1977

1977-1978 Undergraduate Course Description

Rochester Institute of Technology

Follow this and additional works at: https://scholarworks.rit.edu/archives

Recommended Citation

This Text is brought to you for free and open access by RIT Scholar Works. It has been accepted for inclusion in RIT Digital Archives by an authorized administrator of RIT Scholar Works. For more information, please contact ritscholarworks@rit.edu.
COURSES
1977-78
Rochester Institute of Technology
Course Numbering

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

First letter: College offering the course
Second and Third letters: School or department of that college
Fourth letter: Major field of interest
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; 6, 7, or 8 = Courses for graduate credit. (6 may be undergraduate or graduate.)
Second and Third numbers: Course differentiation and sequencing

Directly below the alpha-numeric number in the course description is the registration number. You must use this number when you register for a course, because the Institute’s computer cannot read the alpha-numeric number.

Course prerequisites are shown in parenthesis after course descriptions.

Courses of Study 1977-78
Produced by RIT Communications Group
Rochester Institute of Technology
Office of Admission
One Lomb Memorial Drive
Rochester, NY 14623
(716) 464-2831

After December 1977 the 464 RIT telephone exchange will be 475.
College of Business
School of Business Administration

## Accounting

**BBUA-210 Basic 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-215 Survey of Accounting Concepts**
- Registration #0101-215
- A course for non-business majors. An introduction to the purposes and functions of accounting in a dynamic society. Emphasis is placed upon essential financial and managerial accounting concepts necessary for management planning and control.
- 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 application of fund. (BBUA-210)
- Class 4, Credit 4

**BBUA-313 Auditing**
- Registration #0101-313
- 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)
- Class 4, Credit 4

**BBUA-331,332 Cost Accounting I, II**
- Registration #0101-331,332
- 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 furnishing the accounting data and reports required for efficient managerial planning and control. (BBUA-211 or BBUA-308)
- Class 4, Credit 4

**BBUA-421 Advanced Accounting**
- Registration #0101-421
- 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. (BBUA-310)
- Class 4, Credit 4

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

**BBUA-442 Tax Accounting**
- Registration #0101-442
- Presents basic tax law for an understanding of how it affects the taxpayer. Emphasizes federal income taxes, but also introduces social security, estate, and gift taxes; includes problems requiring the use of published tax services. (BBUA-210 or 215)
- 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/Qt. (maximum 12 credits allowed)

## Management

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

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

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

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

**BBUB-404 Administrative Policy**
- Registration #0102-404
- Application 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. (Senior standing)
- Class 4, Credit 4

**BBUB-407 Legal Environment of Business Activity**
- Registration #0102-407
- The impact and effect of law on any and all activities dealing with business or economic activity of individuals, business entities, governmental agencies, employers and employees. (BBUB-201)
- Class 4, Credit 4
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBUB-434</td>
<td>Operations Management</td>
<td>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)</td>
</tr>
<tr>
<td>Class 4, Credit 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBUB-450</td>
<td>Multinational Management</td>
<td>Registration #0102-450 Acquaints the student with the characteristics and impact of the multi-nation enterprise. It explores in depth the process of leadership, motivation and performance appraisal in a cross-cultural setting. (BBUB-201 and BBUB-401)</td>
</tr>
<tr>
<td>Class 4, Credit 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBUB-531</td>
<td>Labor Relations</td>
<td>Registration #0102-531 The past and present of the American labor movement are discussed, including union philosophy and objectives, issues and approaches. (BBUB-201)</td>
</tr>
<tr>
<td>Class 4, Credit 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B BUB-534</td>
<td>Purchasing</td>
<td>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.</td>
</tr>
<tr>
<td>Class 4, Credit 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBUB-535</td>
<td>Planning and Decision Making</td>
<td>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.</td>
</tr>
<tr>
<td>Class 4, Credit 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBUB-536</td>
<td>Organization Theory</td>
<td>Registration #0102-536 Modern models 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)</td>
</tr>
<tr>
<td>Class 4, Credit 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBUB-554</td>
<td>Seminar in Management</td>
<td>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)</td>
</tr>
<tr>
<td>Class 4, Credit 4/Qtr. (maximum 12 credits allowed)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Economics

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBUE-381</td>
<td>Money and Banking</td>
<td>Registration #0103-381 The evolution of money and monetary standards. American banking systems with emphasis on commercial banking practices and their relationship to the Federal Reserve Bank. Central bank activities in controlling the price and availability of credit in relation to national and international monetary policy. (BBUA-210, GSSE-302)</td>
</tr>
<tr>
<td>Class 4, Credit 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBUE-405</td>
<td>Microeconomics</td>
<td>Registration #0103-405 An advanced course in economic theory dealing with the contemporary analyses of price or value under conditions of free competition and various degrees of monopoly control; of income distribution; and of the level of income and employment. Business applications are given along with the exposition of the theory itself. (GSSE-302, BBUG-292 or BBUG-411)</td>
</tr>
<tr>
<td>Class 4, Credit 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Finance

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBUF-441</td>
<td>Financial Management</td>
<td>Registration #0104-441 A management-oriented approach to the finance function of the corporation. Application of decision making techniques in planning for the procurement and distribution of capital, directing its use, and evaluating management’s action in providing a return on the firm’s investment. (BBUA-210, GSSE-302)</td>
</tr>
<tr>
<td>Class 4, Credit 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBUF-502</td>
<td>Money and Capital Markets</td>
<td>Registration #0104-502 Analysis and description of the money and capital markets, secondary distributions, and government issues. (BBUE-381)</td>
</tr>
<tr>
<td>Class 4, Credit 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
BBUM-550  Financial Problems
Registration #0105-550
The analysis of financial problems and application of decision making techniques to the operation of the firm. (BBUF-441)
Class 4, Credit 4

BBUF-504  International Finance
Registration #0104-504
The balance of payments, foreign exchange rates and markets, gold standard, flexible exchange rates system, international capital movements, exchange restrictions, and international monetary experiences. (BBUE-381)
Class 4, Credit 4

BBUF-508  Portfolio Management
Registration #0104-508
Analysis of fundamental criteria involved in the construction and management of securities portfolios. Theory of yield and policies of financial institutions. (BBUF-507)
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 industries. 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

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

BBUF-554  Seminar in Finance
Registration #0105-554
A seminar covering current policies and problems in financial management. It centers around the problems managers face in the direction, control, and supervision of sales activities. (BBUM-263)
Class 4, Credit 4

BBUQ-352  Quantitative Methods
Registration #0105-352
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. (BBUQ-291, BBUQ-411)
Class Variable, Credit 4

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. (BFAM-215).

Class 4, Credit 4

Food Administration and Tourist Industries 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. (BFAM-215).

Class 4, Credit 4

**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

**BFAD-520 Communication & Instructional Techniques**
Registration #0107-520 (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 2, 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 status. Role of diet and dietetics in metabolic, gastro-intestinal, renal, musculoskeletal, cardiac, endocrine, febrile, and other diseases. (BFAD-213, SCHG-203, SBIG-212)

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

Practicum in hospital by arrangement.

**BFAD-535 Nutrition Seminar**
Registration #0107-535
Study of 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)

Class 4, Credit 4

**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)

Class 2, Credit 4

Clinical hours by arrangement.
BFAM-210 Introduction to Food Management and Tourist Industries
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-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

BFAM-311 Food Systems Design
Recognizing, analyzing and solving food problems in layouts of existing institutions and in designing new food service plans. Consideration of food service equipment; determination of needs; development of specifications, procedures of maintenance, sanitation, and safety. (BFAM-215)
Class 3, Lab. 2, Credit 4

BFAM-314 Sanitation and Safety in 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-311)
Class 2, Credit 2

BFAM-321 Food and Beverage Merchandising
Written menu presentation for various types of commercial food services and other merchandising and promotional techniques for the food service industry. Presentation of beverages as related to bar management. (BFAM-215)
Class 2, Credit 2

BFAM-331, 332 Food Production Management I & II
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 upon scientific, technological, economic, and social factors. Emphasis on operations 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)
BFAM-331 Class 3, Lab. 6, Credit 5
BFAM-332 Class 2, Lab. 6, Credit 4

BFAM-333 Operational Analyses in Food Systems
Integration of classroom study of fundamental management principles with on-location application of research, analysis, and cost control procedures in hotel/motel and food service operations. (BFAM-332)
Class 4, Credit 4

BFAM-415 Food Science I
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-212, SCHG-216)
Class 2, Lab. 6, Credit 4

BFAM-416 Food Science II
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 2, Lab. 6, Credit 4

BFAM-422 Hotel/Motel Management
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

BFAM-423 Management Systems for the Lodging and Tourism Industry
Analysis and evaluation of systems and operations, franchising; feasibility planning, development, financial, 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-219)
Class 4, Credit 4

BFAM-425 Introduction to the Tourist Industry
Evolution of tourism as an industry geographically and culturally; the economic role of tourism, tourism demand, tourism organizations, planning and development; managerial requirements.
Class 4, Credit 4

BFAM-450 Marketing for Hotel and Tourism Industries
A study of tourism development, marketing and the interaction between the broad areas of the travel industry and its relationship to hotels, motels, restaurants, community economy, trade associations, competitive and non-competitive markets. (BBUM-263)
Class 4, Credit 4
School of Retailing

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 production, personnel and customer relations and attitudes. Evaluation of management experience by preparation of operations reports. (BFAM-331, 332)
Class 1, Lab. 8, Credit 4

BFAM-517 Ethnic Foods
Registration #0108-517
Study of regional and international foods and food customs of peoples of various backgrounds.
Class 4, Credit 4

BFAM-554 Seminar in Tourist Industries
Registration #0108-554
Management
Selected management problems associated with hotels, motels, resorts and travel systems. Topics such as the areas and groups that constitute the source of tourism, attractions that draw them, conveyances and routings used, matters of rates, foreign exchange, passport requirements or other current management concerns will be covered.
Class 4, Credit 4

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

BRER-211 Retail Organization and Management
Registration #0109-211
This survey course is a basic orientation to the field of retailing. Emphasis is placed on the major store functions of merchandising, sales promotion, control, operations, and personnel. The activities of each of these areas and their interrelationships are considered.
Class 4, Credit 4

BRER-212 Merchandising Concepts I
Registration #0109-212
A detailed examination of the merchandise function with particular attention to the role of the store buyer. Topics include buying and pricing merchandise, operating statements, inventory valuation, shortages, merchandise planning and control. (BRER-211)
Class 4, Credit 4

BRER-213 Merchandising Concepts II
Registration #0109-213
A comprehensive study of retail mathematics associated with the merchandising function. Specific topics include markup, markdown, retail method of inventory, turnover, the merchandise plan, and open-to-buy. (BRER-212)
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
A study of the sales promotion function of a retail store. Basic philosophies, planning, budgeting, use of media and market coverage are stressed. Two major activities, public relations and retail advertising, are examined with emphasis on the retail advertising function. Students are introduced to techniques used in creating newspaper advertising. (BRER-211)
Class 4, Credit 4

BRER-511 Basic 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 furnishings.
Class 4, Credit 4

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 #0109-523
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

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 furnishings. Practical application of these principles to determine the level of good taste.
Class 4, Credit 4
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 courses,  
Business Administration  

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  

BBUA-702  Cost and Managerial Accounting  
Registration #0101-702  
Emphasizes 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. (Foundation courses)  
Credit 4  

BBUA-704  Accounting Theory I  
Registration #0101-704  
Theory and practice of accounting for assets based upon the latest pronouncements of the APB and FASB. Study of alternative valuation systems and their impact on income and financial position is the central focus of each asset category as it is studied in detail. (Foundation courses)  
Credit 4  

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

BBUA-707  Advanced Accounting and Theory  
Registration #1010-707  
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 or admission to MS program)  
Credit 4  

BBUA-708  Auditing  
Registration #0101-708  
The theory and practice of advanced public accounting are 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 day auditing techniques by statistical sampling and electronic data processing applications. (BBUA-705 or admission to MS program)  
Credit 4  

BBUA-709  Basic Taxation Accounting  
Registration #0101-709  
A study of the basic field of federal income taxation is undertaken, emphasizing its importance in business decisions and policies; application of income taxation to individuals, partnerships, and corporations is examined; income tax and accounting concepts affecting revenues and deductions are compared, including concepts of gross income, basis, recognition of gain and loss, capital asset transactions, exemptions and deductions. (Foundation courses or admission to MS program)  
Credit 4  

BBUA-710  Advanced Taxation Accounting  
Registration #0101-710  
A study of federal income taxes with special emphasis on corporate tax problems affecting business decisions and policies, including corporate reorganizations, personal holding companies, dividends, liquidations, capital gains transactions, federal gifts and estate taxes; tax planning and management. (BBUA-709 or admission to MS in accountancy)  
Credit 4  

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 director of Graduate Programs)  
Credit 4  

Business group  

BBUB-741  Management and Organization  
Registration #0102-741  
Analysis and description of management principles and processes from the classical and behavioral viewpoints. Study of organizations and organizational change from the structural, systematic, and humanistic perspectives. Text and reading of original sources supplemented by case analysis and/or research paper. (Foundation courses)  
Credit 4  

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  

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

BBUB-744  Behavioral Science in Management  
Registration #0102-744  
The implications of studies from the fields of psychology are discussed; problems in perception, motivation, social interaction, group dynamics, attitudes and values are stressed. Lecture, discussion, case studies and emphasis on critical analysis and interpretation of original research readings.  
Credit 4  

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

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 law as they influence wage levels and wage structure. (Foundation courses)
Credit 4

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. (Foundation courses)
Credit 4

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

BBUB-758 Seminar in Management
Registration #0102-758
This course will take on different content depending on the instructor and quarter when offered. Topics which 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 director of Graduate Programs)
Credit 4

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 formulating and implementation of business policy as viewed by top management. The case method is used extensively. (All other core courses)
Credit 4

BBUB-770 Business Research Methods
Registration #0102-770
Research as a basis for policy building, planning, control and operation of the business enterprise. Concepts, tools, sources, methods, and applications are covered. Procurement and evaluation of data for business use from government and private sources. (Foundation courses)
Credit 4

BBUB-771, 772 Research Option
Registration #0102-771, 772
A thesis course requiring the student to confront a real business problem. Requirements include steps from design to completed management report. (Core courses and one of the following: BBUB-770, BBUA-718, BBUF-723, BBUQ-784)
Credit 8

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 and dissemination of information, and the economics of information. (BBUB-743)
Credit 4

BBUF-722 Financial Management
Registration #0104-722
A broad coverage of business finance with emphasis on the analytical techniques of resource allocation and asset management. Covers securities and securities markets, capital structure, analysis of financial statements, financing business operations, cost of capital and capital budgeting. (Foundation courses)
Credit 4

BBUF-723 Theory of Finance and Research
Registration #0104-723
This course involves a study of the current literature and most recent developments 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)
Credit 4

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-722)
Credit 4

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

BBUF-729 Seminar in Finance
Registration #0104-729
This course will take on different content depending on the instructor and quarter when offered. Topics which 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 director)
Credit 4

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. (BBUF-723)
Credit 4

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

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

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

### Quantitative group

**BBUQ-778**  
Probability Theory  
Registration #0106-778  
A calculus-based introduction to probability theory. The course includes set theory, theorems, axioms, and concepts of probability, discontinuous and continuous distributions, moment generating functions and probability generating functions. (Differential and Integral Calculus and Foundation courses)  
Credit 4

**BBUQ-781**  
Statistical Analysis I  
Registration #0106-781  
A study of probability and classical statistics including set theory, discrete and continuous probability distributions, sampling distributions, point estimation, and hypothesis testing. Applications are made to the managerial decision making situation.  
Credit 4

**BBUQ-782**  
Statistical Analysis II  
Registration #0106-782  
A continuation of topics from classical statistics including interval estimation, nonparametric tests, analysis of variance, regression and correlation analysis, time series, and index numbers. (BBUQ-781)  
Credit 4

### Marketing group

**BBUM-769**  
Seminar in Marketing  
Registration #0105-769  
This course will take on different content depending on the instructor and quarter when offered. Topics which 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 director of Graduate programs)  
Credit 4

**BBUQ-784**  
Decision Theory  
Registration #0106-784  
The decision theory approach to decisions under uncertainty is examined. The modeling of business decision situations, the utilization of utility theory, and the application of various principles of choice are considered. The Bayesian approach to decision theory is primarily emphasized. (BBUQ-779)  
Credit 4
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 4

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

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

CTAM-741 Techniques for Investigational Analysis Registration #0240-741
Studies of special statistical techniques applicable to industrial, educational, accounting, medical, and business-type problems. Helpful to those doing research in these fields. Topics: use of special probability papers, probit analysis, sensitivity testing, order statistics and extreme value applications, analysis of means, goodness of fit tests, and special plotting techniques. (CTAM-712 or equivalent.)

Credit 3

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

Credit 3

CTAM-761 Reliability Registration #0240-761
A methods course in reliability practices: What a reliability engineer must know about reliability prediction, estimation, analysis, demonstration, and other reliability activities. Covers most methods presently being used in industry. Topics: applications of normal, binomial, exponential, and Weibull graphs to reliability problems; hazard plotting; reliability confidence limits and risks; strength and stress models; reliability safety margins; truncated and censored life tests; sequential test plans; Bayesian test programs. (CTAM-712 or equivalent.)

Credit 3

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 to 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

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 4

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

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

CTAM-741 Techniques for Investigational Analysis Registration #0240-741
Studies of special statistical techniques applicable to industrial, educational, accounting, medical, and business-type problems. Helpful to those doing research in these fields. Topics: use of special probability papers, probit analysis, sensitivity testing, order statistics and extreme value applications, analysis of means, goodness of fit tests, and special plotting techniques. (CTAM-712 or equivalent.)

Credit 3

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

Credit 3

CTAM-761 Reliability Registration #0240-761
A methods course in reliability practices: What a reliability engineer must know about reliability prediction, estimation, analysis, demonstration, and other reliability activities. Covers most methods presently being used in industry. Topics: applications of normal, binomial, exponential, and Weibull graphs to reliability problems; hazard plotting; reliability confidence limits and risks; strength and stress models; reliability safety margins; truncated and censored life tests; sequential test plans; Bayesian test programs. (CTAM-712 or equivalent.)

Credit 3

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 to 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

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 4

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

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

CTAM-741 Techniques for Investigational Analysis Registration #0240-741
Studies of special statistical techniques applicable to industrial, educational, accounting, medical, and business-type problems. Helpful to those doing research in these fields. Topics: use of special probability papers, probit analysis, sensitivity testing, order statistics and extreme value applications, analysis of means, goodness of fit tests, and special plotting techniques. (CTAM-712 or equivalent.)

Credit 3

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

Credit 3

CTAM-761 Reliability Registration #0240-761
A methods course in reliability practices: What a reliability engineer must know about reliability prediction, estimation, analysis, demonstration, and other reliability activities. Covers most methods presently being used in industry. Topics: applications of normal, binomial, exponential, and Weibull graphs to reliability problems; hazard plotting; reliability confidence limits and risks; strength and stress models; reliability safety margins; truncated and censored life tests; sequential test plans; Bayesian test programs. (CTAM-712 or equivalent.)

Credit 3
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

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

CTAM-811 Probability Theory and Applications I
Registration #0240-811
How to handle processes that have some chance element in their structure.
Topics: review of basic concepts of mathematical theory; Markov sequences; Poisson processes, and discrete parameter random processes. Applications. (CTAM-822 or equivalent.) Credit 3

CTAM-812 Probability Theory and Applications II
Registration #0240-812
Continuation of CTAM-811, with more on stochastic processes.
Topics: algebraic methods useful for solving Markov chains, non-finite and continuous Markov chains, limiting distributions, and an introduction to queuing theory. (CTAM-811 or equivalent.) Credit 3

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 the department.) Credit 3

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. (CTAM-821 or equivalent.) Credit 3

CT AM-823 Theory of Statistics III
Registration #0240-823
Continuation of CTAM-821, 822.
Topics: estimation theory and applications; the multivariate normal probability model, its properties and applications; interval estimation theory and applications. (CTAM-822 or equivalent.) Credit 3

CTAM-830 Multivariate Analysis
Registration #0240-830
Deals with the summarization, representation, and interpretation of data sampled from populations where more than one characteristic is measured on each sample element. Usually the several measurements made on each individual experimental item are correlated, as 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

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

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

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

CT AM-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 beta 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

CT AM-861, 862 Reliability Certification
Registration #0240-861, 862
Seminars I & II
The American Society for Quality Control (ASQC) offers Certification as a Reliability Engineer by written examination. These two-quarter courses prepare students for this examination. Purpose is to increase reliability expertise. Offered are lectures, handouts, workshops, and practice examinations.
Topics: reliability management, prediction, estimation, analysis, appointment, test and demonstration; math models growth; maintainability, parts selection, design review, human factors; and other selected reliability activities. (Consent of the department.) Credit 3/Qtr.

CTAM-871 Sampling Theory and Application
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
College of Engineering

Engineering

CTAM-881 Bayesian Statistics I
Registration #0240-881
Probabilty as a degree of belief; how we learn; the applications of Bayesian principles to: estimation of failure rates, testing odds, testing precise hypotheses, finding credible regions; entropy and information; description of errors in measurements; analysis of experimental results. (CTAM-712 or equivalent.)
Credit 3

CTAM-882 Bayesian Statistics II
Registration #0240-882
Continuation of CTAM-881: non-normal and contaminated distributions; decision making; discrimination; tests of significance and goodness of fit from the Bayesian point of view; sequential decisions; handling several variables: comparisons, measuring efficiency, straightline analysis. A potpourri of applications: rare events, reliability, radar, and other. (CTAM-881.)
Credit 3

CTAM-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.

CTAM-895 Statistics Seminar
Registration #0240-895
This course or sequence of courses, provides for one or more quarters of independent study and research activity by students other than those in the Plan C option. 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

CTAM-896, 897, 898 Thesis
Registration #0240-896, -897, -898
For students working toward the MS degree in mathematical statistics under Plan A. (Consent of the department.)
Credit 3/Qtr.

CTAM-899 Individual Achievement Program
Registration #0240-899
For students accepted under the Plan C Option (Independent Study). The program to be followed will permit either:
(a) satisfactory achievement in the same subject matter the student would select under Plan A or Plan B; or
(b) satisfactory achievement through independent studies in the student’s particular field of professional interest in statistics, such as mathematics, engineering, quality control, or business.
Prerequisite: Consent of the department.
Credit 3
45 quarter hours to be earned and recorded in quarter hour segments as the candidate progresses in the plan of independent study set up with him or her.

Electrical Engineering

EEEE-351, 352, 353 Circuit Analysis I, II, III
Registration #0301-351, -352, -353
Class 3 Lab. 3 Credit 4

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

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

EEE-461, 462 Electrical Engineering I, II
Registration #0301-461, -462
A course for non-electrical engineering majors. Circuit analysis, electronics, machines, switching circuits. Logic and the elements of communication. (SPSCG-207, SMAM-306)
Class 3 Lab. 3 Credit 4
EEE-471,472 Electromagnetic Fields I, II
Registration #0301-471, -472
Vector analysis, electrostatics and dielectrics, conduction current fields, magnetics, time varying fields, Maxwell's equation and wave equations. Concepts of retarded potentials. (SMAM-308)
Class 4, Credit 4 - EEEE-471
Class 3, Lab. 3, Credit 4 - EEEE-472

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

EEE-613 Introduction to Classical Controls
Registration #0301-613
A one-quarter study of linear control systems and their physical behavior including stability and transient response. This is approached through the classical methods of the Laplace domain; Routh's Criterion, Nyquist, Bode and Nichols charts and root locus. Lead and lag compensators are introduced using these tools. Analog computation techniques are studied and used, in laboratory, as a means of verifying the analysis and design of complex systems. (EEE-430, SMAM-420)
Class 3, Lab. 3, Credit 4

EEE-634 Introduction to Communications
Registration #0301-634
Modulation theory, including both amplitude and frequency modulation and demodulation systems; pulse modulation systems, including pulse amplitude modulation, pulse width modulation and pulse position modulation; introduction to random signals and noise, with emphasis on the determination of system performance. (SMAM-351, EEEE-430)
Class 4, Credit 4

EEE-643 Introduction to Communications
Registration #0301-643
Linear waveshaping; digital circuits including the multivibrator family, gates, non-linear waveshaping; introduction to switching theory; Boolean algebra, logic circuits, K-maps, counters, converters, sampling circuits. (EEE-441)
Class 3, Lab. 3, Credit 4

EEE-650 Introduction to Logic and Switching
Registration #0301-650
Boolean algebra; analysis and synthesis of combinational switching circuits; analysis and synthesis of sequential switching circuits; hazards in switching circuits for digital computers. (EEE-643)
Class 3, Lab. 3, Credit 4

EEE-665 Digital Computer Workshop
Registration #0301-665
This course will stress the working structure, programming details, and interfacing characteristics of minicomputers in sufficient detail to enable one to use them in a varied set of engineering applications. (ICSP-205 or ICSP-220)
Class 3, Lab. 3, Credit 4

EEE-670 Introduction to Microelectronics
Registration #0301-670
Hybrid and monolithic microelectronic technology; processes in thick film and thin film circuit fabrication, complementary nature of monolithic and film circuits; impact of fabrication, testing and quality control on microcircuit design. (EEE-643)
Class 4, Credit 4

EEE-590 Thesis
Registration #0301-590
A research or development project will be carried out under the general supervision of a staff member. The project need not be of the "state of the art" type. A reasonable problem of theoretical and/or experimental investigation will be acceptable as a thesis topic.
Credit 4

EEE-614 Control Synthesis
Registration #0301-614
This course builds upon the classical analysis techniques introduced in EEEE-613. Practical experimental and mathematical approaches to obtaining transfer functions are developed. Resulting systems are modeled both analytically in the Laplace domain and experimentally on the analog computer. System improvements by tachometer feedback, lead compensation, lag compensation and by lead-lag compensation are developed using Nyquist, Bode and Nichols chart methods and by root locus. Results are verified experimentally. Figures of merit are discussed and applied. (EEE-613)
Class 3, Lab. 1, Credit 4

EEE-621 Transmission Propagation and Waves
Registration #0301-621
A course in guided and unguided wave propagation; transmission lines, wave guides, antennas; antenna arrays, radio-frequency and optical interference and diffraction; aperture effects and beam-forming. (EEE-472)
Class 3, Lab. 3, Credit 4

EEE-645 Special Semiconductors
Registration #0301-645
The study of a variety of semiconductors which are not included in the required electronics course sequence. Included are the UJT, SCR, DIAC, TRIAC, varactor, zero-crossing IC, various photo devices, various MOSFET types and their applications. (EEE-643)
Class 3, Lab. 3, Credit 4

EEE-532 The design and operating characteristics, both static and dynamic, of transformers and synchronous and induction machines. (EEE-353, 471)
Class 3, Lab. 3, Credit 4

EEE-535 Introduction to Power Conditioning
Registration #0301-535
This course provides an introduction to the theory of thyristor circuits with emphasis on applications. The course builds upon the theory of static switching, SCR characteristics, triggering and commutation. 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 experiment complement the classroom lectures by providing exposure to the device characteristics, testing and measuring techniques and various thyristor systems. (EEE-441, EEEE-531 or concurrent registration for EEEE-531)
Class 3, Lab. 3, Credit 4

EEE-536 Motor Application and Control
Registration #0301-536
A review of the speed torque characteristics of DC and AC motors. A study of the characteristics of mechanical loads and the transient response of electromechanical systems. A review of thyristor characteristics and the design of solid state motor control systems. (EEE-430, 531, 645)
Class 3, Lab. 3, Credit 4

EEE-666 Introduction to Microcomputers
Registration #0301-666
This course will discuss currently available microcomputer systems and will include such topics as programming methods, architecture, areas of application and a relative comparison of existing systems. The course will consist of lecture, seminar and some student projects. Enrollment will be limited to 15 and preference will be given to fifth-year students with the required prerequisites. (EEE-643, EEEE-665)
Credit 4

EEE-670 Introduction to Microelectronics
Registration #0301-670
Hybrid and monolithic microelectronic technology; processes in thick film and thin film circuit fabrication, complementary nature of monolithic and film circuits; impact of fabrication, testing and quality control on microcircuit design. (EEE-643)
Class 4, Credit 4
EEE-671 Hybrid Microelectronics Design
Registration #0301-671
An electronic design course utilizing the media of thick film hybrid technology. Functional electronic modules will be designed, produced, and tested, from original specifications to finished package, with students performing all steps. (EEE-670)
Class 3, Lab. 3, Credit 4

EEE-672 Optical Devices and Systems
Registration #0301-672
An introductory applied optics course designed not only to familiarize and review optical fundamentals but to introduce state of the art concepts and applications. Fundamental aspects of laser operation, lens system analysis, optical modulation, optical detection, and noise problems associated with optical components will be discussed. Applications to fiber optic, integrated optic, and solar optic systems will be considered. A demonstration lab complements course activities. (SPSP-314, 315; EEEE-471, 472-concurrent)
Class 3, Lab. 3, Credit 4

EEE-673 Applied Electronic Design
Registration #0301-673
A project-type lab-oriented course wherein the student will design, build, and test electronic circuits, system parts, or systems to specifications. The course is a modest attempt to simulate the industrial setting to better prepare the student to handle practical electronic design work by providing a supervised first attempt experience. (EEE-643)
Class 3, Lab. 3, Credit 4

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

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

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

EEE-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 frequency and switching. (EEE-634)
Class 4, Credit 4

EEE-695 Introduction to Audio Engineering
Registration #0301-695
A course based on topics from dynamics, acoustics and audio systems. Electrical-mechanical equivalents, Plane and spherical acoustic waves. Radiators and resonators. Loudspeaker systems. Equalization methods in recording and playback. Elements of speech and hearing. (EEE-430, SMAM-308)
Class 4, Credit 4

EEE-696 Communication Circuit Design
Registration #0301-696
Design and operation of electronic circuits used in communication systems. Oscillators, amplifiers, oscillators, modulators, matching networks, demodulators, transmitting and receiving systems. A project type laboratory is included. (EEE-442)
Class 3, Lab. 3, Credit 4

Graduate Courses in Electrical Engineering

EEE-700, 701 Linear Systems I, II
Registration #0301-700, 701
This two-course (core) sequence replaces the EEEE-707 Linear Systems course which has been part of the course offerings since Fall 1977. The two courses will cover a number of topics in mathematics and in linear system theory (e.g., convolution, Fourier and Laplace transforms, matrices, etc.)
Credits 4/Qtr.

