folklore
Registration #0504-563
Scholarly investigation into the rationale, origins and sources of myths, legends and folklore of the western world and the affect these primary forms have had on our literature

Class 3, Credit 4 (offered annually)

GLLL-564 The Epic
Registration #0504-564
Advanced study of great representative works in the epic mode

Class 3, Credit **4** (offered annually)

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-440 **The Arts and Craft Movement**
Registration #0505-440 **in the United States**
A historical and sociological study of the crafts and design from the industrial Revolution to the present, tracing their stylistic and cultural changes, the changing roles of the craftsman/artist and their relationship to technology. This course is part of the American Artistic Experience Concentration and may also be taken as an elective. (0505-213 or 0505-214 or 0505-215 or equivalent)

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered annually)

GSHF-480 ' **Women and the Visual Arts**
Registration #0505-480
This course examines the image of women in the visual arts and the role of women as image makers. Major topics to be covered include: the variety of images of women, the evolution and change of these images over time, media images (as differentiated from fine art images) of women, images of women by women and by men, women's images and the issues of their relationship to the images made by men, the nude and pornography, history of women as artists, selected women artists and their work, relation of their work to the art of their period, current issues and status of women artists. This course is part of the Women's Studies Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

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-512 **Master Drawings Since the Renaissance**
Registration #0505-512
A study of drawings from the 15th to the 20th century, including the work by Leonardo da Vinci, Michelangelo, Durer, Rembrandt and Picasso.

Class 3, Credit 4 (offered occasionally)

GSHF-513 **Oriental Art**
Registration #0505-513
A survey outlining the development of art in India, China and Japan and examining the philosophical circumstances that distinguish Eastern traditions.

Class 3, Credit 4 (offered occasionally)

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

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered annually)

GSHF-520 **Picasso**
Registration #0505-520
The life and work of one of the most influential artists of our century.

Class 3, Credit 4 (offered annually)

GSHF-525 **Major Symphonies**
Registration #0505-525
A non-specialred humanistic approach to the understanding of the people, ideas} and times during which major musical compositions were created.

Class 3, Credit 4 (offered occasionally)

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

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered occasionally)

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

Class 3, Credit 4 (offered occasionally)

GSHF-529 **Visual Interpretation of the Drama**
Registration #0505-529
Study of the visual components in a play from the point of view of a theatrical designer. Plays from various countries and time periods will be studied in order to develop skill in interpreting character, literary style and dramatic structure and techniques for communicating this understanding to an audience through stage designs. Students will be expected to master the content of a selected group of plays as well as increase their ability to find visual equivalents through which to render their understanding.

The course is designed for upper division students with interest in dramatic literature, theater or the application of visual design to the performing arts.

Class 3, Credit 4 (offered occasionally)

GSHF-530 Art, Music and Ideas
Registration #0505-530
This is a non-specialized course offering the student the opportunity to examine specific works of art and music against the background of ideas and concepts that influenced and animated the life of their times.

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

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered annually)

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

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

Class 3, Credit 4 (offered annually)

GSHH-445 Modern Latin America
Registration #0507-445
This course surveys the historical development of the Hispanic and Portuguese areas of the Americas from independence to the mid-twentieth century. The movement towards independence, the problems that emerged during the nineteenth century of forming unified nations, and the problems of modernization in the twentieth century are all covered. The histories of selected countries are used to illustrate these issues. This course is part of the History Concentration and may also be taken as an elective. (0507-301 or 0507-302 or equivalent)

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered annually)

GSHH-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-508 History of England
Registration #0507-508
A political and constitutional history of England from the Anglo-Saxon period to the present.

Class 3, Credit 4 (offered on sufficient demand)

GSHH-514 Race and Society
Registration #0507-514
A social, historical, political, religious and anthropological appraisal of the factors which have produced the differences between social appearances and social attainments of the world's population.

Class 3, Credit 4 (offered alternate years)

GSHH-516 The Middle Ages and the Rise of Europe
Registration #0507-516
The Medieval society and its political, religious, economic, and social problems and achievements will be analyzed as the foundation and the cradle of our modern society.

Class 3, Credit 4 (offered annually)

GSHH-518 The Advance of Communism
Registration #0507-518
An examination of the expansion of Communism from Marx up to the present time: an analysis of the basic ideas of Marxism, of the rise of communist parties and regimes in West and East Europe, in China and southeast Asia, in Africa, and on the American continent.

Class 3, Credit 4 (offered annually)

GSHH-519 United States-Latin America
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-520 Crime, Violence and Urban Crisis
Registration #0507-520 in the 20th Century
The course will analyze the causes of the outbreak and rapid increase of violent and criminal trends in the world as the most serious realities of the 20th century.

Class 3, Credit 4 (offered annually)

GSHH-523 Religion in Society
Registration #0507-523
This course will examine religion in the West—Christianity, Judaism and atheism—as an integral and interrelated aspect of the totality of society.

Class 3, Credit 4 (offered annually)

GSHH-524 The Italian-American Experience
Registration #0507-524
Examines the history and culture of the Italian-Americans from the colonial period to the present.

Class 3, Credit 4 (offered annually)

GSHH-525 Culture and Counterculture in
Registration #0507-525 Historical Perspective
This course will examine the cultural, social, political and economic conflicts which were prominent during the 1960's in America and around the world.

Class 3, Credit 4 (offered occasionally)

GSHH-526 The United States and The Third World
Registration #0507-526 Revolutions in the 20th Century
One of the dominant features of the 20th century has been the revolution of rising expectations in the countries of the Third World. This course will study the underlying causes of these revolutions and the reaction of the United States government to this revolutionary ferment in Latin America, Asia, and Africa.

Class 3, Credit 4 (offered annually)

GSHH-528 History of Popular Culture in America
Registration #0507-528
A study of selected special social and cultural issues and topics in American history from the colonial period to the present, focusing as well on the leading personalities.

Class 3, Credit 4 (offered annually)

GSHH-529 Military History
Registration #0507-529
An analysis of the causes and nature of war.

Class 3, Credit 4 (offered on sufficient demand)

GSHH-530 19th Century American Diplomatic History
Registration #0507-530
An examination of American diplomacy from the early years of American independence to the emergence of the United States as a world power The War of 1812, Monroe Doctrine, and Manifest Destiny are among the topics considered.

Class 3, Credit 4 (offered annually)

GSHH-531 The Black Experience in America
Registration #0507-531
This course explores the history of blacks in America and treats it primarily from a social and cultural perspective.

Class 3, Credit 4 (offered annually)

GSHH-532 Civil Liberties in American History
Registration #0507-532
The course will teach the history of civil liberties in America. Emphasis will be placed on analyzing Supreme Court cases that explain the current state of civil liberties. This is a companion course to GSHH-538, Social Justice and the Constitution in American History.

Class 3, Credit 4 (offered annually)

GSHH-533 China, Russia and the United States
Registration #0507-533 Since 1949
This course is a follow-up of the other two courses on Russia and on the advance of Communism.

Class 3, Credit 4 (offered annually)

GSHH-536 History of Mexico
Registration #0507-537
The historical development of Mexico including the colonial period, independence movement, the liberal-conservative class, and the revolution of 1910.

Class 3, Credit 4 (offered alternate years)

GSHH-537 Russia: Imperial and Communist
Registration #0507-537
An analysis of the last century of Czarist Russia and of the Communist Regime. Emphasis will be placed on the agricultural, social, industrial, economic, and political situation.

Class 3, Credit 4 (offered occasionally)

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.

Class 3, Credit 4 (offered annually)

GSHH-543 20th Century European Diplomatic History
Registration #0507-543
The course seeks to appraise the crisis of diplomacy, and the quest for a higher level of political organization in Europe in the age of mass democracies, totalitarianism and contending political ideologies.

Class 3, Credit 4 (offered annually)

GSHH-544 19th Century European Diplomatic History
Registration #0507-544
The course focuses on the relations of the European Great Powers, their rivalries and national jealousies which ultimately resulted in the first total war in the history of humanity.

Class 3, Credit 4 (offered annually)

GSHH-545 Revolutionary Leaders in Latin America
Registration #0507-545
In this course three movements will be studied: the rise of Juan Peron in Argentina in the 1940's; Fidel Castro's revolution in Cuba; and Salvador Allende's electoral victory in Chile in 1970. By studying these three "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-546 The Immigrant in American History
Registration #0507-546
This course traces the history of the Irish, Germans, Jews, and Polish in the United States.

Class 3, Credit 4 (offered occasionally)

GSHH-547 History of Social Discrimination
Registration #0507-547
A study of the discriminatory practices, present and historical, found in the United States. To inlcude the cultural values and problems of acculturation for the American Indian, Black, Puerto Rican, Chicano, Asian, women, and religious groups, with emphasis on its implications to social work.

Class 3, Credit 4 (offered annually)

GSHH-550 The Ascent of Man
Registration #0507-550
The course is a multi-disciplinary study-in societal, historical, technological and scientific perspectives—of biological and cultural adaptation; natural and genetic evolution; cosmological and physical relations; matter, elements, and energy; human behavior and the environment, among others. The course is based on the television series ***The Ascent of Man,*** created and narrated by Jacob Bronowski.

Class 3, Credit 4 (offered annually)

GSHH-566 Origins of the Cold War, 1917-1947
Registration #0507-566
An historical appraisal of the developing conflicts between classical liberal economics and the mercantilism of romantic nationalist states from the 1870's through 1947. The roles of the British Foreign Office, the French Foreign Office, the Weimar Republic, and Hitler's Germany, as opposed to the Soviet Union, are traced and appraised. Eventual assumption of leadership of this policy by the United States, during the war within the war (1943-45) is examined and related to the development of the Cold War as recognized by the general public by 1947.

Class 3, Credit 4 (offered annually)

GSHH-567 Technology in American History
Registration #0507-567
An examination of the cultural context of American technology and its influence on American social, economic, political, and cultural institutions.

Class 3, Credit 4 (offered occasionally)

GSHN-211 Science, Technology and Values
Registration #0508-211
This course explores the concepts and effects of science and technology in society, analyzes the relationship between science and technology, examines how each has come to play a major role today, and looks at how science and technology have been affected by our values. Science and technology are often assumed to be value free, yet people, guided by individual and societal values, develop the science and technology. In turn, the choices people make among the opportunities provided by science and technology are guided by their individual values.

Class 3, Credit 4 (offered quarterly)

GSHN-440 History of Science
Registration #0508-440 \
This course presents a study of the origins, nature, and development of Western science, and its social, economic, and cultural context. This course is part of the Social Impacts of Science and Technology Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

GSHN-441 Science and Technology Policy
Registration #0508-441
This course will examine how local, state, Federal, and international policies are developed to influence innovation, the transfer of technology, and industrial productivity in the United States and other selected nations. This course is part of the Social Impacts of Science and Technology Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

GSHN-442 History of American Technology
Registration #0508-442
This course presents an examination of the cultural context of American technology and its influence on American social, economic, political, and cultural institutions. This course is part of the Social Impacts of Science and Technology Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

GSHN-443 Face of the Land
Registration #0508-443
This course is a case study in the relationship of technology and society, focusing on the interaction of land, people and technology. By considering the natural landforms of the United States and other countries as appropriate, students will see how the nature of land determines its value. As technological innovations are made and introduced, old relationships with the land are altered, sometimes irreversibly. Through this study students have a concrete example of the positive and negative effects of technology on the social structure. This course is part of the Social Impacts of Science and Technology Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

GSHN-444 Social Consequences of Technology
Registration #0508-444
Modern society is increasingly based on technology. With each advance due to technology, unanticipated problems are also introduced. Society must define and solve these problems or the advances may be diluted or lost. In this course we will study several interactions between technology and the world in which we live. We will investigate how various technologies developed and compare the expected effects of the new technologies with the actual results. This course is part of the Social Impacts of Science and Technology and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

GSHN-481 Man, Nature and Technology
Registration #0508-481
This course seeks to make students aware of the environmental consequences of modern technology by investigating to what degree various technological systems conflict with basic ecological principles. This course is part of the Environmental Studies Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

GSHN-482 Energy and the Environment
Registration #0508-482
In this course we will look at the current situation, its environmental implications, and try to determine how we got here, why we got here, and where we may be able to go in the next 20-50 years. We will look at the nature, uses, and relative importance of our sources of energy 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,
Registration #0508-484 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)

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 mdral philosophy through an analysis, comparison and evaluation of some main theories that have been offered as systematic ways of making moral decisions, and through discussions of contemporary moral problems. ~

Class 3, Credit 4 (offered quarterly)

GSHP-213 Philosophy: Critical Thinking
Registration #0509-213
An introduction to philosophical analysis, especially as it may be applied in contexts other than professional philosophy.

Class 3, Credit **4** (offered quarterly)

GSHP-483 The Biblical Tradition
Registration #0509-483
An examination of Judaism and Christianity as they are presented in the Old and New Testaments. This course is part of the Perspectives on Religion Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

GSHP-440 Philosophy of Religion
Registration #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 recoginize 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-515 Philosophy of Law
Registration #0509-515
This course will introduce the student to philosophical problems centering on the nature, extent and justification of law. By means of the readings, assignments and class discussions, the student will acquire a philosophical background for the understanding and evaluation of some fundamental and recurring questions about the law and people's relationship to it.

Class 3, Credit 4 (offered alternate years)

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
Registration #0510-501 in Subcultural Diversity
This course is designed to expose students from a variety of backgrounds to an alternative means of understanding human behavior through the methods of the cultural anthropologist and to demonstrate that variations in cultural patterning exist in our presumably homogenous society. The primary emphasis in the course will be involvement of students in the actual observation of human behavior and collection of data in a subculture of their own selection in the Rochester area.

Class 3, Credit 4 (offered occasionally)

GSSE-210 Introduction to Economics
Registration #0511-210
This course is designed to introduce the student to basic economic concepts and methods of analysis. Application of these concepts and methods of analysis to the contemporary economic issues of the U.S. and other countries will be emphasized. Topics of primary interest will include: economic methodology, the economizing problem, economic foundations of capitalism, supply and demand, different market structures, national income accounting, the role of government in the economy, the banking system in the U.S. and the role of money, unemployment, inflation, government stabilizing policies, public goods, and externalities.

Class 3, Credit 4 (offered quarterly)

GSSE-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 discrimation, primary secondary education, higher education, distribution of income and wealth, poverty and income maintenance, manpower planning, and microeconomic analysis of the work/leisure decision. This course is part of the Economics Concentration and mqy 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 amd 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.

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 applicationto real world situations, it is shown that the social, political, and individual equality of women depends, to a great extent, on their economic role in family and society. This course is part of the Women's Studies Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

GSSE-481 Environmental Economics
Registration #0511 -481
The course will examine the relationship and apparent conflict between economic growth and environmental quality, the economics of environmental issues and policy, the environment as a resource and a public good, and the ability and lack of ability of free markets and the government to deal adequately with pollution and other environmental problems. This course is part of the Environmental Studies Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

GSSM-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 or0513-215or 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 #0513-540
This course is a study of politics and government on the state and local levels, and the relationships between these levels and the federal government. It will illustrate differences in state governments by comparing other states to New York, and will use the Rochester area for comparisons with local governments found elsewhere. This course is part of the American Politics Concentration and may also be taken as an elective. (0513-211 or 0513-215 or equivalent)

Class 3, Credit **4** (offered annually)

GSSM-451 The Legislative Process
Registration #0513-451
This course examines the role of the legislature in the U.S. political process. The primary emphasis will be the study of the U.S. Congress, but some attention will also be directed to state legislatures. Topics to be studied include elections, party organization, committees, interest group activities, and executive-legislative relations. This course is part of the American Politics Concentration and may also be taken as an elective. (0513-211 or513-215 or equivalent)

Class 3, Credit 4 (offered annually)

GSSM-452 The American Presidency
Registration #0513-452
This course is a study of the role of the presidency in the American Political System. Among the topics to be considered are: the nomination and election process, evolution, expansion and limitation of presidential powers, factors in decision making, and the various leadership functions performed by the American Presidency. This course is part of the American Politics Concentration and may also be taken as an elective. (0513-211 or 0513-215 or equivalent)

Class 3, Credit 4 (offered annually)

GSSM-453 American Foreign Policy
Registration #0513-453
A study of the formulation and execution of American foreign policy, including the examination of the instruments, procedures and philosophies shaping the development and implementation of foreign policy. This course is part of the American Politics Concentration and may also be taken as an elective. (0513-211 or 0513-215 or equivalent)

Class 3, Credit 4 (offered annually)

GSSM-504 Twentieth Century America
Registration #0513-504
An examination of the major political, social, and economic developments affecting the United States in the 20th century. Emphasis will be placed upon the reactions of the various presidential administrations to conditions in both the domestic and foreign fields.

Class 3, Credit 4 (offered annually)

GSSM-510 Comparative Policies
Registration #0513-510
This course is designed to provide a mode of analysis for the study of political systems. There will be a basic overview of such nations as the United States, Great Britain, France, the Federal Republic of Germany, and the Soviet Union, although relevant examples of other nations will be presented when warranted. A study of each nation's governmental process and political culture will be emphasized.

Class 3, Credit 4 (offered annually)

GSSM-514 Theories of Political Systems
Registration #0513-514
A comparative examination of contemporary political theories viewed from the perspective of the earlier theories out of which they evolved. Emphasis is placed upon the value of theory, its practical application and its limitations.

Class 3, Credit 4 (offered annually)

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 is the required first course of the Human Growth and Development Concentration. This course offers stutlents the opportunity to learn about many of the psychological influences affecting people from birth to death. This course may not 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 and 0514-440 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 and 0514-440 or equivalent)

Class 3, Credit 4 (offered annually)

GSSP-443 Learning and Memory
Registration #0514-443
The course focuses on the environmental forces that are responsible for the outcome of human development. It studies how learning shapes and changes individuals almost from the moment they are born and how it continues to be all pervasive throughout their lives. It examines the complexity of memory process, which is an essential element of learning and learning theories and their applications in real-life situations. This course is part of the Human Growth and Development Concentration and may also be taken as an elective. (0514-210 & 514-440 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 formation, attribution, self actualization, brainwashing, conflict, denial, projection, and repression may be applied and misapplied in efforts to understand religious belief and behavior. This course is part of the Perspectives on Religion Concentration and may also be taken as an elective. >

Class 3, Credit 4 (offered annually)

GSSP-501 Industrial Psychology
Registration #0514-501
Consideration of principles, application and current research in industrial psychology, with particular reference to personnel selection, training, motivation, morale, performance appraisal, leadership and communication.

Class 3, Credit 4 (offered annually)

GSSP-503 Abnormal Personality
Registration #0514-503
Description and theories of the nature and development of behavioral disorders. Contemporary treatment procedures will also be discussed.

Class 3, Credit 4 (offered annually)

GSSP-504 Attitude Formation and Persuasion Techniques
Registration #0514-504
The course will focus on current theories of attitude formation, and seek to apply them to contemporary events to achieve an understanding of how those who wish to shape or change attitudes do so.

Class 3, Credit 4 (offered annually)

GSSP-508 Psychology of Learning
Registration #0514-508
Studies the learning process, which includes memory and learning. Interprets many theoretical positions that have evolved in the study of the psychology of learning and shows application of findings on memory and learning.

Class 3, Credit 4 (offered annually)

GSSP-509 Psychology of Perception
Registration #0514-509
A study of methods and research findings primarily in the field of visual perception together with an evaluation of theoretical interpretations.

Class 3, Credit 4 (offered annually)

GSSP-510 Social Psychology
Registration #0514-510
The course will attempt to give a general overview of those areas of social psychology currently under the most intensive investigation, and likely to be of most interest to the student, including nonverbal communication, attraction, aggression, and group effects.

Class 3, Credit 4 (offered annually)

GSSP-511 Humanistic Psychology: An Introduction
Registration #0514-511
Sometimes called "the new psychology." Based on the assumption that each individual has inherent powers of growth towards self-realization. Emphasis on conscious awareness, perception, meaningfulness, and uniqueness in human experience.

Class 3, Credit **4** (offered annually)

GSSP-512 Psychology of Personality
Registration #0514-512
A consideration of theories of personality classification and development.

Class 3, Credit 4 (offered annually)

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GSSP-513 Psychology of Motivation
Registration #0514-513
The nature and development of motive and emotion and the role of these processes in adjustment. Covers concepts and theories of motivation.

Class 3, Credit 4 (offered annually)

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.

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.

Class 3, Credit 4 (offered annually)

GSSP-517 Death and Dying
Registration #0514-517
This course will view America's last taboo subject 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.

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.

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.

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.

Class 3, Credit 4 (offered annually)

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.

Class 3, Credit 4 (offered annually)

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.