EEE-702 Introduction to Random Variables and Signals
Registration #0301-702
Random events, random variables, histograms; probability density functions; functions of a random variable; moments; multivariate topics; statistical decision theory; parameter estimation. This course is a prerequisite for the sequence 735, 736, 737.
Credit 4

EEE-704 Electromagnetic Fields
Registration #0301-704
Vector analysis; electrostatic fields in vacuum and in dielectrics; energy and forces; analytical methods of solution of electrostatic problems; approximate methods; magnetic field of steady currents; magnetic materials; electromagnetic induction; Maxwell's equations. (EEE-471, 472)
Credit 4

EEE-705 Electromagnetic Waves
Registration #0301-705
Maxwell's equations; propagation of plane waves in unbounded regions; reflection and refraction of waves; total reflection, polarizing angle, multiple dielectric boundaries; guided electromagnetic waves; characteristics of common waveguides; circular waveguides; resonant cavities; radiation and antennas. (EEE-471, 472)
Credit 4

EEE-706 Special Topics in Electromagnetics
Registration #0301-706
Selection of one or more of the following topics depending upon the interest of the students: interaction of fields and matter; wave propagation in anisotropic media; theory of antenna arrays; microwave networks; field computation by method of moments; generation of microwaves. (EEE-704, 705)
Credit 4

EEE-707 Linear Systems
Registration #0301-707
This course has now been replaced by EEEE-700, 701-Linear Systems I, II (see above).
EEE-708  Passive and Active Filter Design
Registration #0301-708
Network analysis (review); classical frequency domain filters and passive filter design; filter transformations: low pass to high pass and bandpass; active filter design using single Op amps and RC networks; filter design using multiple Op amps for two-pole two-zero sections; realization of n-pole filters using two-pole sections; sensitivity analysis; tuning of filters; effect of non-ideal Op amp characteristics on filter performance; design examples and demonstrations. (EEE-707)
Credit 4

EEE-709  Active Network Synthesis
Registration #0301-709
Fundamentals of network synthesis: energy functions, P.R. functions; properties of network functions; synthesis of RC one-port and two-port networks; approximation, normalization and frequency scaling; active network analysis; active network elements: tunnel diodes, gyrators, impedance converter, impedance inverter; realizability, stability and sensitivity of active networks; synthesis of one-port and two-port active networks using negative resistances; synthesis of one-port and two-port active networks using controlled sources. (Instructor's approval)
Credit 4

EEE-711  Integrated Circuit Operational Amplifiers
Registration #0301-711
Analysis of operational amplifier circuits using the ideal Op amp; development of circuit models to predict non-ideal Op amp characteristics; study of feedback systems, stability (using Bode plots), and compensation; direct-coupled amplifiers and operational amplifier design; interpretation of manufacturers' specifications and basic applications with emphasis on practical aspects.
Credit 4 or instructor's approval

EEE-712  Control System Fundamentals
Registration #0301-712
This course is intended for graduate students who have not had a formal course in control systems in their undergraduate program. It is not open to those who have already had an introductory control systems course.
It is a study of linear control systems, their physical behavior, dynamical analysis and stability using mathematical models. This involves the use of root locus, Bode and Nyquist techniques for the stability of single and multiple-loop systems.
(Elements knowledge of LaPlace transforms)
Credit 4

EEE-713  Modern Control Theory
Registration #0301-713
The development of the analytical techniques of modern theory as applied to linear control systems. Topics include vector spaces, state space, state variables, matrices and matrix functions, controllability, observability and stability theory. (EEE-613 or EEEE-712)
Credit 4

EEE-714  Nonlinear Control Systems
Registration #0301-714
An introduction to the physical nature and mathematical theory of nonlinear control systems' behavior using phase plane techniques, Liapounov theory, (including Aizerman's method, variable gradient methods and the Lyapunov forms), perturbation methods, describing function techniques and Popov's criterion; analysis of switching and relays. These are applied to both piecewise-linear and analytical nonlinear systems. (EEE-713)
Credit 4

EEE-716  Digital Signal Processing
Registration #0301-716
A course in sampled data methods aimed at the development and study of discrete signal processing techniques. Elementary sampling theory and the one-sided Z transform are the principal tools used. Emphasis is placed on the design of digital filters and the use of fast Fourier transform methods. (EEE-707)
Credit 4

EEE-718  Statistical Design of Control Systems
Registration #0301-718
Brief review of probability; statistical description of random processes; mean square error analysis; design of optimum linear control system for minimizing the mean square error with stationary random inputs with or without additive noise; design with constraints. (EEE-613 or EEEE-712)
Credit 4

EEE-719  Sampled Data Control Systems
Registration #0301-719
Brief review of the theory of sampling and quantizing; modified Z-transforms and other techniques for sampled data control systems; stability criteria; synthesis of digital controllers; multirate sampled data control systems; computer control theory. (EEE-713)
Credit 4

EEE-720  Optimum Control Systems
Registration #0301-720
Introduction to calculus of variations; conditions of optimality; optimizing transient performance by statistical and variational procedures, dynamic programming and by Pontryagin's maximum principle; design of optimal linear systems with quadratic criteria. (EEE-713)
Credit 4

EEE-721  Thyristor Power Control and Conversion
Registration #0301-721
Thyristor family of semiconductors is becoming increasingly important in the area of power control and conversion. The objective of this course is to provide an adequate, application-oriented knowledge to those interested in the areas of control, power and power electronics. Topics to be discussed: preliminaries: basic principles of static switching, thyristor theory, triggering, commutations; rectifiers: principles of controlled rectification, analysis of single- and three-phase controlled rectifiers; inverters: series and parallel SCR inverters, design of inverters, sine-wave filters, forced commutated inverter, McMurtry inverter; DC systems: principles of DC-DC conversion, choppers, DC motor control, single-phase DC motor drives, three-phase DC motor drives, dual converter; cycloconverter: frequency conversion using SCR's, phase-controlled cycloconverters, cycloconverter controls.
Modeling and simulation of thyristor circuits: thyristor models, approximations, digital simulation of choppers, inverters and cycloconverters, areas for further research.
Demonstration experiments will be set up. Also, individual projects by interested students will be encouraged.
Credit 4

EEE-722  Control System Design
Registration #0301-722
Evaluation of feedback control system performance; design using root locus and frequency response plots; compensating networks; realization of transfer functions-cascade and feedback compensation; applications; analysis and design of AC feedback control systems; introduction to nonlinear system representation and design. (EEE-613 or EEEE-712)
Credit 4

EEE-734  Communication Techniques
Registration #0301-734
Study of different modulation schemes; linear modulation; angle modulation; Heuristic discussion of noise in linear modulation and FM systems; noise figure; brief discussion of pulse modulation. (EEE-707)
Credit 4

EEE-735  Digital Data Transmission
Registration #0301-735
Pulse code modulation and pulse amplitude modulation; carrier systems, FSK and PSK systems; DCPSK system; signal space representation of data signals and discussion of signal space. (EEE-702, 724)
Credit 4
EEE-736 Information Theory  
Registration #0301-736  
An introduction to the fundamental concepts of information theory: entropy, equivalence, transformation and redundancy; coding for binary channels; measurement of signal parameters in the presence of noise; bandwidth vs. accuracy. (EEE-702)  
Credit 4

EEE-737 Random Signals and Noise  
Registration #0301-737  
Random processes; correlation functions; spectrum of periodic functions and periodic random processes; orthogonal series for a random process; spectral densities; the Gaussian random process; noise through a linear system: physical sources of noise; noise figure; statistical decision theory. (EEE-702)  
Credit 4

EEE-738 Physics of Semiconductor Devices  
Registration #0301-738  
A basic course dealing with the physics of semiconductors. Topics include: crystal structure and bonding; electron and hole motion; energy band structure; lattice vibrations; impurities; defects; occupation statistics; carrier transport; optical phenomena; and pn, npn, pnp junctions.  
Credit 4

EEE-739 Integrated Circuit Design  
Registration #0301-739  
A discussion of the practical as well as the physical aspects of integrated circuit design. Device layout and processing methods along with their effects on actual device characteristics will be considered in some detail. Passive components and active components such as the JFET, MOSFET and bipolar devices will be discussed in conjunction with their implementation in linear as well as logic integrated circuits. (EEE-738)  
Credit 4

EEE-740 Digital Integrated Circuits  
Registration #0301-740  
Evolution of digital IC's, pertinent properties, overview of logic families. Techniques to: measure characteristics, model via computer, employ standard MSI/LSI, minimize package count, use programmed logic, interface. Small system case studies; microcomputer, TV terminal, etc. (EEE-650 or EEEE-750, 751. 751 may be taken concurrently).  
Credit 4

EEE-742 Computer Methods in Electrical Engineering  
Registration #0301-742  
A study of numerical methods for the solution of problems in electrical engineering with special emphasis on approximation techniques. The method of moments and computer solutions of problems in antennas and microwave networks are studied. (SMAM-611)  
Credit 4

EEE-743 Minicomputer Fundamentals  
Registration #0301-743  
A course designed to provide engineers with a practical knowledge of minicomputers. Stress will be placed on basic architecture, software fundamentals, interfacing characteristics, and interrupt structures and control of I/O devices.  
Credit 4

EEE-744 Microprocessors  
Registration #0301-744  
This course aims to provide an understanding of basic microprocessor architecture, develop an understanding of microcomputer programming techniques and software aids, and illustrate methods of interfacing microcomputers to digital systems. Typical microprocessor applications which illustrate conventional logic replacement, hardware and software design tradeoffs and design flexibility will be discussed. Most discussions will be based upon the Intel 8080 and the Motorola M6800. Lab exercises are an integral part of the course. (EEE-743)  
Credit 4

EEE-750, 751, 752 Switching Circuits I, II, III  
Registration #0301-750, 751, 752  
This three-course sequence will discuss the various aspects of switching circuits, both theoretical and practical. Classical topics such as switching algebra, minimization procedure using Karnaugh maps, modern topics dealing with currently available logic packages will be included in 750. Sequential circuits (asynchronous and synchronous), counters, shift registers, feedback logic will be included in 751. Finite state models, decomposition into simpler components, identification of states and machines will be included in 752.  
Credits 4 per course

EEE-772, 773, 774 Special Topics in Electrical 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)

EEE-800, 801 Graduate Paper  
Registration #0301-800, -801  
This course number is used to fulfill the graduate paper requirement under the non-thesis option for the master of science degree in electrical engineering. The graduate paper is an extensive term paper on a topic of professional interest. The student must obtain the consent of a faculty member to supervise the paper before registering for these course numbers.  
Credit 4 for EEEE-800; variable (maximum 4) for EEEE-801

EEE-890 Research and Thesis Guidance  
Registration #0301-890  
An independent engineering project or research problem to demonstrate professional maturity, preferably involving the reduction of theory to practice. An oral examination and a written thesis are required.  
Credit variable (maximum of 12 credits total)

EEE-702 Introduction to Operations Research I  
Registration #0301-401  
An introduction to the methodology of problem solving. Investigation of mathematical programming techniques including linear programming, special types of linear programming problems and dynamic programming. (SMAM-308 or consent of instructor)  
Class 4, Credit 4

EEE-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, replacement theory, and inventory theory. (EIEI-401 or consent of instructor)  
Class 4, Credit 4

EIEI-415 Human Factors I, II  
Registration #0303-415, 416  
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.  
Class 3, Lab. 2, Credit 4
EIEI-685 Patent Law
Registration #0303-685
The course will be primarily directed towards the patent laws of the United States, however, comparisons to the patent laws of other countries will be addressed as appropriate. The course will cover the broad categories of obtaining a patent, the exploitation of a patent, the corporation and patents as well as other patent-related items. Major topics to be specifically addressed include what is patentable under U.S. law, the concept of prior art, techniques used in the preparation of patent applications, the prosecution of a patent application at the U.S. Patent Office, the licensing of patents, the enforcement of patent rights through litigation, the benefits of patents, specific problems involving intellectual property within a corporate environment, trademarks, copyrights, and trade secrets. Emphasis will be placed on practical situations involving the handling of inventions within the corporation and on behalf of an individual inventor.
Credit 4

EIEI-701 Principles of Operations Research I
Registration #0303-701
Applied linear programming; computational techniques for solving constrained optimization problems; linear programming; the simplex method and variations; duality and sensitivity testing. Credit 4

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

EIEI-705 Survey of Operations Research
Registration #0303-705
A survey course designed to introduce the student to such topics as waiting line analysis, inventory, scheduling, replacement, and simulation. This course is intended to present an integrated view of the field of operations research to students who will take more specialized courses as well as those in other disciplines desiring only a limited exposure to the field.
Credit 4

EIEI-710 Systems Simulation
Registration #0303-710
Methods of modeling and simulating human-machine systems with emphasis on model validation, design of simulation experiments, variance reduction techniques, random number generation, distribution generation. Major emphasis is placed on GPDS simulation language.
Credit 4

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

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 are encouraged.
Credit 4

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

EIEI-730 Biotechnology and Human Factors I
Registration #0303-730
Basic functional anatomy and physiology; human body systems; anthropometry; applications on the design for people and human-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 people; design considerations to protect people 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 people perform in human-machine systems; techniques to quantify people’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

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

Mechanical Engineering
EMEM-331 Mechanics I
Registration #0304-331
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. (SIMM-253, SPMSG-205)
Class 4, Credit 4

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
EMEM-335 Strength of Materials
Registration #0304-335
Relation between stress and strain, deflection of beams, shafts and columns; combined stresses, stress and strain at a point and theories of failure are covered. (EMEM-336)
Class 3, Lab. 2, Credit 4

EMEM-336 Statics
Registration #0304-336
This basic course in statics of rigid bodies integrates the mathematical subjects of vector algebra and simultaneous linear algebraic equations with the physical concepts of Newton's Law of Statics and Reaction. (SMAM-253, SPSG-205)
Class 4, Credit 4

EMEM-337 Strength of Materials I
Registration #0304-337
This basic course in statics of deformable bodies integrates the mathematical subjects of vector algebra, differential equations, and theory of a continuum with the fundamental physical considerations which govern the mechanics of solids in equilibrium. Topics covered include mechanics of deformable bodies, forces and moments transmitted by slender bodies, stress and strain, and temperature effects on stress-strain relations. (EMEM-336)
Class 3, Lab. 2, Credit 4

EMEM-338 Strength of Materials II
Registration #0304-338
A continuation of Strength of Materials I to include torsion, bending stresses, deflection due to bending, and stability considerations. (EMEM-337)
Class 3, Lab. 2, Credit 4

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 considered. (SMAM-306, SPSG-206, SPSG-207)
Class 3, Lab. 3, Credit 4

EMEM-344 Materials Science
Registration #0304-344
A study of the properties of metallic, organic, and ceramic materials as related to structural imperfections, atom movement, 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. (SMAM-306)
Class 3, Lab. 2, Credit 4

EMEM-413 Thermodynamics I
Registration #0304-413
A basic course in the mathematical and physical concepts of thermodynamics. The course presents a rigorous treatment of the zeroth, first and second laws of thermodynamics and their application to gases, liquids and two-phase mixtures. (SMAM-306, SPSG-205, SPSG-207)
Class 3, Lab. 2, Credit 4

EMEM-414 Thermodynamics II
Registration #0304-414
A continuation of Thermodynamics I stressing application of the basic principles to various energy conversion processes. (EMEM-413)
Class 3, Lab. 2, Credit 4

EMEM-415 Fluid Mechanics I
Registration #0304-415
Fluid statics. Ideal fluid-continuity, momentum and energy equations in integral and differential form, Bernoulli's equation; open channel flow, viscous fluid--its characteristics, dimensional analysis, flow through pipe. (SMAM-306, EMEM-413)
Class 3, Lab. 2, Credit 4

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. (EMEM-336)
Class 4, Credit 4

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 mechanical elements. (EMEM-338)
Class 3, Lab. 2, Credit 4

EMEM-439 Dynamics
Registration #0304-439
This basic course in the dynamics of rigid bodies integrates the mathematical subjects of vector algebra, ordinary and partial differential equations, simultaneous linear algebraic equations, and tensor notation with the physical concepts of Newton's laws of dynamics and reaction, Newton's universal law of gravitation, and Euler's equations of motion of a rigid body. Applications include kinematics of a particle, kinematics of a rigid body, dynamics of a particle, dynamics of a system of particles, and dynamics of rigid bodies. (EMEM-337)
Class 4, Credit 4

EMEM-501 Mechanical Engineering Laboratory I
Registration #0304-501
A basic laboratory course stressing the fundamentals of experimentation. Topics covered include problem identification, determination of experimental variables, design of experimental apparatus and experimental procedures, execution of the experiment, collection and analysis of data, study of error and error analysis, and correlations with theory. (EMEM-415, EMEM-439)
Class 2, Lab. 4, Credit 4

EMEM-502 Mechanical Engineering Laboratory II
Registration #0304-502
Two four-hour periods per week are provided during which the student applies the experimental techniques learned in EMEM-501 to the engineering systems studied in the theory courses. The student groups propose, design, execute and analyze a sequence of experimental projects utilizing equipment in the power laboratory, the materials laboratory, and the systems laboratory. Formal presentation of the results is required for some of the experiments performed. (EMEM-501)
Lab 8, Credit 4

EMEM-514 Heat Transfer
Registration #0304-514
A basic course in the fundamentals of heat transfer by conduction, convection, and radiation together with application to typical engineering systems. Topics covered include steady and unsteady conduction, combined modes, fins, heat exchangers, boiling and condensation, and numerical and graphical techniques. (EMEM-413, EMEM-415)
Class 4, Credit 4

EMEM-516 Fluid Mechanics II
Registration #0304-516
A continuation of Fluid Mechanics I with introduction to one dimensional compressible flow in convergent-divergent nozzle, normal shock, choking, lift and drag, potential flow around a cylinder, qualitative discussion of Navier-Stokes equations; Couette and Poiseuille flows, laminar and turbulent boundary layer on flat plate. (EMEM-415)
Class 4, Credit 4

EMEM-543 Mechanical Vibrations
Registration #0304-543
Harmonic and nonharmonic vibrations of systems with one degree of freedom, vibrations of systems with several degrees of freedom, localized coordinates and Lagrange's equations, vibrations of elastic bodies. (EMEM-439)
Class 3, Lab. 2, Credit 4
EMEM-544 Dynamics of Physical Systems I
Registration #0304-544
This course builds upon its Vibrations prerequisite to examine the dynamic behavior of linear physical systems. It completes the required core of courses in the mechanics sequence. Topics include writing equations of motion for physical systems, dynamic response of first- and second-order systems with and without forcing functions, Bode and S-plane plots; stability analysis of systems using the Root-locus technique of Evans and Routh’s Stability Criterion; analysis of two degree-of-freedom systems, transfer-function analysis of coupled systems and a case study; brief introduction to control systems; analog computer laboratory. (EMEM-534)
Class 3, Lab 2, Credit 4

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

Technical Electives in Mechanical Engineering

EMEM-632 Advanced Mechanical Systems
Registration #0304-632
Optimization of system response to deterministic inputs. Various mechanical systems in use will be analyzed and studies will be made to improve them. Both the analog and the digital computer are used. (EMEM-672)
Class 4, Credit 4

EMEM-635 Industrial Heat Transfer
Registration #0304-635
The course is intended to acquaint students with the design of heat transfer equipment with an emphasis on heat exchangers. Each student is required to submit an individual or group project on a practical heat transfer problem to reinforce his or her classroom experience. (EMEM-514)
Class 4, Credit 4

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

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

EMEM-652 Fluid Mechanics of Turbomachinery
Registration #0304-652
Building on a background in thermodynamics and fluid mechanics, this course will develop the basic relationships for energy transfer between a rotor and a fluid. Application of the fundamentals of turbomachine fluid mechanics will be to such devices as radial flow and axial flow turbines. Both compressible and incompressible fluid machinery will be considered. (EMEM-416)
Class 4, Credit 4

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-414)
Class 4, Credit 4

EMEM-664 Engineering Acoustics and Noise Control
Registration #0304-664
A basic course in the principles of acoustics and the application of sound measurements and noise control in industry and the community. Topics to be covered will include an introduction to wave theory; properties of sound waves such as the various classifications of sound levels, pressure characteristics, sound combinations, and loudness levels; instrumentation and measurement; sound fields; noise sources; sound control; and noise control criteria.
Class 4, Credit 4

EMEM-667 Introduction to Air Pollution
Registration #0304-667
An exploratory study of atmospheric dynamics, source emission, sulphurous and photochemical smog, aerosols, and pollution control including devices, air quality standards and enforcement.
Class 4, Credit 4

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

EMEM-670 Thermal Stresses
Registration #0304-670
Thermal stresses in bars, rings, beams, plates, and shells; energy methods; introduction to dynamical problems and to viscoelastic stress analysis.
Class 4, Credit 4

EMEM-672 Selected Machine Elements
Registration #0304-672
This course should treat some of the machine elements discussed in EMEM-532 to a larger extent and introduce machine elements not previously discussed and of a more complex nature: Optimization techniques can be applied. (EMEM-532)
Class 3, Lab 2, Credit 4

EMEM-676 Modern Energy Conversion
Registration #0304-676
Principles of energy conversion, introduction to semiconductors, thermoelectric generators, photovoltaic generators, thermionic generators, magnetohydrodynamic power generators. (EMEM-414)
Lab. 4, Credit 4

EMEM-679 Dynamics of Physical Systems II
Registration #0304-679
A continuation of EMEM-544. Review of stability analysis techniques; Nyquist stability criterion; design and compensation of feedback control systems; non-linear system analysis; introduction to state variable time-domain analysis of control systems. Students will be required to undertake team projects involving the design, analysis and fabrication of a device or system incorporating control and feedback principles. (EMEM-544)
Class 3, lab 2, Credit 4

EMEM-680 Advanced Thermodynamics
Registration #0304-680
This course provides a general, postulative approach to macroscopic thermodynamics by means of a mathematical formalism developed around axioms concerning equilibrium and stability. Applications of the formalism to chemical, electrical, magnetic, and stressed solid systems are considered. (EMEM-414)
Class 4, Credit 4
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
<th>Class</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMEM-685</td>
<td>Advanced Strength of Materials</td>
<td>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; introduction to bending of plates. (EMEM-338)</td>
<td>Class 4</td>
<td>Credit 4</td>
</tr>
<tr>
<td>EMEM-689</td>
<td>Patent Law and Protection</td>
<td>A study of protection of intellectual property including study of patent rights, inventions, procedures for obtaining patents as well as a study of the law and drafting techniques of patents and their claims. Insights to invention protection and legal ramifications of inventor’s and attorney’s activities will be included.</td>
<td>Class 4</td>
<td>Credit 4</td>
</tr>
<tr>
<td>EMEM-690</td>
<td>Environment and the Engineer</td>
<td>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 technologically 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.</td>
<td>Class 4</td>
<td>Credit 4</td>
</tr>
<tr>
<td>EMEM-694</td>
<td>Stress Analysis</td>
<td>Experiments and lectures on topics in stress analysis; non-symmetric bending; composite beams; curved beams; thick-wall cylinders; torsion; stress concentrations; plastic behavior; contact stresses; complex stresses; experimental verification of the theories of failure; energy methods; experiments with strain gauges, photoelasticity applications, and brittle coatings. (EMEM-338)</td>
<td>Class 3, Lab 2</td>
<td>Credit 4</td>
</tr>
<tr>
<td>EMEM-695</td>
<td>Solid Waste Management</td>
<td>A study of the practices and processes of solid waste disposal. In addition to the technical aspects, special emphasis is placed on the socio-political, economic, and environmental aspects of solid waste management. Course format is that of an engineering design case study.</td>
<td>Class 4</td>
<td>Credit 4</td>
</tr>
<tr>
<td>EMEM-696</td>
<td>Nuclear Power</td>
<td>A first course in nuclear engineering: brief review of nuclear physics related to fission, fusion, and radiation emission; use of radioisotopes; biological effects of radiation and shielding; steady state reactor theory and reactor control.</td>
<td>Class 4</td>
<td>Credit 4</td>
</tr>
<tr>
<td>EMEM-699*</td>
<td>Applied Mechanics System Analysis</td>
<td>Introduction to optimization techniques: calculus of variations, Hamilton’s principle, Rayleigh-Ritz method; Volterra and Fredholm integral equations with applications. (EMEM-301)</td>
<td>Credit 4</td>
<td></td>
</tr>
<tr>
<td>EMEM-701</td>
<td>Thermodynamics System Analysis</td>
<td>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</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMEM-702</td>
<td>Applied Mechanics System Analysis</td>
<td>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 vectors statics and dynamics of rigid and elastic bodies and systems. Credit 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMEM-800</td>
<td>Applied Engineering Analysis I</td>
<td>Use of matrices including matrix algebra, matrix inversion, diagonalization of matrices, eigenvalues and eigenvectors; application of matrices to the solution of sets of linear ordinary differential equations; the solution of partial differential equations by separation of variables using orthogonal functions, including Bessel functions; introduction to LaPlace transforms. Credit 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMEM-802</td>
<td>Applied Engineering Analysis II</td>
<td>Theory of complex variables including analytic functions, mapping, power series, and residues; application of complex variables, LaPlace and Fourier transform inversion for solving partial differential equations. Credit 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMEM-806</td>
<td>Numerical Analysis</td>
<td>Numerical methods for solving algebraic and transcendental equations, finite difference methods, error and convergence analysis, numerical methods of solutions of initial value and boundary value problems in engineering. Extensive use of computer is anticipated. (Graduate standing) Credit 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMEM-810</td>
<td>Introduction to Continuum Mechanics</td>
<td>Cartesian tensors and indicial notation. Analysis of the stress and deformation in a continuous media. Introduction to the linear theory of elasticity and the mechanics of fluids. (SMAM-308 or EMEM-692) Credit 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMEM-812</td>
<td>Theory of Plates and Shells</td>
<td>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-811) Credit 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
EMEM-813 Energy Methods in Mechanics  
Registration #0304-813  
Credit 4  
EMEM-815 Experimental Stress Analysis  
Registration #0304-815  
Experimental methods of analysis of structural machine members, including strain gages and instrumentation, photoelastic techniques; and the hydrodynamic, electrical, and membrane analysis. Laboratory tests of models. (EMEM-694 or equivalent)  
Credit 4  
EMEM-816 Finite Elements I  
Registration #0304-816  
Development of theory from variational principles. Two-dimensional applications to elastic continua, considering plane stress, plane strain, and axisymmetric loading examples. Problem-solving sessions using RIT computer. Applications in structural mechanics, considering beam elements, plate elements, and shell elements. Utilization of these elements in solving specific structural problems. Introduction to three-dimensional stress analysis. Features of large general-purpose computer programs.  
Credit 4  
EMEM-818 Finite Elements II  
Registration #0304-818  
Variational principles for linear and nonlinear elements. Three-dimensional element derivations using natural coordinate systems. Solid elements, tetrahedron and hexahedron; various thin shell elements. Computer workshops with use of various programs demonstrating the above theory.  
Credit 4  
EMEM-820 Analytical Mechanics  
Registration #0304-820  
A brief review of vectorial mechanics with emphasis on the dynamics of rigid bodies and applications to systems of degrees. Introduction to continuum using the limiting case of a system with an infinite degree of freedom. (Graduate standing or departmental approval)  
Credit 4  
EMEM-821 Vibration Theory and Applications I  
Registration #0304-821  
Credit 4  
EMEM-822 Vibration Theory and Applications II  
Registration #0304-822  
Analysis of vibrations of linear continuous systems; involving beams, frames, plates, and shells. Solution by classical methods or by approximate methods, as expedient. Introduction to finite-element analysis of vibration. System analysis techniques such as mobility and receptance methods. Applications of methods discussed to practical problems.  
Credit 4  
EMEM-825 Lubrication  
Registration #0304-825  
Incompressible lubrication in one-dimensional and finite journal bearings, hydrodynamic gas bearings, hydrostatic bearings, squeeze film and dynamic loading, rolling elements, thrust bearings, sliding bearings. Design considerations. (EMEM-415)  
Credit 4  
EMEM-826 Materials, Principles and Selection  
Registration #0304-826  
A study of the principles of material behavior as applied to design. Application of these materials according to these principles is stressed. Ferrous and non-ferrous materials are covered. Among the possible topics are strength, hardness, corrosion, fatigue, economy, forming, wear resistance, dimensional stability, heat treating, welding, and machining. (EMEM-344)  
Credit 4  
EMEM-828-829 Special Topics in Applied Mechanics  
Registration #0304-828, -829  
An opportunity for the advanced student to undertake an independent investigation in the area of applied mechanics. Assistance will be given only when the student requests it. The project may be a comprehensive literature investigation, theoretical study, or an investigation involving laboratory experiment. Credit variable (maximum of 4 credits/quarter)  
EMEM-830 Heat Transfer I  
Registration #0304-830  
The formulation of conduction heat transfer problems. Solutions to steady state and unsteady state problems by separation of variables, Laplace transforms and numerical methods. Empirical methods for forced convection and their use in the design of industrial systems. (EMEM-514)  
Credit 4  
EMEM-833 Heat Transfer II  
Registration #0304-833  
Principles of natural and forced convection, thermal boundary layers and their solutions. Convection heat transfer systems such as flows inside tubes, outside tubes, and over external surfaces. Empirical relations; applications to heat exchangers; nature of thermal radiation, radiation properties of surfaces and gases, radiant energy interchange in an enclosure filled with participating media. Problems involving simultaneous conduction, convection, and radiation. (EMEM-514)  
Credit 4  
EMEM-835 Thermodynamics  
Registration #0304-835  
The thermodynamics of chemical reactions, combustion and flame phenomena, phase change, stressed solids and other topics depending on the interest of the students. An introduction to irreversible thermodynamics.  
Credit 4  
EMEM-836 Statistical Thermodynamics  
Registration #0304-836  
Credit 4  
EMEM-840 Fluid Dynamics  
Registration #0304-840  
Selected topics from hydromechanics, compressible flow, viscous flow, hydrodynamic instability and turbulence, depending on interests of the students. (EMEM-415)  
Credit 4  
EMEM-841 Gas Dynamics  
Registration #0304-841  
Credit 4
EMEM-848, 849 Special Topics in Thermo Fluid Systems
Registration #0304-848, -849
An opportunity for the advanced student to undertake an independent investigation in the area of thermo fluid systems. Assistance will be given only when the student requests it. The project may be a comprehensive literature investigation, a theoretical study, or an investigation involving laboratory experiment.
Credit variable (maximum of 4 credits/quarter)

EMEM-851 Automatic Control Systems I
Registration #0304-851
A study of the dynamics of the physical processes involving the atmosphere, and precipitation. 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

EMEM-852 Automatic Control Systems II
Registration #0304-852
A continuation of EMEM-851. Topics include Nyquist plots and stability theorem, Nichols charts, compensation, state-space formulation of multi-variable systems and non-linear systems. Students will undertake individual projects requiring both analytical and experimental work. Individual use of analog and digital computers is encouraged. (EMEM-851)
Credit 4

EMEM-854 Optimal Control Systems Design
Registration #0304-854
An advanced study of feedback systems in terms of optimal and adaptive control, Variational calculus, the maximum principle, Hamilton-Jacobi theory, criteria for optimal design, constrained and unconstrained optimization, examples of optimal systems control. Introduction to the adaptive system. Gradient methods and examples of adaptive or self-optimizing control systems. Utilization of computers is encouraged. (EMEM-851, 852, 800)
Credit 4

EMEM-857 Advanced Topics in Systems Analysis
Registration #0304-857
A project-oriented course examining a spectrum of feedback systems and problems. Systems to be studied include mechanical, electromagnetic, optical, biomedical, and systems associated with transportation: hybrid propulsion systems, car-driver interaction, vehicular traffic flow and high-speed vehicle guidance systems. (Subject to instructor’s approval)
Credit 4

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

EMEM-861 Engineering Hydrology
Registration #0304-861
A study of the dynamics of the physical processes involving the waters of the earth. Included in the course will be: the meaning of hydrology, the hydrological cycle, transport processes, physical composition of the atmosphere, physical composition of oceans and lakes, planetary fluid mechanics, circulation of the atmosphere, and precipitation.
Credit 4

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

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)
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Registration #</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>FADE-520</td>
<td>Professional Design Business Practices and Ethics</td>
<td>#0402-520</td>
<td>3</td>
</tr>
<tr>
<td>FADE-301</td>
<td>Environmental Design—Exhibit</td>
<td>#0403-301</td>
<td>3</td>
</tr>
<tr>
<td>FADE-302</td>
<td>Environmental Design—Product</td>
<td>#0403-302</td>
<td>3</td>
</tr>
<tr>
<td>FADE-303</td>
<td>Environmental Design—Interior</td>
<td>#0403-303</td>
<td>3</td>
</tr>
<tr>
<td>FADE-320</td>
<td>Design Technology—Graphic Visualization</td>
<td>#0403-320</td>
<td>3</td>
</tr>
<tr>
<td>FADE-321</td>
<td>Design Technology—Mechanical Drawing</td>
<td>#0403-321</td>
<td>3</td>
</tr>
<tr>
<td>FADE-322</td>
<td>Design Technology—Materials and Processes</td>
<td>#0403-322</td>
<td>3</td>
</tr>
<tr>
<td>FADE-401</td>
<td>Environmental Design—Furniture</td>
<td>#0403-401</td>
<td>3</td>
</tr>
<tr>
<td>FADE-402</td>
<td>Environmental Design—Product</td>
<td>#0403-402</td>
<td>3</td>
</tr>
<tr>
<td>FADE-403</td>
<td>Environmental Design—Interior</td>
<td>#0403-403</td>
<td>3</td>
</tr>
<tr>
<td>FADE-411</td>
<td>Design Applications</td>
<td>#0403-411, 412, 413</td>
<td>3</td>
</tr>
<tr>
<td>FADE-501</td>
<td>Environmental Design—Product, Package, Graphics</td>
<td>#0403-501</td>
<td>9</td>
</tr>
<tr>
<td>FADE-502</td>
<td>Environmental Design—Interior, Product Systems</td>
<td>#0403-502</td>
<td>9</td>
</tr>
<tr>
<td>FADE-503</td>
<td>Environmental Design—Thesis</td>
<td>#0403-503</td>
<td>9</td>
</tr>
<tr>
<td>FADF-205</td>
<td>Creative Sources</td>
<td>#0404-205, 206, 207</td>
<td>2</td>
</tr>
<tr>
<td>FADF-210</td>
<td>Drawing</td>
<td>#0404-210, 211, 212</td>
<td>4</td>
</tr>
<tr>
<td>FADF-221</td>
<td>Photo Design I</td>
<td>#0404-221, 222, 223</td>
<td>4</td>
</tr>
<tr>
<td>FADF-230</td>
<td>Design</td>
<td>#0404-230, 231, 232</td>
<td>4</td>
</tr>
<tr>
<td>FADF-240</td>
<td>Design</td>
<td>#0404-240, 241, 242</td>
<td>4</td>
</tr>
<tr>
<td>FADF-261</td>
<td>Drawing (Craft Majors)</td>
<td>#0404-261, 262, 263</td>
<td>3</td>
</tr>
<tr>
<td>FADF-321</td>
<td>Photo Design II</td>
<td>#0404-321, 322, 323</td>
<td>3</td>
</tr>
</tbody>
</table>
FADP-301, 302, 303 Advanced Drawing
Three-quarter core course for fine arts program in painting and printmaking. Initial emphasis 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

FADP-313 Medical Illustration Carbon Dust Technique
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

FADP-320 Color
One quarter course dealing with the examination of basic color phenomena by visual comparison. Study of differences between light and pigment. Class problems exploring such relationships as intensity, vibration, temperature, after-image, spatial effects and image-ground distortion.
Class 2, Lab. 3, Credit 3

FADP-401, 402, 403 Painting
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. Advanced drawing incorporated into studio procedure.
Lab. 12, Credit 6

FADP-411,412,413 Painting
Registration #0405-411, -412, -413
An elective providing the opportunity for exploration of personal expressive styles through a painting media.
Lab. 6, Credit 3

FADP-420 Illustration
Registration #0405-420
One-quarter course exploring the art of illustrators; their relationship to audience, publishers, and media. Studio problems will develop and expand basic concepts of all illustration from children's books to that of heavy industry. 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

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

FADP-501, 502, 503 Painting
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. Advanced drawing incorporated into studio procedure.
Lab. 18, Credit 9

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

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

FADR-401, 402,403 Printmaking
Registration #0406-401, -402, -403
Design projects applied to the techniques of lithography, wood block, and etching. (FADP-301, 302, 303)
Lab. 12, Credit 6

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

FADR-501, 502,503 Printmaking
Registration #0406-501, -502, -503
Continuation of third-year practices. Opportunity is presented for a major concentration of a particular medium. (FADR-401, 402, 403)
Lab. 18, Credit 9

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

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

School for American Craftsmen

FSCC-200 Ceramics Materials and Processes
Registration #0409-200
Sequential course for three quarters providing fundamentals of the preparation and use of clay. Methods of fabrication from hand building to wheel-thrown wares. Mold-making, slip casting, and jiggering, ceramic sculpture and decorative techniques. Chemistry and application of glazes. Stacking and firing of kilns. The organization of the ceramic shop, with planning for efficient production. Survey of pottery.
Lab. 15, Credit 5

FSCC-251, 252,253 Ceramics Craft Elective I
Registration #0409-251, -252, -253
An elementary course in design and techniques in ceramics.
Lab. 6, Credit 3

FSCC-300 Ceramics Materials and Processes
Registration #0409-300
Sequential course for three quarters providing intensive work on individual clay and glaze problems. Designing for production and production problems. Ceramic raw materials, sources of supply, use and maintenance of equipment. Independent study, papers, reports.
Lab. 15, Credit 5

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.
Lab. 6, Credit 3
FSCG-400 Glass Materials and Processes
Registration #0411-400
Sequential course for three quarters, introducing glass materials and their source of supply. An introduction to the mixing of batch glass. The formulation of various glass batches with an in-depth analysis of color and fusing 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

FSCG-500 Glass Techniques and Thesis
Registration #0411-500
Sequential course for three quarters, introducing problems related to glass fabrication, culminating in a research and thesis project. The student is expected to organize and present an exhibition of his or her work in a manner to reflect a continuity and growth of style.
Lab. 24, Credit 8

FSC-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

FSC-251, 252, 253 Ceramics Elective I
Registration #0412-200 and Processes
Sequential course for three quarters, providing an opportunity for more advanced study in metals.
Lab. 6, Credit 3

FSCM-200 Metalcrafts Materials
Registration #0412-200
Sequential course for three quarters, introducing basic exercises in the use of equipment and metalcrafts techniques through jewelry design and production in various metals. Fundamental techniques in hollow ware; raising, forming, and planishing in copper, bronze, brass, and pewter. Enameling techniques. Discussion of design, materials, processes, and equipment.
Lab. 15, Credit 5

FSCM-251, 252, 253 Metalcrafts Elective I
Registration #0412-251, -252, -253
An elective course providing an opportunity for more advanced study in metals.
Lab. 6, Credit 3

FSCM-300 Metalcrafts Materials
Registration #0412-300
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