Class 3, Credit 4 (offered annually)

GSSS-210 General Sociology
Registration #0515-210
This course introduces students into 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
This sociology course examines American society as a complete entity using a sociological framework and capitalizing on the contributions of theory and research. The course focuses on the contemporary U.S. social system, American culture, and the motivating forces and values of the people. Such institutions as the family, economic life, political system, education, religion, recreation, health and welfare systems will be analyzed. This course is part of the American Society in Transition Concentration and may also be taken as an elective. (0515 210) ¹

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)

Class 3, Credit 4 (offered annually)

GSSS-442 . The Urban Experience
Registration #0515-442
This sociology course analyzes social and spatial characteristics of cities and considers reasons for urban development, ecological factors, types and networks of settlements, and urbanism as a way of life. It also examines the issues of neighborhoods, subareas, “ghetto” enclaves, metropolitan regions, urban social and political structures, problems, services, and regions, urban social and political structures, problems, services, and planning. This course is part of the American Society in Transition Concentration and may also be taken as an elective. (0515-210)

Class 3, Credit 4 (offered annually)

GSSS-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)

Class 3, Credit **4** (offered annually)

GSSS-480 Women in Contemporary U.S. Society
Registration #0515-480
This sociology course will examine three meijor social institutions which shape the lives of women in contemporary U.S. society: the family, the workplace, and political structure. This course is part of the Women's Studies Concentration and may also be taken as an elective.

Class 3, Credit 4 (offered annually)

GSSS-502 Contemporary Social Problems
Registration #0515-202
Essential sociological insights necessary for an understanding of social problems. The principal aim of this course is to develop an understanding of the multiple factors involved in the development and amelioration (remedial actions) of social problems. These will be viewed primarily on the American scene although extending both into history and the future. Conflicts of values (and goals and interests) are analyzed along with signs of social disorganization and change and various personal deviations.

Class 3, Credit 4 (offered annually)

GSSS-504 Intergroup Relations: American Racial and Ethnic Minorities
Registration #0515-504
A sociological analysis of relations between ethnic, racial, and religious groups.

Class 3, Credit 4 (offered occasionally)

GSSS-505 Juvenile Delinquency
Registration #0515-505
Problems of juvenile delinquency in the United States: etiology, extent, and significance of the problem. This course features an in-depth study of family court as its procedures as well as modern methods of prevention, treatment and control.

Class 3, Credit 4 (offered annually)

GSSS-511 Population & Society
Registration #0515-511
Study of demographic variables of mortality, fertility, and migration as they affect the rise and quality of population.

Class 3, Credit 4 (offered annually)

GSSS-512 Urbanization: Urban Man and Society
Registration #0515-512
The social and spatial characteristics of cities are analyzed, encompassing such topics as the reason for urban development, ecological factors, types and networks of settlements, and urbanism as a way of life.

Class 3, Credit 4 (offered annually)

GSSS-517 **Sociology of Deviant Behavior**
Registration #0515-517
Examination of conditions under which deviance develops and changes over time. Study of individual deviance, deviant sub-cultures, and the transformation of a deviant identity.

Class 3, Credit 4 (offered annually)

GSSS-519 **Women's Studies: Selected Topics**
Registration #0515-519
An analysis of selected factors that contribute to our understanding of the present status of women.

Class 3, Credit 4 (offered annually)

GSSS-520 **Educational Sociology**
Registration #0515-520
The development of sociological and socio-psychological types of knowledge that have relevancy for or logical connections to educational practices. This course will be based on substantive material about social phenomena making up the social order in which the educational systems are operating and by which they are influenced.

Class 3, Credit 4 (offered occasionally)

GSSS-521 **Sociological Seminar**
Registration #0515-521
A course of mimimum procedural as well as substantive structure which approaches matters of contemporary concern from a sociological perspective.

Class 3, Credit 4 (offered annually)

GSSS-522 **Medical Sociology**
Registration #0515-522
This course is a survey of the sociological aspects of health and illness. Some areas of study will be the definition, causes (etiology) and cure of disease in various societies and social groups.

Class 3, Credit 4 (offered annually)

GSSS-524 **Applied Sociology**
Registration #0515-524
This course is an effort to provide the student with useful sociological knowledge applicable to solutions of practical problems. The inventory of problems is not fixed beforehand, and the specific course content reflects the problems either already encountered by students or very likely to represent a significant portion of their anticipated professional concern upon graduation. (Admission with instructor's approval only)

Class 3, Credit 4 (offered annually)

GSSS-525 **Sociology of Work**
Registration #0515-525
This course will analyze the structural properties, group processes and social meanings of work. Work, like all other social realities, is studied as a product wrought out of social relationships. [v]

Class 3, Credit 4 (offered annually)

GSSS-526 **Hispanic Culture**
Registration #0515-526
This course will portray objectively the life of Mexican-Americans, Puerto Ricans and other Spanish-speaking groups and the problems of assimilation into a predominantly Anglo-American society.

Class 3, Credit 4 (offered annually)

GSSS-527 **Black Culture**
Registration #0515-527
This course is designed to analyze past, present and future social policies, programs and practices from their actual effects and predictable effects on Black people. These analyses and solutions will include particular emphasis on how the Black community has been forced to develop mechanisms for coping with the debilitating effects of poverty, environmental deprivation, and institutional racism. The course is designed to present a systematic means of facilitating change in people's attitudes and behaviors.

Class 3, Credit 4 (offered annually)

GSSS-531 **Marriage**
Registration #0515-531
Contemporary trends in courtship patterns, male-female relationships and marital systems.

Class 3, Credit 4 (offered annually)

GSSS-569 **Human Sexuality**
Registration #0515-569
An overview of various aspects of human sexuality including basic physiology, sex roles, sexual myths, legal and social issues, pre-marital and marital sexual behavior, and alternate sexual behavior.

Class 3, Credit 4 (offered annually)

Open Elective or Independent Study
The student has the freedom to select any course within the Institute or to create an independent study project subject to the approval of the student's dean or department chairperson, the faculty sponsor and the dean of the College of General Studies. An independent study course enables the interested student and his or her faculty sponsor to coordinate their efforts on subject and topics that range beyond the normal sequence of course selections. The student may, for example, participate in a volunteer community human service experience.

Credit variable (offered annually)

Service Courses

Service courses are required courses offered by the College of General Studies for specific professional departments. These courses may not be taken as general studies electives.

GLLC-402 **Conference Techniques**
Registration #0502-402
Basic theories of conference techniques including leadership, participation, types, and functions of public and private conferences and their evaluation. Student participation in training, problem solving, and informational-developmental conferences.

Class 4, Credit 4 (offered annually)

GLLC-404 **Communication with the Handicapped**
Registration #0502-404
An examination of the communication difficulties with the handicapped: specifically the deaf, blind and others with physical handicaps. To include interpersonal, family, social and rehabilitation modes of communication. (Introduction to Psychology)

Class 3, Credit 4 (offered annually)

GSSE-301, 302 **Principles of Economics I, II**
Registration #0511-301, 302
A study of basic concepts and principles pertaining to the economic behavior of the consumer and the firm (micro-economics), the economic problems of the nation (macro-economics), and international economic relations.

Class 3, Credit 4 (offered annually)

GSSP-203 **Psychology of Childhood and Adolescence**
Registration #0514-203
A systematic, integrated, and interpretive study of a growing person. Includes physical, cognitive, social, moral and emotional development.

Class 3, Credit 4 (offered annually)

GLLZ-200 **Basic Communications**
Registration #0518-200
Students will gain an understanding of deafness, plus basic skills which will permit communication with a segment of the deaf population.

Class 3, Credit 4 (offered on sufficient demand)

GLLZ-201, 202, 203 **Manual Communication I, II, III**
Registration #0518-201, -202, -203
A course designed to provide the student with the basic vocabulary of frequently used signs and the American manual alphabet.

Class 3, Credit 4 (offered annually)

Graduate Courses

GLLL-702 **Film and Society**
Registration #0504-702
An inquiry concerning the relationship between motion pictures and society that will use historical, humanistic, and social science research to achieve an understanding of movies as a social force, industry, and art form.

Class 3, Credit 5 (offered occasionally)

GSHF-702 **Film History and Criticism**
Registration #0505-702
A critical examination of key aspects of film criticism and of the development of film as an art. The emphasis of the course will be historical, with the development of cinema being traced through major films by important directors. There will be an opportunity to pursue individual interests.

Class 3, Credit 4 (offered occasionally)

GSHF-703 **American Architecture**
Registration #0505-703
An examination of American architecture from the 17th century to the present designed for the graduate level of study. Emphasis will be placed on American building art in the late 19th and 20th centuries.

Class 3, Credit 5 (offered occasionally)

GSHF-705 **Theories of Aesthetics and Art Criticism**
Registration #0505-705
A course for the art-oriented graduate student centering on the student's search for a supportable and reliable basis for making value judgments about works of art as well as introducing the student to major concepts in aesthetics.

Class 3, Credit 4 (offered occasionally)

GSHF-707 **Cubism to the Present**
Registration #0505-707
Cubism as a way of seeing and as an expression of 20th century thinking. Differences and similarities with art forms of earlier eras and other cultures will be discussed.

Class 3, Credit 5 (offered occasionally)

GSHF-708 **Oriental Art**
Registration #0505-708
A seminar exploring the philosophical and cultural perspectives underlying traditional Far Eastern art as a prelude to examining selected topics in Indian, Chinese and Japanese art. Emphasis will be placed on the application of research techniques and critical methods to an individually selected area of interest which may serve as a foundation for continuing study.

Class 3, Credit 5 (offered occasionally)

GSHF-711 **20th Century American Art**
Registration #0505-711
An investigation of American art from the Civil War to the present. Emphasis will be placed on the visual arts but many references will be made to music and architecture.

Class 3, Credit 5 (offered occasionally)

GSHF-712 **Arts and Crafts in Tribal Societies**
Registration #0505-712
A study of the function of “primitive" art and the techniques of its production, including the use of clay, stone, fibers, bark, wood, bronze, gold, etc. Hair styling, body painting and scarification will also be discussed.

Class 3, Credit 5 (offered occasionally)

GSHF-71,3 **Contemporary Issues in Art**
Registration #0505-713
This course offers the graduate art student the opportunity to investigate those aspects of 20th century art that question the very nature of art and the role of the artist in today’s and tomorrow’s society.

Class 3, Credit 5 (offered occasionally)

GSHF-714 **Art: Vision and Concept**
Registration #0505-714
Though the course will develop chronologically from the Renaissance to the present, emphasis will be placed on a close analysis of (1) selected works of art, including paintings, sculpture and architecture, and (2) the development of the unique oeuvre of selected artists. Topics chosen for study will be limited in number but treated in depth. Topical choices will be based on richness and import of the formal and/or conceptual content embodied therein. Some background in the history of art is helpful but not necessary.

Class 3, Credit 5 (offered occasionally)

GSHF-715 **Picasso**
Registration #0505-715
The impact of Picasso and his circle on 20th century art. Their affinities with modern scientific and philosophical attitudes will also be discussed.

Class 3, Credit 5 (offered occasionally)

GSHF-716 **Rembrandt**
Registration #0505-716
A detailed analysis of the art and times of the Baroque master. Emphasis will be placed on the development of his style and technique, on his and other artists’ relationship to their society and to the character of the Baroque outlook.

Class 3, Credit 5 (offered occasionally)

GSHF-717 **Music Literature**
Registration #0505-717
A comparison of various musical styles from the 17th to the 20th century with emphasis on music’s relationship to the other fine arts and its socio-cultural environments. Representative composers include Bach, Beethoven, Chopin and Stravinsky.

Class 3, Credit 5 (offered on sufficient demand)

GSHH-701 **History of American Educational**
Registration #0507-701 **Thought and Practice**
This course traces the history of formal and informal education in America from the colonial era to the present. It examines the growth of progressive education and the evolution of the open education movement of the 1960’s and 1970's. The course evaluates the role of education among women and ethnic and religious minorities. Emphasis is given to such educative institutions as family, television, churches, factories, business corportations, public libraries and art galleries.

Class 3, Credit 5 (offered occasionally)

GSHP-705 **Seminar in Aesthetics**
Registration #0509-705
A range of questions will be addressed in the seminar. What is it to perceive something aesthetically? Are there any essential or defining properties shared by all works of art? Are our evaluations and interpretations of art works objective or subjective? Are an artist’s intentions relevant factors in critical arguments? Understanding how answers to these questions are constrained by features of actual art works will be an important part of discussion.

Class 3, Credit 5 (offered occasionally)

GSSP-701 **Developmental Psychology**
Registration #0514-701
This course seeks to investigate the broad development patterns of human behavior with emphasis upon the cognitive and moral aspects of development, personality and culturally patterned behaviors. Consideration is given to major theoretical perspectives. It is strongly suggested that students have a background in introductory psychology before taking this course.

Class 3, Credit 5 (offered annually)

GSSP-702 **Educational Psychology**
Registration #0514-702
This course is designed to furnish students with an understanding of the basic psychological processes underlying the educational process and to help students apply them to concrete situations that may arise when teaching. Students will find the material covered in Developmental Psychology (GSSP-701) useful for this course.

Class 3, Credit 5 (offered annually)

GSSS-701 **Educational Sociology**
Registration #0515-701
This course is designed to furnish students with an understanding of the basic sociological processes unaerlying the educational process and to help students apply them to concrete situations that may arise for teachers.

Class 3, Credit 5 (offered annually)

College of Graphic Arts and Photography

School of Photographic Arts and Sciences

All courses in the School of Photographic Arts and Sciences will be offered at least once annually, except as noted.

Biomedical Photography

PPHB-201, 202, 203 **Biomedical Photography I**
Registration #0901-201, -202, -203
Basic photography program for biomedical photographers with emphasis on theory, craftsmanship and visual communication. Patient photography, close-up and other photography as a foundation for future biomedical photography.

Class 4, Lab. 8, Credit 6/Qtr.

PPHB-211 **Survey of Biomedical Photography**
Registration #0901-211
Career opportunities, typical biomedical photography settings, types of photography performed. Ethical, professional, and personal relationships with patient, physicians, 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 light, 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 and slide/tape presentations and exhibition displays.

Lab. F-4, W-4, S-6, Credit 3/Qtr.

PPHB-402 **Advanced Photography in**
Registration #0901-402 **Biomedical Communications**
Sophisticated and creative applications of photography serving the needs of the scientific community. Students explore a variety of specialized photographic techniques and a variety of philosophies Assignments are performed which are similar to those encountered in biomedical and research institutes.

Class 2, Lab. 4, Credit 4

PPHB-413 **Biomedical AV Design and Production**
Registration #0901-413
Design, creation, and presentation of 35mm slide and 35mm slide/tape productions as applied to medical and scientific needs. Planning, researching, scripting, production, revision, evaluation. Multiple projector uses. Multiple screen uses. Lap dissolve; programming; graphics; eclectic combination of music, words, and images

Class 2, Lab. 4, Credit 4

PPHB-501, 502, 503 **Senior Thesis Production**
Registration #0901-501, -502, -503
An investigation, planning, organization and production of an audiovisual presentation, a learning package or an informational program for a biomedical communications client.

Class 2, Lab. 8, Credit 4/Qtr.

PPHB-551, 552, 553 **Special Topics in Photography**
Registration #0901-551, -552, -553
A seminar 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 two-quarter sequential 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. (offered each year)

Film and Television

PPHF-207 **Introduction to Film Making**
Registration #0902-207
A basic course for novices. Emphasis is on film making and the use of the medium as an interpretive and expressive form. There is no restriction on the choice of style or content. Learning will take place in a communal, participatory environment so that ideas can be shared and the medium experienced as a total, integrated process.

Short films by contemporary film makers will be screened to familiarize students with the diversity and potential of the medium.

A minimum of two independent film making projects are required of each student. One of these includes the use of sound.

Super 8 equipment and facilities are provided by RIT. Students are responsible for film and processing costs, *'U* inch recording tape and editing incidentals. Approximate cost to students is $50.00 for the quarter.

Class, Lab., Studio, 7 hours, Credit 3

PPHF-208 **Introduction to Film Making II**
Registration #0902-208
An exploration of the diverse contemporary forms used to interpret and express subject matter in film. This course provides an opportunity for the student to make films which exploit traditional and experimental uses of camera, editing, sound, and attitudes toward subject matter. Although complete films can be attempted, the primary objective will be to create short film experiments.

Short films by film makers from the past and present will be screened to familiarize students with the diversity and potential of the medium.

Super 8 equipment and facilities are provided by RIT. Students are responsible for film and processing costs, *'It* inch recording tape and editing incidentals. Approximate cost to students is $50.00 for the quarter. (Introduction to Film Making)

Class, Lab., Studio, 7 hours, Credit 3

PPHF-209 **Basic Television Production**
Registration #0902-209
This is an overview course designed to familiarize students with the entire television production process. Emphasis is placed on design of graphics for television, shooting film and slides which conform to video system limitations and operation of the film-chain. Topics covered include basic visualization, camera operation, portable video equipment, studio production techniques and set design. Limited hands-on experiences include half inch portable systems, “real time" studio production, limited studio electronic assembly techniques and video art techniques. (Permission of the Art and Design Department/SPAS. No previous media experience required)

Lab and lecture required. Class 3 hrs., Lab. 4 hrs. (Spring quarter only)
Class 3, Credit 3

PPHF-301 **Conceptual Film Production**
Registration #0902-301
A fundamental course in Conceptual Film Production. Film making as a means of interpretation and expression. Film as a medium of communication, as a structural unity, the main elements of structure, organizational principles-with special application to the conceptual film form. A combined theoretical-practical approach to the dynamics of the film medium. The student is expected to demonstrate the techniques in film assignments. Production will be in non-sync (Super 8) format. Students furnish film processing; equipment is furnished by the department. Elective to all undergraduate 3rd and 4th year Photographic Illustration or Professional Photography students, and other students by special permission.)

Class 2, Lab. 6, Credit 4

PPHG-302 **Narrative Film Production**
Registration #0902-302
A fundamental course in straight Narrative Film Production. Film making as a means of interpretation and expression with emphasis on the straight narrative but not to the exclusion of the conceptual film form. Application of the elements of structure and organizational principles appropriate to the main area of emphasis. A combined theoretical-practical approach to the dynamics of. the film medium. The student is expected to demonstrate technical and theoretical knowledge of the film making process through a series of film assignments. Production will be in non-sync (Super 8) format. Students furnish film and processing; equipment is furnished by the department. (PPHF-301 or a satisfactory equivalent or by permission of instructor)

Class 2, Lab. 6, Credit 4

PPHF-303 **Fiction and Dramatic Short Film Production**
Registration #0902-303
A fundamental course in Fiction and Dramatic Short Film Production. Film making 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 are organizational principles appropriate to the main area of emphasis. A combined theoretical-practical approach to the dynamics of the film medium. The student is expected to demonstrate technical and theoretical knowledge of the film making process through a series of film assignments. Production will be in non-sync (Super 8) format. Students furnish film and processing: equipment is furnished by the department. (PPHF-302 or a satisfactory equivalent)

Class 2, Lab. 6, Credit 4

PPHF-407, 408, 409 **Film History**
Registration #0902-407, -408, -409
Survey of developments in film from the early beginnings to the present. Objective is to explore the uses of the medium within a historical, cultural and theoretical context. Each quarter will emphasize a different film form: 407 fiction feature, 408 documentary, 409 experimental and animation. No prerequisites. Admission during any quarter of the academic year.

Class 3, Credit 3/Qtr.

PPHF-411 **Visualization and Commercial**
Registration #0902-411 **Film Production**
A general review of professional production methods and the theory and practice of visualizating an expressive film continuity. Basic synchronous sound recording is included. (PPHF-303 or permission of the instructor)

Class 2, Lab. 6, Credit 4

PPHF-412 **Film Planning and Studio Operations**
Registration #0902-412
Introduction to studio crew work and editing systems for professional film. Budgeting and an elementary view of the economics of production are also included. Film writing is introduced and related to production planning (PPHF-411 or permission of the instructor)

Class 2, Lab. 6, Credit 4

PPHF-413 **Film Project with Sound**
Registration #0902-413
A short (5-10 min. suggested) film is produced by student teams. Advanced sound editing, sound mixing and A&B roll conforming are included; Cameras, lighting and editing equipment are provided but students are e» pected to provide sensitized goods and processing.

Class 2, Lab. 6, Credit 4

PPHF-417 **Portable Video Production**
Registration #0902-417
A rigorous "hands-on" introduction to both the practical-technical and aesthetic considerations of portable video production. The emphasis is on single system shooting and post production editing. This includes visual continuity, storyboarding,' 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-418 **Studio and Documentary Video**
Registration #0902-418
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 also expected to refine the skills learned in the first quarter by producing an independent mini-documentary due at the end of the quarter (417 or permission of instructor)

Class 2, Lab. 4, Credit 4

PPHF-419 **Advanced Video Production**
Registration #0902-419
Lab work explores television remotes, advanced studio lighting, the still and motion picture interface, the technical limits of the video image, advanced editing, video art and image processing. Lectures include production budgeting, Public Broadcasting, copyright, the job market, educational/industrial television, experimental video and computer interfacing. The major spring project, a final “portfolio production", concludes the broad based three quarter program. (417 and 418)

Class 2, Lab. 4, Credit 4

PPHF-421, 422 **Writing for Film and Television**
Registration #0902-421, -422
This course explores the writing of non-fiction and fiction for theatrical and non-theatrical films, and television. Experience in the writing of fiction concentrates on the elements of dramatic construction. The exploration of nonfictiohal writing examines information gathering techniques and methods of investigation. Both non-fiction and fiction are treated as expository, storytelling forms. Students are responsible for writing film or televiion scripts on subjects of their own choosing and for completing several brief written exercises in areas such as character, dialogue, the interview, suspense, and plot. Although this course is designed primarily to meet the needs of film and television majors, it is not restricted to those students.