FSCM-351, 352, 353 Metalcrafts Elective II
Registration #0412-351, -352, -353
An elective course providing an opportunity for more advanced study in metals.
Lab. 6, Credit 3

FSCM-400 Metalcrafts Materials
Registration #0412-400
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

FSCM-500 Metalcrafts Techniques and Thesis
Registration #0412-500
Sequential course for three quarters, providing individual research in technical problems including a summarizing thesis.
Lab. 24, Credit 8

FSCT-200 Textile Materials and Processes
Registration #0413-200
Lab. 15, Credit 5

FSC-325, 326 American Art
Registration #0410-325, -326
A course in American art from the colonial period to the present. Lectures, independent study, discussion groups, assigned gallery visits, papers, reports.
Class 3, Credit 3

FSC-327 Contemporary Tendencies in Art
Registration #0410-327
The development of the arts in the 20th century, and current characteristics and goals of expression in architecture, sculpture, and painting. Lectures, independent study, discussion groups, assigned gallery visits, papers, reports.
Class 3, Credit 3

FSCG-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

FSCG-300 Glass Materials and Processes
Registration #0411-300
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

FSCG-351, 352, 353 Glass Elective II
Registration #0411-351, -352, -353
An elective course providing an opportunity for more advanced study in glass.
Lab. 6, Credit 3

FSCT-200 Textile Materials and Processes
Registration #0413-200
Lab. 15, Credit 5

FSC-300 Glass Materials and Processes
Registration #0411-300
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

FSCG-351, 352, 353 Glass Elective II
Registration #0411-351, -352, -353
An elective course providing an opportunity for more advanced study in glass.
Lab. 6, Credit 3

FSCM-200 Metalcrafts Materials
Registration #0412-200
Sequential course for three quarters, introducing basic exercises in the use of equipment and metalcrafts techniques through jewelry design and production in various metals. Fundamental techniques in hollow ware; raising, forming, and planishing in copper, bronze, brass, and pewter. Enameling techniques. Discussion of design, materials, processes, and equipment.
Lab. 15, Credit 5

FSCM-251, 252, 253 Metalcrafts Elective I
Registration #0412-251, -252, -253
An elective course providing an opportunity for more advanced study in metals.
Lab. 6, Credit 3

FSCM-300 Metalcrafts Materials
Registration #0412-300
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

FSCM-351, 352, 353 Metalcrafts Elective II
Registration #0412-351, -352, -353
An elective course providing an opportunity for more advanced study in metals.
Lab. 6, Credit 3

FSCM-400 Metalcrafts Materials
Registration #0412-400
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

FSCM-500 Metalcrafts Techniques and Thesis
Registration #0412-500
Sequential course for three quarters, providing individual research in technical problems including a summarizing thesis.
Lab. 24, Credit 8

FSC-251, 252, 253 Ceramics Elective I
Registration #0412-251, -252, -253
An elective course providing an opportunity for more advanced study in metals.
Lab. 6, Credit 3

FSC-300 Glass Materials and Processes
Registration #0411-300
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

FSCG-351, 352, 353 Glass Elective II
Registration #0411-351, -352, -353
An elective course providing an opportunity for more advanced study in glass.
Lab. 6, Credit 3
FSCT-251, 252, 253 Textile Craft Elective I
Registration #0413-251, -252, -253
An elementary course in design and techniques in textiles.
Lab. 6, Credit 3

FSCT-300 Textile Materials and Processes
Registration #0413-300
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

FSCT-351, 352, 353 Textile Craft Elective II
Registration #0413-351, -352, -353
An elective course providing an opportunity for more advanced study in textiles.
Lab. 6, Credit 3

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

FSCT-500 Textile Techniques and Thesis
Registration #0413-500
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

FSCW-200 Woodworking Materials
Registration #0414-200 and Processes
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

FSCW-241, 242, 243 Mechanical Drawing
Registration #0414-241, -242, -243
A beginning course, covering the fundamentals of drafting, oriented to the needs of the interior and furniture designer.
Lab. 2, Credit 1

FSCW-251, 252, 253 Wood Craft Elective I
Registration #0414-251, -252, -253
An elementary course in design and techniques in woodworking.
Lab. 6, Credit 3

FSCW-300 Woodworking Materials
Registration #0414-300 and Processes
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

FSCW-351, 352, 353 Wood Craft Elective II
Registration #0414-351, -352, -353
An elective course providing an opportunity for more advanced study in wood.
Lab. 6, Credit 3

FSCW-400 Woodworking Materials
Registration #0414-400 and Processes
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

FSCW-500 Woodworking Techniques
Registration #0414-500 and Thesis
Sequential course for three quarters, allowing each student, with the approval of the instructors, either to specialize in one branch of woodworking or to develop a particular design trend. This culminates during the final quarter in the completion of a thesis project.
Lab. 24, Credit 8

Graduate Courses, Fine and Applied Arts

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 Methods and Materials in Art Education
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

FADA-820 Seminar in Art Education
Registration #0401-820 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

FADA-860 Practice Teaching in Art
Registration #0401-860 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

Communication Design

FADC-780 (MFA) Communication Design Studio
Registration #0402-780
FADC-750 (MST) Registration #0402-750
Advanced creative problem solving experiences in communication design imagery. Professional problems in graphic design and related visual techniques for communication media such as print, television, film. Media Center facility available for extension of studio problems.
Lab. 9-27, Credit 3-9
Environmental Design
FADE-780 (MST) Design Applications
FADE-780 (MST) Registration #0403-780
FADE-780 (MST) Registration #0403-750
The reasoned application of theoretical three-dimensional design to responsible practical solutions that are valid in our complex and dynamic world environment, by considering the importance of the decision making role of the individual designer in a mass industrialized society.
Lab. 9-27, Credit 3-9

FADE-780 (MST) Painting
FADE-780 (MST) Registration #0405-780
FADE-780 (MST) Registration #0405-750
The pursuit of the pertinent, the ecstatic, the beautiful, by a small group of those dedicated to the art.
Lab. 9-27, Credit 3-9

FADE-780 (MST) Printmaking
FADE-780 (MST) Registration #0406-780
FADE-780 (MST) Registration #0406-750
Advanced techniques in etching, lithography and woodcutting, as well as in many experimental areas including color processes, photo-etching, photo-lithography, vacuum-forming, combination printing and calligraphy. 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. 9-27, Credit 3-9

FADE-780 (MST) Thesis
FADE-780 (MST) Registration #0405-890 Research and Thesis
FADE-780 (MST) Registration #0405-890 Guidance
The development of a thesis project instigated by the student and approved by a faculty committee and the Graduate Faculty Chairperson. Primarily creative production, the thesis must also include a written report.
Credit 12

School for American Craftsmen
Design, Techniques and Research Problems
A program structured on the basis of individual needs, interests and background as they may be determined through faculty counseling. This sequence of courses will lead to the production of a thesis project, suggested by the student and approved by the faculty. This applies to all craft areas.

FSC(C, G, M, T or W)-890 Research and Thesis
FSC(C, G, M, T or W)-890 Registration #0409(9, 11, 12, 13 or 14)-890 Guidance
Research and presentation of an acceptable thesis with a focus on technique, design, production, or a combination of these approved by the faculty. The thesis subject will be chosen by the candidates with the approval of the faculty advisor. The thesis will include a written summation or report of the research and presentation program.

Lab. 27, Credit 12

College of General Studies

Criminal Justice

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

GCJC-203 Introduction to Criminology
GCJC-203 Registration #0501-203
A survey of the major forms of contemporary crime with emphasis on definition of crimes and criminality, the extent of crime, criminal typologies, and fundamental aspects of the social control of crime.
Class 3, Credit 4

GCJC-204 Introduction to Public Administration
GCJC-204 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.
Class 3, Credit 4

GCJC-206 Administrative Concepts in Law Enforcement
GCJC-206 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.
Class 3, Credit 4

GCJC-207 Fundamentals of Corrections
GCJC-207 Registration #0501-207
The course is designed to introduce the student to the basic organizations of the correctional system, their functions and performance. Prisons and jails, as well as probation and parole agencies, will be discussed within the context of historical and contemporary philosophy. Attention will also be focused on decision making functions, the role of various personnel within the correctional system and the population of offenders within it. Strategies for rehabilitation and their effectiveness will be surveyed.
Class 3, Credit 4
GCJC-301 Fundamentals of Corrections and Criminal Law
Registration #0501-301
This course will investigate assumptions and conceptions of law, crime, and social issues. It will concentrate on the history of various criminal justice systems as compared to contemporary criminal justice systems, the dynamics of criminal law reform, and its relationship to constitutional law. Class 3, Credit 4

GCJC-302 History of Organized Crime
Registration #0501-302
This course will examine the developmental role of informal organizations of industry and area-wide rackets; with special emphasis upon organized crime as it developed historically in America. Class 3, Credit 4

GCJC-303 Law Enforcement and Society: The Police Function
Registration #0501-303
The course deals with 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. Class 3, Credit 4

GCJC-304 The Judicial Process
Registration #0501-304
An examination of judicial systems (criminal and juvenile) from indictment through sentencing, their functions and operation, their internal and external relationships, and their impact upon the community. Class 3, Credit 4

GCJC-305 Introduction to Para-Legals
Registration #0501-305
An in-depth view of lawyers' ethics in dealing with clients under various professional circumstances. The course deals with criminal and civil law, matrimonial law, legal research, counseling, problem solving techniques, as well as a study of community resources in reference to assisting the client. Class 3, Credit 4

GCJC-306 Criminal Investigation
Registration #0501-306
This course is an introduction to the criminal investigative function and process, 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, the admissibility of evidence in a court of law. Class 3, Credit 4

GCJC-307 Juvenile Justice
Registration #0501-307
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. Class 3, Credit 4

GCJC-401 Scientific Methodology
Registration #0501-401
This course surveys present and future methods of modifying human behavior with a goal of individual change. Included will be a survey of control technologies utilized and proposed as methods of individual behavior modification. Discussion will center on technique, as well as social and ethical implications. Class 3, Credit 4

GCJC-402 Constitutional Law and Criminal Justice
Registration #0501-402
This course is intended to provide the student with a basic understanding of constitutional law and its relationship to criminal justice. The course will deal with specific Supreme Court decisions. Emphasis will be placed on First Amendment Rights and on the concepts of due process and on equal protection. Class 3, Credit 4

GCJC-403 Legal Rights of Convicted Offenders
Registration #0501-403
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. Class 3, Credit 4

GCJC-404 Issues in Corrections
Registration #0501-404
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. Class 3, Credit 4
GCJC-412 Social Control of Deviant Behavior
Registration #0501-412
Designed as a professional elective for criminal justice majors interested in studying the major theories 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.
Class 3, Credit 4

GCJC-413 Civil Disobedience and Criminal Justice
Registration #0501-413
The philosophy and history of civil disobedience; civil disobedience as a political tactic; differentiation between civil disobedience and "ordinary crime," civil disobedience and "non-criminal as a violation of order within the criminal justice system.
Class 3, Credit 4

GCJC-414 Forensic Science
Registration #0501-414
A survey of the elements of microscopy, spectroscopy, and basic chemistry as they apply to the study of firearms, hair, fibers, blood, paint, tools, glass, documents, laundry, market poisons, and other materials which comprise physical evidence. (Basic Chemistry)
Class 3, Credit 4

GCJC-505 White Collar Crime
Registration #0501-505
An examination of the extent and character of white collar crime, with special emphasis upon political and financial variables and differentiating conditions.
Class 3, Credit 4

GCJC-506 Evidence
Registration #0501-506
Rules of evidence of particular interest in criminal justice. The course will study the introduction of physical and testimonial evidence into a criminal trial.
Class 3, Credit 4

GCJC-512 Minority Groups and the Criminal Justice System
Registration #0501-512
This course will represent a three-fold approach to minorities and the criminal justice system and will strongly consider the conflict perspective in all phases. (1) The course will review early violations of civil and human rights for the purpose of developing an historical perspective of the subject matter. (2) The course will concern itself with the generation of criminal activity and disparities in the criminal justice system that result from the historical and continuing double standard to which minorities have been consistently subjected. (3) The course will consider the effectiveness of remedial efforts past, present and future-to correct disparities within the criminal justice system.
Class 3, Credit 4

GCJC-514 Planning and Change in the
Registration #0501-514
Criminal Justice System
It the objective of this offering to expose the student to issues of "change" 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 both organizational and individual 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.
Class 3, Credit 4

GCJC-516 Family Court Administration
Registration #0501-516
A course designed to explore the management of the criminal process, specifically the operation of family court systems. Included will be discussion of the inter-relationships of the components of the system, as well as the relationships among the various actors. In addition, operational problems, such as the bail process, record keeping, jury service and calendar management will receive significant attention.
Class 3, Credit 4

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.
Class 3, Credit 4

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.
Class 3, Credit 4 (1976-77)

GCJC-520 Law and Discretion in Criminal Sentencing
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.
Class 3, Credit 4

GCJC-522 Victimless Crime and the Law
Registration #0501-522
The course is designed to study those crimes traditionally classified as "victimless" crimes: alcoholism, prostitution, gambling, drugs, and so on.
Class 3, Credit 4

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.
Class 3, Credit 4

GCJC-525 Industrial Security Administration
Registration #0501-525
Analysis of the major problems of industrial and business security, including college campuses, hospitals, etc. Emphasis on current security problems and methods of dealing with them effectively. Administrative, legal and technical problems will also be discussed.
Class 3, Credit 4

GCJC-526 Issues 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 function 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.
Class 3, Credit 4

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. (Fundamental Concepts and Patterns of Criminal Law)
Class 3, Credit 4
GSWS-301 Introduction to the Field of Social Work
Registration #0516-301
Designed to introduce various aspects of the social work profession to give the student basic knowledge of major social welfare programs, such as public assistance. To sensitize students to people's needs, especially the needs of members of society who differ from themselves and to begin building social work attitudes of objectivity, inquiry, empathy and non-judgment.
Class 3, Credit 4

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

GSWS-303 Social Welfare: Profession and Issues
Registration #0516-303
Examines the profession of social work. It will look at the values in social work practice, as stated in the Code of Ethics. Current practice issues of the profession will be studied and discussed. Maintenance issues of the profession such as licensure, third party payments and other topics will also be examined.
Class 3, Credit 4

GSWS-304 Social Welfare: Organization and Systems
Registration #0516-304
An in-depth study of the organization of social welfare services. To include: analysis of agency structure, i.e., board, staff, budget, client need and services; the pyramiding of agencies into umbrella systems; power groups, vested interests and coalitions. The role and function of the social worker in this milieu will be explored.
Class 3, Credit 4

Social Work Field Study
Registration #0516-305
Designed to introduce the student to the social work community and a wide spectrum of agencies. Class sessions will be scheduled once a week for a block of three hours, and will be taught entirely off campus. It is meant to follow Introduction to Social Work, and to illustrate social work in practice, not in theory.
Class 3, Credit 2

Methods of Social Work I, II, III
Registration #0516-411, -412, -413
Methods of Social Work is a three-quarter sequential course offered concurrently with field experience. Concurrent field experience requires a part-time placement in a community agency as part of the course requirement of Methods I (GSWS-411). Methods II and III (GSWS-412, 413) are offered concurrently with Field Instruction I and II (GSWS-421, 422).

Field Instruction I, II
Registration #0516-421, -422
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 first-hand experience with its organization, programs, and methods of work. Closely supervised work at the agency is supplemented by periodic consultations with the instructor.
Credit 5/Qtr.

GSWS-430 Hispanic Culture for Social Workers
Registration #0516-430
This course, designed with a social work emphasis, will attempt to objectively portray the life of both Mexican-Americans and Puerto Ricans and other Spanish speaking groups in a predominantly Anglo society.
Class 3, Credit 4

Current Treatment Modalities
Registration #0516-510
A course focusing upon current advanced treatment modalities. To include behavior modification, transactional analysis, parent effectiveness training, Gestalt and reality therapy. Other modalities will be considered.
Class 3, Credit 4

Gerontology
Registration #0516-515
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.
Class 3, Credit 4

Social Work from a Pan-African Perspective
Registration #0516-520
This course is designed to analyze past, present and future social welfare policies, programs and practices from a Pan-African perspective. This perspective is viewed as essential if one is to attain skills needed to analyze programs and policies from their actual effects and predictable effects on black people.
Class 3, Credit 4
The Advocacy Role in Social Work
Registration #0516-521
This course will examine the role of social workers in advocating for 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 which directly affect poverty, racism, and related urban crises will be related to examining techniques for achieving change.
Class 3, Credit 4

Community Organization
Registration #0516-522
Principles of organization theory and practice and their application to the social planning process at the local, state, regional and national levels. Emphasis on contemporary social, political and economic systems, and their relationship, both formal and informal, to the social planning process.
Class 3, Credit 4

Research Methods
Registration #0516-531
Introduction to the methodology of research in behavioral and social sciences. Stress will be laid on the use of theoretical leads, formulation of hypotheses, collection of data, measurements, statistics, and evidence evaluation. Instruction and practical demonstration is provided in techniques ranging from simple case studies to computer utilization.
Class 3, Credit 4

Seminar and Project
Registration #0516-535
For social work seniors who have completed field experience. A study of a variety of professional areas to be defined by students, with staff participation. Each student’s input will be based upon the field experience and its related work, and academic experience to strengthen areas of professional and personal concern. Includes a research project and may include “supervision” of a freshman in the first field experience.
Class 3, Credit 4/Qtr.

Social Work Electives
The following courses are offered by the College of Continuing Education but may be taken as electives by students enrolled in the Social Work program.

Mental Health & Mental Illness from a Social Work Perspective
Registration #0516-354
This course is designed to give social work students a basic understanding of mental health and mental retardation from a social work perspective. The role of the social worker in working with mentally retarded individuals and their families will be included. Students will also be given a general understanding of our current mental hygiene systems.
Class 3, Credit 4

Group Work Methods
Registration #0516-450
A course designed to help a person understand the basic dynamic components inherent in all groups and to become a more able and knowledgeable leader of groups. The course will investigate the scope, technique and function of the group work concept as practiced in such diverse places as social service agencies, business, correctional institutions, church groups, and community activities.
Class 3, Credit 4

Alcoholism—Physiology and Psychology
Registration #0516-460
The chemistry of ethanol, methanol and alcohol and their effects on the body and mind as well as signs, symptoms, addiction and withdrawal. The presentation of normal and abnormal personality development in the adolescent and later years and the psychological mechanisms lending support to alcohol use in our society.
Class 3, Credit 4

Alcoholism—Interventive Skills and Techniques
Registration #0516-461
Teaches a variety of interventive skills to those giving care to alcoholics, their families, and communities. Emphasis is placed upon the method of use of these skills. Role play, video tape and case study will be included.
Class 3, Credit 4

Alcoholism—Rehabilitation Modalities and Community Resources
Registration #0516-462
Analysis of the psychological symptoms and diagnosis of the alcoholic and current methods of rehabilitation. Explores structure, function and use of community resources.
Class 3, Credit 4

Drug Abuse
Registration #0516-525
This course is designed to familiarize the social work student with the many varieties of dry drugs, drug abuse, drugs and the social scene. Emphasis is placed on a variety of treatment modalities to be used by the social worker when working with drug abusers.
Class 3, Credit 4

Independent Study
Registration #0516-599
A combined student/faculty member 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.
Class variable, Credit variable

Psycho-Social Aspects of Deafness
Registration #0227-401
This course provides a broad overview of the effects of deafness on individuals, its relation to their social and intellectual development, and an appreciation of the hearing impaired as a group. It provides basic information regarding the nature of sound, anatomy of hearing, and the causes and types of deafness.
Class 3, Credit 4

Growth and Development of the Pre-School Child
Registration #0233-470
The course seeks to examine the basic factors contributing to the growth and development of the pre-school child. Emphasis is put on those factors leading to personality development as described by Freud and Erikson, behavioral patterns as described by S-R theory, and those factors leading to the development of “intelligence” and creativity.
Class 3, Credit 4

Day Care Programming
Registration #0233-471
Essential to the total development of the child are the activities provided to stimulate that development. The course is so designed that newcomers as well as those having worked in child care can appreciate the interrelationships between the various disciplines and developmental tasks. The element of proper planning is introduced.
Class 3, Credit 4

Day Care—Materials and the Classroom
Registration #0233-472
Participants will be given instruction in the use of a variety of program materials and skills to meet the needs of the day care child. Included will be use of dramatics, dance, crafts, arts, music, rhythm, paper boy activities, etc. In addition, creative use of audiovisual equipment will be taught and community resources will be identified.
Class 3, Credit 4
This course will explore various aspects of the emerging profession of day care with specific emphasis on history and development, philosophy, roles of various staff members—teacher, teacher aides, supervisor, administrator, board of directors—and their relationship with one another. In addition, the course will explore working with the family, community relationships, referrals, community resources, and the development of goals and objectives in day care programming.

Class 3, Credit 4

**General Studies courses**

**Language and Literature**

**GLLC-220** English Composition

Registration #0502-220

This required course is to be taken in the lower division, preferably in the freshman year. The purpose of the course is to develop certain language skills needed to write effectively. The specific objectives of the course are the following: to teach students the basic skills required for the discovery, selection, and arrangement of ideas and the expression of such ideas in a manner appropriate to the purpose and audience for writing; to familiarize students with the uses of a library; to acquaint students with the purposes and procedures of documentation; to teach students the skills of accurate proofreading and critical reading of their own prose; to emphasize the necessity for the basic conventions of grammar, usage, spelling, and punctuation; to emphasize critical reading and thinking as essential components of good writing.

Class 3, Credit 4

**GLLC-421, 422** German I, II

The courses are designed to enable the student to read and understand technical and scientific German.

Class 3, Credit 5/Qtr.

**GLLC-501** Effective Speaking

Registration #0504-501

The development of the techniques of oral communications as an aid to self-confidence in modern social and business situations. Weekly practice talks with emphasis on organization, clarity, vocal expression, poise, interest, and appropriateness.

Class 3, Credit 5

**GLLC-511** Modern Applications of Language Theory

Registration #0502-511

The history and theory of communication from basic human communication through the mass media extensional systems.

Class 3, Credit 5

**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 5

**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 CLLC-514 a useful introduction to this course).

Class 3, Credit 5

**GLLL-320** Literature and Myth

Registration #0504-320

A study of the uses of myth in literature, emphasizing a selected group of commonly accepted archetypes and motifs which appear in a variety of literary forms.

Class 3, Credit 4

**GLLL-322** Literature and the Vision of Man

Registration #0504-322

A study of major modern and contemporary writers with special emphasis on the visions of the human condition.

Class 3, Credit 4

**GLLL-323** The Cycle of Life in Literature

Registration #0504-323

A study of the literary uses of myths connected with the cycle of life.

Class 3, Credit 4

**GLLL-324** Guilt and Expiation

Registration #0504-324

The course uses a survey approach of Western literature from the ancient world up through the 20th century dealing with the theme of man’s sense of guilt and how he handles it.

Class 3, Credit 4

**GLLL-325** Thematic Approach to Western Literature

Registration #0504-325

A survey of the major literary genre concerned with certain recurring thematic subjects—love, conflict, religion, evil, death, and the individual—which emphasizes plot, character, setting, style, and theme of respective works.

Class 3, Credit 4

**GLLL-326** Literature in its Critical Perspectives

Registration #0504-326

An analysis of short stories, poems, plays, and the novel from various critical perspectives.

Class 3, Credit 4

**GLLL-328** Modern Criticism of Literature

Registration #0504-328

Critical approaches to literature to provide the student with a standard of judgment in literature.

Class 3, Credit 4

**GLLL-330** Voyages in Literature

Registration #0504-330

The treatment of the voyage in literature from Homer to the present.

Class 3, Credit 4

**GLLL-331** Genres of World Literature

Registration #0504-331

Survey of the primary genres of world literature: drama, novel, short story and poetry.

Class 3, Credit 4

**GLLL-332** Survey of Western Literature

Registration #0504-332

A chronological survey of the masterpieces of Western literature from the epic of Homer to selected works of 20th century American and European writers.

Class 3, Credit 4

**GLLL-334** Studies in the American Novel

Registration #0504-334

A study of selected American novels of the 19th and 20th centuries which have become literary classics.

Class 3, Credit 4

**GLLL-335** The Hero in Literature

Registration #0504-335

This course is an introduction to the literature of Western civilization. It will trace the changing nature and treatment of the hero in literature from the time of ancient Greece to contemporary America.

Class 3, Credit 4

**GLLL-336** Man and His Fictions

Registration #0504-336

The study of literature as one among the many fabrations of man which help him to define and come to terms with himself, time, the world, and other human beings in the world.

Class 3, Credit 4
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 5

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 the respective periods.
Class 3, Credit 5

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 5

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 through 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 5

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 5

Black Literature
Registration #0504-509
Black Literature is a historical survey of significant black writers from Revolutionary times until the present day.
Class 3, Credit 5

Ecological Awareness in Literature
Registration #0504-513
A chronological examination of selected works dealing with man's relationship to nature.
Class 3, Credit 5

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 5

Literature and Protest
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 5

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 5

Creative Writing II
Registration #0504-518
Students are given maximum freedom to write what they are concerned with in as wide a range of genres as they will attempt.
Class 3, Credit 5

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 5

Contemporary Film
Registration #0504-524
A study of contemporary world films, to be drawn from those presently showing in the Rochester area (theaters, television, film festivals). Emphasis will be on both technical and aesthetic aspects of the films.
Class 3, Credit 5

The American Dream: Success or Collapse?
Registration #0504-526
A multi-disciplinary look at the tenets of the American Dream and the question of its present success or collapse.
Class 3, Credit 5

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 5

Great World Novels
Registration #0504-528
An examination of a major novel by Dickens, Dostoyevsky, Joyce and Faulkner to explore the particular genius of each writer and his contributions to the modern novel.
Class 3, Credit 5

Literature and Man's Religious Experience
Registration #0504-529
An interdisciplinary course which attempts to explore the complexity and variety of man's personal religious quest and its conflicts as these are portrayed by psychologists and literary artists.
Class 3, Credit 5

Religions Of the East: Hinduism, Buddhism, Taoism
Registration #0504-530
A study of the major religions of the East.
Class 3, Credit 5

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 5

Man, Nature, and Technology
Registration #0504-532
An interdisciplinary ecology course; texts include Commoner, The Closing Circle.
Class 3, Credit 5

The Modern Movement in Literature
Registration #0504-533
Examination of the philosophy and literary achievements of modernism through the works of Mann, Joyce, Proust, Beckett, Faulkner and Borges.
Class 3, Credit 5

Modern American Fiction
Registration #0504-534
A study of the American novel from 1900 to 1957.
Class 3, Credit 5
A close examination of poems of important English and American poets of the 19th and 20th centuries, including several living poets.

Class 3, Credit 5
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSHF-511</td>
<td>Modern European Architecture</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHF-512</td>
<td>Master Drawings Since the Renaissance</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHF-513</td>
<td>Oriental Art</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHF-514</td>
<td>Cubism to the Present (Undergraduate)</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHF-519</td>
<td>Rembrandt Van Rijn: His Art and Times (Undergraduate)</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHF-520</td>
<td>Picasso</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHF-521</td>
<td>The Arts Under Communism, Fascism and Nazism</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHF-525</td>
<td>Major Symphonies</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHF-526</td>
<td>Twentieth Century Music</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHF-527</td>
<td>Orchestral Music</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHF-528</td>
<td>Romanticism in Music</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHF-530</td>
<td>Art, Music and ideas (Undergraduate)</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHF-532</td>
<td>African Tribal Art</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHH-311</td>
<td>African Tribal Art</td>
<td>Class 3, Credit 4</td>
</tr>
<tr>
<td>GSHH-308</td>
<td>Latin American History: From Independence to the Modern Period</td>
<td>Class 3, Credit 4</td>
</tr>
<tr>
<td>GSHH-309</td>
<td>Modern American History</td>
<td>Class 3, Credit 4</td>
</tr>
<tr>
<td>GSHH-310</td>
<td>The Future As History</td>
<td>Class 3, Credit 4</td>
</tr>
<tr>
<td>GSHH-311</td>
<td>Ethnic History</td>
<td>Class 3, Credit 4</td>
</tr>
<tr>
<td>GSHH-312</td>
<td>Communism, Fascism and Democracy in Their Theoretical Foundations</td>
<td>Class 3, Credit 4</td>
</tr>
</tbody>
</table>
GSHH-316 \textit{The History of the World Since 1945} \hfill \textit{Religion in Society} \\
\textit{The History of the World Since 1945} \hfill \textit{Religion in Society} \\
Survey of the major events of world history since 1945: Europe, Africa, Asia, and the United States. \hfill \textit{This course will examine religion in the West-Christianty, Judaism and atheism-as an integral and interrelated aspect of the totality of society.} \\
Class 3, Credit 4 \hfill Class 3, Credit 5

GSHH-319 \textit{Religious and Cultural Movements} \hfill \textit{The Italian-American Experience} \\
\textit{Religious and Cultural Movements} \hfill \textit{The Italian-American Experience} \\
The influence of religion on our society will be the focus of the course. \hfill \textit{Examines the history and culture of the Italian-Americans from the colonial period to the present.} \\
Class 3, Credit 4 \hfill Class 3, Credit 5

GSHH-320 \textit{The Unification of Europe: Achievements and Perspectives} \\
\textit{The Unification of Europe: Achievements and Perspectives} \\
An analysis of the concept of Europe, of its making and disintegration, of its resilience after two World Wars, of the movement for a political union and of its first achievements: the Common Market and its goals up to 1972. \\
Class 3, Credit 4

GSHH-508 \textit{History of England} \\
\textit{History of England} \\
A political and constitutional history of England from the Anglo-Saxon period to the present. \\
Class 3, Credit 5

GSHH-510 \textit{Contemporary Middle East} \\
\textit{Contemporary Middle East} \\
An historical analysis of the origins of the modern Middle East with particular emphasis on the patterns of political developments in the region during the 19th and 20th centuries. \\
Class 3, Credit 5

GSHH-514 \textit{Race and Society} \\
\textit{Race and Society} \\
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 5

GSHH-516 \textit{The Middle Ages and the Rise of Europe} \\
\textit{The Middle Ages and the Rise of Europe} \\
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 5

GSHH-518 \textit{The Advance of Communism} \\
\textit{The Advance of Communism} \\
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 in the American continent. \\
Class 3, Credit 5

GSHH-519 \textit{United States--Latin American Diplomatic Relations} \\
\textit{United States--Latin American 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 5

GSHH-520 \textit{Crime, Violence and Urban Crisis in the 20th Century} \\
\textit{Crime, Violence and Urban Crisis 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 5

GSHH-522 \textit{20th Century American Diplomatic History} \\
\textit{20th Century American Diplomatic History} \\
A narration and interpretation of the events and forces which shaped American foreign relations from 1898 to 1950. Special emphasis will be placed on such issues as the Open Door Policy, the Treaty of Versailles, Pearl Harbor and the Yalta Conference. \\
Class 3, Credit 5
that the student will come to an understanding of the historical
Analysis of the ethnic, national, and international implications
This course traces the history of ethnic and racial minorities
the age of mass democracies, totalitarianism and contending
The course seeks to appraise the crisis of diplomacy, and the
of Fascist and Nazi propaganda in the U.S. from 1922 to 1945.
GSHH-542 Mussolini’s and Hitler’s Intrigues
Class 3, Credit 5
A study of Germany in the 19th and 20th centuries.
GSHH-541 Modern Germany
Class 3, Credit 5
GSHH-540 Selected Problems in Black History
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 5
GSHH-540
Registration #0507-540

Analytic, social, industrial, economic, and political situation.
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 5

GSHH-538 Social Justice and the Constitution
Registration #0507-538
The course will analyze how well the constitution has met the social and political expectations of citizens. Emphasis will be placed on analyzing Supreme Court cases that explain the current state of social justice. This is a companion course to GSHH-532, Civil Liberties in American History.
Class 3, Credit 5

GSHH-540
Registration #0507-540

A study of the discriminatory practices, present and historic.
GSHH-547 History of Social Discrimination
Registration #0507-547
A study of the various discriminatory practices, present and historical, found in the United States. To include the cultural values and problems of acculturation for the American Indian, Black, Puerto Rican, Chicano, Asian, women, and religious groups, with emphasis on its implications to social work.
Class 3, Credit 5

GSHH-540
Registration #0507-540

This course, based on Jacob Bronowski’s BBC-PBC television series, analyzes the human, intellectual, religious, political, scientific, and historical development of the Western man.
Class 3, Credit 5

GSHH-550 The Ascent of Man
Registration #0507-550
This course is concerned with those selected aspects of geology that pertain to surface features of the earth. The aim of the course is to acquaint students with landforms they can recognize in the field or from a car on the highway.
Class 3, Credit 4

GSHH-540
Registration #0507-540

Readings from both classical and contemporary sources.
GSHHP-210 Introduction to Philosophy
Registration #0509-210
An introduction to some of the major problems in philosophy with readings from both classical and contemporary sources.
Class 3, Credit 4

GSHHP-210
Introduction to Philosophy
Registration #0509-210
An introduction to moral philosophy through an analysis, comparison and evaluation of the main theories that have been offered as systematic ways of making moral decisions. Readings in both classical and contemporary sources.
Class 3, Credit 4

GSHHP-302 Greek and Roman Philosophy
Registration #0509-302
This course will provide an account of Greek and Roman philosophy from what is known as the pre-Socratic period to the early Christian era.
Class 3, Credit 4
GSSA-201 Introduction to Anthropology
Registration #0510-201
This course focuses on cultural rather than physical anthropology, is holistic in its approach, and will touch on all aspects of anthropology as the science of man. The course is a survey designed for students of technology.
Class 3, Credit 4

GSSA-204 Introduction to Cultural Anthropology
Registration #0510-204
This course introduces the student to the basic concepts and principles of cultural anthropology. Particular attention is given to how culture impacts on technical careers.
Class 3, Credit 4

GSSA-205 Deafness in American Culture
Registration #0510-205
Using principles of cultural anthropology, this course investigates the cultural patterns of deaf Americans and how those patterns relate to those of other cultural systems in America.
Class 3, Credit 4

GSSA-210 Cultural Anthropology
Registration #0510-210
A study of the basic institutional patterns of behavior and of thought which the human animal uses to provide the means of life and experience.
Class 3, Credit 4

GSSA-501 Anthropological Research Methods: Explorations in Subcultural Diversity
Registration #0510-501
This course is designed to expose students from a variety of backgrounds to an alternative means of understanding human behavior through the methods of the cultural anthropologist and to demonstrate that variations in cultural patterning exist in our presumably homogenous society. The primary emphasis in the course will be involvement of students in the actual observation of human behavior and collection of data in a sub-culture of their own selection in the Rochester area.
Class 3, Credit 5

GSSA-525 Planned Society
Registration #0510-525
A study of the principles of economic planning, of political decision making and of institutions of social control required to implement the plans of mankind for human survival. This course features a simulation laboratory.
Class 3, Credit 5