Class 2, Lab. 3, Credit 3 (Winter and Spring quarter)

PPHF-424, 425, 426 **Animation and Graphic Film Production**
Registration #0902-424, -425, -426
An introduction to the techniques and practice of graphic and animated film production. This course provides training and practical experience in a wide variety of approaches to single frame motion picture production. Students produce a number of short film exercises utilizing both existing and original artwork. Some techniques covered in the course are: optical printer, direct modification of the film surface, cell, ink, and paint animation, and kinestasis. Screenings of professionally made films will illustrate each technique. In the third quarter students produce a short animated film with sound using techniques of their own choosing. Proficiency in drawing is not required. No prerequisites. (Fall, Winter, Spring)

Class 3, Lab. 2, Credit 4

PPHF-520 **Sound Recording**
Registration #0902-520
Specialized information and work in sound. To give information and lab work beyond the regular course. To encourage the beginning of vocational level work in sound. Each student prepares a mixed sound track to professional quality standards.

Class 2, Credit 2

PPHF-521 **Visualization for Film and Television**
Registration #0902-521
A basic course in the mechanics and aesthetics of visualization for film and television. Emphasis is on editing, camera, and subject dynamics and their interrelationship. Combined theoretical-practical approach to the development of visual images for film and television.

Class 2, Credit 2

PPHF-522 **Film Directing**
Registration #0902-522
An indepth 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 observatipn of a director in action. (PPHF-303, 413, 419 or equivalents)

Class 2, Credit 2

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

Credit 4

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

Credit 4

PPHF-543 **Post Production-**
Registration #0902-543 **(Film/Television)**
Completion of senior projects. Includes a review of post production techniques. (PPHF-542)

Credit 4

PPHF-551, 552, 553 **Special Topics in Photography**
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 photographic illustration and professional phtography. This is the minimum photographic education needed to gain entry to second year standing and replaces PPHG-201, 202, 203. Since this course is such an intensive offering, some previous photographic experience is highly advisable.

Credit 12

PPHG-201, 202, 203 **Photography I**
Registration #0903-201, -202, -203
A program in basic photography with emphasis on craftsmanship, theory, and visual communications. The major aim is to enable the student to form a broad foundation of understanding and skillsnecessary for advanced study in photography available in upper-class programs. The completion of this foundation year allows the student to select a more specific program culminating in the baccalaureate degree in photography.

Class 3, Lab. 12, Credit 7/Qtr.

PPHG-207,208,209 **Still Photography**
Registration #0903-207, -208, -209
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.

PPHG-210 **Materials and Processes**
Registration #0903-210 **of Photography**
An intensive 10-week summer course for students entering the transfer program in film and television, photographic illustration, and professional photography. This course provides the minimum study necessary to gain second year standing. It replaces PPHG-211, 212, 213.

Credit 6

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

Class 2, Lab. 1, Credit 3/Qtr.

Professional Photographic Illustration

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 18

PPHL-301, 302, 303 **History and Aesthetics**
Registration #0904-301, -302, -303 **of Photography**
Covering the history and aesthetics of photography from 1839 to the present, with special emphasis on the development of photographic seeing, and its related effect on other media. A survey of the numerous processes and how their development affected the image-making of their particular period, i.e., daguerreotypes, callitypes, ambrotypes, etc. Student projects are designed to illuminate phases of photographic history best understood by personal visual exploration.

Class 3, Credit 3/Qtr.

PPHL-311, 312, 313 **BFA Photography II**
Registration #0904-311, 312, 313
This related group of courses is currently required of all second-year photographic illustration students. Emphasis is placed on a unified learning experience which serves as a further cognitive foundation to upperclass study. One course is a study of large-format photography in black and white; another is a study of color photography, with laboratory practice; the other is a study of studio photography with stress on electronic flash lighting. Combined, these courses will assist in making a selection of one of the four areas of concentration offered to upperclass degree candidates. (PPHG-200 or PPHG-203)

Class 3, Lab. 9, Credit 6/Qtr.

PPHL-401, 402, 403 **Photography As a Fine Art I**
Registration #0904-401, -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-303)

Class 2, Lab. 8*, Credit 4/Qtr.

PPHL-411, 412, 413 **Photojournalism I**
Registration #0904-411, -412, -413
A journalistic photography for mass media publication with emphasis on the development of specialized skills in projects dealing with various aspects of reportage and all related editorial problems from caption writing, law and history, to organizational structures, printing processes, layout and design. Special emphasis is placed on the story as a total concept from inception to finished layout. Research and origination of material as well as the study of publications is explored. (PPHL-313)

Class 2, Lab. 8, Credit 4/Qtr.

PPHL-421, 422, 423 **Nature Photography**
Registration #0904-421, -422, -423
A course designed to help students become more concerned and visually aware of the natural environment. This is accomplished principally by direct involvement through study and photography of major natural forms. The student also acquires valuable basic understanding of the natural world, special photographic techniques and a broader concept of people's attitudes toward and impact on their environment. (PPHG-203)

Class 2, Lab. 8*, Credit 4/Qtr.

PPHL-431, 432, 433 **Illustration Photography I**
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 2, Lab. 8*. Credit 4/Qtr.

PPHL-437, 438, 439 Visual Communications
Registration #0904-437, -438, -439 Workshop
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-440 News Writing and News Reporting
Registration #0904-440
Principles and practices of observing, interviewing, investigating, analyzing, organizing, and writing for publication in the news media. Emphasis will be on actual student work in all phases of news reporting and news writing, and class work will be focused on critical editorial appraisal of student projects.

Class 3, Credit 4 (offered every quarter)

PPHL-460 Photo for Printers
Registration #0904-460
A workshop in black and white and color photography for non-photography majors. Technical and esthetic 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

PPHL-501, 502, 503 Photography as a Fine Art II
Registration #0904-501, -502, -503
The major emphasis is placed on the individual's learning to generate and intensify personal statement through the medium of photography. Students select their own projects and work with their own ideas under the guidSnce of an instructor. Class discussions center around certain common problems found in working with this medium, such as the self-imposition of unnecessary limitations. Development of awareness of the other arts is continued. (PPHL-403 or PPHL-400)

Class 2, Lab. 8*, Credit 4/Qtr.

PPHL-511, 512, 513 Photojournalism II
Registration #0904-511, -512, -513
A workshop course with emphasis on the production and editing of photographs for publication in the media; newspapers, magazines and photographic books. (PPHL-413)

Class 2, Lab. 8*, Credit 4/Qtr.

PPHL-521, 522, 523 Color Photography Workshop
Registration #0904-521, -522, -523
A workshop in which the student designs and executes projects in advanced color photography. Emphasis is on the aesthetic use of color photography techniques. (PPHL-313 or equivalent, and permission of instructor)

Class 2, Lab. 6*, Credit 4/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 or PPHL-400)

Class 2, Lab. 8*, Credit 4/Qtr.

PPHL-551, 552, 553 Special Topics in Photography
Registration #0904-551, -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

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

Credit Variable

'Lab hours may not be scheduled and are to be completed in available time

Photographic Processing and Finishing Management

PPHM-201, 202, 203 Basic Principles of Photography
Registration #0905-201, -202, -203
The program of study is designed to provide photographic marketing students with a thorough knowledge of the basic photographic process in order that they may have an understanding of how photographic products work. The course will include units of study in film characteristics, lighting, optics, photographic chemistry, 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 to 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 (spring only)

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. (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)

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

**Lab hours may not be scheduled and are to be completed in available time*

PPHM-501, 502, 503 Senior Seminar in Production Processing
Registration #0905-501, -502, -503 and Finishing Management
This course is designed to help the photo management student make last minute preparations for entering the world of work. Procedures for obtaining employment, i.e., preparing resumes, taking interviews, plant visitations, etc., will be covered in detail. Information on the lastest 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-511, 512, 513 Advanced Production Processing
Registration #0905-511, -512, -513 and Finishing
This course taken during the last year of study provides the student with an opportunity to study in depth, on an independent basis, those areas of processing and finishing which the student finds most interesting. This course may also be used to strengthen those areas of interest in which the student feels a weakness. (PPHM-303)

Lab. 12, Credit 4/Qtr.

PPHM-520 Operation, Care and Maintenance of
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)

TECHNICAL PHOTOGRAPHY (PPHT): At the time this catalog was developed, the new technical photography program was awaiting state approval. For more information please contact Dr. Les Stroebel, School of Photographic Arts and Sciences, Rochester Institute of Technology, P.O. Box 9887, Rochester, N.Y. 14623.

Professional Photography

PPHP-301, 302, 303 Photography II
Registration #0906-301, -302, -303
Advanced applied photography in black-and-white and color with emphasis on craftsmanship, problem solving, and visual communications. Further emphasis is placed on the development of the student's ability to apply creative thinking and contemporary techniques in executing meaningful and effective professional photographs for a wide variety of media and utilization. (PPHG-203)

PPHP-311, 312, 313 Basic Color
Registration #0906-311, -312, -313
Color photographic image-making based on the study of color principles, color vision and color photographic material and processes. Part of this course is a visual design workshop which explores what constitutes an image, concentration in visual awareness, perception and sensitivity. Color transparencies are emphasized in the design workshop, and practices in negative-positive printing, negative analysis, internegative making, transparency duplicating, and the use of special processing techniques are used to emphasize theory. (PPHG-213)

Class 2, Lab. 4 Credit 3/Qtr.

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
Registration #0906-408 of Photography
An introduction into the field of photography as it applies to technical problem solving. Event timing, photo sensing, visible and invisible radiation recording are presented in class and laboratory projects. (PPHP-303, PPHP or PPHL-313)

Class 2, Lab. 8, Credit 4

PPHP-409 Corporate and Special Interest
Registration #0906-409 Publications
A survey of this type of publication with particular emphasis on the photographic problems involved. Skill building assignments to improve competence and an introduction into the problems of the art director, editor, printer, layout person, and writer form the basis on the course content. (PPHP-303, PPHP or PPHL-313)

Class 2, Lab. 8, Credit 4

PPHP-421, 422, 423 Advertising Photography
Registration #0906-421, -422, -423
A course built strictly to the standards of professional photography. Only those students who seriously aspire to be professional craftspeople should enroll. The assignments are specific and vary from strictly commercial to advertiing illustration. In addition, the student is encouraged to specialize in the direction of his or her own natural ability and interests. Approximately 2/3 of the photography will be in color. (PPHP-303 and PPHP-313, PPHL-313)

Class 2, Lab. 7*, Credit 4/Qtr.

PPHP-431 Forensic Photography
Registration #0906-431
The use of photography in forensic application for business and indstry, surveillance, photographic evidence, forgery detection, safety. (PPHP-203)

Class 2, Lab. 6, Credit 4 (Spring only - on sufficient demand)

PPHP-441, 442, 443 Advanced Color Printing
Registration #0906-441, -442, -443
This course is designed to give the student an advanced study in color techniques and theory in relation to quality and creative use of photographic materials. The student may choose a section for intensive study such as the dye transfer process, quality control methods in printing and processing and special masking. PPHP-313 or equivalent is required. (Permission of the instructor)

Lecture 1, Lab. 6, Credit 4/Qtr.

PPHP-461 Micrographics
Registration #0906-461
A one-quarter course designed to acquaint the professional photography student with a career in the micrographic industry. It is directed to familiarize the student with microimaging techniques and materials utilized in microfilm production situations as well as in media production situations where the creation and reproduction of illustrative imagery is of prime importance. (PPHP-303)

Class 1, Lab. 5, Credit 4 (offered on sufficient demand)

PPHP-501, 502, 503 Industrial Photography Seminar
Registration #0906-501, -502, -503
Depending on the student's interest, the course is subdivided into two areas of emphasis.

(a) Instrumentation; a continuation of PFHP-408 to a greater depth on a seminar basis. (PPHP-408 or permission of the instructor)

(b) Corporate and Special Interest Publications; a continuation (PPHP-409 or permission of the instructor)

Class 2, Lab. 3, Studio 5, Credit 4/Qtr.

PPHP-521, 522, 523 Advanced Color Seminar
Registration #0906-521, -522, -523
This course offers the student an opportunity to work relatively independently to complete majors in advertising, architectural, illustration photography or portraiture. Individual growth and the development of personal style are stressed. The student is assisted in preparing a portfolio of professional 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-313 and permission of instructor)

Class 3, Lab. 4, Credit 4/Qtr.

'Lab hours may not be scheduled and are to be completed in available time.

PPHP-541 **Basic Portrait Photography**
Registration #0906-541
Introduction to basic professional portraiture, the study of the art of lighting (indoors and outdoors), posing, composition, makeup, camera techniques, mounting and communication. (PPHP-303, PPHP-313 or PPHL-313)

Lecture 3, Lab. 2, Credit 4 (Fall, Winter, Spring)

PPHP-542 **Advanced Portrait Photography**
Registration #0906-542
Introduction to color harmony, use of "props," backgrounds, vignetting, candid wedding, bridal portraiture, full lengths, groups, multiple exposure, business procedures, sales, pricing, and public relations. (PPHP-541)

Lecture 3, Lab. 2, Credit 4 (Winter only)

PPHP-543 **Contemporary Portrait Photography**
Registration #0906-543
The study of the finer arts of lighting and posing, the classical approach to portraiture, environmental portraiture on location or in the studio, mood in portraiture, coordinating clothing, props, and backgrounds for pleasing results in both low and high key portraiture.

Lecture 3, Lab. 2, Credit 4 (Spring only)

PPHP-551, 552, 553 **Special Topics in Photography**
Registration #0906-551, -552, -553
A seminar approach offered on demand when adequate numbers of students and faculty desire to investigate specialized topics not normally offered in the regular curriculum. Available to upper level students. (PPHP-303)

Credit Variable

PPHP-561, 562 **Perceptual Principles for Photographers**
Registration #0906-561, -562
An introductory course into the ways we select and organize pictorial information based primarily on gestalt principals. The emphasis is not on the technical aspects of the photographic process (the medium) but rather on the communicative aspects (the message). (No prerequisites)

4 Qtr. Cr.

PPHP-599 **Independent Study**
Registration #0906-599
A student proposed advanced project sponsored by an instructor. Approval of the proposal by the department chairperson and the director of the school. Available to upper level students with a G.P.A of 3.0 or greater.

Credit Variable

Photographic Science and Instrumentation

The two courses, PPHS-200 and PPHS-210, are special intensive summer courses designed for students transferring into the Photographic Science and Instrumental Program at the third year level, and for others who desire a background in photographic science and instrumentation at an introductory engineering level. Students normally take both courses concurrently.

PPHS-200 **Fundamentals of Photographic Science I**
Registration #0907-200
An intensive course presenting the subject matter normally taken by photographic science and instrumentation students during their first year. Topics include the basic physics and chemistry of photo-sensitive systems, characteristics of radiation, introduction to sensitometry and tone reproduction, and applied photography. (Permission of the department)

Credit 9 (Summer only)

PPHS-201, 202, 203 **Photography for Scientists and Engineers**
Registration #0907-201, -202, -203
An introduction to the theory and applications of radiation-sensitive materials and systems. Physical properties of photographic materials, characteristics of radiation, sensitometric properties of photo-sensitive materials processing chemistry, and fundamentals of black-and-white and color photography.

Class 3, Lab. 3, Credit 4/Qtr.

PPHS-210 **Fundamentals of Photographic Science II**
Registration #0907-210
An intensive course presenting the subject matter normally taken by photographic science and instrumentation students during their second year. Topics include the chemistry and physics of black-and-white and color materials and processes as a continuation of topics covered in PPHS-200. (Permission of the department and PPHS-200 or PPHS-203)

Credit 9 (Summer only)

PPHS-303 **Photographic Instrumentation**
Registration #0907-303
Introduction to the use of photographic recording methods to obtain space and time information from object fields; principles for selection of camera, lens parameters, recording material and recording rate; the use of time and space references to facilitate date retrieval. (PPHS-203)

Class 2, Lab. 6, Credit 4

•PPHS-312 **Applied Processing**
Registration #0907-312
Problems in applied processing and the application of analytical chemical techniques to the control of black-and-white and color processing solutions. Processing faults, and image restoration, trouble shooting, archival permanence, ecology and processing machine operation. Statistical techniques application to machine control. (SCHG-206, PPHS-203)

Class 2, Lab. 6, Credit 4

PPHS-313 **Color Systems**
Registration #0907-313
Introduction to color and color imaging systems; systems of color specification; additive and subtractive trichromatic systems of color recording and reproduction; the technology of color photography; sensitometry and densitometry of color materials; introduction to graphic reproduction and electronic systems. Laboratory work in the exposure and evaluation of color photographic materials. (SMAM-305, PPHS-201 through PPHS-312)

Class 3, Lab. 3, Credit 4

PPHS-401 **Radiometry**
Registration #0907-401
The course serves as an introduction to the physics of light, its generation, propagation, absorption and measurement. This is combined with an introduction to the human visual process, to general photometry and radiometry, to light sources and to light receivers. (SMAM-205, SPSP-313, PPHS-311)

Class 3, Lab. 6, Credit 5

PPHS-402 **Image Microstructure**
Registration #0907-402
Introduction to image formation and structure; mathematical models for spread functions of image-forming elements and detectors; superposition and convolution; noise; sinusoidal response functions; figures of merit; characteristics of instruments used for small-scale image measurements. Laboratory work in microdensitometry and subjective image evaluation. (SMAM-305, PPHS-203, SPSP-313)

Class 3, Lab. 5, Credit 5

PPHS-404 **Introduction to Scientific Research**
Registration #0907-404
A course for third-year students in photographic science and instrumentation designed as preparation for the fourth-year research project. Project selection and the use of scientific literature; preparation of proposals; research notebooks; patents; considerations in data collection and analysis; written and oral presentations. (Third-year status in Photographic Science and Instrumentation or permission of the instructor)

Class 2, Credit 2/Qtr.

PPHS-411 **Statistical Inference**
Registration #0907-411
Hypothesis testing, confidence intervals, and sample size for variables; introduction to analysis of variance and regression analysis.

Class 2, Lab. 2, Credit 3

PPHS-412 **Design of Experiments**
Registration #0907-412
Basic designs for experiments, objectives, conclusions, error estimation, data analysis; continuation of analysis of variance and regression analysis; response surfaces and factorials.

Class 2, Lab. 2, Credit 3

PPHS-413 **Statistical Quality Control**
Registration #0907-413
Basic probability, control charts, sampling plans, power and O.C. curves, and modern applications of product and process control.

Class 2, Lab. 2, Credit 3

PPHS-421, 422, 423 **Photographic Chemistry**
Registration #0907-421, -422, -423
The chemistry and photographic properties of photographic emulsions and developer solutions at the intermediate level; topics in physical, organic, and analytical chemistry necessary to the continued study of photographic science. (PPHS-312, SCHG-207)

Class 3, Lab. 3, Credit 4/Qtr.

PPHS-501, 502, 503 Research
Registration #0907-501, -502, -503
An investigation of a problem in photographic science of engineering including planning and execution of experiments, statistical data analysis, and reporting results orally and in a written paper. (PPHS-404, 413)

Class 2, Lab. 2 (Fall)
Class 2, Lab. 6, Credit 4 (Winter and Spring)

PPHS-511, 512, 513 Optical Instrumentation
Registration #0907-511, -512, -513
Principles of geometrical and physical optics, image evaluation, optical instruments, and instrumentation. (SMAM-305, SPSP-313, PPHS-303)

Class 3, Credit 3/Qtr.

PPHS-521, 522, 523 Image Systems and Evaluation
Registration #0907-521, -522, -523
An analytical approach to analysis and evaluation of photo-optical and other images recording systems; objective and subjective evaluation techniques and their correlation. The use of convolution, correlation, autocorrelation, and Fourier methods in the analysis of the image recording systems. Laboratory work in the design of photo-optical systems. (PPHS-402, SMAM-305, SPSP-313)

Class 2, Lab. 6, Credit 4 (Fall)
Class 2, Credit 2 (Winter and Spring)

PPHS-531, 532, 533 Theory of the Photographic Process
Registration #0907-531, -532, -533
An advanced course in photographic theory: sensitivity, emulsions, latent image, and processing of both black-and-white and color materials; chemistry and physics of selected non-silver and other non-conventional processes (PPHS-423, SPSP-313)

Class 3, Credit 3/Qtr.

PPHS-551, 552, 553 Special Topics in Photographic Science
Registration #0907-551, -552, -553
Topics of special interest, varying from quarter to quarter, selected from the field of photographic science and not currently offered in the Division's curriculum. Specific topics are announced in advance. (Not offered each quarter Consult staff chairman of the Photographic Science Division)

Class, Credit: variable

PPHS-599 Independent Study
Registration #0907-599
Faculty directed study of appropriate topics on a tutorial basis. Approval of the proposal by the staff chairman of the Photographic Science Division required.

Class, Credit: variable

PPHS-600 Principles of Photographic Science
Registration #0907-600
A course intended for students who have completed their undergraduate programs in engineering or the sciences and who desire to prepare themselves for entry into the graduate program in photographic science and instrumentation or who desire a working knowledge of photographic science at an undergraduate level. It is an intensive course, assuming working knowledge of undergraduate mathematics, physics and chemistry. Course topics include radiation and radiometry, properties of radiation-sensitive materials, chemistry of photographic processing, sensitometry, tone reproduction, principles of color measurement, color photographic systems, image microstructure, and photographic instruments The course includes both lectures and the laboratory work. (Registration requires consent of the graduate coordinator.)

Credit 15 (Summer only)

(Not applicable to the 45 required graduate credits in the photographic science and instrumentation graduate program)

PPHS-601, 602, 603 Principles of Photographic Science
Registration #0907-601, -602, -603
Equivalent to PPHS-600, but offered in the evening and Saturdays during the regular fall, winter, and spring Quarters. (Preliminary admission to the MS program in Photographic Science or consent of graduate coordinator. Not offered every year. Consult coordinator of photographic science graduate program.)

Credit 5/Qtr.

(Not applicable to 45 required graduate credits)

Master of Fine Arts in Photography

PPHG-701, 702, 703 History and Aesthetics of Photography
Registration #0903-701, -702, -703
An intensive inquiry into the history and aesthetics of photography to the present. Some of the areas of exploration: the rise and development of portrait, architectural and landscape photography in the 19th and 20th centuries; a survey of old and recent processes and how they affect the image-making of their particular period; exploring new frontiers; the photographers of the geological and geographical U.S. Surveys and NASA moonscapes; "straight" photography vs. pictorialism: 135 year battle; the document and Robert Frank's ***Americans*** and the evolution of color photography.

Credit 3/Qtr.

PPHG-705, 706, 707 Student/Faculty Seminar
Registration #0903-705, -706, -707
An all-purpose weekly meeting to facilitate communication among members of the MFA community and to introduce them to the resources available on the campus and in the community.

Credit 1/Qtr

PPHG-720, 721, 722 Photographic Workshop
Registration #0903-720, -721, -722
Each faculty member offers a different opportunity for students to explore the multiplicity of ways that photography can be used as a vehicle for expression and for communication. Visual research, group critiques, seminars, field trips, studio and laboratory practice are used.

Credit 4/Qtr.

PPHG-725, 726, 727 Photography Core
Registration #0903-725, -726, -727
Major emphasis is placed on the individual's learning to generate and intensify his or her personal statement through photography. Some of the projects are assigned while others are selected by the candidate.

Credit 4/Qtr.

PPHG-730, 731, 732 Cinematography
Registration #0903-730, -731, -732
Film making workshop. Individually planned studies in cinematography, as determined by faculty-student consultation, group critiques, seminars, studio and laboratory practice, field trips.

Credit 3-9/Qtr.

PPHG-740, 741, 742 Photographic Museum Practice
Registration #0903-740, -741, -742
Museum internship workshop, still or motion picture; research, assigned projects, seminars jn 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. *i* ■ .

PPHG-750, 751, 752 Special Topics Workshop
Registration #0903-750, -751, -752
Advanced topics of current or special interest designed to broaden and intensify the student's ability to use photography as a means of communication and expression.

Credit 3-9/Qtr.

PPHG-755 Applied Sensitometry
Registration #0903-755
This course presents relevant sensitometry and photographic theory, principles and practices in a manner sensitive to the background and needs of a fine art photographer.

Credit 4/Qtr.

PPHG-756 Zone System Principles
Registration #0903-756
The application of selected sensitometric and perceptual principles to the understanding and practice of Zone System techniques for calibration and visualization.

Credit 4

PPHG-760 Reception & Photography
Registration #0903-760
An advanced course which provides an applied psychological framework for the ways we select, code, organize, store, retrieve and interpret visual images and explores how photographs relate to art and perception.

Credit 4 (offered on sufficient demand)

PPHG-799 **Independent Project**
Registration #0903-799
The student proposes an advanced project to an individual instructor. The student and the instructor are jointly responsible that the material to be covered is appropriate to the student's program and that the number of credits proposed are justified. Both will sign the proposal which must also be approved by the graduate coordinator and the director of the school.

Credit 1-10/Qtr.

PPHG-889 **Pre-Thesis Seminar**
Registration #0903-889
An introduction to research and thesis procedures and requirements with a review of existing thesis proposals and accepted thesis reports. Each student will be encouraged to develop his/her own thesis proposal during the course.

Credit 1 (Fall 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

Master of Science

PPHS-711, 712, 713 **Theory of the Photographic Process**
Registration #0903-711, -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 #0903-721, -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**
Registration #0907-741, -742, -743 **Imaging Systems**
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**
Registration #0907-751, -752, -753 **Photographic Science**
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 photographic science graduate program.)

Credit varies

School of Printing

All School of Printing courses are offered at least once annually, except as noted.

Management Courses

PPRM-201 **Introduction to Technical Writing**
Registration #0910-201
Basic approach to fundamentals of modern technical writing; review of English and writing skills; consideration of principles, techniques, form and style.

Class 3, Credit 3

PPRM-210 **Financial Controls I**
Registration #0910-210
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**
Registration #0910-301 **to the Graphic Arts**
A study of the applications of electronic computer systems to the graphic arts industry. Topics include fundamental data processing concepts, software development, and technical and managerial graphic arts applications.

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 organisational influences. Case analysis is used extensively.

Class 3, 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-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; obtaining and interpreting specifications; design and use of estimating forms; pricing for a profit margin preparing the quotation. (PPRT-311, PPRM-210)

Class 4, Credit 4

PPRM-402 **Estimating II**
Registration #0910-402
Continuing study of sheet-fed offset lithography estimating; multi-color offset presses and signature-related bindery operations,"'signature imposition; camera, layout, stripping and plate processing production standards; phototypesetting and mechanical artwork costs; color separations and the costs associated with process color printing; finishing operations; the application of the computer to estimating procedures. (PPRM-301, PPRM-401, PPRT-312)

Class 4, Credit 4

PPRM-403 **Printing Production Management I**
Registration #0910-403
Examines the non-technological functions of production as components of a system, emphasising organisational alternatives relating to human factors. Includes such topics as organisation, systems approach, decision making, production planning and control, purchasing, inventory control, quality control, methods analysis, work measurement. Some simple analytical models based on graphs or elementary algebra are introduced.

Class 3, Credit 3

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-502 **Financial Controls II**
Registration #0910-502
Cost accounting systems; measurement and allocation of manufacturing and non-manufacturing costs; uses of full cost information; differential accounting and alternative choice decisions; capital investment decisions; budget preparation, standard cost, variance analysis and the management control process. (PPRM-210)

Class 4, Credit 4

PPRM-506 **Business Law**
Registration #0910-506
Elements of the laws of contracts, agency, sales, negotiable instruments, partnerships, corporations, taxes, insurance, libel, copyright, and other laws pertaining to business, printing and publishing.

Class 3, Credit 3

PPRM-507 **Computer Estimating Workshop**
Registration #0910-507
The design and writing of computer estimating algorithms; use of a full-scale computer estimating system; estimating for web-fed offset presses; estimating for non-lithographic printing processes; business forms and book manufacturing industries practices; addressing, mailing and order fulfillment; preplanning and break-even analysis; techniques for competitive estimating and pricing. (PPRM-402 and ability to program in BASIC required)

Class 4, Credit 4

PPRM-509 **Economics of Production Management**
Registration #0910-509
Intended as a seminar in management for seniors, this course combines readings in managerial economics with case studies, most of which describe real printing company situations involving price, product or equipment decisions. Students analyze situations; prepare, present and defend arguments for specific course of action. The student will find it helpful but not mandatory to have completed courses in Financial Controls I & II, Printing Production Management I & II, Principles of Economics. '

Class 4, Credit 4

PPRM-510 **Personnel Relations II**
Registration #0910-510
Advanced study of employer-employee relationships, introduction to major management concepts as they relate to the printing field. Management functions and organization theory are considered in the light of behavioral science. Supervisory practices are analyzed. (PPRM-302)

Class 4, Credit 4

PPRM-511 **Labor Relations in Graphic Arts**
Registration #0910-511
History and background for organized labor movement; makeup and characteristics of the contemporary labor force; collective bargaining and its effects on wages, hours, and conditions of work; the process of negotiating, administering, interpreting, applying, and enforcing the labor-management contract within the graphic arts area of the modern industrial society

Class 4, Credit 4

PPRM-512 **Collective Bargaining in the Graphic Arts**
Registration #0910-512
A study of the strategies and tactics of collective bargaining as applied to the graphic arts. Wage issues, fringe issues, and such concepts as seniority, discipline, grievance procedures, and managerial prerogatives are considered.

Class 3, Credit 3 (offered'every other year)

PPRM-513 **Sales in the Graphic Arts**
Registration #0910-513
Explores economic, psychological and sociological bases of selling, with emphasis on 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 U.S. Constitutional law decisions as they relate to the unique rights granted the graphic arts industry. Cases cover Article I, Section 8, and the First Amendment plus the limitations of libel, obscenity, privacy and state and federal relations.

Class **4,** Credit **4**

PPRM-516 **Marketing in the Graphic Arts**
Registration #0910-516
Primarily from a printing industry viewpoint, the class explores the marketing concepts (organizing a team to find out what customers want to buy and then produce it at a profit). Students examine marketing functions and consider alternative ways to perform them in various company situations.

Class **4,** Credit **4**

PPRM-518 **Purchasing in the Graphic Arts**
Registration #0910-518
Role of the purchasing agent in the printing plant. Methods of procurement, purchasing policies and sources of supply. Characteristics of paper, ink, sensitized materials and other graphic arts supplies. Inventory control, economic order quantity, role of trade shops, make or buy decisions, blanket orders, consignment agreements, capital investment decisions and the purchase order as a legal document.

Class **4,** Credit 3

PPRM-551 **Special Topics-Printing**
Registration #0910-551
A management, or management related, course used to present and 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, and 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 basic operations necessary for the production of a simple package printing job.

Class 2, Lab. 3, Credit 3

PPRT-201 **Typography I**
Registration #0911-201
Conventional rules of good traditional typography are reviewed through familiarization with basic terminology, type classification and typeface recognition; course includes lectures and laboratory exercises.

Class 2, Lab. 3, Credit 3

PPRT-202 **Composition Technology**
Registration #0911-202
A study of the use, operation, and application of machine principles and mechanisms as related to hot metal and phototypesetting; laboratory projects in setting composition photographically and in hot metal; utilization of various tape systems.

Class 2, Lab. 3, Credit 3

PPRT-203 **Layout and Printing Design**
Registration #0911-203
Practical application of theory relating to typography and idea development in solving printing design problems. Introduction of basic artistic techniques for rendering. Application of requirements and principles of layout design as applied to commercial printing and advertising. Analyzing alphanumeric, pictorial, and related graphics and their interpretation into printing tasks and procedures.

Class 2, Lab. 3, Credit 3

PPRT-204 **Relief Press**
Registration #0911-204
An introduction into the theory and practices used in printing from relief image plates. Letterpress operations are covered when applicable or related to flexographic printing. Emphasis is placed on the elements of flexography from art work through plates, inks and presswork. Printing is done on a wide variety of substrates. General study of trends and applications of the relief printing process is advanced.

Class 2, Lab. 3, Credit 3

PPRT-205 **Gravure Printing**
Registration #0911-205
Introductory course designed to survey the gravure printing process and the study of related information regarding applications, techniques, equipment, materials and supplies. The course is conducted by means of lectures, class discussions, demonstrations and supervised laboratory exercises using a 4-color Champlain Web Press.

Class 2, Lab. 3, Credit 3

PPRT-206 **Reproduction Photography**
Registration #0911-206
A basic course in the fundamental principles, procedures, techniques, and applications of the photographic process as it is related to the production of film negatives or film positives for the major printing processes.

Class 2, Lab. 3, Credit 3

PPRT-207 **Printing Plates**
Registration #0911-207
An introductory course in the principles and practices of platemaking for letterpress, flexographic, planographic, and gravure printing processes. It covers a survey of major printing processes with emphasis on their plate characteristics and platemaking requirements; important physical as well as chemical 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 preparation of positives, 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 **Newsapaper 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, silhoettes cropping, "window," etc. Lectures cover all aspects of copy. Directed to those who do not require the depth of involvement given in PPRT-313.

Class 2, Lab. 3, Credit 3

PPRT-301 **Typography II**
Registration #0911-301
Emphasis is put upon finished typographic problems. Topics included in 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-201)

Class 2, Lab. 6, Credit 4

PPRT-302 **Composition Systems**
Registration #0911-302
Detailed study of photocomposition with emphasis on systems approach; introduction to use of computers in composing rooms, and operation of specialized equipment. (PPRT-202)

Class 2, Lab. 3, Credit 3

PPRT-303 **Layout and Printing Design**
Registration #0911-303
Typical printing design problems with emphasis on typographic arrangements, pictorial arrangement with consideration of production follow-through. Includes design of complete booklet dummy and other commercial items for black-and-white and color reproduction from roughs to comprehensive layout.

Class 2, Lab. 6, Credit 4

PPRT-304 **Advanced Relief Press**
Registration #0911-304
A study of pressroom problems in letterpress printing on cylinder press equipment; commercial forms, single and multi-color work; makeready system; operation and care of equipment. (PPRT-204)

Class 2, Lab 6, Credit 4

PPRT-306 **Tone Reproduction Photography**
Registration #0911-306
The photographic processes as they relate to the measurement and reproduction of tones for the major printing processes. The emphasis will be on the scientific analysis of a complete system of halftone sensitometry and process control. (PPRT-206)

Class 2, Lab. 3, Credit 3

PPRT-308 **Lithographic Press Problems**
Registration #0911-308
An advanced course in the theory, practice, and problems of offset presswork; development of technical knowledge of materials and equipment; practice in running multicolor work. (PPRT-208)

Class 2, Lab. 6, Credit 4

PPRT-309 **Advanced Screen Printing**
Registration #0911-309
Further study of the theory and practice of screen printing covering areas such as experiments with fabrics or screens; stencil forming materials and the effects these have on finished product. Further study into the inks and substrates that are common to the screen printer. Introduction to and running of automatic cylinder screen printing press and container press capable of printing cylindrical, conical and flat objects. (PPRT-209)

Class 2, Lab. 3, Credit 3

PPRT-310 **Advanced Image Carriers**
Registration #0911-310
Advanced study of technological requirements involved in producing letterpress and flexographic plates and gravure cylinders. Chemical, mechanical and electronic processes are discussed and illustrated in lectures. Extensive laboratory project work is devoted to molded rubber platemaking for flexography, photopolymer plates for both letterpress and flexography and both flat plate and cylinder imaging for gravure.

Class 2, Lab. 6, Credit 4

PPRT-311 **Imposition and Finishing**
Registration #0911-311
Printing production planning to correlate pre-press and post-press operations. Topics include preparing layouts, forms and a study of how they are affected by various bindery operations. Laboratory experiments include the operation of modern bindery equipment, evaluation and application of adhesives, binding materials and book performance testing. Several projects are followed through from design, signature layout to a finished product, including a gold stamped, hardcover bound book.

Class 2, Lab. 3, Credit 3

PPRT-312 **Image Assembly**
Registration #0911-312
An introductory course covering the basic and specialized procedures of film assembly for black and white and color work. The course covers work with contact and duplicating room-light films. Stripping of line, halftone, and complementary flats is discussed and practiced. Fake color and process color stripping as well as spreads and chokes purposes, methods and projects given. Electronic and automated prepress imaging is presented in form of slides and discussion.

Class 2, Lab. 3, Credit 3

PPRT-313 **Copy Preparation**
Registration #0911-313
Preparation of copy for camera; working from layouts, making analysis of requirements; paste-up techniques, methods of pre-separation mechanicals, use of photographic and typographic copy, relation to production steps in follow-up for offset platemaking and photo-engraving; proper instructional specification writing. (PPRT-203)

Class 2, Lab. 6, Credit 4

PPRT-314 **Flexography**
Registration #0911-314
A study of the theory and practice of flexographic printing; uses and development of flexography; plate and ink requirements; press principles and operation; experiments in printing on a wide variety of surfaces. (PPRT-204)

Class 2, Lab. 6, Credit 4

PPRT-315 **Ink and Color**
Registration #0911-315
Theory of light and color; basic theory of process color and correction; use of color comparator and spectrophotometer; the study of color systems and color matching systems; theory and application of various ink systems; practice in standard ink mixing and color matching emphasizing offset and letterpress processes; correlation of ink properties with applications; emphasis on relationship of ink to paper and press; study of ink problems and their correction.

Class 2, Lab. 3, Credit 4

PPRT-317 **Calligraphic Forms**
Registration #0911-317
An introduction to the basics of calligraphy; exercises in use of broadedge pen to develop primary forms of italic and Chancery Cursive letter styles and skills in rapid writing; consideration of historical origins of letters, use of basic tools, understanding of methods and disciplines stressed.

Class 2, Lab. 3, Credit 3

PPRT-319 **Newspaper Design**
Registration #0911-319
A study of the methods of designing modern newspaper pages; a look at a variety of front page design methods as well as inside pages; placement of editorial content and ads; problems involved in designing section pages and special pages and editions; the standard format vs. the tabloid format; page sizes, column widths, and space between columns.

Class 2, Lab. 3, Credit 3

PPRT-320 **Newspaper Production**
Registration #0911-320
A study of the methods of producing a newspaper by the use of photocomposition systems and the offset process. Students organize a staff, design a newspaper, set type, paste up paper, go to camera, make plates and go to press.

Class 2, Lab. 3, Credit 3

PPRT-321 **Web Offset**
Registration #0911-321
An analytical study of the technological development in web offset; emphasis on the interrelationship of procedures, materials, and engineer; practical laboratory projects on a commercial four-unit perfecting web offset press. (PPRT-208)

Class 2, Lab. 3, Credit 3*

PPRT-322 **Circulation ancTMailrooms**
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, or instructor's approval) (Every other year)

Class 2, Lab. 3, Credit 3

PPRT-330 **Newspaper Production II**
Registration #0911-330
The production of a newspaper by photocomposition methods and the offset process. A continuation of PPRT-320 Newspaper Production I in more depth, with special emphasis on presswork on the Goss Community Offset Press. Also, emphasis will be made on the use of color in newspaper production. (PPRT-320)

Class 2, Lab. 3, Credit 3

PPRT-333 **Introduction to Book Production**
Registration #0911-333
This course is designed to introduce the student to the many-faceted role of the production manager in a book publishing firm. Production's role throughout the publishing cycle from manuscript to bound books is examined, and detailed emphasis is placed upon determining production and purchasing requirements for producing a variety of books, including trade books, textbooks, juveniles and special editions.

Class 2, Lab. 3, Credit 3

PPRT-335 **The Printed Book in America**
Registration #0911-335
This course traces the main currents in the development of the printed book in America by closely examining the books themselves. In addition, close study of the lives and works of the great printers, their equipment and available technology, and their aesthetic viewpoints is undertaken to determine their impact on their own times and their relevance for today. Classes are held in the Melbert B. Cary, Jr., Graphic Arts Collection.

Class 3, Credit 3

PPRT-337 **Art of the Printed Book 1455-1955**
Registration #0911-337
This course presents masterpieces of the printer's art from the past five centuries. The lives and works of great European printers from Gutenberg to Mardersteig are examined, and their historical impact on Western civilization discussed with a view toward determining new perspectives for today's graphic artisan and book printer. Classes are held in the Melbert B. Cary, Jr. Graphic Arts Collection.

Class 3, Credit 3

PPRT-401 **Typographic Workshop**
Registration #0911-401
Allows the student to create and solve a typographic problem of his own choice. Complete freedom is given and experimentation is encouraged, giving the student the opportunity to meet his own objectives and satisfaction.
The project or projects that the student chooses should be of significant interest to warrant taking this course. (PPRT-301)

Class 2, Lab. 6, Credit 4

PPRT-402 Applications of Electronics to Graphic Arts
Registration #0911-402
A basic course in the fundamentals of electricity and electronics covering DC, AC and semiconductors. Theory and application are combined as major topics and studied, implicating numerous graphic arts machines and devices. Students will perform laboratory experiments using basic electronic components and instruments.

Class 2, Lab. 3, Credit 3

PPRT-403 Layout and Printing Design
Registration #0911-403
A project course with design problems which involves students in converting their designs into the actual camera copy, trying various media, learning to identify art techniques and printing processes; more individualized approaches emphasized, more advanced principles applied. (PPRT-303)

Class 2, Lab. 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 scanners.

Class 2, Lab. 3, Credit 3

PPRT-410 Introduction to Paper
Registration #0911-410
This course begins with a discussion of papermaking fibers, pulping procedures, papermaking machines, and proceeds to show how they affect paper properties and printing characteristics. Laboratory experiences include making paper from various raw materials, physical and optical testing of paper and paper identification.