GSSE-501 Contemporary Economic Systems
Registration #0511-501
An investigation of the functioning of modern capitalist and non-capitalist economies, and their problems. The USA and USSR are used as the main models, with aspects of other economies also included.
Class 3, Credit 5

GSSE-503 Personal Finance
Registration #0511-503
An introduction to basic problems and techniques of managing personal finances, based on the study of such main topics as budgeting, the use of credit, insurance and investment. Considerable emphasis will be placed on investment in stocks and bonds. Students will be required to do a considerable amount of library research, and to prepare research papers.
Class 3, Credit 5

GSSE-508 Urban Economics and Public Policy
Registration #0511-508
This course is designed to give the student an understanding of the economic forces which led to the existence of cities. We will consider the location of economic activity and residence within urban areas and the relationship of location to current urban problems.
Class 3, Credit 5

GSSE-510 Human Resources
Registration #0511-510
The first section of the course will contain a microeconomic analysis of the labor market. The latter section will contain discussion of topics in human resources including education, manpower planning, and discrimination.
Class 3, Credit 5

Social Science

GSSA-501 Anthropological Research Methods: Explorations
Registration #0510-501
The primary emphasis in the course will be involvement of students in the actual observation of human behavior and collection of data in a sub-culture of their own selection in the Rochester area.
Class 3, Credit 5

GSSA-510 Cultural Anthropology
Registration #0510-210
A study of the basic institutional patterns of behavior and of thought which the human animal uses to provide the means of life and experience.
Class 3, Credit 4

GSSSA-501 Anthropological Research Methods: Explorations in Subcultural Diversity
Registration #0510-501
This course is designed to expose students from a variety of backgrounds to an alternative means of understanding human behavior through the methods of the cultural anthropologist and to demonstrate that variations in cultural patterning exist in our presumably homogenous society. The primary emphasis in the course will be involvement of students in the actual observation of human behavior and collection of data in a sub-culture of their own selection in the Rochester area.
Class 3, Credit 5

GSSSA-525 Planned Society
Registration #0510-525
A study of the principles of economic planning, of political decision making and of institutions of social control required to implement the plans of mankind for human survival. This course features a simulation laboratory.
Class 3, Credit 5

GSSSA-550 Man Builds/Man Destroys
Registration #0510-550
Class 3, Credit 5

GSSE-210 Introduction to Economics
Registration #0511-210
A study of selected essential concepts of economics, combined with a discussion of some of the current economic problems of the American society, and the policies adopted to solve them. No prior familiarity with economics is required.
Class 3, Credit 4

GSSE-501 Contemporary Economic Systems
Registration #0511-501
An investigation of the functioning of modern capitalist and non-capitalist economies, and their problems. The USA and USSR are used as the main models, with aspects of other economies also included.
Class 3, Credit 5

GSSE-503 Personal Finance
Registration #0511-503
An introduction to basic problems and techniques of managing personal finances, based on the study of such main topics as budgeting, the use of credit, insurance and investment. Considerable emphasis will be placed on investment in stocks and bonds. Students will be required to do a considerable amount of library research, and to prepare research papers.
Class 3, Credit 5

GSSE-508 Urban Economics and Public Policy
Registration #0511-508
This course is designed to give the student an understanding of the economic forces which led to the existence of cities. We will consider the location of economic activity and residence within urban areas and the relationship of location to current urban problems.
Class 3, Credit 5

GSSE-510 Human Resources
Registration #0511-510
The first section of the course will contain a microeconomic analysis of the labor market. The latter section will contain discussion of topics in human resources including education, manpower planning, and discrimination.
Class 3, Credit 5
GSSE-511  Economics and Politics of Consumer Protection
An analysis of the economics and politics of consumer protection.
Class 3, Credit 5

GSSE-515  Contemporary International Economics Problems
The course will concentrate on major commercial investment issues in international economics. The second part will focus on the interrelationship between ideology and politics from national, regional, and international perspectives. Apart from nationalism, the ideologies of liberalism, socialism, communism, and fascism in their theoretical contents and political implications will be carefully analyzed.
Class 3, Credit 5

GSSM-210  Introduction to Political Science
An introduction to the complex issues of politics, political behavior, and types of governmental structures. The purpose of this course is to develop analytical skills so that students as citizens may identify and deal with political alternatives.
Class 3, Credit 4

GSSM-211  American Politics
To promote an understanding of the American political system and some of the major contemporary issues that confront it. Additionally, an analysis of the historical and philosophical roots of democratic political thought and studies of current political, economic, and social problems will be made in an attempt to separate myths from reality. Special emphasis will also be placed on the institutions of government, political parties, and interest groups.
Class 3, Credit 4

GSSM-212  American Political Development
An examination of the development of the American political system from the Constitutional Convention to the emergence of the Civil War. Emphasis will be placed upon personalities, theories, events, and events which influenced the development of the United States.
Class 3, Credit 4

GSSM-213  Introduction to Political Economy
The course will emphasize resource allocation between private and public goods, the costs and benefits of education, organizing and financing of medical and hospital services, problems of tax structure and tax reform, monopoly power and antitrust system, policies toward American agriculture, issues of urban housing and transportation, control of environmental quality.
Class 3, Credit 4

GSSM-215  Ideology and Politics
The course is specifically designed to introduce lower division students to the interrelationship between ideology and politics from national, regional, and international perspectives. Apart from nationalism, the ideologies of liberalism, socialism, communism, and fascism in their theoretical contents and political implications will be carefully analyzed.
Class 3, Credit 4

GSSM-501  American Foreign Policy
A study of the formulation and execution of American foreign policy. Special emphasis will be given to such topics as the American philosophy and ideology and its impact upon policy making, diplomatic procedures, the role of public opinion, and the functions of the instruments of government in foreign policy. Additionally, current policies will be discussed.
Class 3, Credit 5

GSSM-503  The Cold War
An examination of the origins and evolution of the Cold War. Emphasis will be placed upon the Russian-American conflict in the post World War II era, but attention will also be given to the Sino-American rivalry during this period.
Class 3, Credit 5

GSSM-504  Twentieth Century America
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 5

GSSM-507  International Relations
This course is designed to provide the student with an understanding of basic concepts and theories of international relations. American foreign policy, and the major developments in the contemporary world arena. Additionally, selected ideologies, doctrines, and institutions operative in the present international system will be analytically examined in order to shed light on the relationship between myth and objective reality in world politics.
Class 3, Credit 5

GSSM-508  Government and Politics of the Soviet Union
An examination of various aspects of the Soviet political system. Emphasis will be placed on the role of ideology, the Party apparatus, and governmental institutions. Additionally, aspects of Soviet political culture (e.g., political socialization and the existence of interest group activity) will also be studied.
Class 3, Credit 5

GSSM-510  Comparative Politics
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 5

GSSM-512  Urban Politics
For students interested in a general understanding of the capacity of urban government in solving urban problems.
Class 3, Credit 5

GSSM-513  Foreign Policy of the Soviet Union
An historical and analytical study of Soviet foreign policy since its inception. Special emphasis will be placed on the importance of ideology, the institutions and people who make policy, and the past and present relations with the United States, Western Europe, Eastern Europe, China, and the Third World.
Class 3, Credit 5
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Registration</th>
<th>Credit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSSM-514</td>
<td>Theories of Political Systems</td>
<td>#0513-513</td>
<td>5</td>
<td>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.</td>
</tr>
<tr>
<td>Class 3,</td>
<td>Credit 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GSSM-514</td>
<td>Politics in China</td>
<td>#0513-514</td>
<td>5</td>
<td>This course is designed to inform students of 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.</td>
</tr>
<tr>
<td>Class 3,</td>
<td>Credit 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GSSP-520</td>
<td>Introduction to Psychology</td>
<td>#0514-210</td>
<td>4</td>
<td>A selection of topics drawn chiefly from social and clinical psychology, learning, motivation, and personality with some reference to neuropsychology when relevant.</td>
</tr>
<tr>
<td>Class 3,</td>
<td>Credit 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GSSP-501</td>
<td>Industrial Psychology</td>
<td>#0514-501</td>
<td>5</td>
<td>Consideration of principles, application and current research in industrial psychology, with particular reference to personnel selection, training, motivation, morale, performance appraisal, leadership and communication.</td>
</tr>
<tr>
<td>Class 3,</td>
<td>Credit 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GSSP-503</td>
<td>Abnormal Personality</td>
<td>#0514-503</td>
<td>5</td>
<td>Description and theories of the nature and development of behavioral disorders. Contemporary treatment procedures will also be discussed.</td>
</tr>
<tr>
<td>Class 3,</td>
<td>Credit 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GSSP-504</td>
<td>Attitude Formation and Persuasion Techniques</td>
<td>#0514-504</td>
<td>5</td>
<td>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.</td>
</tr>
<tr>
<td>Class 3,</td>
<td>Credit 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GSSP-508</td>
<td>Psychology of Learning</td>
<td>#0514-508</td>
<td>5</td>
<td>A study of experimental investigation with emphasis upon the nature of the problems, procedures and theoretical significance of basic learning processes. This course will focus on selected topics related to human learning.</td>
</tr>
<tr>
<td>Class 3,</td>
<td>Credit 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GSSP-509</td>
<td>Psychology of Perception</td>
<td>#0514-509</td>
<td>5</td>
<td>A study of methods and research findings primarily in the field of visual perception together with an evaluation of theoretical interpretations.</td>
</tr>
<tr>
<td>Class 3,</td>
<td>Credit 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GSSP-510</td>
<td>Social Psychology</td>
<td>#0514-510</td>
<td>5</td>
<td>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.</td>
</tr>
<tr>
<td>Class 3,</td>
<td>Credit 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GSSP-511</td>
<td>Humanistic Psychology: An Introduction</td>
<td>#0514-511</td>
<td>5</td>
<td>Sometimes called “the new psychology.” Based on the assumption that each individual has inherent powers of growth toward self-realization. Emphasis on conscious awareness, perception, meaningfulness, and uniqueness in human experience.</td>
</tr>
<tr>
<td>Class 3,</td>
<td>Credit 5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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 and its procedures as well as modern methods of prevention, treatment and control.
Class 3, Credit 5

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 5

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 5

GSSS-517 Sociology of Deviant Behavior
Registration #0515-517
Examination of conditions under which deviance develops and changes over time. Study of individual deviance, deviant subcultures, and the transformation of a deviant identity.
Class 3, Credit 5

GSSS-518 Social Protest Movements
Registration #0515-518
The course will examine that pervasive phenomenon of modern life, the social protest movement from a sociological perspective.
Class 3, Credit 5

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 5

GSSS-520 Educational Sociology (Undergraduate)
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 5

GSSS-521 Sociological Seminar
Registration #0515-521
A course of minimum procedural as well as substantive structure which approaches from a sociological perspective, matters of contemporary concern.
Class 3, Credit 5

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 5

GSSS-523 Sociology of the Black or Afrikan Experience
Registration #0515-523
This seminar is designed to study the social movements directed towards social change. Aspects of black or Afrikan life and culture will be dealt with and emphasis is placed on the various ideologies among blacks.
Class 3, Credit 5

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 5

GSSS-531 Marriage
Registration #0515-531
Contemporary trends in courtship patterns, male-female relationships and marital systems.
Class 3, Credit 5

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, premarital and marital sexual behavior, and alternative sexual behavior.
Class 3, Credit 5

GSSS-570 The Homophiles and Their Society
Registration #0515-570
This course will examine the world of the homosexual, and an analysis of the diverse types to be found in it.
Class 3, Credit 5

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 elections. The student may, for example, participate in a volunteer community human service experience.
Credit variable

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

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 inter-personal, family, social and rehabilitation modes of communication.
Class 3, Credit 4

GLLC-431, 432, 433 Spanish I, II, III
Registration #0502-431, -432, -433
Spanish I, II, III
This is a specially designed course in conversational Spanish which lays stress upon communications in different languages or in argot, slang, and vernacular of the various groups of clients with whom the social worker is likely to come in contact with. Proficiency in Spanish would satisfy this requirement.
Class 3, Credit 4
A survey outlining the development of art in India, China and Japan and examining the philosophical circumstances that distinguish Eastern artistic traditions.

A critical examination of certain films as an integral part of modern culture. 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.

A systematic, integrated, and interpretive study of a growing field. Emphasis will be placed on the role of art in the daily life of American society, and on the impact of American art on the larger cultural context.

A detailed analysis of the art and times of the Baroque master. Emphasis will be placed on the development of his style and techniques, and to the character of the Baroque outlook.

A study of the 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.

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.

An introduction to and analysis of those ideas, philosophies and human attitudes that are associated with and expressed in major works of art from Giotto and des Prez to Stravinsky, Picasso and Wright.

An examination of American architecture from the year 1000 to the present. Emphasis will be placed on the study of the evolution of aesthetics and structure in English building art together with an analysis of the work of major English architects.

A study of the 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.

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.

An introduction to and analysis of those ideas, philosophies and human attitudes that are associated with and expressed in major works of art from Giotto and des Prez to Stravinsky, Picasso and Wright.

A critical examination of certain films as an integral part of modern culture. 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.

A systematic, integrated, and interpretive study of a growing field. Emphasis will be placed on the role of art in the daily life of American society, and on the impact of American art on the larger cultural context.

A detailed analysis of the art and times of the Baroque master. Emphasis will be placed on the development of his style and techniques, and to the character of the Baroque outlook.

A study of the 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.

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.

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.

An introduction to and analysis of those ideas, philosophies and human attitudes that are associated with and expressed in major works of art from Giotto and des Prez to Stravinsky, Picasso and Wright.

An examination of American architecture from the year 1000 to the present. Emphasis will be placed on the study of the evolution of aesthetics and structure in English building art together with an analysis of the work of major English architects.

A study of the 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.

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.

An introduction to and analysis of those ideas, philosophies and human attitudes that are associated with and expressed in major works of art from Giotto and des Prez to Stravinsky, Picasso and Wright.

A critical examination of certain films as an integral part of modern culture. 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.

A systematic, integrated, and interpretive study of a growing field. Emphasis will be placed on the role of art in the daily life of American society, and on the impact of American art on the larger cultural context.

A detailed analysis of the art and times of the Baroque master. Emphasis will be placed on the development of his style and techniques, and to the character of the Baroque outlook.

A study of the 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.

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.

An introduction to and analysis of those ideas, philosophies and human attitudes that are associated with and expressed in major works of art from Giotto and des Prez to Stravinsky, Picasso and Wright.

An examination of American architecture from the year 1000 to the present. Emphasis will be placed on the study of the evolution of aesthetics and structure in English building art together with an analysis of the work of major English architects.

A study of the 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.

A critical examination of certain films as an integral part of modern culture. 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.

A systematic, integrated, and interpretive study of a growing field. Emphasis will be placed on the role of art in the daily life of American society, and on the impact of American art on the larger cultural context.

A detailed analysis of the art and times of the Baroque master. Emphasis will be placed on the development of his style and techniques, and to the character of the Baroque outlook.

A study of the 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.

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.

An introduction to and analysis of those ideas, philosophies and human attitudes that are associated with and expressed in major works of art from Giotto and des Prez to Stravinsky, Picasso and Wright.

An examination of American architecture from the year 1000 to the present. Emphasis will be placed on the study of the evolution of aesthetics and structure in English building art together with an analysis of the work of major English architects.

A study of the 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.

A systematic, integrated, and interpretive study of a growing field. Emphasis will be placed on the role of art in the daily life of American society, and on the impact of American art on the larger cultural context.

A critical examination of certain films as an integral part of modern culture. 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.

A systematic, integrated, and interpretive study of a growing field. Emphasis will be placed on the role of art in the daily life of American society, and on the impact of American art on the larger cultural context.

A detailed analysis of the art and times of the Baroque master. Emphasis will be placed on the development of his style and techniques, and to the character of the Baroque outlook.

A study of the 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.

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.

An introduction to and analysis of those ideas, philosophies and human attitudes that are associated with and expressed in major works of art from Giotto and des Prez to Stravinsky, Picasso and Wright.

An examination of American architecture from the year 1000 to the present. Emphasis will be placed on the study of the evolution of aesthetics and structure in English building art together with an analysis of the work of major English architects.

A study of the 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.
GSSP-701 Developmental Psychology
Registration #0514-701
The course seeks to investigate the broad developmental patterns of normal human behavior, with emphasis on the growth of cognitive, personality, and culturally patterned behaviors.
Class 3, Credit 5

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 apply them to concrete situations that may arise for persons doing teaching.
Class 3, Credit 5

GSSP-710 Visual Concepts for Visual Practitioners
Registration #0514-710
An introduction to the analysis of basic principles of visual perception as they apply to the creation and interpretation of visual images, including 3-dimensional scenes, paintings, photographs, sketches, graphics, motion pictures and television. Emphasis will be on providing a structure for a better understanding on how the human visual system represents and relates visual information.
Class 3, Credit 5

GSSP-703 Educational Sociology
Registration #0515-703
The development of sociological and socio-psychological types of knowledge that have relevancy for or logical connection with educational processes. Based on substantive material about social phenomena making up the social order in which school systems are operating and by which they are influenced.
Class 3, Credit 5

PPHF-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.

PPHF-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

PPHF-209 Basic Television Production (Art and Design)
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 and limited studio electronic assembly 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-401 Introduction to Film Making and 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 the film, organizational and conceptual 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 technical and theoretical knowledge 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.
Class 2, Lab. 6, Credit 4

PPHF-402 Introduction to Non Fiction Film Production
Film making as a means of interpretation and expression with an emphasis in the non-fictional film form, 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-401 or a satisfactory equivalent)
Class 2, Lab. 6, Credit 4

PPHF-403 Introduction to Fiction and Dramatic Documentary 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 documentaries. Included will be the non-fictional narrative and conceptual film form. Application of the elements of structure and organizational principles appropriate to the main area of emphasis. A combined theoretical-practical approach to the dynamics of the film medium. The student is expected to demonstrate technical and theoretical knowledge of the film making process through a series of film assignments. Production will be in non-sync (Super 8 format). Students furnish film and processing; equipment is furnished by the department. (PPHF-402 or a satisfactory equivalent)
Class 2, Lab. 2, Credit 3/Qtr.

PPHF-407, 408, 409 Film History
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-421, 422 Writing for Film and Television Production
This course explores the writing of non-fiction and fiction for theatrical and non-theatrical films, and television. Experience in the writing of fiction concentrates on the elements of dramatic construction. The exploration of non-fictional writing examines information gathering techniques and methods of investigation. Both non-fiction and fiction are treated as exposition, story-telling forms. Students are responsible for writing film or television scripts on subjects of their own choosing and for completing several brief written exercises in areas such as character, setting, scene, interviews, suspense and plot. At the end of this course, students will have produced a complete short film script and assignment.
Class 2, Lab. 2, Credit 3/Qtr.

PPHF-501 Visualization and Commercial Film Production
A general review of professional production methods and the theory and practice of visualizing an expressive film continuum. Basic sound recording and single system camera use is included. (PPHF-403 or permission of the instructor)
Class 2, Lab. 6, Credit 4

PPHF-502 Film Planning and Studio Operations
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-501 or permission of the instructor)
Class 2, Lab. 6, Credit 4

PPHF-503 Film Project with Synchronous Sound
A short (3-5 min. suggested) film is produced by student teams. Advanced sound editing, sound mixing and A&B roll conforming are included. Cameras, lighting and editing equipment are provided but students are expected to provide sensitized goods. (PPHF-502)
Class 2, Lab. 6, Credit 4

PPHF-507, 508, 509 Television Production
Use of the television medium to communicate with audiences. Course emphasizes the producing and directing of informational programs of the student's design and includes work as a crew member on other students' productions: lighting, camera operation, video switching, audio control. A secondary emphasis is put on television as a social, legal and technical phenomenon. All materials are furnished except expendable graphic supplies.
Class 2, Lab. 8, Credit 4/Qtr.

General Photography
PPHG-200 General Photography
A 10-week summer course for students entering the transfer program in photographic illustration and professional photography. This is equivalent to Photography PPHG-201, 202, 203.
Credit 12

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

PPHG-207, 208, 209 Still Photography
A program in basic photography with emphasis on craftsmanship, theory, and visual communications. The major aim is to enable the student to form a broad foundation of understanding and skills necessary for advanced study in photography available in upperclass programs. The completion of this foundation year allows the student to select a more specific program culminating in a bachelor of fine arts or a bachelor of science degree.
Class 1, Lab. 6, Credit 3/Qtr.

PPHG-210 Materials and Processes of Photography
A 10-week summer course for students entering the transfer program in photographic illustration and professional photography. This course is equivalent to PPHG-211, 212, 213 Materials & Processes of Photography.
Credit 6
Photographic Illustration

PPHL-301, 302, 303 History and Aesthetics of Photography
PPHL Registration #0904-301, -302, -303
Class 3, Credit 3/Qtr.

This is a basic course and presupposes no background. The course will stress the way in which the world is seen through the camera and the language of photography. The course is open to all students.

Class 3, Lab. 9, Credit 6/Qtr.

PPHL-401, 402,403 Photography as a Fine Art I
Registration #0904-401, -402, -403
Class 2, Lab. 8, Credit 4/Qtr.

The third-year course for students majoring in photography as a fine art places emphasis on expanding the individual's ability and understanding of photography as a light-sensitive medium for communicating ideas. This is done through exploration of traditional as well as non-silver print-making techniques. The course is intended to develop an awareness and sensitivity to shared concepts among other disciplines in arts. (PPHL-303)

Class 2, Lab. 8, Credit 4/Qtr.

PPHL-411, 412,413 Photojournalism I
Registration #0904-411, 412, 413
Class 2, Lab. 8, Credit 4/Qtr.

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
Class 2, Lab. 8, Credit 4/Qtr.

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)

Materials and Processes 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 reviews of 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.

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 on the growth of the student's 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 line, form, photography, both in black-and-white and color images. (PPHL-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

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 within their own ideas under the guidance 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 to 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 upon the production of photographic images for publication in mass media. Study includes market research, marketing methods, accepted industry practices, as well as the production of photographic images for the market. (PPHL-413)

Class 2, Lab. 8, Credit 4/Qtr.

PPHL-521, 522, 523 Color Photography
Registration #0904-521, -522, -523
Workshop
A workshop course 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.
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-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 machine processing. 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.
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. Student will be involved with automated processing and finishing on a full production basis. (PPHS-201, 202, 203, or 21 credit hours of basic photography)
Class 1, Lab. 8, Credit 4/Qtr.

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

PPHM-320, 321 Mechanics of Photographic Registration
Registration #0905-320, -321
The course will cover causes, effects and benefits of the application of basic principles of 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.

PPHM-401, 402, 403 Photographic Process Control Registration
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 (PPHP-413, or permission of the instructor)
Class 2, Lab. 6, Credit 4/Qtr.

PPHM-410, 411, 412 Training and Supervision of Registration
Registration #0905-410, -411, -412
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 1, Lab. 8, Credit 4/Qtr.

PPHM-511, 512, 513 Advanced Production Processing Registration
Registration #0905-511, -512, -513
This course taken during the last year of study provides the student with an opportunity to study in depth, on an inde­pendent basis, those areas of processing and finishing which the student finds most interesting. This course may also be used to strengthen those areas of interest in which the student feels a weakness.
Lab. 12, Credit 4/Qtr.

PPHM-520 Operation, Care and Maintenance of Photofinishing Equipment
Registration #0905-520
This course will provide the student with an opportunity to gain a thorough understanding of the mechanical, optical, and electrical aspects of the major pieces of photofinishing equipment. This course will employ the latest techniques in programmed learning, demonstrative hands-on experience, and lectures so that the student will be able to operate and maintain 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. (PPPM-412)
Lab 3, Credit 1

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)
Class 3, Lab. 11, Credit 6/Qtr.

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 materials 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.
Class 2, Lab. 4, Credit 3/Qtr.

PPHP-407 AV Preparations and Presentations
Registration #0906-407
A survey of the problems involved in conceiving, constructing and exhibiting audiovisual productions. Special emphasis is placed on photographic techniques and how they relate to other phases of production. (PPHG-203)
Class 2, Lab. 8, Credit 4

PPHP-408 Scientific and Technical Application
Registration #0906-408
Class 2, Lab. 8, Credit 4

PPHP-409 Publications
Registration #0906-409
A survey of this type of publication with particular emphasis in 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 of the course content.
Class 2, Lab. 8, Credit 4
PPHP-411, 412, 413 Sensitometry Registration #0906-411, -412, -413 Provides the professional photographer with technical tools for solving photographic problems. Topics include statistical concepts, process control methods, sensitometry, densitometry, tone reproduction systems, color reproduction systems, and image evaluation. (SMAP-212, PPHS-203)
Class 3, Lab. 3, Credit 4/Qtr.

PPHP-421, 422, 423 Advertising Photography Registration #0906-421, -422, -423 A course built strictly to the standards of professional photography. Only those students who seriously aspire to be professional craftspeople should enroll. The assignments are specific and vary from strictly commercial to advertising illustration. In addition, the student is encouraged to specialize in the direction of his or her own natural ability and interests. Approximately half of the photography will be in color. (PPHP-303 and/or 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 instructional purposes including photographic evidence, forensic detection, safety. (PPHG-203)
Class 2, Lab. 6, Credit 4

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 subjects for independent study such as the dye transfer process, quality control methods in printing and processing and special masking. (PPHP-311 or some previous experience is required)
Lab. 8, 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.
Class 1, Lab. 5, Credit 4

PPHP-501, 502, 503 Industrial Photography Registration #0906-501, -502, -503 Depending on the student's interest, the course is subdivided into three areas of emphasis. 
(a) AV Preparations and Presentations; a continuation of PPHP-407 to a greater depth on a seminar basis. (PPHP-407 or permission of the instructor)
(b) Instrumentation; a continuation of PPHP-408 to a greater depth on a seminar basis. (PPHP-408, or permission of the instructor)
(c) Corporate and Special Interest Publications; a continuation of 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 is designed to give advanced students an opportunity to work relatively independently to either develop their portfolios and/or to explore specific areas of interest in-depth, either in the picture making areas or in image/materials manipulation techniques. It combines the individual initiative 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 2, Lab. 6, Credit 4/Qtr.
CLASS 2, LAB. 2, CREDIT 3

PPHS-412 Design of Experiments

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

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

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-301, SCHG-207)

Class 3, Lab. 3, Credit 4/Qu.

PPHS-501, 502, 503 Research Registration #0907-501, -502, -503

An investigation of a problem in photographic science or engineering, including planning and execution of experiments, statistical data analysis, and reporting results orally and in a written paper. (PPHS-403, PPHS-413)

Class 2, Credit 2 (Winter and Spring)

PPHS-511, 512, 513 Optical Instrumentation

Introduction to the use of photographic recording methods to obtain information and space information from object fields; principles for selection of camera, lens parameters, recording material, and recording rate; the use of time and space references to facilitate data retrieval. Laboratory work in planning and executing a time-lapse, normal or high-speed data recording project using 16mm cine apparatus. (PPHS-203)

Class 2, Lab. 6, Credit 4

PPHS-521, 522, 523 Image Systems and Evaluation

An analytical approach to analysis and evaluation of photographic and other image recording systems; objective and subjective evaluation techniques and their correlation. The use of convolution, correlation, autocorrelation, and Fourier methods in the analysis of the image recording systems. Laboratory work in the design of photo-optical systems. (PPHS-403, SMAM-305, SPSP-313, PPHS-413)

Class 3, Credit 3/Qu.

Graduate Courses

(Fifth year of five-year program)

PPHS-711, 712, 713 Theory of the Photographic Process

Physical structure and optical properties of the silver halide emulsion and their relations to the characteristic curve; chemistry and preparation of emulsions; extensive treatment of theory of sensitivity and latent image formation; chemistry and kinetics of processing, including color processing, theory of color reproduction; chemistry and physics of selected non-silver and other non-conventional processes. (PPHS-423, SPSP-313)

Class 3, Credit 3/Qu.

PPHS-301 Applied Processing Registration #0907-301

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-207, PPHS-202)

Class 2, Lab. 6, Credit 4

PPHS-302 Advanced Sensitometry of Black-and-White Registration #0907-302

The design of sensitometers for exposing photographic materials to light and other forms of radiation; densitometry; the measurement of exposure and processing effects; the analysis of data from densitometric tests; spectral response measurement; objective and subjective tone reproduction; the performance of the human visual system, the laboratory includes two extended problems on topics chosen by the student. (PPHS-203)

Class 2, Lab. 6, Credit 4

PPHS-303 Photographic Instrumentation Registration #0907-303

Introduction to the use of photographic recording methods to obtain information and space information from object fields; principles for selection of camera, lens parameters, recording material, and recording rate; the use of time and space references to facilitate data retrieval. Laboratory work in planning and executing a time-lapse, normal or high-speed data recording project using 16mm cine apparatus. (PPHS-203)

Class 2, Lab. 6, 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-203)

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; figures of merit; sinusoidal response functions; information and information capacity; characteristics of instruments used for small-scale image measurements. Laboratory work in microdensitometry and optical image formation. (SMAM-305, PPHS-203, SPSP-313)

Class 3, Lab. 6, Credit 5

PPHS-403 Principles of Color Photography Registration #0907-403

Theory of color mixing; sensitometry and densitometry of the three dye layers; analysis of photographic speeds of color materials; color reproduction; study of additive and subtractive color systems; physical behavior of the dyes in color systems; systems of color specifications (Munsell and CIE systems); masking in color photography; relationship between integral and analytical densities; practical methods of analyzing non-ideal color films; laboratory includes printing from color negatives, direct duplicating, printing from internegatives, determination of the equivalent neutral densities. (SMAM-305, SPSP-313, PPHS-203)

Class 3, Lab. 6, Credit 5

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
The principles of geometrical and physical optics with application to photographic instrumentation systems. Geometrical optics—general laws, first-order imaging, aberrations and geometrical image evaluation, mirror and prism systems, the eye and vision characteristics, radiometry of optical images, basic instrument systems. Physical optics—Maxwell’s equations, electromagnetic waves, polarization, interference and interferometers, coherence, Kirchhoff integral and Huygen’s principle, Fraunhofer and Fresnel diffraction, Fourier-transform formulation of diffraction, transferfunction description of imaging system performance.

Class 3, Credit 3/Qtr.

PPHS-741, 742, 743 Analysis and Evaluation Registration #0907-741, -742, -743 of 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 3/Qtr.

PPHS-890 Research and Thesis Guidance Registration #0907-890 Thesis based on experimental evidence obtained by the candidate in an appropriate field as arranged between the candidate and his or her advisor.

Credit 9 minimum for MS

Master of Fine Arts in Photography

PPHG-700 Fundamentals of Photographic Communication Registration #0907-700 A summer course for students entering the graduate program with insufficient undergraduate credits in photography and/or the visual arts. An intensive survey of photographic materials, processes, equipment and practice; workshop in the application of photography to the solution of problems in visual communication and design. Undergraduate credit (15 hours) will be granted upon completion.

Credits not applicable to MFA requirements.

PPHG-701, 702, 703 History and Aesthetics of Photography Registration #0903-701, -702, -703 Covering the history and aesthetics of photography from 1639 to the present with special emphasis on the development of photographic seeing, and its related effect on other media. A survey of the numerous processes and how their development affected the image-making of their particular period, i.e. daguerreotypes, calotypes, and ambrotypes. Student projects designed to illuminate phases of photographic history best understood by personal visual exploration.

Credit 3/Qtr.

PPHG-705, 706, 707 Student/Faculty Seminar Registration #0903-705, -706, -707 An all purpose weekly meeting to facilitate communication among all members of the MFA community.

Credit 1/Qtr.

PPHG-720 Photography (Still) Registration #0903-720 Photographic communications workshop: Individually planned studies in photographic visual communication as determined by faculty-student consultation based on the student’s personal objectives. Research, group critiques, seminars, and laboratory practice, field trips.

Credit 1-9

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.

Required for still photography majors.

Credit 3/Qtr.

PPHG-730 Cinematography Registration #0903-730 Film making workshop. Individually planned studies in cinematography, as determined by faculty-student consultation, group critiques, seminars, and laboratory practice, field trips.

Credit 3-9

PPHG-740 Photographic Museum Practice Registration #0903-740 Museum internship workshop, still or motion picture; research, assigned projects, seminars in history, function and administration of museums, with emphasis on photographic curatorial duties; practice in exhibition planning and development; field trips. This cannot be selected as a minor concentration.

Credit 3-9

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 1-9

PPHG-889 Pre- Thesis Seminar Registration #0903-889 Development and statement of written thesis proposal with emphasis on research required and exposure to various concepts of MFA thesis possibilities.

Credit 1

PPHG-890 Research and Thesis Registration #0903-890 Research, execution of a creative project and presentation of an acceptable exhibition with emphasis on technique, design, and communication. The candidate will select his or her thesis subject with the approval of the graduate committee and will deposit a suitable report and record of the thesis with the Institute. Museum majors will plan, assemble and take full responsibility for mounting a major photographic exhibit under the sponsorship of Rochester Institute of Technology, or a major museum or educational institution. The announcement, catalog, reviews and a satisfactory illustrated report of the project must be deposited with the Institute.

Credit 1-9
Master of Science in Photographic Science

PPHS-700  Principles of Photographic Science
Registration #0907-700
A course intended for students who have completed their undergraduate programs in engineering, or the sciences and who now wish to prepare themselves for entry into the graduate program in photographic science and instrumentation. It is an intensive course, assuming working knowledge of mathematics, physics, and chemistry, and includes radiation theory and radiometry, properties of radiation-sensitive materials, chemistry and kinetics of photographic processing, sensitometry, tone reproduction, principles of color measurement, and color photographic systems. (Preliminary admission to MS program in photographic science or consent of graduate coordinator)
Credit 15 (Summer only)
(Note applicable to 45 required graduate credits)

PPHS-701, 702, 703  Principles of Photographic Science
Registration #0907-701, 702, 703
Equivalent to PPHS-700, but offered in the evening and Saturdays during the regular Fall, Winter and Spring Quarters. (Preliminary admission to MS program in photographic science or consent of graduate coordinator)
Credit 5/Qtr.
(Note applicable to 45 required graduate credits)

PPHS-711, 712, 713  Theory of the Registration #0907-711, 712, 713
Photographic Process
Chemical and physical properties of silver halides and gelatin, physical structure and optical properties of the silver halide emulsion and their relations to the characteristic curve; chemistry and preparation of emulsions; extensive treatment of theory of sensitivity and latent image formation; chemistry and kinetics of processing, including color processing; theory of color reproduction; chemistry and physics of selected non-silver processes.
Credit 3/Qtr.

PPHS-721, 722  Mathematics and Statistics
Registration #0907-721, 722
A special graduate course in mathematics and applied statistics involving those areas of direct concern in design, analysis, and evaluation of photographic systems.
Credit 5/Qtr.