Class 3, Lab. 2, Credit 3

PPRT-500 Quality Control in the Graphic Arts
Registration #0911-500
A study of the methods and instrumentation necessary to produce a product consistent with the appropriate quality level. Topics will include process variability, waste reduction, problem analysis, materials testing, process control, process optimization, and quality assurance.

Prerequisite: Students should have completed all required 200 level technical courses in the School of Printing or have consent of the instructor.

Class 3, Credit 3

PPRT-501 Development of Printing Types
Registration #0911-501
Present-day typefaces studied with relationship to their historical development and current use; type classification and nomenclature.

Class 3, Credit 3

PPRT-506 Advanced Color Reproduction
Registration #0911-506
Further study of color measurement and color reproduction. The emphasis will be on the analysis of a color reproduction system using such tools as color measurement instrumentation, visual color evaluation, color tone reproduction, and process control. (PPRT-406)

Class 2, Lab. 3, Credit 3

PPRT-551 Special Topics-Printing
Registration #0911-551
This course presents and investigates technological topics which normally are not covered in the regular curriculum on a one-time basis. Guest lecturers such as industry leaders as well as regular faculty are used to conduct this course. Topics to be covered are announced in advance.

Credit varies/Qtr.

PPRT-591 Reproduction Photography
Registration #0911-591
An intensive course designed to enable photography students to gain a basic understanding of the various printing processes, the application of photography to each, with an emphasis on problems involved in obtaining optimum tone and color reproduction of their photographs.

Class 2, Lab. 3, Credit 3

PPRT-592 Printing Plates
Registration #0911-592
A specialized course for photography students to develop understanding of various imaging methods and characteristics, processing steps, applications, and major problems of platemaking.

Class 2, Lab. 3, Credit 3

PPRT-593 Printing Presses-Lithographic
Registration #0911-593
Course offered for photography students; theory and practice of the methods of planographic processes.

Class **2,** Lab. 3, Credit 3

PPRT-594 Printing Presses-Screen
Registration #0911-594
Course offered for photography students; theory and practice of the methods of screen processes.

Class **2,** Lab. 3, Credit 3

Graduate Courses

Master of Science in Printing

PPRM-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-oriented production control techniques. (PPRM-301)

Credit **4**

Printing Technology

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 5

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 5

PPRT-708 Introduction to Systems Analysis
Registration #0911-708
Problems of systems analysis in printing operations for the highest quality product at the minimal cost including optimal floor designs and methods of study. (PPRM-301)

Credit 4

PPRT-709 **Trends in Printing Technolory**
Registration #0911-709
A study of the forces which have influenced the development of printing with emphasis upon the technological factors involved; examinations of the relationships of aesthetics and craft concepts to modern industrial techniques.

Credit 4

PPRT-711 **Tone and Color Analysis**
Registration #0911-711
Methods of instrumentation necessary for the evaluation and process control of printed tone and color and the photographic intermediate images required for the photomechanical reproduction of tone and color.

Credit 4

PPRT-8S0 **Research Projects**
Registration #0911-850
Individual research projects in which independent data is collected by the student, followed by analysis and evaluation. A comprehensive written report is required. Consent of advisor is required.

Credit variable

PPRT-890 **Research and Thesis Guidance**
Registration #0911-890
An experimental survey of a problem area in the graphic arts.

Credit variable

PPRT-713 **Photo Typography Procedures**
Registration #0908-713
An introductory course in the basic tenets of traditional typography. Areas that will be covered are: terminology, style, copyfitting, point systems, legibility, initials and typeface recognition. Laboratory demonstrations will be given to illustrate the theoretical areas covered in the lectures. Emphasis is placed on photo composition and the systems approach.

Credit 4

PPRT- **Ink, Color and Substrates**
Registration #0911-
A study of the physics of light and color, basic color theory, color measurements and color systems. Included are applications of color theory to the graphic arts. The chemistry and physics of ink and substrates, and their interaction, are covered. Emphasis is given to the problem of ink, color and substrates in each printing process.

College of Science

NOTE: Quarter offered follows course description in parenthesis: F-Fall; W-Winter; S-Spring: SR Summer

NOTE: From time to time special courses may be offered in the Contemporary Sciences series, **e.g.,** *Environmental Geology, Oceanography, etc*

Biology

SBIB-550 **Biology Seminar**
Registration #1001-550
Written and oral reports and their discussion by class members covering topics of current interest in the biological sciences. (40 quarter hours in biology and successful completion of the departmental writing requirement)

Class 2, Credit 2 (W, S)

SBIB-559 **Special Topics-Biology**
Registration #1001-559
Advanced courses which are of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary course and have specified prerequisites, contact hours, and examination procedures

Class variable, Credit variable (offered every quarter)

SBIB-599 **Independent Study-Biology**
Registration #1001-599
Faculty directed study of appropriate topics on a tutorial basis. This course will generally be used to enable ***at}*** individual to pursue studies of existing knowledge available in the literature (one year of general biology)

Class variable, Credit variable (Offered every quarter)

Molecular & Cellular Biology

SBIC-320 **Histology**
Registration #1002-320
Detailed study of the structure and function of normal and abnormal vertebrate tissue, (one year of general biology)

Class 2, Lab. 4, Credit 4 (F-alternate years)

SBIC-402 **Immunology**
Registration #1002-402
Investigation of the basic concepts of immunology (antigens, antibodies, immunologic specificity, antibody synthesis, and cell-mediated immunity) and the applications of immunology to infectious diseases, allergic reactions, transplantations, tumors, autoimmune diseases, immunosuppressive drugs and tolerance, (one year of general biology, one year of organic chemistry)

Class 3, Credit 3 (F-every year, W-alternate years)

SBIC-412 **Immunology Laboratory**
Registration #1002-412
Laboratory work to complement the lectures in Immunology (SBIC-402). Each student experiences a variety of techniques (including use of laboratory animals) used in immunological research and clinical laboratories.

Lab. 3, Credit **1** (F-every year, W-alternate years)

SBIC-403 **Cell Physiology**
Registration #1002-403
Functional cytology, cellular water and electrolyte homeostasis, exchange of materials across cell membranes, regulation of cellular metabolism and control of cell growth, (one year of general biology, one year of organic chemistry)

Class 3, Lab. 3, Credit 4 (E)

SBIC-404 **Introductory Microbiology**
Registration #1002-404
Principles of anatomy, biochemistry, genetics, taxonomy, ecology of viruses, bacteria, molds, algae, and protozoa. Useful and harmful activities. Basic laboratory techniques, microscopy, staining, counting, identifying, (one year of general biology, one year of organic chemistry)

Class 3, Lab 4, Credit 5 (F, SR)

SBIC-406 **Virology**
Registration #1002-406
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 (alternates W/S)

SBIC-409 **Plant Anatomy**
Registration #1002-409
A detailed study of the cellular structure and development of plant tissues and organs, (one year of general biology)

Class 3, Lab. 3, Credit 4 (F-alternate years)

SBIC-710 **Antibiotics & Chemotherapy**
Registration #1002-710
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 (SBIC-404, one year of organic chemistry)

Class 3, Lab. 2, Credit 4 (W-alternate years)

Developmental, Genetic & Environmental Biology

SBID-340 **General Ecology**
Registration #1003-340
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)

SBID-420 **Plant Ecology**
Registration #1003-420
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 (SBID-340)

Class 3, Lab. 3, Credit 4 (S-alternate years)

SBID-421 **Genetics**
Registration #1003-421
Genes and cytoplasmic factors as units of inheritance; the nature and origin of inheritable characteristics and variations. Principles of inheritance in plants, animals and man. (one year of general biology, third year status)

Class 3, Lab. 3, Credit 4 (S, SR)

SBID-422 **Developmental Biology**
Registration #1003-422
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 (W, alternate years)

General Biology

SBIG-201 **General Biology**
Registration #1004-201
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)

SBIG-202 **General Biology**
Registration #1004-202
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)

SBIG-203 **General Biology**
Registration #1004-203
A study of cellular and organismal reproduction, the principles of genetics and developmental biology, introduction to evolution and ecology.

Class 3, Credit 3 (S)

SBIG-205, 206, 207 **General Biology Laboratory**
Registration #1004-205, -206, -207
Laboratory work to complement the lecture material of General Biology (SBIG-201, 202, 203). The experiments are designed to illustrate concepts, develop laboratory skills and techniques, and improve ability to make, record and interpret observations (Corequisite SBIG-201, 202, 203)

Lab. 3, Credit 1 (F-205, W^06, S-207)

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 emphasizes common disease states and their treatments.

Class 3, Credit 3 or Class 3, Rec. 1, Credit 4 (S)

SBIG-220** **Microbiology in Health & Disease Laboratory**
Registration #1004-220
Laboratory culturing handling and identification of microorganisms with special emphasis on the relationship of bacteria to food handling and preservation, the production of food products by bacteria, and the prevention of food-borne diseases. (Corequisite SBIG-210)

Lab. 3, Credit 1 (F, S)

SBIG-221 ** **Human Biology Laboratory**
Registration #1004-221
Laboratory for dietetic and medical illustration students complements the lecture material of SBIG-211. Experiments are designed to illustrate the dynamic characteristics of cells, tissues and organ systems.

Lab. 3, Credit 1 (W)

SBIG-222** **Human Biology Laboratory**
Registration #1004-222
Laboratory for dietetic and medical illustration students complements the lecture material of SBIG-212. Experiments are designed to illustrate the dynamic anatomy and physiology of major organ systems.

Lab. 3, Credit 1 (S)

SBIG-289** **Contemporary Science-Biology**
Registration #1004-289
A study in various biological topics relevant to contemporary problems of society. Topics may include population biology, pollution, disease control, human heredity, contagious diseases, marine biology, 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. (SBIG-203, or equivalent)

Class 2, Credit 2 (W)

V

SBIG-440** **Enviromental Microbiology**
Registration #1004-440
Microorganisms in water and sewage, biological and medical aspects; methods for detection, isolation, and enumeration. Treatment methods for eliminating and controlling harmful organism

Class 3, Lab 2, Credit 4 (S, SR)

Organismal Biology

SBIO-310 **Invertebrate Zoology**
Registration #1006-301
Biology of invertebrate animals with reference to classification, structure, function, and ecology, (one year of general biology or permission of instructor)

Class 3, Lab. 3, Credit 4 (F-alternate years)

SBIO-302 **Vertebrate Zoology**
Registration #1006-302
Morphology, physiology, behavior, classification, and ecology of chordates. (one year of general biology)

Class 3, Lab. 3, Credit 4 (F-alternate years)

SBIO-303 **Comparative Vertebrate Anatomy**
Registration #1006-303
A comparative study of the organ systems of representative members of the vertebrates with emphasis on structural changes which occur during evolution. (one year of general biology)

Class 3, Lab. 3, Credit 4 (S)

SBIO-304 **Botany**
Registration #1006-304
Distribution of the major groups of plants and their adaptations to their particular environment, (one year of general biology or permission of the instructor)

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

SBIO-305 **Physiology and Anatomy**
Registration #1006-305
An integrated systems approach to cellular, nerve, muscle and cardiovascular physiology. Laboratory exercises include detailed studies of the human skeletal and muscular systems, (one year of general biology, SCHG-217 or permission of instructor)

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

SBIO-306 **Physiology and Anatomy**
Registration #1006-306
Integrated systems approach to renal, respiratory and gastrointestinal physiology, metabolism and endocrinology. Laboratory exercises include studies of kidney function, lung performance, neuroanatomy and gastrointestinal anatomy and physiology. (SBIO-305)

Class 3, Lab. 3, Credit 4 (S)

SBIO-410 **Plant Physiology**
Registration #1006-410
Physiological phenomena in the growth and development of higher plants. Water relationships, photosynthesis, translocation, mineral nutrition, growth hormonal contro) and reproduction, (one year of general biology, one year of organic chemistry)

Class 3, Lab. 3, Credit 4 (S)

SBIO-411 **Systematic Botany**
Registration #1006-411
Study of diversity existing in vascular plants. Its origin and its organization into a hierarchy of categories, orders, and families. Laboratory experience in collection, identification, and study of vascular plants with special emphasis on local flora. Practice in use of manuals and interpretation of morphological characters. (SBIO-304)

Class 3, Lab. 3, Credit 4 (F-alternate years)

SBIO-412 **Parasitology**
Registration #1006-412
Structure, life cycle, and control of human parasites. Emphasis on forms of diagnostic importance, (one year of general biology)

Class 3, Lab 3, Credit 4 (alternates W/S)

SBIO-413 **Comparative Animal Physiology**
Registration #1006-413
A comparative study of the physiological mechanisms of the animal kingdom. An interpretation of the physiological variations in terms of evolutionary significance, morphological variation and ecological conditions, (one year of general biology, one year of organic chemistry)

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

SBIO-705 **Advanced Physiology**
Registration #1006-705
An in-depth study of the functions of the human body. Both the chemical and physical factors of normal physiology will be studied along with the modified functions that are a result of disease (SBIO-305, 306, SCHB-602, SCHB-603)

Class 3, Credit 3 (F-alternate years)

SBIO-720 **Introduction to Pharmacology**
Registration #1006-720
The chemical properties, metabolism and excretion of drugs and their effects on physiological systems such as cardiovascular, renal, gastrointestinal, respiratory, endocrine, and central nervous system. Antimicrobial and cancer chemotherapeutic agents will also be discussed. (SBIO-305, 306 and permission of the instructor)

Class 3, Credit 3 (alternates F/W)

SBIO-721 **Pharmacology Laboratory**
Registration #1006-721
Laboratory work to accompany SBIO-720. Experiments relate to principles discussed in corresponding lectures.

Lab. 3, Credit 1 (alternates F/W)

SBIO-740 **General Toxicology**
Registration #1006-740
The study of the science of poisons (the harmful actions of chemicals on 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 co-requisite for biology majors)

Class 3, Credit 3 (alternates W/S)

SBIO-741 **General Toxicology Laboratory**
Registration #1006-740
Laboratory work to accompany the lectures in General Toxicology. (Corequisite SBIO-741)

Lab 3, Credit 1 (alternates W/S)

Biological Techniques

SBIT-320 **Laboratory Animal Techniques**
Registration #1007-320
A course designed to prepare the student for small animal handling, biological administrations and preparations, minor surgery and autopsies. (Major status and permission of the instructor)

Class 1, Lab. 3*, Credit 3 (W, S)

SBIT-430 **Radiation Biology**
Registration #1007-430
Effects of radiation upon living tissue, both harmful and beneficial. Morphological changes, genetic effects, and pathological changes in both plant and animal tissues. Use of radioisotopes in plant and animal research. (Minimum of 20 credits in biological science)

Class 2, Lab. 6, Credit 4 (F)

SBIT-431 **Histological Techniques**
Registration #1007-431
Preparation of plant and animal tissues for slide mounts. Techniques in paraffin and frozen sectioning. Sectioning on the rotary and sliding microtomes and multiple staining techniques, (one year of general biology)

Class 1, Lab 4, Credit 3 (F-alternate years)

SBIT-460 **Introduction to Electron Microscopy**
Registration #1007-460
An introduction to the theory and practice of transmission and scanning electron microscopy. Laboratory experience includes preparation of selected biological specimens, operation of a transmission electron microscope, and basic black-and-white electron micrograph preparation. This course is designed for those students who may not desire or need the comprehensive training in electron microscopy provided by SBIT-481, 482, 483.

Class 1, Lab. 6, Credit 3 (S, SR)

SBIT-481 **Electron Microscopy-Instrumentation**
Registration #1007-481
A comprehensive lecture/laboratory course in the operation, maintenance and performance testing of medium resolution transmission and scanning electron microscopes. Basic black-and-white electron micrograph preparation techniques are also covered. This is the first course in a comprehensive three-quarter sequence in electron microscopy, (one year of general biology or equivalent, or permission of the instructor.)

Class 1, Lab. 6, Credit 3 (F)

SBIT-482 **Electron Microscopy-Specimen Preparation**
Registration #1007-482
A comprehensive lecture/laboratory course covering all of the routine techniques for preparation of particulate and non-particulate specimens for transmission and scanning electron microscopy. (SBIT-460 or SBIT-481)

Class 1, Lab. 6, Credit 3 (W)

SBIT-483 **Advanced Electron Microscopy**
Registration #1007-482
Medical and industrial applications of transmission and scanning electror microscopy; x-ray analysis; advanced specimen preparation techniques; design and supervision of an EM facility; individual EM projects; certification (SBIT-482)

Class 1, Lab. 6, Credit 3 (S)

SBIT-541, 542, 543 **Biology Research**
Registration #1007-541, -542, -543
Faculty directed projects or research usually involving original field or laboratory work encompassing a period of at least two quarters. Final results are presented in written and oral formats. (Third-year status with a GPA of 2.5 in science and mathematics courses, and consent of faculty).

Class variable, Credit variable

SBIT-730 **Topics in Radiation Biology**
Registration #1007-730
A study of the biological effects of ionizing radiation, and uses in the medical and biological laboratory. Emphasis will be placed upon dosages and responses. (SBIT-430 or permission of instructor)

Class 3, Lab. 3, Credit 4 (S)

Chemistry

SCHA-261, 262, 263 **Introduction to Chemical Analysis**
Registration #1008-261,-262, -263
An introduction to qualitative and quantitative analysis. Introduction to the chemistry of inorganic ions by qualitative analysis. Classical methods of gravimetric analysis and titration analysis based on acid-base, precipitation, oxidation-reduction and complex formation as well as non-aqueous solvent acid-base reactions, introduction to electro-chemical techniques, and fundamentals of spectroscopy are stressed Equilibrium concepts and statistical evaluation of results are incorporated.

Class 2, Lab. 5, Credit 3 (261-F, 262-W, 263-S)

SCHA-311 **Analytical Chemistry-Instrumental Analysis**
Registration #1008-311
Elementary treatment of instrumental theory and techniques; properties of light; ultraviolet, visible, and infrared spectrophotometry; atomic and molecular fluorescence, emission spectrocopy; flame photometry. SCHA-318 is a corequisite. (SCHC-212)

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

SCHA-312 **Analytical Chemistry-Separations**
Registration #1008-312
Inorganic and organic separations; Raoult and Henry Laws; phase rules; distillation; extraction; absorption and surface effects; electrophoresis, chromatography including gas, liquid, column, paper, thin layer, and ion exchange. (SCHC-212)

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

SCHA-318 **Instrumental Analysis Lab**
Registration #1008-318
Lab accompanying SCHA-311. Quantitative and qualitative experiments in ultraviolet, visible, and infrared spectrophotometry, molecular fluorescence and flame atomic absorption spectrophotometry. SCHA-311 is a corequisite (SCHC-212)

Lab. 4, Credit 1 (offered every year) (F, W)

SCHA-319 **Separations Lab**
Registration #1008-319
Lab accompanying SCHA-312. Experiments with chemical separation techniques including distillations, extractions, and a variety of chromatographic methods (thin layer, paper, ion exchange, gas, gel filtration). Laboratory report writing is emphasized.

Lab. 4, Credit 1 (offered every year) (S, SR)

5CHB-234 **Biochemistry**
Registration #1009-234
Introduction to biological chemistry. An in-depth survey of the molecular organization, physiological functions and bio-energetics principles of the molecular components of cells: amino acids, proteins, enzymes, carbohydrates, lipids, and nucleic acids. Emphasis is on the structure-function relationships, solution behavior, and metabolism of biomolecules. (SCHO-233)

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

SCHC-200 **Chemical Safety**
Registration #1010-200
Discussion and demonstration of protective devices and equipment; techniques for safety handling chemicals, glassware, and performing chemical reactions. Emphasis on flammable solvents, explosives, cryogens, and toxic materials; radiation hazards; storage of chemicals; waste disposal.

Class 1, Credit 0 (offered every year) (F)

SCHC-201 **Chemical Literature**
Registration #1010-201
A survey of the techniques used to monitor the chemical literature. Chemical Abstracts, Science Citation index and Beilstern are covered. Technical writing is required. The structure and development of journals, theses, monographs, reviews and textbooks are covered. (SCHC-211, -212)

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

SCHC-211,212 **General Chemistry**
Registration #1010-211, -212
For science and photoscience majors and others who desire an in-depth study of general chemistry. Atomic structure and chemical bonding; thermodynamics and equilibrium; chemical equations and chemical analysis; gases; acids and bases; oxidation-reduction; chemical kinetics. Course stresses problem solving applications of chemical principles.

Class 3, Credit 3 (offered every year) (211 -F, 212-W)

SCHC-230 **Introduction to Co-op**
Registration #1010-230
Exploration of co-operative education opportunities; practice in writing letters of application; resume writing, and interviewing procedures.

Class 1, Credit 0 (offered every year) (F, W)

SCHC-402 **Introduction to Research**
Registration #1010-402
Introduction to laboratory research projects of interest to chemistry faculty members. Students desiring to pursue active undergraduate research will investigate research opportunities with faculty members. Preparation and presentation of a research proposal in this course is a prerequisite to participation in research. (SCHO-431, SCHP-441)

Class 1, Credit 0 (offered every year) (F, W)

SCHC-541, 542, 543 **Chemistry Research**
Registration #1010-541, -542, -543
Faculty directed student projects or research usually involving laboratory work and/or calculations that could be considered of an original nature. (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)

SCHG-201 **General Chemistry**
Registration #1011-201
One quarter survey of general chemistry for non-science majors, e.g., Dietetics and other Health Related Professions majors.

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

SCHG-202 **Organic Chemistry**
Registration #1011-202
One quarter survey of the fundamentals of organic chemistry that are essential to an understanding of biological molecules and biochemistry. (SCHG-201 or equivalent)

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

SCHG-203,204 **Biochemistry**
Registration #1011-203, -204
A two-quarter survey of biochemistry for non-science majors, e.g., dietetics and other health related professions. (SCHG-202)

Class 4, Credit 4 (offered every year) (203-S, 204-F)

SCHG-205, 206, 207 **Chemical Principles Laboratory**
Registration #1011-205, -206, -207
A laboratory course for photoscience, mathematics, and physics majors who are taking general chemistry (SCHC-211, 212) and introduction to Organic Chemistry (SCHO-230) concurrently. Laboratory experiments are designed to complement the lecture material in these courses.

Lab. 3, Credit 1 (offered every year) (205-F, 206-W, 207-S)

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SCHG-208, 209 **College Chemistry**
Registration #1011-208, -209
For engineering students. The concepts of energy and the work function are discussed in terms of industrial chemical processes. Topics include applications of the gas laws, equilibrium theory, nuclear and electrochemistry, thermodynamics, and modern instrumental methods of structure analysis.

Class 4, Credit 4 (offered every year) (208-F, W; 209-S)

SCHG-221 **General Chemistry Laboratory**
Registration #1011-221
Laboratory course to accompany SCHG-201. Emphasis on introduction to methods of chemical analysis, qualitative and quantitative techniques.

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

SCHG-222 **Organic Chemistry Laboratory**
Registration #1011-222
Laboratory course to accompany SCHG-202. Emphasis is on representative examples of typical organic techniques and synthesis. (SCHG-221 or equivalent)

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

SCHG-215, 216, 217 **General and Analytical Chemistry**
Registration #1011-215, -216, -217
Principles of chemistry presented for students in medical technology and the life sciences.

Class 3, Credit 3 (offered every year) (215-F, 216-W, 217-S)

SCHG-225, 226, 227 **General and Analytical**
Registration #1011-225, -226, -227 **Chemistry Laboratory**
Laboratory sequence to accompany SCHG-215, 216, 217. Experiments in inorganic chemistry, separation techniques and quantitative analysis.

(225-F, Lab. 3, Credit 1)
(226-W, Lab. 3, Credit 1)
(227-S, Lab. 6, Credit 2)
(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. Laboratory work trains the student in volumetric analysis.

Class 3, Lab. 3, Credit 4 (offered every year) (F, W)

SCHG-272 **Chemistry of Water**
Registration #1011-272
Chemistry of organics, metals, construction materials, radioactive and other environmental pollutants, and other substances related to water analysis. Laboratory practice in water analysis, including use of instrumentation.

Class 2, Lab. 3, Credit 3 (offered every year) (S, SR)

SCHG-281, 282, 283 **General Chemistry**
Registration #1011-281, -282, -283
For printing students. Aspects of general chemistry of widest applicability to graphic arts technology; first quarter includes definitions of terms, basic concepts and laws; second quarter devoted to properties of solutions and organic materials; third quarter deals with applications in ink, paper, photolithographic processes and other topics as time allows.

Class 3, Lab. 2, Credit 4 (offered every year) (281 -F, 282-W, 283-S)

SCHG-289 **Contemporary Science-Chemistry**
Registration #1011-289**
This course examines a broad range of contemporary scientific topics with a chemical basis. These include nuclear power, alternative energy sources, nuclear wastes and nuclear safety. The biological effects of radiation, nuclear medicine, recombinant DNA, and medicinal drugs are also covered.

Class 4, Credit 4 (F, W, S)

SCHO-230 **Introduction to Organic Chemistry**
Registration #1013-230
Introduction to the structure and reactivities of organic molecules for physical science majors. An overview of the structure, nomenclature, bonding, and reactivity of the various functional groups. Chemistry of alkenes, alkynes, aliphatic, and aromic mdlecules. (SCHC-212 or permission of instructor) (S)

Class 3, Credit 3 (offered every year)

"Not acceptable tor science credit for College of Science major.

SCHO-231, 232 **Organic Chemistry**
Registration #1013-231, -232
Survey of the structure, names, reactions, and synthesis of the major functional groups. Mechanisms of main classes of reactions are discussed. (SCHG-216, SCHC-212, or SCHG-209)

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

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SCHO-233 **Organic Chemistry**
Registration #1013-233
Structure, nomenclature, reactions, and properties of the important classes of bio-organic molecules (carbohydrates, lipids, amino acids, proteins, and nucleic acids) are covered in depth. Emphasis is on structure and reactivity in relation to biochemical processes. (SCHO-232).

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

SCHO-235, 236, 237 **Organic Chemistry Lab**
Registration #1013-235, -236, -237
Laboratory work emphasizes techniques, preparations, and analyses. SCHO-237 emphasizes reactions and properties of biomonomers and polymers. To be taken concurrently with SCHO-231, -232, -233.

Lab. 3, Credit 1 (offered every year) (235-F, 236-W, 237-S)

SCHO-431, 432, 433 **Organic Chemistry**
Registration #1013-431, -432, -433
A rigorous survey of the reactions of all major functional groups. Conformational Analysis, Stereochemistry and Spectral (IR, NMR) analysis are also covered. Prior coursework in Organic Chemistry is required. (SCHO-23C) or its equivalent)

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

SCHO-435, 436 **Preparative Organic Chemistry**
Registration #1013-435, -436
Synthesis of organic compounds utilizing a variety of laboratory techniques. Purification techniques and spectral characterization will be routinely used. (SCHO-230) (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**
Registration #1013-437 **Organic Compounds**
A laboratory course utilizing chemical and spectural (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, liquids, and solids; kinetic theory of gases, Maxwell-Boltzmann distribution; temperature; energy and the first law; thermochemistry; entropy and the second and third laws; intorduction to Helmholtz and Gibbs free energy. (SCHC-212, 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-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 radiation law; photoelectric effect; the Bohr atom; DeBroglie, Schrodinger, and Heisenberg theories; eigenvalue/eigenfunction problems; variation and perturbation theory; quantum statistics; Hietler-London theory of covalent bonds; selection rules and spectroscopy.

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

SCHP-443 **Physical Chemistry III**
Registration #1014-443
Kinetic molecular theory; transport properties of gases; chemical kinetics; surface chemistry; photochemical kinetics; irreversible processes in solution. (SCHP-441)

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

SCHP-445 **Physical Chemistry Laboratory I**
Registration #1014-445
Introduction to physical chemistry laboratory; chemical thermodynamics and equilibrium (SCHP-441 should be taken concurrently).

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

SCHP-446 **Physical Chemistry Laboratory II**
Registration #1014-446
Experiments in the application of quantum chemistry, atomic and molecular spectroscopy, and in radioactivity measurements. (SCHP-442 should be taken concurrently)

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

SCHP-447 **Physical Chemistry Laboratory III**
Registration #1014-447
Laboratory experiments in chemical dynamics. (SCHP-443 should be taken concurrently)

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

SCHT-241 **Chem Tec I (General)**
Registration #1015-241
Safety in the chemical laboratory, toxicity of chemicals, use of compressed gases, laboratory notebooks, separation techniques, paper and gas chromatography, properties of gases and their measurement, common units and conversion factors, weighing techniques, density of solids and liquids, chemical equilibrium, visible spectrophotometry, ionic and covalent bonding.

Class 3, Lab. 9, Credit 6 (offered every year) (F) • ^ -

SCHT-242 **Chem Tec II (Analytical)**
Registration #1015-242
Periodicity and chemical properties. Qualitative detection of common metallic and non-metallic ions. Sampling techniques and sample preparation. Quantitative analysis by gravimetric and titrimetric procedures—acid base and redox. Measurement of pH.

Class 3, Lab. 9, Credit 6 (offered every year) (W, S)

SCHT-243 **Chem Tec III (Organic)**
Registration #1015-243
Techniques of handling organic compounds; recrystallization and melting points, distillation, extraction. Refractive index and optical activity. Reactions of functional group classes. Infra-red spectrophotometry.

Class 3, Lab. 9, Credit 6 (offered every year) (SR, F)

SCHT-244 **Chem Tec IV (Organic)**
Registration #1015-244
Continuation of classes and reactions of organic compounds, synthetic techniques, vacuum distillation, gas chromatography, and NMR spectroscopy

Class 3, Lab. 9, Credit 6 (offered every year) (W, S)

SCHT-305 **Chemical Specialty (Spectrometry)**
Registration *1015-305
Quantitative analysis including trace analysis by spectroscopic methods involving visible, ultra-violet, atomic absorption, flame photometric and luminescent instrumentation. Techniques of sample preparation, instrument construction and operation, spectral measurement and interpretation are utilized.

Class 2, Lab. 6, Credit 4 (offered every year) (SR, F)

SCHT-306 **Chemistry Specialty**
Registration #1015-306
The final academic quarter of the Chem Tech curriculum is designed so that students are given the opportunity to develop more definite options as to their own individual goals. The student may elect to branch-off into one of three areas of specialization; advanced instrumental techniques, the development of synthetic techniques in organic chemistry and polymer technology

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 **Glassblowing Techniques**
Registration #1015-309
This course is designed to introduce and train each student in small scale scientific glassblowing techniques. Proficiency will be developed in rod manipulation, ring seals, construction of apparatus,, annealing, use of a simple lathe and hand-torch work.

Lab. 4, Credit 2 (offered every year) (F, SR)

Graduate Courses

SCHA-711 **Instrumental Analysis**
Registration #1008-711
Theory, applications and limitations of instrumental methods in qualitative, quantitative, and structural analysis. Topics covered include fluorescence and phosphorescence, Raman, mass spectrometry, nuclear magnetic resonance, X-ray and radiochemistry, and electrochemistry. (SCHA-312)

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

SCHA-720 **Instrumental Analysis Lab**
Registration #1008-720
Lab accompanying SCHA-711. Experiments include A A., fluorimetry, coulometry, ^{3}C and ^{1}H NMR, polarography. Assignments depend on student background.

Lab. 6, Credit 2 (offered every year) (F, W)

SCHB-702 **Biochemistry**
Registration #1009-702
Introduction to biological chemistry. Chemical structures, reactions and physiological functions of molecular components of cells: amino acids, sugars, lipids, nucleotides and selected biopolymers. Solution behavior, catalytic properties and structure of proteins and enzymes. (SCHO-433 and SCHP-443 or -742)

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

SCHB-703 **Biochemistry-Metabolism**
Registration #1009-703
Bioenergetics principles; catabolism of carbohydrates, fatty acids and amino acids; photosynthesis, biosynthesis of carbohydrates, lipids, and nitrogenous compounds; active transport; metabolic diseases. (SCHB-702)

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

SCHB-704 **Biochemistry-Nucleic Acids**
Registration #1009-704 **and Molecular Genetics**
The biochemistry of inheritance, expression of genetic information, protein biosynthesis, differentiation, viral and bacterial infection and the “origin of life ” (SCHB-702)

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

SCHC-772 **Special Topics**
Registration #1010-772
Advanced courses which are of current interest and/or logical continuations of the course already being offered. These courses should be structured as ordinary courses and should have specified prerequisites, contact hours, and examination procedures.

Class variable, Credit variable (offered every year)

SCHC-859 **External Research**
Registration #1010-859
Industrial internship research.

Credit 1-16 (offered every year)

SCHC-870 **Chemistry Seminar**
Registration #1010-870

Credit 1 (offered every year)

SCHC-879 **Research and Thesis Guidance**
Registration #1010-879
Hours and credits to be arranged. Chemical research in a field chosen by the candidate, subject to approval of the department head and advisor.

Credit variable (offered every year)

SCHC-899 **Independent Study-Chemistry**
Registration #1010-899

Credit variable (offered every year)

SCHI-762 **Inorganic Chemistry**
Registration #1012-762
The properties and structures of the elements and their compounds in relation to electronic and stereochemical configurations; acid-base theories; non-aqueous solvents (SCHO-433 and SCHP-442)

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

SCHI-763 **Inorganic Chemistry**
Registration #1012-763
Transition metal coordination chemistry; lanthanides and actinides; organometallic compounds and special topics. (SCHO-433 and SCHP-442)

Class 3, 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**
Registration #1013-736 **of Organic Compounds**
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)

SCH0-737 **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 SCHP-443.)

Class 3, Credit 3 (offered every year)

SCH0-832 **Stereochemistry**
Registration #1013-832
Advanced treatment of steric relationships and stereoisomerism in organic compounds. (SCHO-433, SCHP-443)

Class 3, Credit 3 (offered upon sufficient request)

SCHO-833 **Heterocyclic Chemistry**
Registration #1013-833
The preparation, properties, and reactions of heterocyclic systems, especially heteroaromatic rings. (SCHO-433)

Class 3, Credit 3 (offered upon sufficient request)

SCH0-835 **Organic Chemistry of Polymers**
Registration #1013-835
Introduction to the chemistry of synthetic, high molecular weight polymers and a survey of their diverse structures and properties. Mechanisms of condensation, free radical and ionic polymerization. (SCHO-433).

Class 3, Credit 3 (offered in alternate years)

SCHP-741 **Chemical Thermodynamics**
Registration #1014-741
A study of the basic fundamentals of thermodynamics and their use in deriving the interrelationships of thermodynamic functions. Thermodynamic properties of gases will be calculated based on spectroscopic data. (SCHP-443 and SMAM-307)

Class 3, Credit 3 (offered every year)

SCHP-742 **Survey of Physical Chemistry**
Registration #1014-742
This course will present principles of physical chemistry to students who have an interest in the health related sciences. Molecular structures, thermodynamics and kinetics will be discussed with a view to their biological applications. (SCHG-217, SCHO-232)

Class 3, Credit 3 (offered upon sufficient request) Not acceptable for M.S. in Chemistry.

SCHP-743 **Chemical Kinetics**
Registration #1014-743
Methods of investigating the kinetics of chemical reactions and the theories used to interpret their results. Focus on homogeneous reactions in gas and liquid phases. Discussions of references from recent chemical literature. (SCHP-443)

Class 3. Credit 3 (offered alternate vears)

SCHP-744 **Quantum Mechanics**
Registration #1014-744
Matrix formulation of quantum mechanics; variation and perturbation methods; group therapy; 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**
Registration #1016-201, -202, -203 **Analytic Geometry**
A sequence of courses covering essential skills and concepts in such topics as solutions of equations, graphing, exponents and radicals, logarithms, trigonometric functions and applications, vectors, determinants, inequalities and conic sections.

Class 3, Credit 3 (offered every year) (201 -F, 202-W, 203-S)

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.

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

SMAM-210, 211 **Freshman Seminar**
Registration #1016-210, -211
An orientation program for entering mathematics majors to give them information and guidance concerning the various aspects of mathematics, job opportunities, and the numerous programs from which they may choose.

Class 1, Credit 1 (offered every year) (210-F, 211-W)

SMAM-214, 215 **Introduction to Calculus**
Registration #1016-214, -215
214: A non-rigous introduction to the study of differential calculus. The following topics will be covered: functions and graphs, limits, continuity, the derivative and its significance, the algebra of derivatives, chain rule, related rates, maxima and minima. (SMAM-204 or equivalent)
215: A continuation of SMAM-214, dealing with an introduction to integral calculus. The following topics will be covered: definite integral,'area, work and distance problems, volumes, fundamental theorem of calculus, approximation techniques, exponential and logarithmic functions, applications, introduction to differential equations. (SMAM-214 or equivalent)

Class 3, Credit 3 (offered every year) (214-F, W; 215-W, S)

SMAM-216, 217 **Mathematics of Business and Finance**
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 for solving linear programming prob lems (with and without a computer). (SMAM-204 or equivalent)
217: Compound interest, annuities, depreciation, differentiation tech" niques, marginal cost and marginal revenue, elasticity of demand, appli*o max-min problems. (SMAM-216)

Class 3, Credit 3 (offered every year) (216-W, S; 217-S)

SMAM-251, 252, 253 Calculus I, II, III
Registration #1016-251, -252, -253
A standard first course in calculus intended for students majoring in mathematics, science or engineering with the major emphasis on understanding the concepts and using them to solve a variety of physical problems. The subject matter is divided as follows:
251: Two-dimensional analytic geometry, functions, limits, the derivative and its formulas, applications of the derivative, introduction to anti-differentiation.
252: The transcendental functions, anti-derivatives by various methods, the definite integral with applications to area, work, etc., numerical integration.
253: Parametric equations, polar coordinates, improper integrals, indeterminate forms, sequences series, Taylor series.

Class 4, Credit 4 (offered every year) (251 -F, W; 252-W, S; 253-S, F)

SMAM-265 Foundations of Discrete Mathematics
Registration #1016-265
A study of several discrete mathematics topics with careful attention given to the underlying concepts and development. Topics include: logic, proofs, switching circuits, sets, Well-Ordering Principle, Mathematical Induction Theorem, relations, equivalence classes, functions, one-to-one, onto, permutations, discrete function, counting principles, combinations, elementary probability, two-dimensional geometric linear programming.

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

SMAM-289 Contemporary Science-Mathematics
Registration #1016-289**
A basic survey of mathematical structures as well as an introduction to problem solving. Topics will be chosen from foundations of mathematics, algebra, topology, number theory, graph theory, and probability theory. These structures will be examined as they occur naturally in modern settings.

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

SMAM-305 Calculus IV
Registration #1016-305
A continuation of SMAM-253 treating 3-dimensional analytic geometry and vector algebra, partial derivatives, multiple integrals, and applications. (SMAM-253)

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

SMAM-306 Differential Equations I
Registration #1016-306
A first course. Solutions in closed form for common types of first order equations, applications to a variety of physical problems, second order linear equations, methods of undetermined coefficients and variation of parameters, independence and the Wronskian, applications to vibrating systems, numerical techniques, Runge-Kutta, more applications, power series solutions. (SMAM-305)

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

SMAM-307 Differential Equations II
Registration #1016-307
Topics will include: power series solutions to ordinary differential equations about ordinary and regular singular points; Legendre's equation; Bessel's equation; the hypergeometric equation; Picard's theorem with its proof; solution techniques for systems of linear differential equations; and the LaPlace transform along with its application to the solution of differential equations. (SMAM-306)

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

SMAM-309 Elementary Statistics
Registration #1016-309
Handling of statistical data; measures of central tendency and dispersion; sample space; events; probability and its basic laws; conditional probability; basic rules of counting; binomial, geometric, Poisson and normal distributions; sampling distributions; estimation of popular mean; T-distributions, testing of hypotheses concerning the mean and difference between means, use of chi-square in testing statistical independence and in estimating variance. (SMAM-203 or equivalent)
NOTE: This course may not be taken for credit if credit is to be earned in SMAM-319.

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

SMAM-318 Boundary Value Problems
Registration #1016-318
This course includes: power series solutions of ordinary differential equations about ordinary and regular singular points; Bessel's equation; Legendre's equation; Sturm-Liouvill theory; Fourier series; and the solution of the wave equation, heat equation and LaPlace's equation in rectangular and polar coordinates. (SMAM-306)

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

SMAM-319 Data Analysis •
Registration #1016-319
This course will study the statistical principles of presenting and interpreting data. Topics to be covered will include: patterns of variability; histograms; populations and samples; the Normal distribution; confidence intervals; hypothesis testing; and correlations. (SMAM-204 or equivalent)
NOTE: This course may not be taken for credit if credit is to be earned in SMAM-309.

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

SMAM-320 Quality Control
Registration #1016-320
This course will investigate the application of data analysis techniques to the control of processes. It will also include an introduction to probability and the applications of the binomial, Poisson, and hypergeometric distributions to the construction of sampling plans. (SMAM-319)

Class 4, Credit 4 (offered upon sufficient request)

SMAM-328 Engineering Mathematics
Registration #1016-328
This course provides introductions to matrix algebra and vector calculus. Topics will include: matrix operations with applications to the solution of linear systems of algebraic equations; gradient, divergence, and curl; line and surface integrals; independence of path and the divergence theorem, with discussion of their importance in engineering analysis. NOTE: This course may not be taken for credit if credit is to be earned in SMAM-410 or SMAM-431.