PPHS-731, 732, 733  Instrumental and Registration #0907-731, 732, 733
Photographic Optics
The principles of geometrical and physical optics with application to photographic instrumentation systems. Geometrical optics-general laws, first-order imaging, aberrations and geometrical image evaluation, mirror and prism systems, the eye and vision characteristics, radiometry of optical images, basic instrument systems. Physical optics-Maxwell's equations, electromagnetic waves, polarization, interference and interferometers, coherence, Kirchhoff integral and Huygen's principle, Fraunhofer and Fresnel diffraction, Fourier-transform formulation of diffraction, transferfunction description of imaging system performance.
Class 3, Credit 3/Qtr.

PPHS-741, 742, 743  Analysis and Evaluation Registration #0907-741, 742, 743
of 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. Consultant coordinator of the photographic science graduate program.)
Credit 3/Qtr.

PPHS-890  Research and Thesis Guidance
Registration #0907-890
Thesis based on experimental evidence obtained by the candidate in an appropriate field as arranged between the candidate and his or her advisor.
Credit 9 minimum for MS

School of Printing

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-301  Applications of Computers to Registration #0910-301
the Graphic Arts
A study of the applications of automated data processing, involving both tabulating systems and electronic computer systems, to the graphic arts industry. Topics include historical development, basic theory and concepts, general and special purpose computer applications. Both technical and managerial aspects of applications are considered.
Class 4, Credit 3

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

PPRM-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 imposition and pre-planning techniques; obtaining and interpreting specifications; design and use of estimating forms; pricing for a profit margin; preparing the quotation.
Class 4, Credit 4

PPRM-402  Estimating II
Registration #0910-402
Continuing study of commercial offset lithography estimating; multi-color offset presses and signature-related bindery operations; signature imposition; camera, layout, stripping and plate processing production times; phototypesetting and mechanical artwork costs; color separations and the costs associated with process color printing; valuing finishing operations. (PPRM-401)
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, emphasizing organizational alternatives relating to human factors. Includes such topics as organization, systems approach, decision making, production planning and control, purchasing, inventory control, quality control, methods analysis, work measurement. Some simple analytical models based on graph 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, assignment and transportation problems, linear programming, decisions under uncertainty. These topics are considered from conceptual and problem solving viewpoints without emphasis on mathematics beyond what can be covered adequately in the course.  
Class 4, Credit 4

PPRM-501  Financial Controls I  
Registration #0910-501  
Gives the line manager an understanding of the firm's financial accounting system so that he or she can work with the accountant to use that system effectively. Includes balance sheet, income, funds and cash statements, ratio analysis and asset vs. expense decisions.  
Class 4, Credit 3

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, accounting and alternative choice decisions; capital investment decisions; budget preparation, standard cost, variance analysis and the management control process.  
Class 4, Credit 4

PPRM-503, 504  Statistics of Quality  
Registration #0910-503, -504  
Control I, II  
Fundamental concepts of statistics and the application of statistical methods to the control and investigation of processes and operations. (SMAM-201)  
Class 4, Credit 4

PPRM-505  Advertising Management  
Registration #0910-505  
A survey of the advertising industry and its relationship to printing; advertising research, copywriting, media, and the social aspects of the advertising process.  
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  Estimating Workshop  
Registration #0910-507  
Estimating for letterpress, flexography, gravure and screen printing; special considerations in web-fed press planning; estimating practices in the business forms and book manufacturing industries; addressing, mailing and order fulfillment; pre-planning and break-even analysis; computer-assisted estimating systems; techniques for competitive estimating and pricing.  
Class 4, Credit 4

PPRM-508  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 courses 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. Introduces 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

PPRM-513  Sales in the Registration #0910-513  
Graphic Arts  
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 Publishing  
Registration #0910-515  
Legal aspects of news gathering; freedom of the press; state and federal legislation; libel, privilege, obscenity, privacy, copyright, and laws applying to advertising, photography, and publishing.  
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-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 independent study project of his or her own design. Project and amount of credit assigned must be approved by director of School of Printing. Credit by arrangement
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 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 on modern composing room procedures.
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 phototype-setting; 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
Historical analysis of letter forms; essential requirements and principles of layout and printing design as applied to commercial printing and advertising; practical application of theory in solving printing design problems.
Class 2, Lab. 3, Credit 3

PPRT-204  Relief Press
Registration #:0911-204
Theory and practice of letterpress presswork using platen and cylinder presses; techniques, mechanics of equipment, care of equipment and materials used; application of special techniques of letterpresses, diecutting, scoring, numbering, perforating, embossing, makeready methods for line and halftone printing; press preparation of various plates for printing; introduction to flexographic printing.
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 negatives for the major printing processes.
Class 2, Lab. 3, Credit 3

PPRT-207  Printing Plates
Registration #:0911-207
Introductory course in the elements of platemaking procedures for letterpress, flexographic, and lithographic plates, gravure cylinders, and electronically engraved plates. Theoretical study plus practical involvement in making of various plates.
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; exercise 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; experiences in printing of papers, plastics, and irregular shapes; 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-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.
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; field trips. (PPRT-202)
Class 2, Lab. 4, 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-305  Gravure
Registration #:0911-305
Laboratory and technical course embracing the theories and practices of gravure presswork using sheet-fed presses. Demonstrations and class use of three-unil web press will also be incorporated; study of related information on techniques, equipment, materials, and supplies.
Class 2, Lab. 3, Credit 3

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 half tone sensimetry and process control. (PPRT-208)
Class 2, Lab. 3, Credit 3

PPRT-307  Lithographic Plates
Registration #:0911-307
Advanced lithographic plate course covering the theory and practice of all types of litho plates; their processing, problems, controls, and applications in the industry. Included are related plate department operations such as step and repeat, and work with roomlight-contact films.
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.
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 Relief and Gravure Plates
Registration #0911-310
An introduction to the technological requirements involved in producing relief printing plates. Original and duplicate plate characteristics are considered in light of typical production needs. Chemical, mechanical, and electronic processes are dis­cussed and illustrated in lecture and laboratory experiences.
Class 2, Lab. 3, Credit 3

PPRT-311 Imposition and Finishing
Registration #0911-311
This course is designed to understand imposition planning as related to and governed by folding and other finishing operations. Content deals with the concepts of pre-press planning, binding and finishing. Included are topics on preparing layouts, forms and folded paper material for binding. Laboratory experiments in­clude operation of modern bindery equipment and the binding of a hardcover bound book.
Class 2, Lab. 3, Credit 3

PPRT-312 Stripping
Registration #0911-312
Examination and treatment of negative and positive films to re­move defects; study and application of various methods of as­sembling film negatives or positives into flats in preparation for platemaking; study of proofing systems and types of impositions.
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 pre­paration, and 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: standard in 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 3, Lab 2, Credit 4

PPRT-316 Production for Book Publishing
Registration #0911-316
A study of the procedures utilized in the modern production of books, from the viewpoint of both publishing firms and book manufacturers. The structure of the publishing industry is ana­lyzed, along with each step in the production of a book, from manuscript to bound copy.
Class 3, Credit 3

PPRT-317 Calligraphic Forms
Registration #0911-317
An introduction to the basics of calligraphy; exercises in use of broad-edge 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 methods of producing a newspaper by both the letter­press and the lithographic processes; uses of hot type and cold type composition; newspaper makeup procedures in hot type as well as pasteup methods with the use of cold type; a review of basic camera, stripping, plate, and press operations. (PPRT-319)
Class 2, Lab. 3, Credit 3

PPRT-321 Web Offset
Registration #0911-321
An analytical study of the technological developments in web offset; emphasis on the interrelationship of procedures, ma­terials, and equipment; principles of quality control and problem solving; practical laboratory projects on a commercial four-unit perfecting web offset press. (PPRT-208)
Class 2, Lab. 3, Credit 3

PPRT-401 Typographic Workshop
Registration #0911-401
Principles of typography applied to individual projects, depen­ding upon the educational objectives of each student. Oppor­tunity is allowed for complete use of the facilities of the typo­graphic composition laboratories. (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 are studied implicating numerous graphic arts machines and devices. Students will perform labo­ratory experiments using basic electronic components and in­struments.
Class 2, Lab 2, 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 2, Lab. 3, Credit 3
PPRE-701 Development of Printing Types
Registration #0911-701
A prerequisite course for most students working in the printing education major. A study of historical trends along with the development and overview of philosophy and methodology, including a survey of current industrial education teaching problems.
Credit 4

PPRE-702 Teaching Methods in Graphic Arts
Registration #0908-702
The study of the criteria necessary for selecting the methods, procedures, and materials relevant to planning and executing an effective lecture or demonstration lesson.
Credit 4

PPRE-712 Lithographic Press Methodology
Registration #0908-712
A study of the principles, materials, and equipment used in lithographic presswork, set-up and operation of sheet-fed presses. An independent graduate research project is required.
Credit 4

PPRE-713 Typographical Procedures
Registration #0908-713
An introductory course in the basic tenants 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.
Credit 4

PPRE-714 Color Separation Photography
Registration #0908-714
Color separation and color corrections; color theory, masking requirements, tone reproduction for color, color proofing systems, electronic scanner. An independent graduate research project is required.
Credit 4

PPRE-720 Photographic Reproduction Technology
Registration #0908-720
The fundamental principles, procedures, techniques, and applications of the photographic process as it is related to the production of negatives for the major printing processes. An independent graduate research project is required.
Credit 4

PPRE-721 Screen Printing
Registration #0908-721
Theory and practice of screen printing including preparation of positives, frames, fabrics, stretching of fabrics, stencil methods, fillers, squeegees, inks, presses, and dryers; experiences in printing of papers, plastics and irregular shapes.
Credit 4

PPRE-860 Practice Teaching in the Graphic Arts
Registration #0908-860
A 10-week teaching experience in a school offering an appropriate exposure for the student teacher in the areas of student relationships and understanding, development of teaching methods and procedures, and a supervised involvement in the duties of the cooperating teacher.
Credit 12
PPRT-700 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, cross vs. nested experiments, studying individual effects, introduction to matrix algebra, regression analysis, planning experiments from a statistical point of view, basic experimental designs, factorial experiments, fractional factorials, determination of optimum conditions, introduction to nonparametrics and quality control concepts (as time allows).
Credit 5

PPRT-705, 706, 707 Application of Mechanics and Electronics
Registration #0911-705, 706, 707 to Materials, Machine Design, and Processes in Printing
Force systems, elementary dynamics, work, power, and energy, relation to stress and strains, particularly as applicable to printing equipment and processes; torsion stresses of printing materials; design of machine elements; bearings, gears, shafts, fasteners, and frames; application of basic circuits to electronic devices and systems.
Credit 4/Qtr.

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 study. (PPRM-701) Credit 4

PPRT-709 History of Printing Technology
Registration #0911-709
A study of the forces which have influenced the development of printing with emphasis upon the technological factors involved; examinations of the relationships of aesthetics and craft concepts to modern industrial techniques.
Credit 4

PPRT-710 Introduction to Paper
Registration #0911-710
A study of the interrelationships of paper, ink and printing processes; emphasis is placed upon physical and optical properties of paper, including the pulping and papermaking, paper testing and problem solving. An independent graduate research project is required.
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-712 Printing Plate Methodology
Registration #0911-712
Elements of platemaking procedures for letterpress, flexographic and lithographic plates, and gravure cylinders; theoretical study plus practical involvement in making of various plates. An independent graduate research project is required.
Credit 4

PPRT-714 Relief Press Methodology
Registration #0911-714
Theory and practice of letterpress presswork using platen and cylinder presses; techniques, mechanics of equipment, care of equipment and materials used; application of special techniques on letterpresses, die cutting, scoring, numbering, perforating, embossing; make-ready methods for line and halftone printing; prepress preparation of various plates for printing; introduction to flexographic printing. An independent graduate research project is required.
Credit 4

PPRT-715 Gravure
Registration #0911-715
An 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 web press. An independent graduate research project is required.
Credit 4

PPRT-716 Layout and Printing Design
Registration #0911-716
Historical analysis of letter forms; essential requirements and principles of layout and printing design as applied to commercial printing and advertising; practical application of theory in solving printing design problems. An independent graduate research project is required.
Credit 4

PPRT-717 Copy Preparation
Registration #0911-717
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 plate-making and photoengraving; proper instructional specification writing. An independent graduate project is required.
Credit 4

PPRT-718 Imposition and Finishing Procedures
Registration #0911-718
This course is designed to help the student understand imposition planning as related to and governed by folding and other finishing operations; content deals with the concepts of pre-press planning, binding and finishing. Included are topics on preparing layouts, forms and folded paper material for binding. Laboratory experiments include operation of modern bindery equipment and the binding of a hardcover bound book. An independent graduate research project is required.
Credit 4

PPRT-719 Photocomposition
Registration #0911-719
Emphasis on use and operation of composing machines; introduction to use of computers in printing; operation and application of photocomposition and cold type processes; practice on specialized equipment; participation in field trips required. An independent graduate research project is required.
Credit 4
College of Science

SSEG-201 Contemporary Science—Biology
Registration #1018-201
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, (F, W, S)
Class 4, Credit 4

SSEG-202 Contemporary Science—Chemistry
Registration #1018-202
The overall intent of this course is to relate the important role of chemistry to issues of immediate and contemporary concern. Basic chemistry principles are discussed qualitatively and then applied to environmental concerns, energy, pesticides, food and drugs, and the properties of polymers. Lap-dissolve projection, current films and invited speakers are integrated into the lecture schedule. (F, W, S)
Class 4, Credit 4

SSEG-203 Contemporary Science—Physics
Registration #1018-203
Introductory science for non-science students. Several topics such as 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 is offered for the small-group meetings once a week, which reinforce the material given in demonstration lectures and audiovisual presentations. (F, W, S)
Class 4, Credit 4

SSEG-204 Contemporary Science—Mathematics
Registration #1018-204
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. (F, W, S)
Class 4, Credit 4

Biology

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 courses and have specified prerequisites, contact hours, and examination procedures. (Offered every quarter.)
Class variable, Credit variable

SBIB-599 Independent Study—Biology
Registration #1001-599
Faculty directed study of appropriate topics on a tutorial basis. This course will generally be used to enable an individual to pursue studies of existing knowledge available in the literature. (Offered every quarter.)
Class variable, Credit variable

Molecular & Cellular Biology

SBIC-320 Histology
Registration #1002-320
Detailed study of the structure and function of normal and abnormal vertebrate tissue (SBIG-201) (F)
Class 2, Lab. 4, Credit 4

SBIC-401 Immunohematology
Registration #1002-401
Composition of blood, blood groups, and the chemistry and immunology of blood-like substances. Structures of hemoglobin, chemical and physical properties of the red cell membrane. Chemical genetics of blood groups with reference to practical applications in hospital procedures. Antigen-antibody reactions and compatibility of blood groups will be emphasized in the laboratory. (F)
Class 3, Lab. 3, Credit 4

SBIC-402 Immunology
Registration #1002-402
Fundamental study of nature of antigens and antibodies, the mechanisms of agglutination, precipitation, complement fixation, anaphylaxis; the theoretical and practical aspects of the immune response, immunological tolerance, and allergic reactions. Laboratory work: preparation, standardization, and assays of antigens and antibodies. (SBIC-404) (F)
Class 2, Lab. 3, Credit 3

SBIC-403 Advanced Cellular Biology
Registration #1002-403
An in-depth study of the structure and physiology of membrane bound organelles, molecular genetics, and the biochemistry of genetic events. (SBIG-421, SCHO-232)
Class 3, Lab. 3, Credit 4

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. (SBIG-201) (F)
Class 3, Lab. 4, Credit 5

SBIC-405 Medical Microbiology
Registration #1002-405
Pathogenic micro-organisms, host-parasite relationships, epidemiology, public health, virology, pathogenic molds, principles of immunology. Advanced laboratory techniques, anaerobiosis, assays, quant, tests, isolating and identifying pathogens. (SBIC-404) (W)
Class 3, Lab. 3, Credit 4

NOTE: From time to time special courses may be offered in the Contemporary Sciences series, e.g., Environmental Geology, Oceanography, etc.

NOTE: Quarter offered follows course description in parentheses; F-Fall; W-Winter; S-Spring; SR-Summer
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. (W)
Class 4, Credit 4

SBIC-408 Immunobiology
Registration #1002-408
An investigation of the development of an immune response in laboratory animals using a wide variety of methods. Each student follows an immune response in a group of animals during the quarter. (SBIC-402) (W-alternate years)
Class 1, Lab 6, Credit 3

SBIC-409 Plant Anatomy
Registration #1002-409
A detailed study of the cellular structure and development of plant tissues and organs. (SBIG-201, SBIG-202, SBIG-203) (S-alternate years)
Class 3, Lab 3, Credit 4

Developmental, Genetic & Environmental Biology

SBID-240 General Ecology
Registration #1003-240
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, biogeography and representative ecosystems. (SBIG-203) (S)
Class 3, Lab, 3, Credit 4

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. (SBIG-203, SBID-240) (S)
Class 3, Lab, 3, Credit 4

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 humans. (SBIG-202, SBIG-203) (S)
Class 3, Lab, 3, Credit 4

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. Both plant and animal systems are considered. (SBIG-203) (F)
Class 2, Lab, 6, Credit 4

General Biology

SBIG-201, 202, 203 General Biology
Registration #1004-201, -202, -203
Basic principles of modern cellular biology including cell structures and the materials which make up cells; physiological processes and their mechanisms in cellular functions; principles of genetics and evolution; organic systems; principles of ecology. The three quarters may be taken in any sequence. No prerequisite is needed for any sequence of the course. (201 -F, SR, 202-W SR, 203-S SR)
Class 3, Lab, 3, Credit 4

SBIG-210 ** Human Biology I
Registration #1004-210
(Microbiology & Disease)
The fundamental processes of living organisms with particular emphasis on the cause, nature, and impact of some of the common diseases of the human body. (F)
Class 4, Credit 4

SBIG-211, 212** Human Biology II, III
Registration # 1004-211,-212
(Physiology & Anatomy)
An introduction to the structure and function of the human body. The laboratory exercises are designed to demonstrate some of the physiological functions which take place in the human body and include exercises in basic histological technique. (211-W, 212-S)
Class 3, Lab, 3, Credit 4

SBIG-213 ** Biology of Human Reproduction
Registration #1004-213
The study of the anatomy, functioning and diseases of the human reproductive systems. An introduction to human heredity, inherited diseases, and birth defects. (W)
Class 4, Credit 4

SBIG-221** Cell Biology
Registration #1004-221
The basic structure and functioning of the cell, including ultrastructure, metabolism, reproduction, and cellular interaction. (F)
Class 3, Lab, 3, Credit 4

SBIG-311 Introduction to Pathology
Registration #1004-311
An introduction to the terminology and concepts of the pathological nature of diseases and the clinical and laboratory methods used in diagnosis of diseases. (SBIG-201, SBIG-202 or SBIG-210, SBIG-211) (S)
Class 3, Credit 3

SBIG-440 ** Environmental Microbiology
Registration #1004-440
Micro-organisms in water and sewage, biological and medical aspects. Methods for detection, isolation, and enumeration. Treatment methods for eliminating and controlling harmful organisms. (S, SR)
Class 3, Lab, 2, Credit 4

Organismal Biology

SBIO-301 Invertebrate Zoology
Registration #1006-301
Biology of invertebrate animals with reference to classification, structure, function, and ecology. (F)
Class 3, Lab, 3, Credit 4

SBIO-302 Vertebrate Zoology
Registration #1006-302
Morphology, physiology, behavior classification, and ecology of chordates. (W)
Class 3, Lab, 3, Credit 4

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. (Minimum of 8 credits in biological science.) (S)
Class 3, Lab, 3, Credit 4

SBIO-304 Botany
Registration #1006-304
An introduction to the major groups of plants and their adaptation to their particular environment. (F)
Class 3, Lab, 3, Credit 4

*Not acceptable for biology credit for biology majors.
SBIO-305, 306 Physiology and Anatomy
Registration #1006-305, 306
Cellular make-up of the body and aggregation into functional units. Tissues, organs, and systems and their relationship in terms of their structure and function. (SBIG-201, SBIG-202, SCHG-217) (305-W, 306-S)
Class 3, Lab. 3, Credit 4

SBIO-410 Plant Physiology
Registration #1006-410
Physiological phenomena in the growth and development of higher plants. Water relationships, photosynthesis, translocation, mineral nutrition, growth, hormonal control and reproduction. (Minimum of 10 credits in biological science.) (S-alternate years)
Class 3, Lab. 6, Credit 5

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 plant life with special emphasis on local flora. Practice in use of manuals and interpretation of morphological characters. (SBIO-304) (P-alternate years)
Class 2, Lab. 6, Credit 4

SBIO-412 Parasitology
Registration #1006-412
Structure, life cycle, and control of human parasites. Emphasis on forms of diagnostic importance. (Minimum of 10 credits in biological science.) (S)
Class 3, Lab. 3, Credit 4

SBIO-413 Comparative Physiology
Registration #1006-413
A comparative study of the physiological mechanism of a selected group of animals with particular emphasis on circulatory, respiratory, excretory and neuromuscular phenomena. (SBIG-201, SBIG-202) (F)
Class 3, Lab. 3, Credit 4

SBIO-605 Advanced Physiology
Registration #1006-605
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, SBIO306, SCHB-602, SCHB-603) (S)
Class 3, Credit 3

Biological Techniques
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 radiotopes in plant and animal research. (Minimum of 20 credits in biological science.) (F)
Class 2, Lab. 6, Credit 4

SBIT-431 Histological Technique
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. (SBIG-201) (S)
Class 1, Lab. 4, Credit 3

SBIT-432, 433 Biology Laboratory Techniques
Registration #1007-432, 433
Instrumental and experimental methods of analysis of biological material. The first quarter stresses the principles of laboratory instruments, which include photometry, fluorometry, electrophoresis, chromatography, and radioactive particle counters. The second quarter is devoted to applications in the clinical laboratory. (432-F-W, 433-S)
Class 2, Lab. 6, Credit 4

SBIT-541, 542, 543

SBIT-541 Radiation Biology
Registration #1007-541, 542, 543
Faculty directed student projects or research usually involving original laboratory work and/or calculations over a period of at least two quarters.
Class variable, Credit variable

SBIT-670 Introduction to Electron Microscopy
Registration #1007-670
An introduction to the theory and practice of electron microscopy. Laboratory experience includes fixation, staining, sectioning, and mounting of selected tissue samples as well as operation and maintenance of a medium resolution electron microscope. (Offered upon sufficient request)
Class 1, Lab. 6, Credit 3

Chemistry
SCHA-261, 262, 263

SCHA-261 Introduction to Analytical Chemistry—Instrumental 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. (261-F, 262-W, 263-S)
Class 2, Lab. 5, Credit 3

SCHA-311 Analytical Chemistry—Instrumental Analysis
Registration # 1008-311
Elementary treatment of instrumental theory and techniques, properties of light: refractive index; ultraviolet, visible and infrared spectrophotometry; emission spectrophotometry; flame photometry; electrochemistry; Nernst Law; pH meters and electrodes. (SCHC-213) (F)
Class 3, Lab. 4, Credit 4

SCHA-312 Analytical Chemistry—Seprations
Registration # 1008-312
Inorganic and organic separations; Rasolt and Henry Laws; phase rule; distillation; extraction; adsorption and surface effects; electrophoresis; chromatography including gas, liquid, column, paper, thin layer, and ion exchange. (SCHC-213) (W)
Class 3, Lab. 4, Credit 4

SCHA-612 Instrumental Analysis
Registration # 1008-612
Theory, applications and limitations of instrumental methods in qualitative, quantitative, and structural analysis. Topics covered include florescence and phosphorescence, Raman, mass spectrometry, nuclear magnetic resonance, X-ray and radiochemistry, and electrochemistry. (SCHP-313) (F, W)
Class 3, Lab. 5, Credit 5

SCHA-613 Advanced Analytical Chemistry
Registration # 1008-613
Theories underlying analytical methods, trace analysis, new instrumental techniques, organic quantitative analysis and non-aqueous titrimetry. Project oriented laboratory optional. (SCHP- 313) (S)
Class 3, Lab. 3, Credit 3 or 4

SCHB-602 Biochemistry
Registration #1009-602
Class 3, Credit 3
SCHB-603 Biochemistry—Metabolism
Registration #1009-603
Bioenergetics principles; catabolism of carbohydrates, fatty acids and amino acids; photosynthesis, biosynthesis of carbohydrates, lipids, and nitrogenous compounds; active transport; metabolic diseases. (SCHB-602) (W)
Class 3, Credit 3

SCHC-672 Special Topics—Chemistry
Registration #1010-672
Advanced courses which are of current interest and/or logical continuations of the courses 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

SCHG-201, 202, 203, 204 General, Organic, Registration #1011-201, -202, -203, -204 and Biochemistry
Terminal, four quarter survey of chemistry presented for the non-science majors, e.g., Dietetics students. Laboratory emphasis on introduction to methods of chemical analysis, qualitative and quantitative techniques. (201-W, 202-S, 203-F, 204-W)
Class 3, Lab. 3, Credit 4

SCHG-205, 206, 207 General and Organic Chemistry Registration #1011-205,-206,-207 Laboratory
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. (205-F, 206-W, 207-S)
Lab. 3, Credit 1

SCHG-208, 209 College Chemistry Registration #1011-208,-209
For engineering students. The concept of energy and the work function is discussed in terms of industrial chemical processes. Topics include applications of the gas laws, equilibrium theories, nuclear and electrochemistry, thermodynamics, and modern instrumental methods of structure analysis. Students will have two lectures and one recitation period per week. One additional lecture period is scheduled for chemistry demonstration material, problem review and simulated laboratory experiments. (208-F, 209-S)
Class 4, Credit 4

SCHG-215, 216, 217 General & Analytical Registration #1011-215, -216,-217
Principles of chemistry presented for students in medical technology and life sciences; laboratory emphasis; inorganic chemistry, separations techniques, quantitative analysis. (215-F, Class 3, Lab. 3, Credit 4) (216-W, Class 3, Lab. 3, Credit 4) (217-S, Class 3, Lab. 6, Credit 5)

SCHG-271 Chemistry of Water Registration #1011-271
Basic training in general chemistry assuming no prior experience, concentrating on those aspects important in the field of water conservation. Laboratory work trains the student in volumetric analysis. (F, W)
Class 2, Lab. 3, Credit 3

SCHG-272 Chemistry of Water Registration #1011-272
Chemistry of organs, metals, construction materials, radioactive and other environmental pollutants, and other substances related to water analysis. Laboratory practice in water analysis, including use of instrumentation. (S, SR)
Class 2, Lab. 3, Credit 3

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 applications in ink, paper, photo-lithographic processes and other topics as time allows. (281-F, 282-W, 283-S)
Class 3, Lab. 2, Credit 4
SCHI-661, 662 inorganic Chemistry
Registration #1012-661, -662
The properties and structures of the elements and their compounds in relation to electronic and stereo-chemical principles; inorganic lab techniques. (SCHO-433, SCHP-443) (661-S, SR; 662-F, W)
Class 3, Lab. 3, Credit 4

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 alkanes, alkenes, alkynes, and aromatic molecules. (SCHC-212 or permission of instructor) (S)
Class 3, Credit 3

SCHO-231, 232 Organic Chemistry
Registration #1012-231, -232
Types of organic compounds, names, and structures, preparations, properties, and reactions. Laboratory work emphasizes techniques; involves preparations and analysis. (SCHG-216 or SCHG-206) 231-F, 232-W
Class 3, Lab. 3, Credit 4

SCHO-233 Organic Chemistry
Registration #1013-233
Chemistry of the major classes of compounds of direct biological significance: carbohydrates, proteins, nitrogen heterocycles. Basic mechanisms of organic reactions and methods of elucidation, including spectrophotometry. (SCHO-232) (S)
Class 3, Lab. 3, Credit 4

SCHO-431, 432,433 Advanced Organic Chemistry
Registration #1013-431, -432, -433
Study of organic compounds: nomenclature, preparations, reactions, and properties including spectral structural determinations. Electronic mechanistic interpretations emphasized. Laboratory work involves techniques; involves preparations and analysis. (SCHC-213 or SCHG-207 or SCHG-217) (431-F, W, 432-S, SR, 433-F, W)
Class 3, Lab. 6, Credit 5

SCHO-631 Advanced Organic Chemistry
Registration #1013-631
Several of the following advanced topics in organic chemistry are covered: polyfunctional compounds, modern synthetic methods, stereochemistry, conformational analysis, free radical reactions, natural and synthetic polymers. (SCHO-433) (Offered upon sufficient request)
Class 3, Credit 3

SCHO-632 Advanced Organic Chemistry
Registration #1013-632
Topics include activation parameters, kinetic and non-kinetic treatment of mechanism elucidation, linear free energy concepts, quantitative analysis of conformational and electronic effects, simple Huckel Molecular Orbital Theory, electrocyclic reactions, acidity functions, and primary and secondary isotope effects. (SCHO-433, SCHP-443) (Note: SCHO-631 is recommended but not required) (Offered upon sufficient request)
Class 3, Credit 3

SCHO-636 Spectrometric Chemical Identification
Registration #1013-636
of Organic Compounds
The theory and application of nuclear magnetic resonance, infrared, mass spectrometry, and ultraviolet spectra as applied to organic structure determination are covered in this course. (SCHO-433)
Class 2, Credit 2

SCHO-638 Systematic Identification of Organic Compounds
Registration #1013-638
In this laboratory course the student utilizes systematic chemical and spectral tests to deduce the structure of organic compounds. (SCHO-433)
Lab. 6, Credit 2

SCHP-640 Introduction to Physical Chemistry
Registration #1014-640
Properties of gases, kinetic molecular theory; Boltzmann distribution functions; non-ideal behavior; first law of thermodynamics; heat capacities; Euler’s theorem and homogeneous functions; thermochemistry, and introduction to the second law. (SCHC-213) (S)
Class 3, Lab. 3, Credit 4

SCHP-441, 442,443 Physical Chemistry
Registration #1014-441, -442, -443
Atomic theory, states of matter, chemical thermodynamics, molecular properties, solutions, equilibria, phase rule, electrochemistry, kinetics, surface chemistry, and photochemistry. (SCHP-340, SPSP-311) (441-F, W; 442-S, SR; 443-F, W)
Class 3, Lab. 3, Credit 4

SCHP-641 Chemical Thermodynamics
Registration #1014-641
A study of the basic fundamentals of thermodynamics and their use in deriving the interrelationships of thermodynamic functions. Applications to thermochemistry, chemical and phase equilibria are made. (SCHP-443, SMAM-307) (Offered upon sufficient request)
Class 3, Credit 3

SCHP-642 Survey of Physical Chemistry
Registration #1014-642
This course will present the elements of physical chemistry to students whose interests are in those areas (such as biology, health related professions, printing, photography, etc.) in which they may have had a minimal exposure to physical chemistry. Molecular structure, thermodynamics, and kinetics will be discussed with a minimum of mathematics. (SCHP-215,216,217, SCHP-231,232 or consent of instructor) (W)

SCHP-647 Principles of Magnetic Resonance
Registration #1014-647
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, and no previous knowledge of the subject material is assumed. (SCHP-443, SMAM-307) (Offered upon sufficient request)
Class 3, Credit 3

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, they may have had a minimal exposure to physical chemistry. Molecular structure, thermodynamics, and kinetics will be discussed with a minimum of mathematics. (SCHP-215,216,217, SCHP-231,232 or consent of instructor) (W)
Class 3, Lab. 9, Credit 6

SCHT-242 Chem Tec II (Analytical)
Registration #1015-242
Class 4, Lab. 9, Credit 6

SCHT-243 Chem Tec III (Organic)
Registration #1015-243
Techniques of handling organic compounds: recrystallization and melting points, distillation, extraction. Reflective index and optical activity. Reactions of functional group classes. Infra-red spectrophotometry. (SR, F)
Class 3, Lab. 9, Credit 6
SCHT-244 Chem Tec IV (Organic) Registration #1015-244
Continuation of classes and reactions of organic compounds. Synthetic techniques, vacuum distillation, gas chromatography. (W, S)
Class 2, Lab 5, Credit 5

SCHT-305 Chemical Specialty (Spectrometry) Registration #1015-305
Quantitative analysis including trace analysis by spectrometric methods involving visible, infra-red, ultra-violet and atomic absorption. Techniques of sample preparation, spectral scanning and measurement using a variety of instruments. Interpretation of spectra. (SR, F)
Class 2, Lab 6, Credit 4

SCHT-306 Chemistry Specialty Registration #1015-306
The final academic quarter of the Chem Tec curriculum is designed so that students are given the opportunity to develop more definite options as to their own individual goals. The student may elect to branch-off into one of three areas of specialization: advanced instrumental techniques, the development of synthetic techniques in organic chemistry and polymer technology. (W, S)
Class 2, Lab 6, Credit 4

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. (307-F, SR)
Credit variable

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. (F, SR)
Lab. 4, Credit 2

Graduate Courses
Master of Science in Chemistry and Master of Science in Clinical Chemistry

SCBA-612 Instrumental Analysis Registration #1008-612
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, Lab. 5, Credit 5

SCBA-613 Advanced Analytical Chemistry Registration #1008-613
Theories underlying analytical methods, trace analysis, new instrumental techniques, organic quantitative analysis and non-aqueous titrimetry. Project oriented laboratory optional. (SCHA-312, SCHA-612)
Class 3, Lab. 3, Credit 3 or 4

SCBA-712 Advanced Analytical Chemistry Registration #1008-712
Theories behind analytical methods; complexity with applications to separations and masking; theory of electrode processes, specific ion electrodes; non-aqueous methodology; new analytical techniques. (SCHHA-612)
Class 3, Credit 3

SCBA-602 Biochemistry Registration #1009-602
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 or SCHO-232)
Class 3, Credit 3

SCBA-603 Biochemistry—Metabolism Registration #1009-603
Bioenergetics principles; catabolism of carbohydrates, fatty acids and amino acids; photosynthesis, biosynthesis of carbohydrates, lipids, and nitrogenous compounds; active transport; metabolic diseases. (SCHA-602)
Class 3, Credit 3

SCBA-604 Biochemistry—Nucleic Acids and Molecular Genetics Registration #1009-604
The biochemistry of inheritance, expression of genetic information, protein biosynthesis, differentiation, viral and bacterial infection and the "origin of life." (SCHA-602)
Class 3, Credit 3

SCBA-605, 606, 607 Biochemistry—Case Studies Registration #1009-605, -606, -607
Biological and clinical case studies of biochemistry. The cases are arranged to be correlated with the lecture topics of Biochemistry 602, 603, and 604. (Concurrent registration in SCBA-602, 603, and 604 is required)
Credit 1

SCBA-650 Media Design Project Registration #1010-650
A seminar workshop on evaluation and critique, human information processing, and instructional systems management as applied to media production.
No Credit

SCBA-651 Media Design Seminar Registration #1010-651
Students in small groups will design, produce, test and evaluate a media form or device for use in the teaching of science at the two-year college level.
Credit 2-4

SCBA-652 Internal Internship Registration #1010-652
Students in small groups will be assigned to a particular general chemistry course for a minimum of one quarter for the purpose of investigating more efficient utilization of the instructional media, recitation/laboratory periods, and computer aided instruction. Various ways will be explored to assist hearing-impaired and first-year students with remedial work as well as provide advanced work for rapid learners and those with advanced high school preparation.
Credit 2

SCBA-671 Independent Study—Chemistry Credit variable

SCBA-672 Special Topics—Chemistry Registration #1010-672
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

SCBA-759 Internship Research Registration #1010-759
Industrial internship research.
Credit 0-16

SCBA-770 Chemistry Seminar Registration #1010-770
Credit 1
The properties and structures of the elements and their compounds in relation to electronic and stereochemical principles; inorganic laboratory techniques. (SCHO-443 and SCHP-443)

Class 3, Lab. (Optional) 3, Credit 3 or 4/Qtr.

The properties and structures of the elements and their compounds in relation to electronic and stereochemical principles; inorganic laboratory techniques. (SCHO-443 and SCHP-443)

Class 3, Credit 3

SCHO-631 Advanced Organic Chemistry
Registration #1013-631
Several of the following advanced topics in organic chemistry are covered: polyfunctional compounds, modern synthetic methods, stereochemistry, conformational analysis, free radical reactions, natural and synthetic polymers. (SCHO-433)

Class 3, Credit 3

SCHO-632 Advanced Organic Chemistry
Registration #1013-632
Selected topics in physical organic chemistry including: techniques for elucidation of mechanism (kinetic, linear free energy relationships, isotope effects), molecular orbital theory, electronic reactions. (SCHO-433 and SCHP-443. Note: SCHO-631 is recommended but not required)

Class 3, Credit 3

SCHO-636 Spectrometric Chemical Identification of Organic Compounds
Registration #1013-636
This course is concerned with the theory and application of nuclear magnetic resonance, infrared, mass spectrometry, and ultraviolet spectra as applied to organic structure determination. (SCHO-433)

Credit 2

SCHO-638 Systematic Identification of Organic Compounds
Registration #1013-638
The laboratory utilizes systematic chemical and spectral tests to deduce the structure of organic compounds. (SCHO-433)

Credit 2

SCHO-713 Physical Organic Chemistry
Registration #1013-713
A theoretical treatment of the basic tools used in mechanism elucidation, interpretation of kinetic, stereochemical and spectral data emphasized. (SCHO-433 and SCHP-443. Note: SCHO-631 recommended but not required)

Class 3, Credit 3

SCHO-732 Stereochemistry
Registration #1013-732
Advanced treatment of steric relationships and stereoisomerism in organic compounds. (SCHO-433, SCHP-443)

Class 3, Credit 3

SCHO-733 Heterocyclic Chemistry
Registration #1013-733
The preparation, properties, and reactions of heterocyclic systems, especially heteroaromatic rings. (SCHO-433)

Class 3, Credit 3

SCHO-734 Natural Products
Registration #1013-734
Introduction to the major classes of natural products. Emphasis is on recent total synthesis of representative natural products of current interest. (SCHO-631)

Class 3, Credit 3

SCHO-735 Organic Chemistry of Polymers
Registration #1013-735
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

SCHP-641 Chemical Thermodynamics
Registration #1014-641
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

SCHP-642 Physical Chemistry for the Life Sciences
Registration #1014-642
This course will present principles of physical chemistry to students who have an interest in the health related sciences. Molecular structure, thermodynamics and kinetics will be discussed with a view to their biological applications. (SCHO-217, SCHO-232)

Class 3, Credit 3

SCHP-646 Radiochemistry
Registration #1014-646
Radioactive decay from statistical and differential approaches. Nature of nuclear emissions; interactions with matter; counting techniques and statistics; chemical tracers; chemical applications of nuclear reactions; shielding health hazards. Laboratory: counting techniques; sample preparation and handling; use of tracers in analysis, structural studies, equilibrium studies, kinetic studies. (SCHP-443)

Class 3, Lab. (Optional) 3, Credit 3 or 4

SCHP-743 Principles of Magnetic Resonance
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

SCHP-744 Quantum Mechanics
Registration #1014-744
Matrix formulation of quantum mechanics, variations and perturbation methods, the uncertainty relations, particle in a box, tunneling, harmonic oscillator, angular momentum and magnetic resonance, the hydrogen atom and more complex atoms. (SCHP-443)

Class 3, Credit 3

SCHP-745 Quantum Chemistry
Registration #1014-745
Application of quantum mechanics to problems of chemical interest. Group theory; calculations of vibrational frequencies and selection rules for complex molecules; molecular orbital energies of complex molecules. (SCHP-744)

Class 3, Credit 3

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
SMAC-265 Discrete Mathematics Registration #1022-265
An elementary survey of topics from modern applied mathematics that are discrete in nature, including number theory, set theory, machine computation, Boolean algebra, graphs, probability, matrix algebra, difference equations. Applications are stressed. (S)
Class 4, Credit 4

SMAC-365 Combinatorial Mathematics Registration #1022-365
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 combinations, permutations, recursion, inclusion-exclusion, block designs, Polya counting theory (SMAM-253) (S)
Class 4, Credit 4

SMAC-465 Linear Programming Registration #1022-465
A presentation of the type of problem to be solved. A review of pertinent matrix theory including convex sets and systems of linear inequalities. The simplex method of solution, artificial bases, duality, parametric programming. Applications. (SMAM-432)
Class 4, Credit 4

SMAC-466 Integer Programming Registration #1022-466
The optimization of functions of integers, theory and practice of branch and bound, implicit enumeration, cutting plane duality and related solution techniques, heuristics, applications. (SMAC-465)
Class 4, Credit 4

SMAC-467 Theory of Graphs and Networks Registration #1022-467
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-431 or permission of instructor)
Class 4, Credit 4

SMAC-565 Game Theory Registration #1022-565
Introduction to the theory of games with solution techniques and applications. Graphs, matrix games, linear inequalities and programming, convex sets, the minimax theorem, n-person games, Pareto optimality. (SMAM-431 or permission of instructor)
Class 4, Credit 4

SMAC-566 Non-Linear Optimization Theory Registration #1022-566
The theory of optimization of non-linear functions of several real variables. Unconstrained optimization (Newton-Raphson, steepest ascent and gradient methods), constrained optimization (LaGrange multipliers, Kuhn-Tucker theorem, penalty concept, dynamic programming), computational aspects (rates of convergence and computational complexity). (SMAM-432 and SMAM-305)
Class 4, Credit 4

SMAC-567 Theory of Optimal Control Registration #1022-567
Solutions to the optimal control problem via variational method, Pontrijagin maximum principle, dynamic programming, Linear, time-optimal control processes (controlability, stability, observability, the synthesis problem.) Implementation of optimal control, system design, computational aspects. Introduction to non-linear processes and recent research interests. (SMAM-432 and SMAM-412)
Class 4, Credit 4

SMAM-201, 202, 203 Algebra, Trigonometry and Analytic Geometry Registration #1016-201, -202, -203
A sequence of courses covering essential skills and concepts in such topics as solutions of equations, graphing, exponents and radicals, exponential and logarithmic functions and their applications, trigonometric functions and applications, vectors, determinants, inequalities and conic sections. (201-F, 202-W, 203-S)
Class 3, Credit 3

SMAM-204 Modern Algebra 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 circular functions; systems of linear equations. (F)
Class 4, Credit 4

SMAM-210, 211 Freshman Seminar Registration #1018-210, -211
An orientation program for entering mathematics majors to give them information and guidance concerning the various aspects of mathematics and the numerous programs from which they may choose. (210-F, 211-W)
Class 1, Credit 1

SMAM-214, 215 Introductory Calculus Registration #1016-214, -215
214: A non-rigorous introduction to the study of differential calculus. The following topics will be covered: functions and graphs, limits, continuity, the derivative and its significance, the algebra of derivatives, chain rule, related rates, maxima and minima.
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-204 or equivalent)
(214-F, W, 215-S)
Class 1, Credit 1

SMAM-216, 217 Mathematics of Business and Finance Registration #1016-216, -217
An introduction to selected topics from those areas of business and finance which use mathematical concepts. These topics are useful to any student interested in their personal finances or the operation of a small business.
216: Basic concepts, payroll, pricing, interest, and loans.
217: Investments, taxes, insurance, business policies, and, as time permits, other selected, relevant topics. (SMAM-201) (216-W, W, 217-S)
Class 3, Credit 3

SMAM-221, 222, 223 College Mathematics Registration #1016-221, -222, -223
A survey of selected topics from college algebra, trigonometry, analytic geometry and differential calculus generally useful for laboratory technicians. The emphasis is placed on understanding of concepts, problem solving and graphs. The topics are divided roughly as follows:
221: Algebra (exponential, log & trig functions- linear equations, curve fitting and special graph papers.)
222: Complex numbers, vector algebra, introduction to limits, graphing of algebraic and exponential functions.
223: Basic differential calculus with strong emphasis on exponential processes.
(221-F, 222-W, 223-S)
Class 4, Credit 4
A standard first course in calculus intended for students majoring in mathematics, a science or engineering with the major emphasis placed 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, function, limits, the derivative and its formulas (in terms of algebraic functions). Applications of the derivative, introduction to anti-differentiation.

252: The transcendental functions. Anti-derivatives by various methods. The definite integral applications to area, work, etc. Numerical integration.

253: Parametric equations, polar coordinates, more techniques of anti-differentiation, improper integrals, indeterminate forms. Application of integrals to volumes, moments. Infinite series. (251-F, 252-W, 253-S)

Class 4, Credit 4

SMAM-300
Registration #1016-300
Content includes material taught in SMAM-253 and SMAM-305
(SR)
Class 8, Credit 8

SMAM-304
Registration #1016-304
A continuation of SMAM-253 treating partial derivatives, multiple integrals, 3-dimensional analytic geometry and vector algebra. (SMAM-253) (F, SR)
Class 4, Credit 4

SMAM-306
Registration #1016-306
A first course. Solutions in closed form for a few 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 including Runge-Kutta. More applications. Power series solutions. (SMAM-305) (W)
Class 4, Credit 4

SMAM-307
Registration #1016-307
Topics include Laplace transform, systems of linear differential equations, some Fourier series and their use in partial differential equations. Numerical techniques in boundary value problems. (SMAM-306) (S)
Class 4, Credit 4

SMAM-308
Registration #1016-308
Topics will be chosen from among matrix algebra, vector analysis and applications of boundary-initial value problems to suit students' academic discipline. (SMAM-306) (S)
Class 4, Credit 4

SMAM-309
Registration #1016-309
Handling of statistical data; measures of central tendency and dispersion; sample space, events; probability and its basic laws; conditional probability, basic rules of counting; binomial, geometric, Poisson and normal distributions; sampling distributions; estimation of population mean; t-distributions, testing of hypothesis concerning the mean and difference between means. Use of chi-square in testing statistical independence and in estimating variance. (W, S)
Class 4, Credit 4

SMAM-341
Registration #1016-341
A study of basic concepts involved in mathematics, a development of mathematical reasoning, and their applications to various mathematical topics. Students will be involved in the development of concepts and presentation of results. Content includes logic, switching circuits, sets, equivalence relations, functions, inverses, permutations, limits, algebraic concepts, applications. (S)
Class 4, Credit 4

SMAM-351, 352
Introduction to Probability
Registration #1016-351, -352
Class 4, Credit 4

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) (S)
Class 4, Credit 4

SMAM-410
Advanced Calculus
Registration #1016-410
Topics from multi-dimensional calculus, Fourier series, special functions, special techniques for differential equations and asymptotic expansions. Alternate topics may be chosen to suit special needs of students. (SMAM-306 or SMAM-308) (Offered upon sufficient demand)
Class 4, Credit 4

SMAM-411,412
Real Variables
Registration #1016-411, -412
Functions of one and of several variables are considered with the basic concepts of sequence, series, continuity, differentiation, and integration studies in depth. Included are the Heine-Borel, mean value, Taylor, and implicit function theorems. (SMAM-305 and either SMAM-341 or permission of instructor) (411-F, W, 412-S, SR)
Class 4, Credit 4

SMAM-420
Complex Variables
Registration #1016-420
A study of the complex number system and preliminary items leading to the concepts of an analytic function. Integrals of complex functions, Cauchy integral theorem, Cauchy integral formulas. If time allows, topics such as Taylor and Laurent series, singularities, residues, conformal mapping, and special transformations are discussed. (SMAM-305) (F,W)
Class 4, Credit 4

SMAM-431, 432
Linear Algebra
Registration #1016-431, -432
A first course in the algebra of matrices and n-tuple vectors over the complex numbers. Topics include systems of linear equations, their solution by several different algorithms, stability of solutions; vector and matrix algebra; inner products and norms of vectors, linear independence, dimension, rank; Gram-Schmidt theorem; matrix inversion and determinants; eigenvalues, eigenvectors and their approximation. 431: A survey of most of these topics with the emphasis on computation and application to physical problems and as such is a course aimed at all students of engineering and science with minimal mathematical prerequisites. 432: Will pursue the topics to greater depth and will lay more emphasis on theory. It is intended for the more serious student of mathematics. (431-F, W, S, 432-S, SR)
Class 4, Credit 4

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) (501-F,W, 502-S, SR)
Class 4, Credit 4

SMAM-511,512
Numerical Analysis
Registration #1016-511, -512
Class 4, Credit 4
SPSP-311, 312, 313  University Physics
Registration #1017-311, 312, 313
An intensive course in general physics, using calculus, for majors in the sciences. Mechanics, heat, sound, electricity and magnetism, and light. Two parallel labs are available for this course, one a 2-hour lab and the other a 3-hour lab. Physics majors have to take the 3-hour lab, others may opt for either of the labs. (Co-registration or credit in SMAM-252, 253) (311-F, W, 312-W, S, 313-F, S)
Class 4, Lab. 3, Credit 5

SPSP-314.315  Introduction to Modern Physics
Registration #1017-314, 315
An introductory survey of modem physics at the sophomore level. Fundamentals of relativity, atomic phenomena, introduction to quantum physics, elementary wave mechanics, nuclear physics, statistical mechanics, and solid state physics. (SMAM-305, SPSP-207, or SPSP-313) (314-W, 315-S)
Class 4, Credit 4

SPSP-319  Electrical Processes in Solids
Registration #1017-319
Electronic properties of conductors and semiconductors, junction characteristics, operating principles of solid state devices. Theory and application. (SPSP-315 or permission of instructor) (W, S)
Class 4, Credit 4

SPSP-321  Introduction to Laboratory Techniques
Registration #1017-321
A.C. circuits, the oscilloscope, vacuum systems.
Class 2, Lab 3, Credit 3

SPSP-341  Foundations of Scientific Thinking
Registration #1017-341
Definition of science; historical perspective; ingredients of the scientific quest; the scientific method; scientific explanation, laws, theories, and hypotheses; the role of mathematics; probability and induction; science and other disciplines. (At least a year of basic science at the college level.) (F, W)
Class 2, Credit 2

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) (351-F, 352-W, 353-S)
Class 4, Lab. 3, Credit 5

SPSP-380  Theoretical Physics I
Registration #1017-380
Introduction to the theoretical concepts and techniques used in the description of physical phenomena: fields, periodic phenomena, quantization, etc. (SPSP-314, SMAM-306)
Class 3, Credit 3

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-305, SPSP-313) (401-F, 402-S)
Class 4, Credit 4

SPSP-411,412  Electricity and Magnetism
Registration #1017-411, 412
Class 4, Credit 4

SPSP-415  Thermal Physics
Registration #1017-415
Fundamental principles of classical thermodynamics, kinetic theory, statistical mechanics, and low temperature physics. Applications to physical problems. (SMAM-306, SPSP-313) (F alternate years)
Class 4, Credit 4

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, electro-magnetism, and physical optics. (SPSP-313 plus co-registration or credit in any one of these: SPSP-401, 411, 415, 455) (421-F, 422-S)
Class 1, Lab. 3, Credit 2

SPSP-431, 432  Electronic Measurements
Registration #1017-431, 432
Laboratory course in electrical and electronic measurements and instrumentation, with theory of electron emission, electron tubes, and solid state devices as needed. (SPSP-313, SPSP-321) (431-F, 432-S)
Class 2, Lab. 3, Credit 3

SPSP-455  Optical Physics
Registration #1017-455
Introduction to wave phenomena as applied to the electromagnetic spectrum. Interaction of radiation with matter. (SMAM-305, SPSP-313) (F alternate years)
Class 4, Credit 4

SPSP-501  Theoretical Physics II
Registration #1017-501
Application of advanced mathematical methods to physics. (SMAM-308 plus co-registration or credit in SPSP-401 and SPSP-411) (S)
Class 4, Credit 4

SPSP-521  Advanced Experimental Physics
Registration #1017-521
Advanced laboratory experiments and projects in atomic physics, nuclear physics, or solid state physics. Special emphasis on experimental research techniques. (SMAM-307, SPSP-421) (F)
Lab. 6, Credit 2

SPSP-531, 532  Solid State Physics
Registration #1017-531, 532
The structure of solids and their mechanical, thermal, electrical, and magnetic properties. (SMAM-307, SPSP-552) (531-S, 532-offered upon sufficient request)
Class 4, Credit 4

SPSP-541, 542, 543  Physics Research
Registration #1017-541, 542, 543
Faculty directed student projects or research usually involving laboratory work and/or calculations that could be considered of an original nature.
Class variable, Credit variable

SPSP-550, 551  Physics Seminar
Registration #1017-550, 551
Discussions of contemporary developments in physics. Special emphasis on technical literature search, preparation and presentation of technical papers. (Senior physics majors) (550-F, 551-S)
Class 1, Credit 1

SPSP-552  Atomic Physics and Quantum Mechanics
Registration #1017-552
Elements of relativistic mechanics and of wave mechanics, quantum theory, Schrodinger's equation and its solutions, atomic spectra and atomic structure. (SPSP-501; SPSP-315 or permission of instructor) (F)
Class 4, Credit 4
SPSP-553 Nuclear Physics
Registration #1017-553
A study of the structure of the atomic nucleus as determined by experiment and theory. Description and quantum mechanical analysis of nuclear properties, radioactivity, and nuclear reactions. (SPSP-552) (S)
Class 4, Credit 4

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 should be structured as ordinary courses and should have specified prerequisites, contact hours, and examination procedures. Topics could include: Introductory Statistical Mechanics; Plasma Physics; General Relativity; Linear Integrated Circuits; Cryogenics; Radio Astronomy; History of Physics; Astrophysics; Astronomy.
Class variable, Credit variable

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

Health Related Professions

A three-course sequence in modern techniques and methodology of clinical chemistry with emphasis on quality control, instrumentation, and automation. This shall include modern general methods of analytical chemistry, the technical aspects of the tests used, and the principles of the methods involved. Additionally, an understanding of normal and abnormal values shall be stressed in relationship to health and disease. (SBIT-432, 433 or equivalent; SCHB-603)
Class 2, Lab. 6, Credit 4/Qtr.

SHPC-799 Clinical Chemistry Research
Registration #1023-729
Credit 0-3

SHPG-201 Issues, Trends and Careers in Health Professions
Registration #1026-201
A panel-type seminar covering a variety of concerns in the health care system. Topics will be on career options, legislation, educational needs, community services, health institutions, and social implications. Panelists will respond to questions from the class. A short paper discussing one of the topics will be required at completion.
Class 1, Credit 1

SHPG-401 Introduction to Radioimmunoassay
Registration #1026-401
Combination lecture/laboratory in radioimmunoassay. Theory and basic principles; instrumentation; specific assays; quality control and future trends in RIA. (W)
Credit 2

SHPR-301 Respiratory Therapy I: Gas, Aerosol/Humidity
Registration #1027-301
The theoretical bases for, operation of, and clinical indications for continuous mechanical ventilation and patent airway maintenance are covered in lecture, laboratory, and clinical practice.
Credit 7 (126 clock hours)

SHPR-302 Respiratory Therapy II: Cardiorespiratory Drug Administration
Registration #1027-302
The properties of aerosols and cardiorespiratory drugs, methods of aerosol generation, and therapeutic techniques of cardiorespiratory drug administration are covered in lecture, laboratory, and clinical practice.
Credit 4 (74 clock hours)

SHPR-303 Respiratory Therapy III: IPPB Therapy and Pulmonary Drainage
Registration #1027-303
The physiological principles and therapeutic techniques of IPPB, deep breathing, and chest physical therapy are covered in lecture, laboratory, and clinical training.
Credit 8 (154 clock hours)

SHPR-304 Respiratory Therapy IV: Pulmonary Function Testing
Registration #1027-304
The physiological principles underlying pulmonary function testing and the theory and operation of equipment utilized in testing are covered in lecture, laboratory, and clinical practice.
Credit 4 (77 clock hours)

SHPR-305 Respiratory Therapy V: Continuous Ventilation and Airway-Trach Care
Registration #1027-305
The theoretical bases for, operation of, and clinical indications for continuous mechanical ventilation and patent airway maintenance are covered in lecture, laboratory, and clinical practice.
Credit 9 (172 clock hours)

SHPR-306 Respiratory Therapy IV: Cardiopulmonary Resuscitation and Emergency Care
Registration #1027-306
The physiological bases of cardiac failure/arrest and the theory and procedures of resuscitation techniques are covered in lecture, laboratory, and clinical practice.
Credit 2 (35 clock hours)

SHPR-307 Respiratory Therapy VII: Inhalation Therapy
Registration #1027-307
The theory and techniques for infection control relative to respiratory therapy and aseptic patient care.
Credit 2 (38 clock hours)

Institute College

School of Applied Science

Upper-Division Civil Engineering Technology

ITEC-420 Hydraulics
Registration #0608-420
Study of liquid flow in pipes and open channels, hydrostatic pressures and forces, stability, devices to measure pressure, velocity, and flow, pump selection, development of pump characteristic curves, and the introduction to design of sewer and water lines.
Class 3, Lab. 3, Credit 4

ITEC-428 Report Writing
Registration #0608-428
The principles of organizing data and information into clear and concise engineering memos, trip reports, and business letters. The techniques of library research, and oral reports using video tapes of student presentations are also stressed.
Class 3, Credit 2

ITEC-430 Water Supply and Distribution
Registration #0608-430
The consideration of water sources, surface and groundwater geology, impoundment reservoirs and wells, criteria for quality and quantity, storage systems, methods of distribution, system analysis, materials and methods of construction, AWWA, FIRO, and other standards are explored.
Class 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. Several expert guest speakers will also lecture.
Class 3, Credit 3

ITEC-436 Design of Sanitary and Stormwater
Registration #0608-436
A survey of population estimate techniques for sewage flow determination, application of basic hydraulics to the analysis and design of sanitary and stormwater collection system for a subdivision, sewer appurtenances and their design such as street inlet and inverted siphon, stormwater retention facilities, curbed and pressure sewers, and pump stations.
Class 2, Recitation 2, Credit 3

ITEC-438 Principles of the Treatment of Water and Sewage
Registration #0608-438
An introduction to water and wastewater treatment interpretation of analyzed physical, chemical, and biological parameters of water quality with regard to the design and operation of treatment processes and to the control of the quality of natural water; fundamental principles and applications of physical, chemical and biological processes employed in water and wastewater treatment; analysis of waste assimilative capacity of streams.
Class 3, Lab, 2, Credit 4

ITEC-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. The topics discussed include the design of a rapid sand filtration plant with water softening treatment.
Class 3, Lab 2, Credit 3

ITEC-520 Design of Wastewater Treatment Facilities
Registration #0608-520
Principles of wastewater treatment plant design; conceptual and hydraulic design of activated sludge and trickling filter plants are studied. Tertiary treatment facilities, such as nitrogen and phosphorous removal will be discussed.
Class 3, Lab, 2, Credit 4

ITEC-549 Environmental Engineering Project
Registration #0608-549
Theory and laboratory study of certain aspects of water pollution control treatment processes. Students are required to prepare a technical paper based on the laboratory findings.
Class 2, Lab 6, Credit 4

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

ITEC-552 Structural Analysis and Design
Registration #0608-552
Analysis and design of steel structures using AISC code; topics include high-strength bolts, welding, design of building frames and trusses, composite beams, study of typical contract and shop drawings. Field trip is scheduled.
Class 3, Recitation 2, Credit 4

ITEC-444 Mechanical Equipment for Buildings
Registration #0608-444
Presentation of mechanical and electrical equipment used in building construction; the pertinent codes will be studied; emphasis will be given to energy aspects of equipment design and selection.
Class 4, Credit 4

ITEC-450 Construction Management
Registration #0608-450
Construction company organization, time and resource scheduling for construction operations (CPM); role of the construction manager; project finance; cash flow; bonding and insurance.
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 machinery.
Class 3, Credit 3
ITEM-301 Engineering Graphics
Registration #0610-301
A basic course in engineering drawing. Topics include lettering, line quality, use of instruments, sketching, orthographic projection, pictorials, sections, auxiliary views, and dimensioning.
Recitation 6, Credit 2 or 3

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. Applications of these concepts to beams, shafts, columns, shrink fits, and curved beams are covered.
Class 3, Credit 3

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 and kinetics of machine elements such as gears, cams, linkages, and the dynamic balancing of machinery. (ITEM-405)
Class 3, Recitation 2, Credit 4

ITEM-407 Mechanical Engineering Technology Laboratory Registration #0610-407
A course in mechanical laboratory techniques and the preparation of laboratory reports; experimental work in materials testing, strength of materials, experimental stress analysis, metallurgy, and metallography; individual instruction in the preparation of laboratory reports. (It is intended that students enroll concurrently in ITEM-404 and ITEM-414).
Class 2, Lab. 4, Credit 4

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-411 Engineering Materials
Registration #0610-411
A study of the physical properties of metallic and non-metallic materials; a survey of manufacturing processes including casting, molding, metal removal, metal forming, and welding; field trips are made to local manufacturing installations. For non-mechanical majors.
Class 3, Lab. 2, Credit 4

ITEM-414,415 Materials Technology I, II Registration #0610-414, –415
A two quarter course involving a study of materials, their structure and their characteristics. Topics covered include atomic and crystal structure, phases and phase diagrams, physical properties, corrosion and oxidation, diffusion in metals, recovery, recrystallization and grain growth, age hardening and heat treatment of metals. The effect of processes such as welding on the metallurgy of the part will be examined. Organic and ceramic materials will also be studied. (Prerequisite for ITEM-414 is ITEM-415)
I. Class 3, Credit 3
II. Class 3, Lab. 2, Credit 4

ITEM-425 Statistical Quality Control
Registration #0610-425
The basic concepts of statistics and probability are studied as they apply to quality control, including the study of control charts, sampling procedures, and the planning, organizing, and installation of quality controls in the industrial setting.
Class 3, Recitation 2, Credit 4

ITEM-431 Production Management
Registration #0610-431
A study of modern industrial organization and how it is managed. Techniques of decision making will be studied in problem areas related to manufacturing.
Class 4, Credit 4

ITEM-436 Engineering Economics
Registration #0610-436
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

ITEM-437 Cost and Value Analysis
Registration #0610-437
The use of decision theory and the nature of man-machine systems in analyzing manufacturing and design projects; integration of economic factors with design and production criteria; use of linear programming and computers in performing value engineering analysis. Techniques of estimating costs will be studied and used. (ICSP-201)
Class 4, Credit 4

ITEM-441 Thermodynamics and Heat Transfer
Registration #0610-441
The first and second laws of thermodynamics and their applications; thermodynamic properties of working fluids including pure substances and ideal gases; the concepts of work and heat, thermodynamic processes, systems, and cycles. An introduction to the basic concepts of heat transfer is also included.
Class 4, 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 and structures; environmental tests for vibration and shock; methods of noise testing and analysis. (SMAT-422)
Class 3, Lab. 2, Credit 4

ITEM-460 Applied Fluid Mechanics
Registration #0610-460
A study of the fundamentals of fluid statics and dynamics; applications of these principles of pumps, turbines, flow measurement, pipe flow, and fluid power. (ITEM-441)
Class 3, Lab. 2, Credit 4

ITEM-470 Numerical Control Applications
Registration #0610-470
The philosophy and use of numerical control in manufacturing. The course will review manual programming, examine different applications of numerical control, and introduce computer assisted programming techniques.
Class 3, Lab. 2, Credit 4

ITEM-472 Tool Engineering
Registration #0610-472
The selection of tools for production, specification of tools, jigs, fixtures, dies, production type gages, selection of tooling for automatic machines, and determining assembly tooling are studied.
Class 3, Lab. 2, Credit 4
ITEM-480 Methods Analysis  
Registration #0610-480  
Principles and applications of basic methods and techniques for improvement of the worker-job-time relationship, job standards and recording, and work-space design for efficient use of labor.  
Class 3, Recitation 2, Credit 4

ITEM-490 Production Planning  
Registration #0610-490  
An introduction to plant design, problems in factory planning, preparation of plant layout, quantitative tools used in solving layout problems, common problems in plant layout, and work simplification principles and practice. (ITEM-480)  
Class 3, Recitation 2, Credit 4

ITEM-491 Material Control  
Registration #0610-491  
The fundamental principles in the control of industrial production in relation to forecasting purchasing, inventory, production planning, routing, and scheduling.  
Class 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-507 Design Practice  
Registration #0610-507  
Introduction to design codes such as ASME Boiler and Pressure Vessel Code, ASTM Standards, National Electrical Code, and individual study of a design problem; the study of the use of these engineering codes and standards in design.  
Class 3, Recitation 2, Credit 4

ITEM-508 Special Topics in Machine Design  
Registration #0610-508  
The study of topics such as clutches, brakes, couplings, belts, chains and/or vibrations in machinery.  
Class 3, Lab. 2, Credit 4

ITEM-514 Special Topics in Material Forming  
Registration #0610-514  
A study of the principles of material shaping; the effects of temperature, friction, and other factors affecting tool life, machinability and formability will be examined.  
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.  
Class 3, Lab. 2, Credit 4

ITEM-535 Analog Control Systems  
Registration #0610-535  
An introduction to the basic concepts of analog process control: the feedback control concept, system components, transfer functions of system components, frequency response technique of system design, and optimizing system performance. (SMAT-422)  
Class 3, Lab. 2, Credit 4

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

ITEM-550 Topics in Machine Design  
Registration #0610-550  
Topics of dynamics and strength of materials as applied to electrical components and subsystems; topics include shaft and bearing design, vibration of rotors, material selection, lubrication, environmental and human factors considerations.  
Class 4, Credit 4

ITEM-599 Independent Study  
Registration #0610-599  
A supervised investigation within a mechanical technology area of student interest. Consent of the instructor is required.  
Credit 4

Community/Junior College Relations

Note: Graduate courses applicable to the MS in business technology are listed under College of Business. A more detailed statement of course objectives, assumed prior knowledge, and topics to be covered is available through the CCJCR office.

IJCG-701 The Two-Year Colleges  
Registration #0604-701  
The study of the philosophies, organizations, developments, finance, goals, curricula, and spirit of the two-year college.  
Credit variable (1-3 credits)

IJCG-702 The Student  
Registration #0604-702 in the Two-Year College  
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)

IJCG-703 Management of Learning  
Registration #0604-703  
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 (1-4 credits)

IJCG-704 Instructional Techniques  
Registration #0604-704  
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)

IJCG-750 Seminar  
Registration #0604-750  
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.  
(All degree candidates should enroll once in Seminar).  
Credit 2

Note: Exceptions to prerequisites can be made only by the consent of the course instructor.
The intent of this course is to develop in the student an understanding of the properties of crystalline and non-crystalline materials, metals, alloys, polymers, ceramics, and glass, based on their micro or macro structures.

The participants will understand the current and projected knowledge and be able to apply such information to their own teaching.

Class 20 hours total, Credit 2

**JCT-760** Collective Bargaining in Community Colleges
Registration #0604-760
An introduction to the collective bargaining process. This workshop course includes various role implications, legal aspects, impact analysis, strategies, preparations, procedures, and mock negotiation sessions.

Class 20 hours total, Credit 2

**JICG-840** Internship
Registration #0604-840
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 CC/JCR.

Credit 3 to 6

**JICG-850** Special Projects
Registration #0604-850
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 to the field of community college teaching. Projects may be directed at teaching, curriculum development, or instructional technology. Proposals require approval by the director.

Credit Variable (1-6)

**Engineering Technology**

**JCT-705** Thermodynamics
Registration #0606-705
The first and second laws of thermodynamics are applied to fundamental problems in mechanical engineering technology.

Credit 4

**JCT-707** Engineering Concepts
Registration #0606-707
A special graduate level course to update knowledge in statics and dynamics of rigid bodies. Modern mathematical techniques, i.e., vectors, matrices, and Cartesian tensors are used.

Credit 4

**JCT-708** Engineering Technology Analysis
Registration #0606-708
A comprehensive review of differential and integral calculus. Other topics included are partial differentiation, multiple integration, dot product, cross product, multiple integration, solution of partial and second order differential equations; LaPlace transforms and Fourier series. The course provides the mathematical background needed by engineering technology faculty. Selection of topics to be emphasized is based on the pre-assessment of course participants' understanding. This course is a prerequisite for most other courses in the JCT series.

Credit 3

**JCT-710** Science and Technology of Materials
Registration #0606-710
The intent of this course is to develop in the student an understanding of the properties of crystalline and non-crystalline materials, metals, alloys, polymers, ceramics, and glass, based on their micro or macro structures.

Credit 3

**JCT-711** Microelectronics
Registration #0606-711
Principles of physical basis of active and passive solid state devices are introduced; manufacturing processes of assembly of passive circuit elements and active solid state devices into a unified circuit package; discussion of thick/thin film circuit techniques, hybrid circuit assembly, and integrated circuit techniques.

Credit 3

**JCT-713** Computers in Engineering Technology I
Registration #0606-713
Introduction to digital computer programming and the application of computer programs to the solution of technical problems in engineering technology education. Programming languages such as FORTRAN, BASIC, and APL are introduced and used as appropriate based upon the pre-assessment of student knowledge. Prerequisite knowledge should include mathematics through college calculus.

Credit 4

**JCT-714** Computers in Engineering Technology II
Registration #0606-714
This course continues the study, use, and application of digital computers to solve engineering technology problems. Additional programming languages and programming techniques are included. Programming assignments are pertinent to the student's area of specialty.

Credit 4

**JCT-715** Electromechanical Systems I
Registration #0606-715
Introduction to the concepts and principles of electromechanical systems and components. The underlying unifying concepts of electrical, fluid, mechanical and thermal systems are examined. Various types of transducers such as temperature, displacement, force, electropneumatic and electrohydraulic are studied. Other topics include thermistors, thermocouples, strain gauges, control valves, open and closed loop systems and digital systems.