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

SMAM-351 Probability
Registration #1016-351
Discrete and continuous probability models; random variables; probability density and distribution functions; mathematical expectation; measures of central tendency and dispersion; central limit theorem. (SMAM-253, co-requisite SMAM-305)

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

SMAM-352 Applied Statistics I
Registration #1016-352
Basic statistical concepts; sampling theory; hypothesis testing; simple linear regression. (SMAM-351)

Class 4, Credit 4 (W, S)

SMAM-353 Applied Statistics II
Registration #1016-353
Continuation of material begun in SMAM-352. Analysis of variance; introduction to multiple regression; non-parametric statistics. Introduction to the use of statistical software packages. Other topics, such as quality control, as time permits. (SMAM-352)

Class 4, Credit 4

SMAM-354 Introduction to Regression Analysis
Registration #1016-354
A study of basic regression techniques with applications to the type of problems encountered in real-world situations; an introduction to the use of statistical software packages for performing regression analysis. The topics include: simple linear regression; residual analysis; two variable multiple regression; the matrix approach to these topics; other models; and selecting the "best" regression equation. (SMAM-353 and 431 (or 328) or equivalents)

Class 4, Credit 4 (offered upon sufficient request)

SMAM-355 Design of Experiments
Registration #1016-355
A study of the design of experiments including factorial experiments, and a study of the relevant analysis of variance. In particular, single factor, two factor and three factor analysis of variance will be studied, as will their derivations from the general linear model. Statistical software will be utilized for projects. (SMAM-353 and 431 (or 328) or equivalents)

Class 4, Credit 4 (offered upon sufficient request)

SMAM-361 Mathematical Modeling
Registration #1016-361
The course will emphasize problem solving, formulation of the mathematical model from physical considerations, solution of the mathematical problem, testing the model and interpretation of results. Problems will be selected from the physical sciences, engineering, economics. (SMAM-352, SMAM-306)

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

SMAM-365 Combinatorial Mathematics
Registration #1016-365
An introduction to the mathematical theory of combination, arrangement and enumeration of discrete structures. Emphasis is on structural, not quantitative, aspects of problems. Topics include: enumeration; recursion; inclusion-exclusion; block designs; Polya counting theory. (SMAM-265)

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

SMAM-410 Advanced Calculus
Registration #1016-410
An in-depth study of vector calculus. Topics will include: scalar and vector fields; the gradient; divergence and curl vectors and their applications to mechanical systems; integration along a path; Green's theorem in the plane; line integrals independent of path; surface integrals; the divergence theorem; and Stroke's theorem. (SMAM-306)

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

SMAM-411,412 Real Variables
Registration #1016-411, -412
Functions of one and several variables are considered, with the basic concepts of sequences, series, continuity, differentiation, and integration studied in depth. Included are the Heine^orel, Mean Value, Taylor, and implicit function theorems. (SMAM-305 and either SMAM-265 or permission of the instructor)

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

SMAM-420 Complex Variables
Registration #1016-420 (
A study of the complex number system and preliminary iWjns leading to the concepts of an analytic function. Integrals of complex funfctoQns, Cauchy integral theorem, Cauchy integral formulas, Taylor and Laurent seftes, singularities, residues. (SMAM-305)

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

SMAM-431 Matrix Algebra
Registration #1016-431
A first course in the algebra of matrices and n-tuple vectors over the complex numbers. Topics include addition, multiplication, transposes and inverses of matrices; symmetric and triangular matrices; partitioning; solution of Ax=b: Gauss algorithm, residual and error, partial pivoting, ill-conditioning, iterative techniques; elementary matrices; echelon form; determinants; eigenvalues and eigenvectors; real symmetric matrices and diagonalization.

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

SMAM-432 Linear Algebra
Registration #1016-432 .
Topics will be pursued to a greater depth, with more emphasis on theory than in Matrix Algebra. Topics include: R^n, C^n and function spaces; subspaces; spanning sets; linear dependence and independence; basis; dimension; inner products; Gram-Schmidt; orthogonality; linear transformations; representation relative to ordered bases; change of basis; similarity; eigenvalues and eigenvectors; diagonalization and special classes of matrices. (SMAM-431)

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

SMAM-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 prbgramming; and applications. (SMAM-432)

Class 4, Credit 4 (offered upon sufficient request)

SMAM-466 Integer Programming
Registration #1016-466
The optimization of functions of integers; theory and practice of branch and bound; implicit enumeration; cutting plane duality and related solution techniques; heuristics; and applications. (SMAM-465)

Class 4, Credit 4 (offered upon sufficient request)

SMAM-467 Theory of Graphs and Networks
Registration #1016-467
The basic theory of graphs with applications to problems in transportation, communications and computer networks. Mathematical techniques for analysis of design, performance, and reliability of network structures modeled by graphs. (SMAM-265 or permission of instructor)

Class 4, Credit 4 (offered upon sufficient request)

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
Numerical techniques for interpolation, differentiation, quadrature, solution of differential equations, non-linear equations, eigenvalue problems. Discussion of error propagation and estimation. Emphasis is on techniques appropriate for digital computers. (SMAM-306, ICSP-215)

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 (offered upon sufficient request)

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.
532: The basic theory of rings, integral domains, ideals and fields, polynomial rings, quotient structures, finite Galois fields $GF(p^n)$, applications to coding theory, abstract vector spaces, function spaces, direct sums, applications to differential equations, applications to scientific problems.

Cl,ass 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
Courses in which topics of special interest to a sufficiently large group of students, and not covered in other courses, may be offered upon request. These courses will be structured as ordinary courses and will have prerequisites, contact hours, and examination procedures specified in advance.

Class variable, Credit variable (offered upon sufficient request)

SMAM-561,562 Complex Variables
Registration #1016-561, -562
Introduction io 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: graphs; matrix games; linear inequalities and programming; convex sets; the minimax theorem; n-person games; and Pareto optimality (SMAM-431 or permission of instructor)

Class 4, Credit 4 (offered upon sufficient request)

SMAM-566 Non-Linear Optimization Theory
Registration #1016-566
The theory of optimi7ation of non-linear functions of several real variables. Topics include: unconstrained optimization (Newton-Raphson, steepest ascent and gradient methods); constrained optimization (La Grange 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 function; 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
An elementary applied calculus course covering differential and integral calculus of algebraic functions with emphasis on applications. (SMAM-204 or equivalent)

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

SMAT-421 **Calculus for Technologists II**
Registration #1019-421
A continuation of SMAT-420. Topics covered in this course are applications of the integral calculus; differential and integral calculus of the transcendental functions; and basic techniques of integration with emphasis on application to engineering technology problems (SMAT-420 or equivalent).

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

SMAT-422 **Solutions of Engineering Problems**
Registration #1019-422
A continuation of SMAT-421 Course covers selected applied mathematics topics including: differential equations through second order linear, LaPlace transforms, Taylor series, and other appropriate topics. Emphasis is on the application of these topics to engineering technology problems (SMAT-421 or equivalent)

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

Physics

SPSP-200 **Physics Orientation**
Registration #1017-200
An introduction to the nature and scope of physics for freshmen interested in physics as a profession. Topics include: (a) what is physics? (b) professional opportunities in physics; (c) the physics profession; (d) the literature of physics; (e) communicating in physics. Laboratory includes safety instruction; measurement and recording techniques; graphical analysis; error analysis; and report writing. Each student will present a formal written or oral report on some topic of interest at the end of the course.

Class 1, Lab. 2, Credit 2 (offered every year) (F)

SPSP-201, 202 / Physics in the Arts
Registration #1017-201, -202
A study of topics from the world of art in which the underlying physical laws have influenced the art form and its development. A weekly laboratory will allow study of the relation of an art form to basic optical, mechanical, and electrical physics and in addition will provide time for the development of student projects.

Class 2, Lab. 2, Credit 3 (offered upon sufficient request) (W, S)

SPSP-205, 206, 207 **General Physics**
Registration #1017-205, -206, -207
General physics for engineering and computer science majors. Mechanics, heat, sound, electricity and magnetism, making moderate use of calculus. (Co-registration or credit in SMAM-252, or SMAM-253) (See SPSP-275,276, 277 for laboratory)

Class 3, Credit 3 (offered every year) (205-W; 206-S; 207-F)

SPSP-211, 212, 213 **College Physics**
Registration # 1017-211, -212, -213
An elementary course in college physics. Mechanics, heat, sound, light, and electricity and magnetism, with some elements of modern physics. (SMAM-203 or SMAM-223) (See SPSP-271, 272, 273 for laboratory)

Class 3, Credit 3 (offered every year) (211-F, 212-W, 213-S)

SPSP-214, 215, 216 **Physics for Graphic Arts**
Registration #1017-214, -215, -216
An introductory course in college physics covering the fundamentals of mechanics, heat sound, light, electricity and magnetism, and some modern physics, with emphasis on topics having application in the printing industry. (SMAM-203) (See SPSP-217, 218, 219 for laboratory)

Class 3, Credit 3 (offered every year) (214-F, 215-W, 216-S)

SPSP-217, 218, 219 **Physics for Graphic Arts Lab**
Registration #1017-217, -218, -219
The labs for these courses will include experiments related to the principles and theories discussed in the corresponding lectures. (SPSP-214,215,216)

Lab. 2, Credit 1 (offered every year) (F, W, S)

SPSP-271, 272, 273 **College Physics Lab**
Registration #1017-271, -272, -273
The labs for these courses will include experiments related to the principles and theories discussed in the corresponding lectures. (SPSP-211,212,213).

Lab. 2, Credit 1 (offered every year) (F, W, S)

SPSP-275, 276, 277 **General Physics Lab**
Registration #1017-275, -276, -277
The labs for these courses will include experiments related to the principles and theories discussed in the corresponding lectures (SPSP-205,206, 207)

Lab. 2, Credit 1 (offered every year) (F, W, S)

SPSP-289** **Contemporary Science-Physics**
Registration #1017-289
Introductory science for non-science students One or more topics such as astronomy, space exploration, relativity, nuclear energy, and lasers are discussed and explained simply, to give an appreciation of the significance of physics in our contemporary technological society. A minimum of mathematics is used. A laboratory or discussion option may be offered for the small group meetings once a week, which reinforce the material given in demonstration lectures and audiovisual presentations.

Class 4, Credit 4 (F, W, S)

SPSP-311, 312, 313 **University Physics**
Registration #1017-311,-312, -313
An intensive course in general physics, using calculus, for majors in the sciences. Also open to engineering majors. Mechanics, heat, sound, electricity and magnetism, and light. (Co-registration or credit in SMAM-252 or SMAM-253)

Class 4, Credit 4 (offered every year) (311-F, W; 312-W, S; 313-S, F)

SPSP-314 **Introduction to Modern Physics**
Registration #1017-314
An introductory survey of modern physics at the sophomore level. Fundamentals of relativity, photons, interaction of radiation with matter, de Boglie waves, Bohr model, introduction to quantum mechanics, nuclear systematics, radioactivity, alpha, beta, and gamma decays, Q-values, nuclear fission, nuclear fusion. (SMAM-305; SPSP-313, or SPSP-207)

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

SPSP-315 **Introduction to Semiconductor Physics**
Registration #1017-315
Kinetic theory of gases and transport phenomena; Drude's theory of metals; quantum mechanics of a particle in a box; atomic orbitals; band theory of metals, insulators, and impurity semiconductors; Fermi-Dirac distribution; equilibrium charge-carrier densities in metals, insulators, and semi-conductors; operating principles of diodes, bipolar junction transistors, and MOSFET'S. (SMAM-306, SPSP-314)

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

SPSP-319 **Electrical Processes in Solids**
Registration #1017-319
Introduction to statistical mechanics; Planck's formula; transport equation; electronic properties of conductors and semiconductors; characteristics of metal-metal, metal-semiconductor, and p-n junctions; operating principles of solid state devices; theory and application. (SPSP-315 and permission of instructor)

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

"Wot *acceptable for science credit for College of Science major.*

SPSP-321 Introduction to Laboratory Techniques
Registration #1017-321
A.C. circuits, the oscilloscope, vacuum systems. (SPSP-313, SPSP-373)

Class 3, Lab. 3, Credit 4 (offered every year) (W)

SPSP-331 Introduction to Electricity and Electronics
Registration #1017-331
Fundamentals of electricity; construction and measurements of electrical and electronic circuits encountered in a scientific laboratory, (two quarters of introductory physics).

Class 3, Lab. 3, Credit 4 (offered every year) (F, W, S)

SPSP-341 Foundations of Scientific Thinking
Registration #1017-341
Definition of science; historical perspective; ingredients of the scientific quest; the scientific method; scientific explanation, laws theories, and hypothesis; the role of mathematics; probability and induction; science and other disciplines. (At least a year of basic sciences at the college level.)

Class 2, Credit 2 (offered upon sufficient request) (F, W)

SPSP-351, 352, 353 Radiation Physics
Registration #1017-351,-352, -353
The physics of nuclear radiation and the electronics used in its detection and monitoring. Application of radioactivity to nuclear medicine. (SPSP-213, SMAM-223 required; SMAM-309 recommended)

Class 4, Lab. 3, Credit 5 (offered every year) (351-F; 352-W; 353-S)

SPSP-355 Radiation Protection
Registration #1017-355
Principles and practical aspects of radiation protection; calculation of external and internal radiation dose measurements. (Permission of instructor and one year of college level physics)

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

SPSP-361 Ultrasonic Physics
Registration #1017-361
A course in the basic physics of ultrasound, covering ultrasonic wave generation and propagation, transducers, Doppler effect, reflection and refraction, biological effects, and applications of ultrasonic physics in medicine (Permission of instructor and one year of college level physics)

Class 4, Lab. 3, Credit 5 (offered every year) (F)

SPSP-371, 372, 373 University Physics Lab
Registration #1017-371, -372, -373
The labs for these courses will include experiments related to the principles and theories discussed in the corresponding lectures. (SPSP-311,312,313)

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

SPSP-374 Modern Physics Laboratory
Registration #1017-374
Basic experiments representative of the experimental foundations of modern quantum physics, such as: photoelectric effect, Franck-Hertz experiment, X-ray diffraction; optical diffraction and interference; atomic spectroscopy; electron microscopy; nuclear spectroscopy; radioactive half-life; Millikan oil drop; black-body radiation. Students enrolled in SPSP-315 may include experiments in semiconductor solid state physics. (SPSP-314)

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

SPSP-401, 402 Intermediate Mechanics
Registration #1017-401, 402
Particle dynamics, systems of particles, motion of a rigid body, gravitational fields and potential, moving coordinate systems, generalized coordinates, Lagrange's equations, mechanics of continuous media. (SMAM-307, SPSP-313)

Class 4, Credit 4 (offered every year) (401-F; 402-S)

SPSP-411,412 Electricity and Magnetism
Registration #1017-411, 412
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 1, Lab. 5, Credit 3 (offered every year) (421-F, 422-S)

SPSP-431, 432 Electronic Measurements
Registration #1017-431, -432
Laboratory course in electronic measurements and instrumentation, with theory and applications of discrete and integrated circuits in analog and digital electronics. (SPSP-313, SPSP-321).

Class 3, Lab. 3, Credit 4 (offered every year) (431-S, 432-F)

SPSP-455 Optical Physics
Registration #1017-455
Physical optics including interference, diffraction, and polarization. Brief introduction to modern optics. (SMAM-305, SPSP-313)

Class 4, Credit 4 (offered alternate years) (F)

SPSP-480 Theoretical Physics I
Registration #1017-480
An introduction to mathematical topics necessary for a quantitative study of physical phenomena. Topics include: vector analysis including vector differentiation and integration, curvilinear coordinate systems and transformations from one orthogonal coordinate system to another, Fourier series and an introduction to Fourier integrals. Applications of these concepts to physics are presented. (SMAM-307, SPSP-313)

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

SPSP-501 Theoretical Physics II
Registration #1017-501
Application of advanced mathematical methods to physics. (SMAM-307, SPSP-480, plus co-registration or credit in SPSP-401 and SPSP-411)

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

SPSP-521 Advanced Experimental Physics
Registration #1017-521
Advanced laboratory experiments and projects in atomic physics, nuclear physics, or solid state physics. Special emphasis on experimental research techniques. (SMSM-307, SPSP-421)

Lab. 6, Credit 2 (offered every year) (F)

SPSP-522 Introduction to Quantum Mechanics
Registration #1017-522
A study of the concepts and mathematical structure of non-relativistic quantum mechanics. Exact and approximate techniques for solving the Schroedinger equation are presented for various systems. (SPSP-314, SPSP-480; SPSP-315 and SPSP-501 are recommended)

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

SPSP-531 Solid State Physics
Registration #1017-531
The structure of solids and their thermal, mechanical, electrical and magnetic properties. (SPSP-315, SPSP-480, and SPSP-522; SPSP-501 is recommended.)

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

SPSP-541, 542, 543 Physics Research
Registration #1017-541, -542, -543
Faculty-directed student f>rojects or research usually involving laboratory work or theoretical calculations that could be considered as of an original nature. (Permission of instructor)

Class variable, Credit variable (offered every year)

SPSP-550 Physics Seminar
Registration #1017-550
Preparation and presentation of papers based on physics literature search May include reports on student research projects. Special emphasis on the techniques of physics literature search and on the mechanics of preparation, organization, and presentation of technical papers. (Senior physics major or permission of instructor)

Class 1, Credit 1 (offered every year) (F, S)

SPSP-533 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; astro-physics; astronomy.

Class variable, Credit variable (offered upon sufficient request)

SPSP-599 **Independent Study-Physics**
Registration #1017-599
Faculty-directed study of appropriate topics on a tutorial basis. This course will generally be used to enable an individual to pursue studies of existing knowledge available in the literature.

Class variable, Credit variable (offered every year)

Clinical Sciences

SCLG-301 **Medical Terminology**
Registration #1026-301
Emphasizes etymology, definition, pronounciation and correct utilization of medical terms which enables students to develop a vocabulary essential to the understanding of and communication with the various health areas in which allied health professionals will serve. (SBIO-306 or instructor's permission)

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

SCLG-415 **Pathophysiology**
Registration #1026-415
The terminology and concepts of the pathophysiological nature of human disease.

Credit 4 (S)

SCLG-559 **Special Topics-Clinical Sciences**
Registration #1026-559
Advanced courses which are of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and have specified prerequisites, contact hours and examination procedures.

Class variable, Credit variable (offered every quarter)

SCLG-599 **Independent Study-Clinical Sciences**
Registration #1026-599
Faculty directed study of appropriate topics on a tutorial basis. This course will be used to enable an individual to pursue studies of existing knowledge available in the literature.

Class variable, Credit variable (offered every quarter)

SCLM-210 **Medical Technology Seminar**
Registration #1024-210
A discussion group involving current topics in the field of medical technology; orientation toward the role of medical technologists in health care.

Class 1, Credit 1 (offered every year) (W)

SCLM-401 **Hematology/I mmunohematology**
Registration #1024-401
A study of the blood (erythrocytes, leukocytes, platelets and blood group antigens). Descriptions of the cellular components of the blood in health and in disease. Cellular and immunological functions and other inter-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 compatability testing of various blood groups. (SBI0306) or instructor's permission.

Class 3, Lab. 3, Credit 4 (S)

SCLM-405 **Diagnostic Bacteriology and Mycology**
Registration #1024-405
Study of bacteria and fungi that cause human disease. Lecture and laboratory subjects include microorganism growth, isolation, identification, antibiotic sensitivity, and related human immunological and serological responses. (SBIC-404)

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

SCLM-432 **Biology Laboratory Techniques I**
Registration #1024-432
Principles of clinical laboratory instruments in the analysis of body fluids. This quarter stresses the principles of instrumental methods of analysis including visible and ultraviolet spectrophotometry, fluorometry, flame photometry, atomic absorption spectrophotometry, chromatography, electrophoresis, osmometry, radiation counters, and automated chemical analysers. (SCHG-217, or equivalent, SBIO-306)

Class 2, Lab. 6, Credit 4 (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. (SCHG-217, or equivalent, SBIO-306)

Class 2, Lab. 6, Credit 4 (S)

SCLN-401 **Introduction to Clinical Nuclear Medicine**
Registration #1025-401
A conbination lecture/laboratory course introducing clinical aspects of Nuclear Medicine. Hospital organization is presented as well as the relationship of nuclear medicine services to other hospital services. Laboratories in affiliated hospitals are correlated with lectures on nuclear medicine technology, patient care and emergency procedures. (Fourth year standing in NMT program)

Credit 4 (F)

SCLN-402 **Nuclear Medicine Procedures-**
Registration #1025-402 **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 pregram)

Credit 1 (F)

SCLN-501 **Nuclear Medicine Procedures-**
Registration #1025-201 **Reticuloendothelial System**
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving structures in the reticuloendothelial system. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year standing in NMT program)

Credit 1 (F)

SCLN-502 **Nuclear Medicine Procedures-**
Registration #1025-502 **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 **Nuclear Medicine Procedures-**
Registration #1025-503 **Respiratory System**
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving structures in the respiratory system. Physiology and Anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year standing in NMT program)

Credit 1 (F)

SCLN-510 **Nuclear Medicine Procedures-**
Registration #1025-510 **Urinary System**
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving structures in the urinary system. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year standing in NMT program)

Credit 1 (F)

SCLN-511 **Nuclear Medicine Procedures-**
Registration #1025-511 **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 interpretaion are covered. Students observe and perform these procedures in the clinical setting. (Fourth year standing in NMT program)

Credit 2 (W)

SCLN-512 **Nuclear Medicine Procedures-**
Registration #1025-512 **Cardiovascular System**
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving structures in the cardiovascular system. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year standing in NMT program)

Credit 2 (W)

SCLN-513 **Nuclear Medicine Procedures-**
Registration #1025-513 **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 **Nuclear Medicine Procedures-**
Registration #1025-514 **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 **Nuclear Medicine Procedures-**
Registration #1025-515 **Hematological and In Vitro Studies**
This course covers the basic procedures utilised in nuclear medicine for the evaluation of patients with hematologic disorders. Medical indications, fundamental principles, technique data calculations and test interpretation are covered for each procedure discussed. (Fourth year standing in the NMT program)

Credit 1 (S)

SCLN-516 **Instrumentation and Computers**
Registration #1025-516 **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 **Radiochemistry and Radiopharmacology**
Registration #1025-517
A combination lecture/lab course covering the production and use of radioisotopes in medicine. Radiopharmaceutical compounding, quality control procedures, dose calibration, and licensing regulations regarding the handling and use of radio-pharmaceuticals are covered. (Fourth year standing in NMT program)

Credit 2 (W)

SCLN-518 **Radionuclide Therapy and Radiation Biology**
Registration #1025-518
A study of the application of radionuclides in the treatment of disease and the study of the biologic changes which occur following irradiation. (Fourth year standing in NMT program)

Credit 1 (W)

SCLN-519 **Radiation Health Safety**
Registration #1025-519
A course designed to familiarise the student with the daily routine for safe handling of radioactive materials. Radiation protection, licensing regulations, decontamination procedures, waste disposal and area surveys are covered. (Fourth year standing in NMT program)

Credit 2 (S)

SCLN-520 **Radioimmunoassay**
Registration #1025-520
A combination lecture/practicum course in RIA. Topics include theory and basic principles, instrumentation, specific assays, and quality control. Commonly encountered pitfalls, current RIA developments and the diagnostic meaning of each test are covered. (Fourth year standing in NMT program)

Credit 4 (S)

SCLN-521 **Review in Nuclear Medicine**
Registration #1025-521
Discussion of all aspects of nuclear medicine covered during the clinical internship including preparation for the national and certification exams in nuclear medicine technology. (Fourth year standing in NMT program)

Credit 2 (S)

SCLN-522 **Clinical Nuclear Medicine I**
Registration #1025-522
A clinical practicum which gives the student the opportunity to learn and master nuclear medicine procedures through technical and practical experience. Each student is assigned a particular combination of three hospitals and trains approximately four months in each. Students work with patients under the supervision of physicians and technologists on the hospital staff. Student progress and performance is monitored by the R I T. nuclear medicine technology clinical coordinator who makes periodic visits to the hospital department. (Fourth year standing in NMT program)

Credit 6 (F)

SCLN-523 **Clinical Nuclear Medicine II**
Registration #1025-523
Continuation of Clinical Nuclear Medicine I. (Fourth year standing in NMT program) j

Credit 7 (W)

SCLN-524 **Clinical Nuclear Medicine III**
Registration #1025-524
Continuation of Clinical Nuclear Medicine II (Fourth year standing in NMT program)

Credit 7 (S)

SCLS-411 **Intro, to Diagnostic Ultrasound**
Registration #1030-411
A course which surveys the historical development of medical ultrasound technology, the professional and occupational development of sonography and the current major diagnostic 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.

Class 3, Rec. 1, Credit **4** (W)

SCLS-413 **Ultrasound Instrumentation**
Registration #1030-413
Principles of techniques and instrumentation used in medical ultrasound imaging. Topics include: pulsed echo technique; real time scanners; A-, B-, and M-mode instrumentation; Doppler; instrument controls; calibration and quality assurance.

Credit 4 (S)

SCLS-551 **Intro, to Clinical Ultrasound**
Registration #1030-551
A combined lecture/laboratory course introducing clinical aspects of ultrasound technology. Topics include: applied ultrasonic physics and instrumentation, imaging and scanning techniques, nursing procedures, and patient care. Cross-sectional anatomy and pathophysiology will be correlated with ultrasound images.

Class 4, Lab. 2, Credit 6 (F)

SCLS-552 **Intro, to Obstetrical Ultrasound**
Registration #1027-552
This course will equip the student with the practical skills and clinical knowledge necessary to perform competent Obstetrical ultrasound scans Image production, recognition, and acceptability are stressed; examination protocols are outlined. Instruction also includes review of teaching files and discussion of new techniques and research trends. (SCLS-551)

Lec. 2, Lab., Credit 5 (F)

SCLS-S53 Intro, to Gynecologic Ultrasound
Registration #1030-553
This course will equip the student with the practical skills and clinical knowledge necessary to perform competent Gynecologic ultrasound scans. Image production, recognition, and acceptability are stressed; examination protocols are outlined. Instruction also includes review of teaching files and discussion of new techniques and research trends. (SCLS-551)

Class 2, Lab., Credit 5 (R

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)

Class 2, Lab., Credit 5 (W)

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)

Class 2, Lab., Credit 5 (W)

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)

Class 2, Lab., Credit 6 (W)

SCLS-557 Intro, to Abdominal Ultrasound II
Registration #1030-557
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)

Class 3, Lab, Credit 7 (S)

SCLS-558 Advanced Abdominal Ultrasound
Registration #1027-558
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)

Credit 7 (S)

SCLS-560 Seminar in Ultrasound
Registration #1030-560
A survey of current ultrasound topics and areas of ultrsound usage peripheral to the major specialties. Diagnostic imaging topics of interest to sonography will also be presented (SCLS-551)

Class 1, Credit variable (offered Winter, Spring)

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

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.

820 will be offered in F 1982; S 1984

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 she limited to 12)

Lab. 4, Credit 1 (offered concurrently with SHPC-820)

SCLC-811 Advanced Clinical Chemistry Laboratory II
Registration #1023-811
Comparison of current methods for separation and determination of isoenzymes. (Permission of instructor, class si?e limited to 12)

Lab. 4, Credit 1 (concurrent with SHPC-821)

SCLC-821 Advanced Clinical Chemistry II
Registration #1023-821
Proteins, enzymes, hemoglobins, iron, renal functions, lipids, quality control, automation, and method selection. (Permission of instructor)

2 hr lecture, 2 hr seminar, Credit 3 (S 1983; F 1984)

SCLC-822 Advanced Clinical Chemistry III
Registration #1023-822
Radioimmunoassay, hormones, fetal-placement unit, integration of laboratory data. (Permission of instructor)

2 hr lecture, 2 hr seminar, Credit 3 (F 1983; S 1985)

SCLC-812 Advanced Clinical Chemistry Laboratory III
Registration #1023-812
Methods for the development, improvement, and trouble shooting of radioimmunoassay analyses. (Permission of instructor, class size limited to 12)

Lab. 4, Credit 1 (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-741, 742 Clinical Laboratory Management I, II
Registration #1023-741
Organization of health care facilities, regulatory agencies, q.c., personnel relations, productivity analyses, equipment maintenance, education and safety programs, extra-laboratory interactions, cost-accounting of laboratory tests

Class 4, Credit 4 (741-W 1982; 742-SR 1983)

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-772 Special Topics in Clinical Science
Registration #1023-772
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, legl aspects of biomedical data processing, instrument interfacing.

Class 3, Credit 3 (Winter of even-numbered years, e.g., 82-83)

Material Science and Engineering

Graduate Courses

SESM-701 Introduction to Materials Science
Registration #1028-701
Crystal structure and defects, strength of materials, metals, alloy principles, ferrous alloys.

Credit 4 (offered every year)

SESM-702 Introduction to Polymer Science
Registration #1028-702
Introduction to the physical chemistry and organic chemitry of polymers, structure, preparation and properties of polymers.

Credit 4 (offered every year)

SESM-703 Solid State Science
Registration #1028-703
Crystal structure and x-ray diffraction; lattice vibrations and thermal properties; electron band theory of insulators, metals, afid semiconductors, junction diodes and transistors.

Credit 4 (offered every year)

SESM-704 Introductory Theoretical Methods
Registration #1028-704
Treatment of waves and fields; selected topics of interest in electrodynamics and fluid mechanics; statistical mechanics, Maxwell-Boltzmann, Bose Einstein, and Fermi-Dirac distributions and their applications.

Credit 4 (offered every year)

SESM-705 Introductory Experimental Techniques
Registration #1028-705
The list of laboratory projects includes the areas of:
a) Microanalysis of materials; x-ray diffraction, scanning electron microscopy metallography, microelectronics, fluorescence, phosphorescence, etc.;
b) Thermal systems: thermomechanical and thermogravimetric systems and differential scanning calorimetry;
c) Thin films; thermal evaporation system, sputter coating system, phase contact microscopy, chemical vapor deposition system;
d) sonics and ultrasonics

Credit 4 (offered every year)

Elective Courses

SESM-706, 707, 708 Experimental Techniques
Registration #1028-706, -707, -708
The study of more topics listed in Introductory Experimental Techniques.

Credit 4 (offered every year)

SESM-710, 711 Material Properties and
Registration #1028-710, -711 Selection I and II
Mechanical properties of metallic polymeric materials; application and selection of such materials based on strength, fatigue, impact, creep, processing, and economy.

Credit 4 per quarter

SESM -714 Ceramics and Glass
Registration #1028-714
Nature of ceramics, nature of glass, processing of ceramics and glass materials, properties and application of ceramics and glass.

Credit 4

SESM-717 Mateials Degradation: Corrosion
Registration #1028-717
Electrochemical nature of corrosion, high-temperature corrosion, anticorrosion techniques, materials selection for corrosion services.

Credit 4

SESM-720 Organic Polymers
Registration #1028-720
This course is designed to meet the needs of students in the area of organic chemistry related to synthesis, polymerization mechanism, structures, stereochemistry and reactions of organic polymers and their industrial usage.

Credit 4

SESM-721 Physical Chemistry of Polymers
Registration #1028-721
This course is designed to meet the needs of students of materials science in the area of theoretical and experimental physical chemistry macromolecules.

Credit **4**

SESM-722 ' ~ Polymer Processing
Registration #1028-722
A study of the basic principles and methods involved in the technology of polymeric materials, including treatment of heat transfer, mass flow, mixing, shaping and moulding of polymeric materials.

Credit **4**

SESM-730 Optical Properties of Materials
Registration #1028-730
Fundamentals of geometrical and physical optics; interaction of radiation with atoms, molecules, and matter; dielectrics; phenomenological considerations of electro-optics, accousto-optics, and lasers.

Credit **4**

SESM-733 Electrical and Magnetic Properties
Registration #1028-733 of Materials
Band structures of pure and doped solids and solid compounds, transport phenomena, semiconduction, optical properties, galvanomagnetic and magneto-optic effects.

Credit **4**

SESM-734 Advanced Optics
Registration #1028-734
Lasers: theory, types and construction; optical properties of various metals and alloys; thin films: multilayer dielectric coating; principles and applications of electro-optical and accousto-optical materials; shutters and modulators. ■

Credit **4**

SESM-736 Amorphous and Semicrystalline Materials
Registration #1028-736
Electrical, thermal, and optical properties of amorphous materials; models of conduction.

Credit **4**

SESM-740 Nuclear Science and Engineering
Registration #1028-740
Systematics of the atom nuclei; radioactivity; neutron induced reactions; fission; nuclear reactor principles, designs and materials.

Credit **4**

SESM-800 Special Topics
Registration #1028-800
In addition to in-depth study of any of the courses listed under Elective Courses, special topics may be selected from such areas as elastomers, organometallics, radiation damage, processing of materials, superconductivity, etc.

Credit **4**

SESM-879 Research and Thesis Guidance
Registration #1028-879
A project involving research on a topic in materials science and engineering carried out either on campus or off campus under the industrial internship option. An oral examination and written thesis are required.

Credit variable

SESM-890 Seminar
Registration #1028-890
This course is required for completion of the program and will involve a one-hour presentation on some topic in materials science and engineering.

Credit **1**

SESM-899 Independent Study
Registration #1028-899
This course number should be used by students wishing to study a topic ***ortl*** an independent study basis. Permission to register required.

Credit variable

National Technical Institute for the Deaf

Department of Educational Support Services Training

Interpreting

NITP-201 **Expressive Interpreting I**
Registration #0850-201
This course introduces several basic interpreting skills. It includes development of memory retention skills, learning of primary sign vocabulary, skills and techniques for oral interpreting, mime and gesturing. The course combines lectures and lab practice. Students are critiqued to check their progress.

Class 3, Credit 3 (offered annually)

NITP-202 **Expressive Interpreting II**
Registration #0850-202
This course requires the student to use skills and principles learned in Expressive Interpreting I. The student will practice interpeting from English to American Sign Language (ASL). Practice will include intepreting both live talent and audiotapes. The audiotapes begin at speeds of 50 wpm and increase to 80 wpm. (NITP-201)

Class 3, Credit 3 (offered annually)

NITP-211 **Voice Interpreting I**
Registration #0850-211
This course will increase the student's ability to receive the spoken and signed messages of hearing-impaired people. It also refines student's ability to use vocal modulation to prepare for the voice interpreting task. This is a self-paced lab course. Students learn by viewing videotapes and completing a series of exercises. The videotapes contain hearing impaired people communicating orally, in Signed English or in ASL.

Class 3, Credit 3 (S)

NIPT-212 **Voice Interpreting II**
Registration #0850-212
This course develops the student's ability to generate a spoken English equivalent while viewing/listening to a hearing-impaired person's signed/spoken message. This is a self-paced lab course. (NITP-211)

Class 3, Credit 3 (Fall)

NITP-213 **Voice Interpreting III**
Registration #0850-213
This course continues development of the voicing task. More complex videotaped samples of signed/spoken messages of hearing-impaired persons are delivered at a faster rate than those in Voice I and II. This is a self-paced lab course. (NITP-212)

Class 3, Credit 3 (Summer)

NITP-251, 252 **Aspects and Issues of Deafness I, II**
Registration #0850-251, -252
The student learns the communication and psycho-social/cultural aspects of deafness through panels, discussions, readings and field trips.

Class 3, Credit 3 (offered annually)

NITP-261, 262 **Theory & Practice of Interpreting I, II**
Registration #0850-261, -262
Students use a communication process model to acquire a theoretical base for the interpreting task. Addressed are: the linguistic principles associated with sign language and the interpreting task, and skills in positioning and lighting. These courses include lectures and student participation in small g and large group activities.

Class 3, Credit 3 (offered annually)

SCL
RegfTP-271, 372 **The Professional Interpreter I, II**
Compgistration #0850-271, -372
liquidjdents develop a broad understanding of interpreting as a profession, say. (tional standards for certification, and the concepts contained in the RID Lab of ethics. Other areas of concentration are: interpersonal skills, self- ique, professional development, and resume writing. Course work in- les panels, role plays, discussions, readings and lectures.

s 3, Credit 3 (offered annually)

NITP-281, 382 **Interpreting Practicum I, II**
Registration #0850-281, -382
These field experiences provide an opportunity to practice and integrate skills acquired in the classroom and laboratories. They include instructional and non-instructional activities on the RIT campus and in the Rochester community, under the supervision of the interpreter manager on site and the instructor responsible for the course.

Class 15, Credit 5 (available any quarter)

NITP-283, 384 **Interpreting Seminar I, II**
Registration #0850-283, -384
Designed as part of the field experience, students share their experiences and concerns as practicing interpreters. Panels of interpreters and consumers of interpreting services are used.

Class 1, Credit 1 (available any quarter)

NITP-303 **Expressive Interpreting III**
Registration #0850-303
This course introduces advanced vocabulary needed for legal, medical, and educational settings. Audiotapes and other materials are made beginning at a speed of 80 wpm and increase to a speed of 120 wpm. The students are critiqued to check progress and help to increase skills. (NITP-202)

Class 3, Credit 3 (offered annually)

NITP-331 **Expressive Transliterating**
Registration #0850-331
The students develop the skills required to accurately represent a spoken message in signed English. Some areas of concentration are: facial expression, body shifting, mouth movements and finger-spelling. Practice of these skills occur in formal lectures and certain classroom environments. (NITP-303)

Class 3, Credit 3 (offered annually)

NITP-341 **Introduction to Specialized**
Registration #0850-341 **Interpreting Settings**
This course introduces the student to interpreting in various specialized settings. Included are: platform, telephone, religious, artistic, and eductional. Practice is given to creating translations for artistic samples. (NITP-303)

Class 3, Credit 3 (offered annually)

NITP-391 **Principles of Tutoring/Notetaking**
Registration #0850-391
This course prepares personnel to provide tutoring and notetaking support services for the hearing-impaired in mainstreamed educational settings. The methodology is appropriate for elementary, secondary, and postsecondary educational levels.

Class 3, Credit 3 (offered annually)

NITP-392 **Tutoring/Notetaking Practicum**
Registration #0850-392
Students provide tutoring and notetaking services to hearing-impaired students. A minimum of 10 hours per week is committed to taking notes in class and tutoring outside of class. Practicum sites include the Rochester City School District, the Monroe County Board of Cooperative Educational Services (BOCES) program, colleges of RIT, and other Rochester area universities and colleges. Supervision is provided. (NITP-391)

Class 10, Credit 3 (available any quarter)

NITP-395 **Mainstreaming: Educational Programs**
Registration #0850-392 **and Alternatives**
Explores the goals and processes of education of the hearing-impaired and covers current demographic, legal, economic and social trends affecting education of the hearing-impaired; identifies criteria and processes for the establishment of quality support services for deaf students.

Class 3, Credit 3 (offered annually)

Course *descriptions for A.A.S., Diploma, and Certificate programs for the deaf may be found in the NTID catalog*

Reserve Officers' Training Corps

A> courses are offered annually

First Year

MHSM-201 * The Military and American Society I
Rdistration #0701-201
iroduction to the organization and purpose of the ROTC Program; organizion of the United States Army, its world-wide missions, its relationship to tt National Security Organization, with emphasis on the Executive Office of t President; branches of the US Army; voluntary leadership laboratory; liio communications exercise.

♦ss 1, Credit 1

I1SM-202* Military History and Leadership
Igistration #0701-202
i oduction to map reading with emphasis on the US Army grid system; an roduction into leadership and principles of war; military history from 1945 1970; voluntary leadership laboratory,

iss 1, Credit 1

USM-'03* The Military and American Society II
•gistrat -n #0701-203
I fie impact ' *he Vietnam conflict upon the American society and the US *I* Vny; the **Arm>** .if the future; US Army weapon systems, Soviet weapon sys- /ms; comparison and contrast of the US and Soviet Union military systems; *)* itelligence preparation of the battlefield; voluntary leadership laboratory.

' Hass 1**,** Credit 1

Second Year

AMSM-301 * Leadership and Management
legislation #0701-301
Provides future officers with the basic principles of leadership and management of human resources; motivation, morale, communication, individua and group behavior are dicussed; voluntary leadership laboratory.

£la6S 2, Credit 2

MMSM-302* Basic Military<Studies
Registration #0701-302
A practical introduction to the basic military organization. Emphasis is placed on tactical operation and movement 6f the squad, first aid, land navigfition and communication techniques. The course stresses practical application rather than theory; voluntary leadership laboratory.

[Class 2, Credit 2

WMSM-303* World Change and Military Implications
Registration #0701-303
1> study of the Army's contribution to the total military structure; an introduc- «on to military implications in the international system; readings in military ■story; voluntary leadership laboratory.

Class 2, Credit 2

Third Year

MMSM-401 Introduction to Basic Operations and Tactics
Registration #0701-401
Provides a knowledge of small-unit leadership training on map reading skills, land navigation and techniques of squad level tactics and tactical employment; leadership laboratory.

Class 3, Credit 3

MMSM-402 Military Skills Training I
Registration #0701-402
Provides knowledge and training of basic military skills essential as a junior officer; weapons training, an introduction to military communication equipment and techniques; leadership laboratory

[Class 3, Credit 3

MMSM-403 Military Skills Training II
Registration #0701-403
Continuation of military skills training with emphasis on military intelligence/ security, first aid, and unit level operations; leadership laboratory; field training exercise.

Class 3, Credit 3

Fourth Year

MMSM-501 Junior Officer Development and Training
Registration #0701-501
Briefings/discussions on military organization, professionalism and ethics, and branches of the Army; principles and techniques of military instruction; the company level training management system; leadership laboratory.

Class 3, Credit 3

MMSM-502 Unit Level Officer Responsibilities
Registration #0701-502
Discussions and seminars on officer extra duties, military justice, supply and property accountability, maintenance management, officer-enlisted personnel management and command and staff responsibilities; leadership laboratory.

Class 3, Credit 3

MMSM-503 Advanced Officer Management and Career Planning
Registration #0701-503
Discussions on the officer personnel management system, active duty orientation seminars, the military as a career and preparations for commissioning; leadership laboratory; field training exercise.

Class 3, Credit 3

'Also offered during summer, which enables a student to begin the third-year courses with his/her class

Rochester Institute of Technology

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