Credit 3

**JCT-716** Electromechanical Systems II
Registration #0606-716
The study of the major components and subsystems required for the operation of numerically controlled machines and other industrial applications of electromechanical technology.

Credit 3

**JCT-717** Electrical Measurements
Registration #0606-717
This course presents the various fundamental electrical measuring devices, instruments, and transducers which the mechanical engineer is likely to encounter. Basic principles and applications are stressed.

Credit 3

**JCT-718** Applications of Linear Integrated Circuits
Registration #0606-718
Linear integrated circuits including operational amplifiers, voltage regulators, and commercial amplifiers. Examination and analysis of manufacturer specifications for standard units, includes numerous examples of practical applications.

Credit 3

**JCT-719** Communication Theory
Registration #0606-719
To provide the student with the basic principles and applications of communication theory in system design.

Credit 3

**JCT-720** Integrated Physics
Registration #0606-720
The course objectives include the synthesis and integration of a wide variety of physics topics that are the basis of electrical, mechanical, and optical technology, and the understanding of their common concepts, structures, and terminology.

Credit 4
Guest discussion leaders are invited at appropriate times. A series of discussions to analyze and propose solutions for instructional problems peculiar to teaching technical courses. A working knowledge of basic digital electronics is assumed.

Credit 3

Career Information Specialist

The Nature of Work

This course deals with historical analyses of work, diverse and changing work-leisure values, economic and political factors, and the influence of science and technology. Topics include: work from the artisan through cottage industries to the large conglomerates and multinational companies of today, the advances of science and technology will be analyzed in terms of its impact on society as a whole and work in particular, the impact of industrialization, business cycles, new economic and political philosophies and their relationship to the changing concepts and possibilities of work. The changing nature of work in post-industrial America will be analyzed.

Credit 2

Career Decision Making Concepts

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

Legal Aspects of Career Plans

The principal goal is that the participant will have a sufficient knowledge of general law and government agency rulings that control career decisions. Topics include: constitutional law, affirmative action, union affiliation for closed and open shops, exempt and non-exempt employment, collective bargaining, the several labor departments and their functions, job qualifications and requirements, handicapped persons, civil service regulations, laws relating to various cooperative education arrangements, and employment related liability. The student will then examine conflicts between the law and selected practices or procedures. (Assumed prior knowledge of the nature of constitutional, statutory, civil and common law.)

Credit 2
The probabilities of emerging careers. Two different purposes that depend on a common base are studied. Investigated will be systems and techniques that are projected to be available several years later will be studied. These areas where probability statements are extremely important. These three internships are for variable credit (one to five credits each), in order to provide the flexibilities needed for different cases.

**IJCC-745**
Registration #0615-745
Career Concepts: Production
Credit 2

**IJCC-746**
Registration #0615-746
Career Concepts: Commerce
Credit 2

**IJCC-747**
Registration #0615-747
Career Concepts: Services
Credit 2

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 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. Services 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. (IJCC-741 and IJCC-742)

**IJCC-748**
Information Retrieval Systems in Career Planning
Registration #0615-748
This includes a sufficient understanding of the computer systems, languages and dictionaries for efficient utilization.

**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. (Satisfaction of all foundation studies)

Credit 2

**IJCC-755, 756, 757**
Career Internships
Registration #0615-755, 756, 757
Each of the three major areas studied in the Career Concepts courses will be followed by internships in the suitable organizations that are found in the Greater Rochester area.

**IJCC-842**
Current Issues and Selected Counseling Skills
Registration #0615-842
Different techniques will be explored with their functions as useful skills for a career information specialist, such as group counseling, role-playing, practice in listening, sensitivity and awareness training. The approach or practice for this training will be geared toward special interest groups: minorities, the mature worker, women, etc. Students will be given an opportunity to learn about special problems encountered by these groups.

The specific topics for each section will be selected with a knowledge of critical challenges and the capability needs of the participants. (IJCC-742)

Credit 3

**ICS-P-205**
Registration #0601-205
Computer Techniques
This course will introduce the student to various facets of computing systems. Concentration will be on the FORTRAN IV language and application programs, documentation, and working knowledge thereof. For non computer science majors.

Class 3, Credit 3

**ICS-P-209**
Registration #0601-209
Introduction to Data Systems
Introduction to the capabilities and characteristics of data processing equipment in a business environment. Topics include the characteristic roles of systems analyst, programmer, and operator in the development of information systems; unit record and computer based systems; data communication systems. Lab work includes operation of some unit record equipment and computer programming.

Class 4, Credit 4

**ICS-P-215**
Programming Language--FORTRAN
Registration #0601-215
A study of FORTRAN programming techniques and applications. Topics include FORTRAN constants, variables, expressions, functions, logical operations, storage allocations, statements, I/O manipulation, program structures, subprograms, plotting, debugging, diagnostic methods and applied problem solving methods. For computer science majors (ICSS-202)

Class 4, Credit 4

**IJCC-842**
Current Issues and Selected Counseling Skills
Registration #0615-842
Different techniques will be explored with their functions as useful skills for a career information specialist, such as group counseling, role-playing, practice in listening, sensitivity and awareness training. The approach or practice for this training will be geared toward special interest groups: minorities, the mature worker, women, etc. Students will be given an opportunity to learn about special problems encountered by these groups.

The specific topics for each section will be selected with a knowledge of critical challenges and the capability needs of the participants. (IJCC-742)

Credit 3

**ICS-P-205**
Registration #0601-205
Computer Techniques
This course will introduce the student to various facets of computing systems. Concentration will be on the FORTRAN IV language and application programs, documentation, and working knowledge thereof. For non computer science majors.

Class 3, Credit 3

**ICS-P-209**
Registration #0601-209
Introduction to Data Systems
Introduction to the capabilities and characteristics of data processing equipment in a business environment. Topics include the characteristic roles of systems analyst, programmer, and operator in the development of information systems; unit record and computer based systems; data communication systems. Lab work includes operation of some unit record equipment and computer programming.

Class 4, Credit 4

**ICS-P-215**
Programming Language--FORTRAN
Registration #0601-215
A study of FORTRAN programming techniques and applications. Topics include FORTRAN constants, variables, expressions, functions, logical operations, storage allocations, statements, I/O manipulation, program structures, subprograms, plotting, debugging, diagnostic methods and applied problem solving methods. For computer science majors (ICSS-202)

Class 4, Credit 4

Computer Science and Technology
ICSP-220 FORTRAN Programming for Engineers
Registration #0601-220
A study of applied computer programming techniques. Topics include FORTRAN programming, numerical methods and applications of computer to engineering problems. (EEE-201)
Class 4, Credit 4

ICSP-301 COBOL Programming
Registration #0601-301
COBOL programming techniques and applications. Topics include COBOL coding methods, data processing and sequential file manipulation, table look-up, SORT and SEARCH verbs, introduction to the concept of modular and structured programming, COBOL debugging and editing facilities, establishment of documentation standards, case studies. (ICSS-200 or ICSS-202)
Class 4, Credit 4

ICSP-302 Computer Applications In Engineering Problems
Registration #0601-302
Fundamentals of programming in the BASIC language; the applications of circuit analysis programs to the solution of electrical circuits.
Class 1, Credit 1

ICSP-304 Advanced COBOL Programming
Registration #0601-304
Advanced COBOL programming techniques and applications; topics include magnetic tape and disc file processing techniques using COBOL, subroutines, overlay and segmentation, report writer, core dump analysis, modular and structured programming techniques, coding optimization techniques, case studies. (ICSP-301)
Class 4, Credit 4

ICSP-305 Assembly Language Programming
Registration #0601-305
A study of assembly language programming methods. Topics include computer organization, assembly process, assembly coding, addressing, binary arithmetic, relocatability, storage allocation, subroutine linkage, looping and address modification, character manipulation, bit manipulation, floating-point arithmetic, decimal instruction set, some system I/O, macros and debugging techniques. For computer science and technology majors. (ICSP-215 or ICSP-301)
Class 4, Credit 4

ICSP-308 Advanced Assembly Language
Registration #0601-308
A study of more advanced assembly language programming techniques, macros, macro generation, conditional assembly, system macros, program linkage, re-entrant and recursive routines, I/O programming at the interrupt level on some machines. (ICSP-305)
Class 4, Credit 4

ICSP-308 Structured Programming
Registration #0601-308
A study of techniques in structured programming. Topics include deficiencies in conventional programming methods, modular programming, program structures, structured programs, top down programming and comparative studies in programming approach. (High-level language, and an assembly language)
Class 4, Credit 4

ICSP-318 APL Programming Techniques & Applications
Registration #0601-318
APL programming techniques and applications. Topics include APL programming, APL report formatting features, file I/O subsystem, graphic I/O, scientific and business systems design using APL case studies. (A programming course in FORTRAN or BASIC)
Class 4, Credit 4

ICSP-330 PL/1 Programming
Registration #0601-330
A study of PL/1 language coding and programming techniques. Topics include record I/O, file processing, indexed and regional file processing, PL/1 application in scientific problems and functions and subroutines. (A high level language)
Class 4, Credit 4

ICSP-331 Advanced PL/1 Programming
Registration #0601-331
A study of more advanced PL/1 programming techniques. Topics include record I/O, file processing, indexed and regional file processing, PL/1 application in scientific problems and programming projects. (ICSP-330)
Class 4, Credit 4

ICSP-350 Programming Language Concepts
Registration #0601-350
The concepts and syntactic structure of languages used in computer programming are analyzed by a study of several of the more sophisticated languages in use. Semantics will be considered. Programs will be written in selected languages. (ICSS-320)
Class 4, Credit 4

ICSP-432 Computer Applications in Analysis and Design
Registration #0601-432
A study of techniques of using computers in the field of physical sciences. Topics include review of programming language, hardware specification and selection, interface problems, software availability and selection, graphical methods, simulation methods and case studies. Projects and hands-on experience will be required. This course is designed for non-computer science majors. (ICSP-205 or equivalent)
Class 4, Credit 4

ICSP-532 Computer Applications in Social and Behavioral Sciences
Registration #0601-532
A study of computer techniques applied to social and behavioral sciences. Topics include language selections, matrix manipulation, statistics (basic), analysis of variance, correlations and regression, distribution, factor analysis, econometrics and probit analysis packages. A project relating to individual fields of interest will be required. (ICSP-205, SMAM-309)
Class 4, Credit 4

ICSS-200 Survey of Computer Science
Registration #0603-200
Basic concepts and overview of computer science for non-computer science majors. Topics include historical development; algorithms, flowcharting, programming in a problem-oriented language like BASIC; exposure to assembly language; hardware concepts, including a functional description of CPU operations; data representation and manipulation; software concepts, including compilers, assemblers, and operating systems; and the application of the computer to various disciplines.
Class 4, Credit 4

ICSS-202 Introduction to Computer Science
Registration #0603-202
Basic concepts and overview of computer science for computer science majors. Topics include those for ICSS-200 with the addition of more rigorous treatment of number systems and machine organizations.
Class 4, Credit 4

ICSS-230 Discrete Structure
Registration #0603-230
A study of discrete mathematical foundations; topics include propositional logic, set algebra, functions and relations, Boolean algebra and Boolean functions, permutations and combinations, vectors and matrices, graphs, digraphs, trees, and strings; applications of these structures to various areas of computer science.
Class 4, Credit 4
ICSS-310 Information Systems Design
Registration #0603-310
Computer oriented information systems design. Topics include data organization, file organization, structure and access methods, file device selection, input/output file design, forms design, decision tables, introduction to data base concept, establishment of programming and documentation standards, application of advanced COBOL, case studies. (ICSP-209, ICSP-301)
Class 4, Credit 4

ICSS-311 Information Systems Analysis
Registration #0603-311
Computer oriented information systems analysis. Topics include problem definition, problem-analysis, fact gathering and analysis techniques, systems design, interviewing techniques, cost analysis system implementation and testing techniques, system evaluation, case studies. (ICSS-316)
Class 4, Credit 4

ICSS-315 Digital Computer Organization
Registration #0603-315
Review of binary numbering systems and arithmetic, complementation, notation, instruction and data representation; logical design fundamentals, including review of Boolean functions and computational logic; hardware fundamentals including logic gates, flip-flops, adders, data bases, and memory technology; machine organization of CPU memory, input/output and control unit; functioning and interfacing including instruction fetch/execut cycle, data flow and control, cycle stealing and instruction interpretation; introduction to interrupts, memory protection features, multiprocessors, concepts of microprogramming and other advanced architectural concepts. This course replaces ICSS-210. (ICSS-230, ICSS-305)
Class 4, Credit 4

ICSS-320 Data Structure Analysis
Registration #0603-320
Information structures-linear lists, stacks, queues, sequential allocation, linked allocation, circular lists, doubly linked lists, arrays and orthogonal lists; trees, traversing binary trees; lists and garbage collection; multilinked structures, dynamic storage allocation. (ICSP-305)
Class 4, Credit 4

ICSS-321 Sorting and Searching Techniques
Registration #0603-321
A study of sorting and searching principles and techniques. Topics include internal and external sorting, table look-up, hash coding and other methods, comparative studies of various techniques and the relations between storage media, and physical file structure. (ICSS-320)
Class 4, Credit 4

ICSS-340 Finite State Machines and Automata
Registration #0603-340
Principles of finite state machines and automata; topics include finite state models, machine capabilities, descriptive methods, decomposition methods, regular expressions, bilaterial analysis, bilateral synthesis, sequential iterative systems and space-time transformations. (ICSS-230, ICSS-315)
Class 4, Credit 4

ICSS-355 The Human Side of Management
Registration #0603-355
Survey of issues of concern regarding the interaction of computer systems and humans. Participants will be expected to prepare a major study, including proposed solutions, for at least one problem. Topics include: the strengths and weaknesses of computers; the effect of, and the computer's role in, change; the effect of organizations, the management process, standardization, organizational structure, and automation; effect on individuals, the "priesthood of the machine", computer assisted instruction, medical uses; effects on society, information banks, privacy, and other legal questions, law enforcement and other governmental uses, the computer utility, the cashless society. (ICSS-200 or ICSS-202)
Class 4, Credit 4

ICSS-400 Logical Design
Registration #0603-400
Digital computer logic design. Topics include review of switch theory, sequential circuit analysis, sequential circuit synthesis, error detection, error correction network, speed-up techniques, parallel and serial approaches, interface techniques and comparative study of digital computer architecture. (ICSS-315)
Class 4, Credit 4

ICSS-420 Data Communication Systems
Registration #0603-420
Data based systems, data communication systems. Topics include the role of the data base; communication techniques; common carrier implications, tariffs, exchanges, concentrations, multiplexors, buffering; network analysis, cost and design, software considerations. (SMAM-309, third year standing in computer science and technology)
Class 4, Credit 4

ICSS-430 Numerical Methods
Registration #0603-430
Numerical methods using computers. Topics include error analysis, power series calculation of functions, roots of equations, solution of linear simultaneous equations, numerical integration, and interpolation and curve fitting. The computational aspects rather than mathematical development will be emphasized. (SMAM-251, 252 or SMAM-214 and ICSP-205)
Class 4, Credit 4

ICSS-440 Operating Systems
Registration #0603-440
A general survey of operating systems modules. Topics include linkers and loaders; I/O and file systems; memory management, paging, segmentation, virtual memory; interrupt handling; resource allocation; scheduling algorithms; deadlocks; multiprocessing and multiprocessing conflict resolution; process definition, communication, and projection. Several existing operating systems are examined. (ICSS-320, ICSS-315)
Class 4, Credit 4

ICSS-450 Computing Management
Registration #0603-450
The application of management principles to managing a data processing installation. Topics include organization, personnel selection and staffing, economic analysis including equipment and software selection, leasing, and purchase, installation layout, physical, software, and file security, management controls and auditing, maintenance, and legal aspects. A major project in equipment selection and installation will be assigned. Must be fourth or fifth year computer science major)
Class 4, Credit 4

ICSS-465 Introduction to Management Information Systems
Registration #0603-465
A study of the analysis, design, and implementation of management information systems; various approaches to system analysis, including inquiring systems and the views of C. West Churchman; a survey of proposed and actual MIS designs for general and specific applications, such as accounting, financial and inventory systems, and consideration of the "total information system;" implementation aspects, such as decision tables, data bases and data base management systems, security, financial considerations, and testing. (ICSS-311)
Class 4, Credit 4

ICSS-480 Formal Languages
Registration #0603-480
Computers formal language principles. Topics include context free, context sensitive grammar, regular expressions; turing machines, introduction to unsolvability and computability. (ICSS-340)
Class 4, Credit 4
ICSS-485  Data Base Concepts
Registration #0603-485
Introduction to the concept of data base. Topics include historical review, read-only storage (ROS), work organization, encoded control, ROS timing, ROS storage capacity and cost, advantages, disadvantages, writable control storage and levels of microprogramming in existence today. (ICSS-315)
Class 4, Credit 4

ICSS-510  Systems Workshop
Registration #0603-510
Commercial projects utilizing COBOL and the principles of systems analysis and design; the projects will be completed by individuals or small groups. (ICSS-311)
Class 4, Credit 4

ICSS-515  Analysis of Algorithms
Registration #0603-515
This course should be designed to teach the mathematics necessary to properly analyze the computational effort of a given algorithm. Specific algorithms should be analyzed and then improved. (Advanced computer science standing)
Class 4, Credit 4

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

ICSS-540  Operating Systems Laboratory
Registration #0603-540
Application of the principles covered in ICSS-440; development of a small operating system and a study of its functional characteristics; special topics include I/O programming, interrupt handling, resource allocation and virtual system concepts; laboratory emphasis. (ICSS-440)
Class 4, Credit 4

ICSS-545  Microprogramming
Registration #0603-545
A study of principles and applications of microprogramming. Topics include historical review, read-only storage (ROS), work organization, encoded control, ROS timing, ROS storage capacity and cost, advantages, disadvantages, writable control storage and levels of microprogramming in existence today. (ICSS-315)
Class 4, Credit 4

ICSS-550  Review of Computer Science
Registration #0603-550
Review of advances in computer science which have occurred in the last few years—designed to give graduating or upper-class students an introduction to recent technological and theoretical advances through readings in the current literature. Normally taken during the last quarter of school. (Must be fifth year computer science and technology major)
Class 4, Credit 4

ICSS-560  Compiler Construction Laboratory
Registration #0603-560
Design of full-scale processors for the purpose of language translation; projects to be completed in a structured environment in areas of parsing, code generation, code optimization, and language design. (ICSS-525)
Credit 4

ICSS-575  Minicomputer Systems and Applications
Registration #0603-575
A study of minicomputer hardware architecture, logical design, system interface, software organization, operating systems and applications in various areas. Hands-on experimentation on the PDP 11/10 and Microdata 1600D dual processing system is emphasized in this course. (Fourth year computer science and technology major)
Class 4, Credit 4

ICSS-580  Systems Programming
Registration #0603-580
A study of computer system programming techniques. Topics include system specifications, system generations, utility, service routines, operating systems, language processors, resources allocation, system protection and system efficiency optimization. (ICSS-525, ICSS-440)
Class 4, Credit 4

ICSS-585  Systems Programming Laboratory
Registration #0603-585
A follow-up study of Systems Programming to provide actual experience on a computer system. (ICSS-580)
Class 4, Credit 4

ICSS-590  Seminar in Computer Science
Registration #0603-590
Current advancement in computer science. Topics selected include telecommunications, operating systems, sorting, systems analysis, virtual storage, microprogramming and others. (Fourth year computer science and technology major)
Class 2-4, Credit 2-4

ICSS-599  Independent Study
Registration #0603-599
Selected topics between a student and a faculty member. (Fifth year Computer science and technology major with an average higher than 2.5)
Class 2-4, Credit 2-4

Graduate Courses
Computer Science and Technology

ICSM-700  Review of Programming Languages
Registration #0611-700
A review of programming techniques and the applications of FORTRAN and assembly language for the incoming graduate student with deficiencies in programming.
Credit 4

ICSM-703  Data Management Concepts
Registration #0611-703
A study of computer data management concepts. Topics include data representation, data structures, searching and storage techniques, file structure and maintenance, data communication and generalized data management systems.
Credit 4

ICSM-710  Computer Systems Software
Registration #0611-710
A study of the wide spectrum of developing and existing system software. Topics discussed include supervisors, monitors, compilers, utility programs, I/O executives, communication processing systems, application programs, and minicomputer operating systems. Detailed studies in IBM and Xerox systems will be made and comparative studies between systems and the availability of various systems will also be covered.
Credit 4

Computer Systems Management
ICSM-715 Computer Systems Hardware
Registration #0611-715
A study of the characteristics of computer system hardware. The topics discussed include speed, memory size, architecture, expandability, maintenance problems and software backup. Both case studies and comparative studies will be made to large, medium, and small scale computers, as well as to mini computers.
Credit 4

ICSM-740 Computer System Personnel and Management
Registration #0611-740
A study of computer installation personnel and management structure. Topics include system programmer and system analysis, qualification and selection, applications programmer qualification and selection, responsibility assignment, scheduling procedures, cost analysis, performance evaluation quality control and other behavioral aspects.
Credit 4

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

ICSM-790 Seminar
Registration #0611-790
Topics addressed include management problems, production problems, maintenance problems, hardware and software systems problems, and invited topics given by Computer Center directors.
Credit 4

ICSM-799 Independent Study
Registration #0611-799
Credit variable (2-4)

ICSS-610 EDP Auditing
Registration #0603-610
A study of the techniques and approaches used to audit computer data centers and systems. Topics include the methodology and tools of EDP auditing, internal departmental controls, program controls, input/output controls, data security, physical security, computer hardware controls and data communication control.
Credit 4

ICSS-620 Computer Architecture
Registration #0603-620
A study of computer architectural analysis and design. Topics include review of basic theories, hardware technology, parallel and distributive logic, asynchronous and synchronous machines and case study. (ICSS-315)
Credit 4

ICSS-621 Microprocessor and Microcomputers
Registration #0603-621
A study of microprocessors, microcomputers and their applications. Topics include microprocessor hardware, microcomputer organization, software, microcomputer programming, interface techniques and trend of development. Case studies will be provided. Intel 8080 will be extensively studied. Students must have background in assembly language programming and knowledge in microprogramming.
Credit 4

ICSS-630 Discrete Simulation
Registration #0603-630
Computer simulation techniques are examined. Topics include abstract properties of simulations, modeling, analysis of a simulation run, and statistics. At least one general purpose simulation language (GPDS) will be taught. Each student will be required to write at least one simulation program, run it on a digital computer, and present an analysis thereof.
Credit 4

ICSS-635 On-Line Information Systems Design
Registration #0603-635
Design of on-line informative systems. 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. (Consent of department)
Credit 4

ICSS-636 Data Base System Implementation
Registration #0603-636
Requirements and characterization of generalized data base systems, the role of data base administrator, creation of a general data base, elements of data base management systems, data base management in multi-access environment, survey of data base management systems, selecting a data base management system, projects in data base systems implementation. (ICSS-485)
Credit 4

ICSS-640 Computer Communications Networks
Registration #0603-640
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.
Credit 4

ICSS-655 Real-Time Computation
Registration #0603-655
Principles and applied problems in real-time computation. Topics include processor subsystems, communication networks, terminal sub-systems, A/D conversion, D/A conversion, interference, noise problems, the major cycle mode, message switching system, through-put rate calculations, system efficiency, and system optimization.
Credit 4

ICSS-670 Computer Graphics
Registration #0603-670
Theory and technology of computer graphics; display devices and processors; display files and transformations; interactive and three-dimensional graphics and graphic systems; graphic languages and systems design.
Credit 4

ICSS-705 Fundamentals of Computing Theory
Registration #0603-705
Computer systems, number representations, arithmetical operations and error analysis, structured programming, recursive programming, systems software, computer architecture and microprogramming. (ICSM-700 or equivalent)
Credit 4

ICSS-706 Foundations of Computing Theory
Registration #0603-706
Principles of computing theory; mathematical logic, set theory, relations; functions, grammars and languages, lattices and Boolean algebra, graph theory. (SMAM-431)
Credit 4

ICSS-715 Computational Complexity
Registration #0603-715
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. Background in analysis techniques is presumed. (ICSS-706)
Credit 4

ICSS-725 Assemblers, Interpreters and Compilers
Registration #0603-725
A survey of the software processors. Topics include design and construction of programming language processors, relative merits vis-a-vis cost, user demands, ease of modification, conversational computing, large scale data reduction, and macro processors.
Credit 4
ICSS-726 Deterministic and Probability Models of Operating Systems
Credit 4
Registration #0603-726
Concurrent processes control, processor scheduling models, computer sequencing problems, auxiliary and buffer storage models, storage allocation in paging systems, memory management of multiprogramming computers. (ICSS-440 and SMAM-352 or SMAM-522)

ICSS-736 Data Base Systems
Credit 4
Registration #0603-736
Data base concepts, information storage structures, data models and data sub-languages, the relational approach, the hierarchical approach, and the network approach, data security and integrity, performance and restructuring application and management issues. (ICSS-485)

ICSS-746 Information Storage and Retrieval
Credit 4
Registration #0603-746
Information structure and file organization; dictionary and thesaurus construction, utilization and maintenance; statistical and syntactic language analysis; question-answering systems; systems evaluation.

ICSS-750 Computability
Credit 4
Registration #0603-750
This course examines the theory of computation as it relates to computable functions. Topics include finite state machines, Turing machines, recursive function theory, and Post's symbol manipulation systems. The limitations of the notion of effective computability are examined. (ICSS-706)

ICSS-752 Coding Theory
Credit 4
Registration #0603-752
Study of error correcting codes. Topics include algebraic structure of group codes, linear switching circuits cyclic codes and the decoding problem. (ICSS-706)

ICSS-756 Theory of Parsing
Credit 4
Registration #0603-756
Application of theoretical concepts developed in formal language and automata theory to the design of programming language and its processors; syntactic and semantic notation for specifying programming languages; theoretical properties of some grammars; general parsing; non-backtrack parsing; and limited backtracking parsing algorithms. (ICSS-480)

ICSS-760 Compiler Construction
Credit 4
Registration #0603-760
Language definition, lexical analysis, syntactic analysis, storage allocation and management, code generation, code optimization, diagnostic generation, bootstrapping. (ICSS-480 and ICSS-525)

ICSS-770 Computer Graphics
Credit 4
Registration #0603-770
Theories in the technology of computer graphics; display devices and processors; display files and transformations; interactive and three-dimensional graphics and graphic systems; graphic languages and systems design.

ICSS-775 Minicomputer Systems and Applications
Credit 4
Registration #0603-775
A study of minicomputer hardware architecture, logical design, system interface, software organization, operation systems and applications in various areas. Hands-on experimentation on the PDP 11/10 and Microdata 1600D dual processing systems is emphasized.

ICSS-780 Systems Programming Laboratory
Credit 4
Registration #0603-780
Computer system programming techniques. Topics include system specifications, system generations, utility, service routines, operating systems language processors, resource allocation, system protection, and system efficiency optimization.

ICSS-785 Systems Programming Laboratory
Credit 4
Registration #0603-785
A follow-up study of Systems Programming to provide actual experience on a computer system.

ICSS-790 Seminar
Credit variable 2-4
Registration #0603-790

ICSS-799 Independent Study
Credit variable 2-4
Registration #0603-799

ICSS-890 MS Thesis
Credit variable 4-8
Registration #0603-890

ICAV-401 Message Design
Credit 4
Registration #0612-401
Reviews perception and learning principles 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 of all students.

ICAV-405 Audiovisual Seminar
Credit 4
Registration #0612-405
Permits entering 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. Guest speakers and visits to local media production units will permit personal contact with potential employers. Required of all students.

ICAV-440 Audiovisual Program Design I
Credit 2
Registration #0612-440
Students learn how to produce programmed instructional materials by working through a programmed text. Students must write a program, developmentally test it and validate the final version. Emphasis is on mastery of skills and techniques involved rather than on theory. Required for all students.

ICAV-450 Audiovisual Program Design II
Credit 4
Registration #0612-450
The systems approach to instructional programming is discussed and used as a basis for a systematic, four-stage process of program identification, design, development, and dissemination. Each student must design an instructional product utilizing this systems model. Required for all students. (ICAV-440)
ICAV-460 Selection, Storage and Dissemination of Media Resources
Reviews methods of selecting non-print media resources (such as films, audiocassettes, videotapes), methods for proper storage and efficient retrieval of non-print materials, and distribution practices. Examines sources reviews and descriptions which can be used in locating, selecting, and acquiring various media.
Credit 2
ICAV-485 Electronics in AV
Covers the fundamentals of electricity and electronics, with particular emphasis on applications to audiovisual hardware and electronic systems, especially as related to proper operation and use.
Credit 4
ICAV-490 Audio Techniques
Students review principles of sound recording and produce audiotapes using both studio and field grade reel-to-reel and cassette formats in a variety of situations. Major topics include equipment, microphones, sale and use, acoustical considerations, dubbing, editing and recording techniques. Special emphasis is on mastery of techniques and equipment selection for specific uses.
Credit 4
ICAV-500 Practicum in a Special Interest Area
Permits students to explore or develop a special competence in an area of special interest and to work with "clients" in real or simulated work environments. A proposal (guidelines available from the department) must be submitted prior to registration. For audiovisual communications majors only.
Credit variable (1-4)
ICAV-501 Practicum in Audiovisual Program Design
Permits 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 (2-4)
ICAV-502 Practicum in Audiovisual Management
Permits 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)
ICAV-503 Practicum in Audiovisual Production
Permits a student to explore or develop a special competence in advanced production 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)
ICAV-510 Writing for Audiovisual Programs
Examines 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
ICAV-550 Management of Audiovisual Programs
Covers organizational strategies, management practices, budgeting and fiscal control, personnel recruitment, selection, training and supervision, resource center operation and organization.
Credit 4
ICAV-556 Media Facilities Design
Examines major variables influencing the design of such media facilities as media production areas, darkrooms, audio and television studio and control rooms, and training and instructional areas. Topics include acoustics, lighting, ventilation, electrical circuits, space requirements and layouts.
Credit 4
ICAV-570 Survey of Audiovisual Equipment
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 4
ICAV-580 Producing Multimedia Presentations
Permits students to apply their skill and knowledge in designing and producing an appropriate senior project in their specialty area. This may involve a media production, design of a training system, or an in-depth study or survey. These courses are to be taken in the Fall and Winter Quarters of the senior year. The project proposal must be completed within the first half of the Winter Quarter. Proposal guidelines are available from the department.
Both courses are required for graduation.
Credit 2/Qtr.

Graduate Courses
ICIT-700 Introduction to Instructional Technology
This modularized course surveys a variety of areas in instructional technology, including the definitions of instructional technology, the history, the research, leaders, funding, trends, health science applications and community college applications. Each module is worth one-half credit. Each student is required to complete at least two credits for graduation.
Credit 2 or 3
ICIT-703 Training Health Professionals
Examines the various methods used to train physicians, nurses, dentists, and veterinarians. Particular emphasis is placed on the role of instructional technology in current training programs. Maximum use is made of field trips to various local training programs.
Credit 2
ICIT-705 Sources of Information in Instructional Technology
Examines the wealth of information sources available to instructional technologists, including catalogs of non-print material, handbooks, newsletters, ERIC, hardware and software dealers, conference proceedings and books. Students are given problems to solve requiring the use of these sources.
Credit 2
ICIT-710 Programmed Instruction
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 Registration #0613-712
Computer Assisted Instruction
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.
Credit 4

ICIT-715 Registration #0613-715
Instructional Television
Explores the various uses of television as an instructional medium, i.e., 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

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

ICIT-722 Registration #0613-722
Research Project
This variable credit course 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. Proposal guidelines are available from the department.
Credit 1-4

ICIT-735 Registration #0613-735
Psychology of Learning and Teaching
Relates various theories of learning to actual teaching and to the preparation of educational media. Students review learning principles and apply them to practical instructional situations, particularly instruction based on various kinds of media. Emphasis is on behavioral approach to developing instruction and training.
Credit 4

ICIT-745 Registration #0613-745
Instructional Facility Design
Designed to enable the instructional technologist to assist and participate in the design of spaces and related utilities 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 3

ICIT-750, 751 Instructional Development I, II Registration #0613-750, -751
This two quarter course examines in detail the process of instructional development. Students examine the literature in instructional development in order to become well versed in the proliferation of theories and methods. Functionally, instruc­tional development is defined as the systematic solution of instructional and learning problems involving, at least, the assessment of needs, specification of objectives, analysis and synthesis of strategies, and evaluation. This course requires the student to complete projects using an instructional development process. The content of the pro­jects reflects the career interest of the student, i.e., health related for those in the health science applications option and com­munity college oriented for those in the community college option. Provision is also made for those generalists interested in examining instructional development in depth. These two courses are required for graduation.
Credit 4/Qtr.

ICIT-752 Registration #0613-752
Instructional Development III
This course continues the process of examining instructional development begun in ICIT-750 and 751. Students examine and critically evaluate the literature of instructional develop­ment; continue or initiate projects; and/or create a model for instructional development. (ICIT-750 and 751.)
Credit 4

ICIT-762 Registration #0613-762
Management and Budgeting in Instructional Technology
Applies basic theories of management (such as X-Y theory, managerial grid) to areas of instructional technology (such as production, audiovisual services) and the management of person­nel in those areas. Examines the organizational structure of media centers and units within the center. Covers budgeting and actual financing for media center services and projects dealing with the use of media in training and instruction.
Credit 4

ICIT-765 Registration #0613-765
Individual Learning Style
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 styles. (ICIT-735)
Credit 4

ICIT-770 Interpersonal Communications
Registration #0613-770
Most, if not all, projects managed by or worked on by instruc­tional technologists require the ability to work well with people. The acquisition of this skill is the objective of this course. Participants in the course will examine their own feelings as well as others in a group situation.
Credit 2

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. Each student selects a topic, examines it thoroughly, and presents the findings to the group. This course is required for graduation.
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.
Credit 1-4

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.
Credit 1-4
Packaging Science

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-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-431 Packaging Production Systems
Registration #0607-431
A study of package forming and filling, closing, product/package identification, inspection, and other machinery commonly used in packaging, plus consideration of handling and storage/retrieval systems. The characteristics of such equipment, and maintenance programs will be considered. Students will gain practice in setting up complete production lines for packaging various products. (IPKG-311, 312).
Class 2, Lab 4, Credit 4

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

IPKG-433 Packaging for Marketing
Registration #0607-433
The interrelationship between packaging and marketing, detailing how the retail consumer package can be used as a scientific marketing tool. The course concentrates on a systematic approach to developing an optimum package for a given product to meet the demands of the retail market. Advertising, marketing demographics, and the impact of color upon packaging will be considered. Students will gain practice in the development of a complete package system. (IPKG-431, 432).
Class 2, Lab 4, Credit 4

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

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

IPKG-530 Packaging and the Environment
Registration #0607-530
Consideration of packaging in a social context. Factors which enhance secondary use, recycling, recovery of resources, and proper disposal will be discussed. Package design in relation to solid waste disposal and materials and energy shortages will be considered. Other topics of current, social interest will be discussed. Primarily a discussion class for senior students. Open to non-majors. (This course is intended for seniors)
Class 1, Rec. 1, Lab 2, Credit 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-599 Independent Study
Registration #0607-599
Independent study, in consultation with the instructor, on any packaging-related topic.
Arranged, Credit variable

Reserve Officers’ Training Corps

First Year

MMSM-201 The Military and American Society I
Registration #0701-201
Introduction to the organization of the United States Army and the ROTC program; warfare: its nature, origin, conduct and future; voluntary leadership laboratory.
Class 1, Credit 1

MMSM-202 The National Security Structure
Registration #0701-202
U.S. Army and National Security Organization of the federal government with emphasis on the Congress, Executive Office of the President, and the Department of Defense. Public opinion and national security; an introduction to small unit organization and military rank; voluntary leadership laboratory.
Class 1, Credit 1
MMSM-203 The Military and American Society II
Registration #0701-203
The impact of the military upon American political, economic and social institutions; significance of military customs, courtesies and traditions; introduction to U.S. Army weapons; voluntary leadership laboratory.
Class 1, Credit 1

Second Year

MMSM-301 Introduction to Basic Operation and Tactics
Registration #0701-301
Provides a knowledge of small unit leadership with emphasis on map reading and land navigation; leadership laboratory.
Class 2, Credit 2

MMSM-304 Basic Operations and Tactics
Registration #0701-304
Fundamentals and techniques of squad level tactics with emphasis on leadership, command and control, and tactical employment; leadership laboratory.
Class 2, Credit 2

MMSM-305 Junior Officer Development
Registration #0701-305
The functions, duties and responsibilities of a junior officer with an introduction to career planning; leadership laboratory to include field training exercise and military installation orientation visit.
Class 2, Credit 2

Third Year

MMSM-401 Fundamentals of Instruction
Registration #0701-401
examination of principles and techniques that are utilized in the preparation and presentation of a complete period of instruction; leadership laboratory.
Class 3, Credit 3

MMSM-402 Leadership in Small-Unit Operations
Registration #0701-402
An extended course in leadership and management of resources on the tactical battlefield with heavy emphasis placed on sequential timing and economy of forces and resources; leadership laboratory to include field training exercise and military installation orientation visit.
Class 3, Credit 3

MMSM-403 Leadership and Management
Registration #0701-403
Provides future officers with the basic principles of leadership and management of human resources; motivation, morale, communication, individual and group behavior are discussed; leadership laboratory.
Class 3, Credit 3

Fourth Year

MMSM-503 World Change and Military Implications
Registration #0701-503
A study of the Army's contribution to the total military structure; an introduction to military implications in the international system; readings in military history; leadership laboratory to include field training exercise and military installation orientation trip.
Class 3, Credit 3

MMSM-504 Administration and Staff Operations
Registration #0701-504
Staff organization, functions and responsibilities at battalion level and company administration; readings in military history; leadership laboratory.
Class 3, Credit 3

MMSM-505 Advanced Leadership and Management
Registration #0701-505
Further studies in leadership and management with emphasis on contemporary human problems and military justice; readings in military history; leadership laboratory.
Class 3, Credit 3
Communication Design ........................................... 24, 28
Communication Techniques ........................................ 16
Communication Theory ........................................... 75
Communication with the Handicapped........................................... 43
Communism, Fascism and Democracy in their Theoretical Foundations ........................................... 37
Community/Junior College Relations ........................................... 74
Community Nutrition ........................................... 5
Community Organization ........................................... 33
Comparative Criminal Law ........................................... 31
Comparative Marketing ........................................... 4
Comparative Physiology ........................................... 60
Comparative Politics ........................................... 41
Comparative Religions ........................................... 40
Comparative Vertebrate Anatomy ........................................... 59
Compiler Construction ........................................... 52
Compiler Construction Laboratory ........................................... 80
Complex Variables ........................................... 66, 67
Compositional Design ........................................... 54
Composition Technology ........................................... 54
Computability ........................................... 81
Computational Complexity ........................................... 81
Computer Applications in Engineering Problems ........................................... 78
Computer Applications in Social & Behavioral Sciences ........................................... 78
Computer Applications in Analysis and Design ........................................... 78
Computer Architecture ........................................... 84
Computer Assisted Instruction ........................................... 81, 82
Computers in Engineering Technology I, II ........................................... 75
Computers in Electrical Engineering Technology ........................................... 17
Computer Science and Technology ........................................... 77
Computer System Personnel & Management I,II ........................................... 81
Computer Systems Hardware ........................................... 81
Computer Systems Software ........................................... 80
Computer Techniques ........................................... 77
Computers in Civil Engineering Technology ........................................... 70
Computers in Engineering Technology II ........................................... 74
Computers in Management ........................................... 54
Computers in the Graphic Arts ........................................... 79
Computing Management ........................................... 79
Concentration Techniques ........................................... 43
Constitutional Law and Criminal Justice ........................................... 30
Constitutional Law and Criminal Justice Practice ........................................... 70
Consumer Behavior ........................................... 4
Consumer Services Analysis ........................................... 4
Consumer Services Seminar ........................................... 4
Contemporary American Novel ........................................... 35
Contemporary Economic Systems ........................................... 40
Contemporary Film ........................................... 35
Contemporary International Film ........................................... 41
Contemporary Middle East ........................................... 38
Contemporary Portrait Photography ........................................... 49
Contemporary Science—Biology ........................................... 58
Contemporary Science—Chemistry ........................................... 58
Contemporary Science—Mathematics ........................................... 58
Contemporary Science—Physics ........................................... 58
Copy Protection ........................................... 55, 57
Cost Accounting I, II ........................................... 2
Cost and Managerial Accounting ........................................... 8
Cost and Value Analysis ........................................... 73
Cost Estimating ........................................... 71
CPA Problems ........................................... 2
Creative Sources ........................................... 25
Creative Writing I ........................................... 35
Crime and Violence ........................................... 31
Crime, Violence and Urban Crisis in the 20th Century ........................................... 38
Criminal Investigation ........................................... 30
Criminal Justice courses ........................................... 30
Cubism to the Present ........................................... 44
Culture and Counterculture in Historical Perspective ........................................... 38
Cultural Anthropology ........................................... 40
Current Issues and Selected Counseling Skills ........................................... 77
Current Treatment Modalities ........................................... 32
Data Base Concepts ........................................... 80
Data Base Systems Implementation ........................................... 81
Data Communications Systems ........................................... 79
Data Management Concepts ........................................... 80
Data Structure Analysis ........................................... 25
Day Care Programming ........................................... 33
Day Care—Materials and the Classroom ........................................... 33
Day Care—the Emerging Profession ........................................... 34
DC and AC Machine Design ........................................... 72
Deaf Studies in Literature ........................................... 36
Death and Dying ........................................... 42
Decision Theory and Research ........................................... 10
Design Applications ........................................... 25, 29
Design of Experiments ........................................... 50, 57
Design of Experiments I ........................................... 12
Design of Experiments II ........................................... 12
Design of Sanitary and Stormwater Drainage Systems ........................................... 79
Design of Wastewater Treatment Facilities ........................................... 70
Design of Water Treatment Facilities ........................................... 70
Design Practice ........................................... 74
Design Technology—Graphic Visualization ........................................... 25
Design Technology—Materials and Processes ........................................... 25
Design Technology—Mechanical Drawing ........................................... 25
Design (2 Dimensional) ........................................... 25
Design (3 Dimensional) ........................................... 25
Deterministic and Probability Models of Operating Systems ........................................... 82
Development of Printing Types ........................................... 56
Developmental Psychology ........................................... 59
Developmental Biology ........................................... 59
Developmental, Genetic & Environmental Biology ........................................... 57
Dietetics ........................................... 5
Dietetics Environment ........................................... 5
Differential Equations ........................................... 66
Digital Computer Design I ........................................... 72
Digital Computer Design II ........................................... 72
Digital Computer Organization ........................................... 79
Digital Computer Workshop ........................................... 14
Digital Data Communications ........................................... 16
Digital Data Transmission ........................................... 16
Digital Fundamentals ........................................... 76
Digital Integrated Circuits ........................................... 16
Digital Signal Processing ........................................... 16
Discrete Mathematics ........................................... 65
Discrete Simulation ........................................... 81
Discrete Structure ........................................... 78
Drawing (Craft Majors) ........................................... 25
Drawing ........................................... 25
Economics ........................................... 9
Economics and Politics of Consumer Protection ........................................... 40
Economics of Underdeveloped Countries, The ........................................... 41
Economics of Production Management ........................................... 53
Education/Business/Industry ........................................... 76
Interrelationships ........................................... 76
Educational Principles and Methods ........................................... 45
Educational Psychology ........................................... 45
Educational Sociology ........................................... 43, 45
Effective Speaking ........................................... 45
Electronic Measurements ........................................... 68
Electric Power Transmission ........................................... 76
Electrical Engineering Technology I, II ........................................... 13
Electrical Engineering I, II ........................................... 13
Electrical Measurement ........................................... 75
Electrical Principles for Design I ........................................... 71
Electrical Principles for Design II ........................................... 71
Electrical Processes in Solids ........................................... 68
Electricities ........................................... 71
Electricity and Magnetism ........................................... 68
Electromagnetic Fields ........................................... 15
Electromagnetic Fields and Antennas ........................................... 71
Electromagnetic Fields/II ........................................... 14
Electromagnetic Waves ........................................... 15
Electromechanical Energy ........................................... 13
Electronics I ........................................... 13
Electronics II ........................................... 13
Electronics in AV ........................................... 83
Electronics for Technologists ........................................... 67
Electrostatic and Magnetic Fields ........................................... 71
Elements of Building Construction ........................................... 70
Energy and the Environment ........................................... 71
Energy Problems ........................................... 78
Energy Management in Mechanics ........................................... 23
Energy Management ........................................... 13
Engineering ........................................... 13
Engineering Acoustics and Noise Control ........................................... 21
Engineering Concepts ........................................... 21
Engineering Design ........................................... 18
Engineering Economics ........................................... 73
Engineering Economics ........................................... 73
Engineering Graphics ........................................... 79
Engineering Hydrology ........................................... 24
Engineering Internship ........................................... 17
Engineering Materials ........................................... 73
Engineering Mechanics ........................................... 73
Engineering Mathematics ........................................... 66, 67
Engineering Planning and Control ........................................... 18
Engineering Technology Analysis ........................................... 75
Engineering Technology Seminar ........................................... 76
English Architecture ........................................... 44
English Composition ........................................... 34
English Language other than British and American ........................................... 36
Environment and the Engineer ........................................... 36
Environmental Design—Product, Packages, Graphics ........................................... 25
Environmental Design—Exhibit ........................................... 25
Environmental Design—Furniture ........................................... 25
Environmental Design—Interiors ........................................... 25
Environmental Design—Interiors Product Systems ........................................... 25
Environmental Design—Product Environment ........................................... 25
Environmental Design—Thesis ........................................... 25
Environmental Engineering ........................................... 25
Environmental Engineering Project ........................................... 70
Environmental Microbiology ........................................... 59
Environmental Pollution ........................................... 70
Estimating I ........................................... 52
Estimating II ........................................... 52
Estimating Workshop ........................................... 53
Ethics and Philosophy of Education ........................................... 44
Ethnic Foods ........................................... 7
Ethnic History ........................................... 37
Etiology of Crime ........................................... 32
Experimental Physics ........................................... 68
Experimental Stress Analysis ........................................... 23
Family Court Administration ........................................... 31
Fashion Accessories ........................................... 7
Fashion History ........................................... 7
Field Experience and Seminar ........................................... 30
Field Instruction I, II ........................................... 32
Film History ........................................... 32
Film making courses ........................................... 45
Film Planning and Studio Operations ........................................... 46
Film Project with Synchronous Sound ........................................... 46
Financial Accounting ........................................... 2, 8
Financial Controls ........................................... 2, 8
Financial Controls I, II ........................................... 53
<table>
<thead>
<tr>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial Institutions</td>
<td>4</td>
</tr>
<tr>
<td>Financial Management</td>
<td>3.9</td>
</tr>
<tr>
<td>Fine Arts Research and Thesis</td>
<td>3.5</td>
</tr>
<tr>
<td>Guidance</td>
<td>2.5</td>
</tr>
<tr>
<td>Finite Elements I, II</td>
<td>2.0</td>
</tr>
<tr>
<td>Finite State Machines and Automata</td>
<td>1.5</td>
</tr>
<tr>
<td>Flexography</td>
<td>1.0</td>
</tr>
<tr>
<td>Fluid Dynamics</td>
<td>1.5</td>
</tr>
<tr>
<td>Fluid Mechanics I, II</td>
<td>2.0</td>
</tr>
<tr>
<td>Fluid Mechanics of Turbomachinery</td>
<td>1.5</td>
</tr>
<tr>
<td>Food and Beverage Merchandising</td>
<td>3.0</td>
</tr>
<tr>
<td>Food and Tourist Industries</td>
<td>2.5</td>
</tr>
<tr>
<td>Food Principles</td>
<td>2.0</td>
</tr>
<tr>
<td>Food Production Management I &amp; II</td>
<td>2.0</td>
</tr>
<tr>
<td>Food Science I</td>
<td>2.0</td>
</tr>
<tr>
<td>Food Science II</td>
<td>2.0</td>
</tr>
<tr>
<td>Food Systems Design &amp; Equipment Layout</td>
<td>1.5</td>
</tr>
<tr>
<td>Foreign Policy of the Soviet Union</td>
<td>1.0</td>
</tr>
<tr>
<td>Forensic Chemistry</td>
<td>1.0</td>
</tr>
<tr>
<td>Forensic Science</td>
<td>1.0</td>
</tr>
<tr>
<td>Formal Languages</td>
<td>0.5</td>
</tr>
<tr>
<td>Fortran Programming for Engineers</td>
<td>2.0</td>
</tr>
<tr>
<td>Foundations of Computing Theory</td>
<td>1.5</td>
</tr>
<tr>
<td>Foundations of Higher Mathematics</td>
<td>2.0</td>
</tr>
<tr>
<td>Foundations of Scientific Thinking</td>
<td>1.5</td>
</tr>
<tr>
<td>Freshman Seminar</td>
<td>1.0</td>
</tr>
<tr>
<td>Fundamental Concepts and Patterns of Criminal Law</td>
<td>1.5</td>
</tr>
<tr>
<td>Fundamentals of Computing</td>
<td>1.0</td>
</tr>
<tr>
<td>Fundamentals of Counseling</td>
<td>1.5</td>
</tr>
<tr>
<td>Fundamentals of Instruction</td>
<td>2.0</td>
</tr>
<tr>
<td>Fundamentals of Photographic Communication</td>
<td>1.5</td>
</tr>
<tr>
<td>Fundamentals of Photographic Science</td>
<td>1.0</td>
</tr>
<tr>
<td>Fundamentals of Physics</td>
<td>1.0</td>
</tr>
<tr>
<td>Fundamentals of Statistics</td>
<td>1.5</td>
</tr>
<tr>
<td>Fundamentals of the Criminal Justice System</td>
<td>1.5</td>
</tr>
<tr>
<td>Future as History, The</td>
<td>1.0</td>
</tr>
<tr>
<td>Game Theory</td>
<td>2.0</td>
</tr>
<tr>
<td>Game Theory for Social Workers</td>
<td>1.0</td>
</tr>
<tr>
<td>General &amp; Analytical Chemistry</td>
<td>1.0</td>
</tr>
<tr>
<td>General Biology</td>
<td>1.0</td>
</tr>
<tr>
<td>General Chemistry</td>
<td>1.0</td>
</tr>
<tr>
<td>General Ecology</td>
<td>1.0</td>
</tr>
<tr>
<td>General Forestry</td>
<td>1.0</td>
</tr>
<tr>
<td>General Geography</td>
<td>1.0</td>
</tr>
<tr>
<td>General History</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the Renaissance</td>
<td>1.5</td>
</tr>
<tr>
<td>General History of Printing Technology</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the Soviet Union</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of Popular Culture in America</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of Printing Technology</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of Social Discrimination</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the Renaissance</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of Popular Culture in America</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of Printing Technology</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of Social Discrimination</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the Renaissance</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>General History of the World Since 1945</td>
<td>1.0</td>
</tr>
<tr>
<td>Course Title</td>
<td>Page</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Operating Systems Laboratory</td>
<td>80</td>
</tr>
<tr>
<td>Operation, Care and Maintenance of Physical Equipment</td>
<td>48</td>
</tr>
<tr>
<td>Operations Management</td>
<td>3, 8</td>
</tr>
<tr>
<td>Operations Research—Mathematical Models</td>
<td>11</td>
</tr>
<tr>
<td>Operations Research—Probabilistic Models</td>
<td></td>
</tr>
<tr>
<td>Optical Devices and Systems</td>
<td>15</td>
</tr>
<tr>
<td>Optical Instrumentation</td>
<td>50</td>
</tr>
<tr>
<td>Optical Physics</td>
<td>68</td>
</tr>
<tr>
<td>Optimal Control Systems Design</td>
<td>24</td>
</tr>
<tr>
<td>Optimum Control Systems</td>
<td>16</td>
</tr>
<tr>
<td>Orchestra and Music</td>
<td>37</td>
</tr>
<tr>
<td>Organic Chemistry</td>
<td>62</td>
</tr>
<tr>
<td>Organic Chemistry of Polymers</td>
<td>54</td>
</tr>
<tr>
<td>Protozoology</td>
<td>57</td>
</tr>
<tr>
<td>Organization Theory</td>
<td>3</td>
</tr>
<tr>
<td>Oriental Art</td>
<td>37,44</td>
</tr>
<tr>
<td>Package Development and Marketing</td>
<td>76</td>
</tr>
<tr>
<td>Package Environment and Testing</td>
<td>76</td>
</tr>
<tr>
<td>Packaging and the Environment</td>
<td>85</td>
</tr>
<tr>
<td>Packaging Economics</td>
<td>75</td>
</tr>
<tr>
<td>Packaging Equipment and Systems</td>
<td>75</td>
</tr>
<tr>
<td>Packaging for Distribution</td>
<td>85</td>
</tr>
<tr>
<td>Packaging for Marketing</td>
<td>85</td>
</tr>
<tr>
<td>Packaging Materials I</td>
<td>52</td>
</tr>
<tr>
<td>Packaging Materials II</td>
<td>52</td>
</tr>
<tr>
<td>Packaging Production Systems</td>
<td>85</td>
</tr>
<tr>
<td>Packaging Science</td>
<td>75</td>
</tr>
<tr>
<td>Painting</td>
<td>26, 29</td>
</tr>
<tr>
<td>Parapsychology</td>
<td>60</td>
</tr>
<tr>
<td>Passive and Active Filter Design</td>
<td>16</td>
</tr>
<tr>
<td>Patent Law</td>
<td>19</td>
</tr>
<tr>
<td>Patent Law and Protection</td>
<td>22</td>
</tr>
<tr>
<td>Personal Finance</td>
<td>40</td>
</tr>
<tr>
<td>Personal Relations I</td>
<td>52</td>
</tr>
<tr>
<td>Personnel Systems</td>
<td>68</td>
</tr>
<tr>
<td>Philosophy of Justice</td>
<td>36</td>
</tr>
<tr>
<td>Philosophy of Religion</td>
<td>40</td>
</tr>
<tr>
<td>Philosophy of Science</td>
<td>57</td>
</tr>
<tr>
<td>Photocomposition</td>
<td>57</td>
</tr>
<tr>
<td>Photographic Instrumentation</td>
<td>50</td>
</tr>
<tr>
<td>Photographic Analysis of Visual Parameters and Evaluation</td>
<td>49</td>
</tr>
<tr>
<td>Photographic Chemistry</td>
<td>50</td>
</tr>
<tr>
<td>Photographic Illustration courses</td>
<td>47</td>
</tr>
<tr>
<td>Photographic Instrumentation</td>
<td>50</td>
</tr>
<tr>
<td>Photographic Museum Practice</td>
<td>51</td>
</tr>
<tr>
<td>Photographic Processing and Finishing Management courses</td>
<td>48</td>
</tr>
<tr>
<td>Photographic Reproduction Technology</td>
<td>56</td>
</tr>
<tr>
<td>Photographic Science and Instrumentation courses</td>
<td>49</td>
</tr>
<tr>
<td>Photography</td>
<td>49</td>
</tr>
<tr>
<td>Photography as a Fine Art</td>
<td>47</td>
</tr>
<tr>
<td>Photography as a Fine Art I</td>
<td>47</td>
</tr>
<tr>
<td>Photography Core</td>
<td>51</td>
</tr>
<tr>
<td>Photography for Scientists and Engineers</td>
<td>49</td>
</tr>
<tr>
<td>Photography (Still)</td>
<td>51</td>
</tr>
<tr>
<td>Photograph H.</td>
<td>48.60</td>
</tr>
<tr>
<td>Photojournalism I</td>
<td>47</td>
</tr>
<tr>
<td>Photojournalism II</td>
<td>47</td>
</tr>
<tr>
<td>Physiology and Anatomy</td>
<td>60</td>
</tr>
<tr>
<td>Physical Chemistry</td>
<td>62</td>
</tr>
<tr>
<td>Physical Chemistry for the Life Sciences</td>
<td>64</td>
</tr>
<tr>
<td>Physical Chemistry of Polymers</td>
<td>64</td>
</tr>
<tr>
<td>Physical Organics</td>
<td>64</td>
</tr>
<tr>
<td>Physics for Graphic Arts</td>
<td>64</td>
</tr>
<tr>
<td>Physics in the Arts</td>
<td>67</td>
</tr>
<tr>
<td>Physics of Non-conductor Devices</td>
<td>85</td>
</tr>
<tr>
<td>Physics Orientation</td>
<td>67</td>
</tr>
<tr>
<td>Physics Research</td>
<td>68</td>
</tr>
<tr>
<td>Physics Seminar</td>
<td>68</td>
</tr>
<tr>
<td>Picasso</td>
<td>37,44</td>
</tr>
<tr>
<td>PL/1 Programming</td>
<td>75</td>
</tr>
<tr>
<td>Planned Society</td>
<td>40</td>
</tr>
<tr>
<td>Planning and Change in the Criminal Justice System</td>
<td>31</td>
</tr>
<tr>
<td>Planning and Decision Making</td>
<td>31</td>
</tr>
<tr>
<td>Plant Anatomy</td>
<td>59</td>
</tr>
<tr>
<td>Plant Ecology</td>
<td>59</td>
</tr>
<tr>
<td>Plant Physiology</td>
<td>60</td>
</tr>
<tr>
<td>Police/Community Relations</td>
<td>31</td>
</tr>
<tr>
<td>Political Philosophy</td>
<td>40</td>
</tr>
<tr>
<td>Politics in China</td>
<td>52</td>
</tr>
<tr>
<td>Population &amp; Society</td>
<td>42</td>
</tr>
<tr>
<td>Portfolio Management</td>
<td>37</td>
</tr>
<tr>
<td>Power Amplifier Design</td>
<td>72</td>
</tr>
<tr>
<td>Power System Analysis</td>
<td>15</td>
</tr>
<tr>
<td>Power System Stability</td>
<td>72</td>
</tr>
<tr>
<td>Practice Management</td>
<td>37</td>
</tr>
<tr>
<td>Practice of Teaching in the Graphic Arts</td>
<td>83</td>
</tr>
<tr>
<td>Practicum in a Special Interest Area</td>
<td>83</td>
</tr>
<tr>
<td>Practicum in Audiovisual Production</td>
<td>83</td>
</tr>
<tr>
<td>Practicum in Audiology</td>
<td>83</td>
</tr>
<tr>
<td>Preparation of Biomedical Visuals</td>
<td>45</td>
</tr>
<tr>
<td>Pre-thesis Seminar</td>
<td>51</td>
</tr>
<tr>
<td>Principles of Color Photography</td>
<td>48</td>
</tr>
<tr>
<td>Principles of Economics I</td>
<td>44</td>
</tr>
<tr>
<td>Principles of Magnetic Resonance</td>
<td>64</td>
</tr>
<tr>
<td>Principles of Operations Research I</td>
<td>19</td>
</tr>
<tr>
<td>Principles of Photographic Science</td>
<td>52</td>
</tr>
<tr>
<td>Principles of Packaging</td>
<td>85</td>
</tr>
<tr>
<td>Principles of the Treatment of Water and Sewage</td>
<td>70</td>
</tr>
<tr>
<td>Printing Education</td>
<td>56</td>
</tr>
<tr>
<td>Printing Management courses</td>
<td>56</td>
</tr>
<tr>
<td>Plate Methodology</td>
<td>57</td>
</tr>
<tr>
<td>Plate Printing</td>
<td>54, 57</td>
</tr>
<tr>
<td>Printing Presses</td>
<td>56</td>
</tr>
<tr>
<td>Printing Production Management I</td>
<td>52</td>
</tr>
<tr>
<td>Research Option (Business Management)</td>
<td>53</td>
</tr>
<tr>
<td>Printing Technology courses</td>
<td>56</td>
</tr>
<tr>
<td>Printing</td>
<td>26, 29</td>
</tr>
<tr>
<td>Probability Theory</td>
<td>67</td>
</tr>
<tr>
<td>Probability Theory and Applications I</td>
<td>12</td>
</tr>
<tr>
<td>Probability Theory and Applications II</td>
<td>12</td>
</tr>
<tr>
<td>Problems About Moral Discourse</td>
<td>40</td>
</tr>
<tr>
<td>Problems in Financial Management</td>
<td>9</td>
</tr>
<tr>
<td>Producing Multimedia Presentations</td>
<td>83</td>
</tr>
<tr>
<td>Production Control</td>
<td>19</td>
</tr>
<tr>
<td>Production Control I</td>
<td>18</td>
</tr>
<tr>
<td>Production for Book Publishing</td>
<td>55</td>
</tr>
<tr>
<td>Production Management</td>
<td>73</td>
</tr>
<tr>
<td>Production Planning</td>
<td>74</td>
</tr>
<tr>
<td>Production Processing and Finishing</td>
<td>48</td>
</tr>
<tr>
<td>Professional Design Business Practices</td>
<td>25</td>
</tr>
<tr>
<td>Professional Photography courses</td>
<td>48</td>
</tr>
<tr>
<td>Professional Principles and Practices</td>
<td>70</td>
</tr>
<tr>
<td>Programmed Instruction</td>
<td>83</td>
</tr>
<tr>
<td>Programming Language—FORTRAN</td>
<td>77</td>
</tr>
<tr>
<td>Project Design</td>
<td>18</td>
</tr>
<tr>
<td>Protective Relaying</td>
<td>73</td>
</tr>
<tr>
<td>Psycho-social aspect of Deafness</td>
<td>31</td>
</tr>
<tr>
<td>Psychology of Aging</td>
<td>42</td>
</tr>
<tr>
<td>Psychology of Alternated States of Consciousness</td>
<td>42</td>
</tr>
<tr>
<td>Psychology of Childhood and Adolescence</td>
<td>44</td>
</tr>
<tr>
<td>Psychology of Human Adjustment</td>
<td>42</td>
</tr>
<tr>
<td>Psychology of Learning and Teaching</td>
<td>42</td>
</tr>
<tr>
<td>Psychology of Motivation</td>
<td>84</td>
</tr>
<tr>
<td>Psychology of Perception</td>
<td>42</td>
</tr>
<tr>
<td>Psychology of Personality</td>
<td>42</td>
</tr>
<tr>
<td>Pulse Circuit Design</td>
<td>72</td>
</tr>
<tr>
<td>Purchasing</td>
<td>3</td>
</tr>
<tr>
<td>Quality Control: Acceptance</td>
<td>31</td>
</tr>
<tr>
<td>Quality Control: Chart Controls</td>
<td>11</td>
</tr>
<tr>
<td>Quantity Control Methods</td>
<td>5</td>
</tr>
<tr>
<td>Quantitative Methods</td>
<td>5</td>
</tr>
<tr>
<td>Quantitative Methods I</td>
<td>5</td>
</tr>
<tr>
<td>Quantum Chemistry</td>
<td>64</td>
</tr>
<tr>
<td>Quantum Mechanics</td>
<td>64</td>
</tr>
<tr>
<td>Race and Society</td>
<td>37</td>
</tr>
<tr>
<td>Radiation Biology</td>
<td>60</td>
</tr>
<tr>
<td>Radar Physics</td>
<td>68</td>
</tr>
<tr>
<td>Radiochemistry</td>
<td>64</td>
</tr>
<tr>
<td>Raman</td>
<td>50</td>
</tr>
<tr>
<td>Random Signals and Noise</td>
<td>17</td>
</tr>
<tr>
<td>Real variables</td>
<td>16</td>
</tr>
<tr>
<td>Real-Time Computation</td>
<td>81</td>
</tr>
<tr>
<td>Recent Economic Policies</td>
<td>3</td>
</tr>
<tr>
<td>Refrigeration and Air Conditioning</td>
<td>21</td>
</tr>
<tr>
<td>Regression Analysis I</td>
<td>12</td>
</tr>
<tr>
<td>Regression Analysis II</td>
<td>12</td>
</tr>
<tr>
<td>Reimbursement</td>
<td>3</td>
</tr>
<tr>
<td>Reliability</td>
<td>12, 18</td>
</tr>
<tr>
<td>Reliability Certification Seminars I &amp; II</td>
<td>12</td>
</tr>
<tr>
<td>Relief of Gravel Plates</td>
<td>55</td>
</tr>
<tr>
<td>Relief Press</td>
<td>54</td>
</tr>
<tr>
<td>Relief Press Methodology</td>
<td>57</td>
</tr>
<tr>
<td>Religion in Society</td>
<td>38</td>
</tr>
<tr>
<td>Religious and Cultural Movements</td>
<td>38</td>
</tr>
<tr>
<td>Rembrandt</td>
<td>44</td>
</tr>
<tr>
<td>Rembrandt Van Rijn: His Art and Times</td>
<td>37</td>
</tr>
<tr>
<td>Report Writing</td>
<td>37</td>
</tr>
<tr>
<td>Reproduction Photography</td>
<td>54, 56</td>
</tr>
<tr>
<td>Research (Photographic Science)</td>
<td>50</td>
</tr>
<tr>
<td>Research and Thesis Guidance (Mechanical Engineering)</td>
<td>24</td>
</tr>
<tr>
<td>Research and Thesis Guidance (Fine Arts)</td>
<td>29</td>
</tr>
<tr>
<td>Research and Thesis Guidance (Photography)</td>
<td>51, 52</td>
</tr>
<tr>
<td>Research and Thesis Guidance (Graphic Arts)</td>
<td>58</td>
</tr>
<tr>
<td>Research and Thesis Guidance (Science)</td>
<td>64</td>
</tr>
<tr>
<td>Research Familiarization</td>
<td>63</td>
</tr>
<tr>
<td>Research in Instructional Technology</td>
<td>84</td>
</tr>
<tr>
<td>Research Methods</td>
<td>33</td>
</tr>
<tr>
<td>Research Methods in Graphic Arts</td>
<td>56</td>
</tr>
<tr>
<td>Research Problems (Food and Pharmacy Management)</td>
<td>9</td>
</tr>
<tr>
<td>Research Project (Institutional Technology)</td>
<td>84</td>
</tr>
<tr>
<td>Research Project (Printing Technology)</td>
<td>58</td>
</tr>
<tr>
<td>Respiratory Therapy I</td>
<td>69</td>
</tr>
<tr>
<td>Respiratory Therapy III</td>
<td>69</td>
</tr>
<tr>
<td>Respiratory Therapy IV</td>
<td>69</td>
</tr>
<tr>
<td>Respiratory Therapy V</td>
<td>69</td>
</tr>
<tr>
<td>Respiratory Therapy VI</td>
<td>70</td>
</tr>
<tr>
<td>Retail Career Seminar</td>
<td>7</td>
</tr>
<tr>
<td>Retail Organization and Management</td>
<td>7</td>
</tr>
<tr>
<td>Retail Sales Promotion</td>
<td>7</td>
</tr>
<tr>
<td>Review of Computer Science</td>
<td>80</td>
</tr>
<tr>
<td>Review of Programming Languages</td>
<td>80</td>
</tr>
<tr>
<td>Revolutionary Leaders in Latin America</td>
<td>80</td>
</tr>
<tr>
<td>Romanticism and Music</td>
<td>37</td>
</tr>
<tr>
<td>Russia: Imperial and Communist</td>
<td>39</td>
</tr>
<tr>
<td>Safety Engineering</td>
<td>18</td>
</tr>
<tr>
<td>Sales in the Graphic Arts</td>
<td>53</td>
</tr>
<tr>
<td>Sales Management</td>
<td>4</td>
</tr>
<tr>
<td>Sampled Data Control Systems</td>
<td>12</td>
</tr>
<tr>
<td>Sampling Theory and Application</td>
<td>12</td>
</tr>
<tr>
<td>Sanitation &amp; Safety in Hospital Food</td>
<td>5</td>
</tr>
<tr>
<td>Sanitation and Safety in Food Operations</td>
<td>6</td>
</tr>
<tr>
<td>School for American Craftsmen</td>
<td>26</td>
</tr>
<tr>
<td>School of Art and Design</td>
<td>24</td>
</tr>
<tr>
<td>School of Business Administration</td>
<td>2</td>
</tr>
<tr>
<td>School of Photographic Arts and Sciences</td>
<td>45</td>
</tr>
<tr>
<td>School of Printing</td>
<td>52</td>
</tr>
<tr>
<td>School of Retailing</td>
<td>7</td>
</tr>
<tr>
<td>Science and Human Values</td>
<td>39</td>
</tr>
<tr>
<td>Science and Humanities</td>
<td>36</td>
</tr>
<tr>
<td>Science and Technology of Materials</td>
<td>75</td>
</tr>
<tr>
<td>Scientific and Technical Application of Photography</td>
<td>48</td>
</tr>
<tr>
<td>Screen Printing</td>
<td>54, 56</td>
</tr>
<tr>
<td>Sculpture</td>
<td>26</td>
</tr>
<tr>
<td>Securities and Investment Analysis</td>
<td>9</td>
</tr>
<tr>
<td>Security Analysis</td>
<td>4</td>
</tr>
<tr>
<td>Selected Machine Elements</td>
<td>39</td>
</tr>
<tr>
<td>Selected Problems in Black History</td>
<td>39</td>
</tr>
<tr>
<td>Selected Topics in Instructional Technology</td>
<td>84</td>
</tr>
<tr>
<td>Selection, Storage and Dissemination of Media Resources</td>
<td>83</td>
</tr>
</tbody>
</table>