COURSES
1976-77
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 and 5 = Upper Level Undergraduate Degree Courses; 6, 7, or 8 = Courses for Graduate Credit.  
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.

Courses of Study 1976-77

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

Table of Contents

2 College of Business  
5 Food Administration and Tourist Industries Management  
7 School of Retailing  
8 Graduate courses in Business Administration  
11 College of Continuing Education  
11 Applied and Mathematical Statistics  
13 College of Engineering  
13 Electrical Engineering  
17 Industrial Engineering  
19 Mechanical Engineering  
25 College of Fine and Applied Arts  
25 School of Art and Design  
27 School for American Craftsmen  
29 Graduate courses, Fine and Applied Arts  
30 College of General Studies  
30 Criminal Justice  
32 Social Work  
33 General Studies courses  
43 Graduate courses in General Studies  
44 College of Graphic Arts and Photography  
44 School of Photographic Arts and Sciences  
50 School of Printing  
56 College of Science  
56 Biology  
58 Chemistry  
63 Mathematics  
65 Physics  
66 Institute College  
66 Computer Science and Technology  
71 Instructional Technology  
73 Community/Junior College Relations  
75 Packaging Science  
76 School of Applied Science  
80 Reserve Officers’ Training Corps  
81 Index

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

For information about the colleges and programs of study at the Undergraduate level, please request the Undergraduate Bulletin; for further information about the colleges and programs at the Graduate level, please request the Graduate Bulletin from:

Rochester Institute of Technology  
Office of Admission  
One Lomb Memorial Drive  
Rochester, New York, 14623  
or telephone 716-464-2831.
Accounting
BBUA-210 Financial Accounting
Registration #0101-210
Basic accounting principles and techniques within a framework of sound modern theory. Methods of accounting for revenues, costs, property, funded 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
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 work order, process, and standard cost systems, with explanation of the techniques of overhead distribution. Special emphasis on the roles of the controller and his organization in furnishing the accounting data and reports required for efficient managerial planning and control. The case method is utilized extensively to assist in applications and techniques of cost accounting. (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-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-423 CPA Problems
Registration #0101-423
A general review of accounting theory and practice designed both to assist the student in preparation for the CPA examination and to review and improve his 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

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-203 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
Registration #0102-407
Business Activity
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>Registration #</th>
<th>Credits</th>
<th>Notes</th>
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<tbody>
<tr>
<td>BBUB-434</td>
<td>Operations Management</td>
<td>#0102-434</td>
<td>4</td>
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<tr>
<td></td>
<td>Theory and practice of operations manage­</td>
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<td>ness problems. (BBUQ-352 or BBUQ-411, ICSS-200)</td>
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<td>BBUB-450</td>
<td>Multinational Management</td>
<td>#0102-450</td>
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<td>BBUE-531</td>
<td>Labor Relations</td>
<td>#0102-531</td>
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<td>Past and present of the American labor</td>
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<td>BBUE-534</td>
<td>Purchasing</td>
<td>#0102-534</td>
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<td>Industrial purchasing, the organization of</td>
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<tr>
<td>BBUE-535</td>
<td>Planning and Decision Making</td>
<td>#0102-535</td>
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<td>BBUE-536</td>
<td>Organization Theory</td>
<td>#0102-536</td>
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<td>Modern models of organization, the task,</td>
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<td>BBUE-537</td>
<td>Seminar in Management</td>
<td>#0102-537</td>
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<td>A seminar series covering selected topics</td>
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<td>in current management problems. Specific</td>
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<tr>
<td>BBUE-381</td>
<td>Money and Banking</td>
<td>#0103-381</td>
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<td>The evolution of money and monetary stan­</td>
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<td>their relationship to the Federal Reserve</td>
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<td>monetary policy. (BBUA-210, GSSE-302)</td>
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<td>BBUE-406</td>
<td>Macroeconomics</td>
<td>#0103-406</td>
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<td>Evaluation of governmental monetary and</td>
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<td>BBUQ-411)</td>
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<td>BBUE-407</td>
<td>Managerial Economics</td>
<td>#0103-407</td>
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<td>Analysis of the firm. Problems facing</td>
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<td>management: economizing in the use of</td>
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<td>BBUE-408</td>
<td>Business Cycles and Forecasting</td>
<td>#0103-408</td>
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<tr>
<td>BBUE-443</td>
<td>Recent Economic Policies</td>
<td>#0103-443</td>
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<tr>
<td>BBUE-509</td>
<td>Advanced Money and Banking</td>
<td>#0103-509</td>
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<td>Development of monetary theory. Money and</td>
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<td>money wage rates and prices. (BBUE-381)</td>
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<td>Labor Economics</td>
<td>#0103-530</td>
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<td>A course in applied economics, using eco­</td>
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<td>inflation and public policy. (BBUE-405)</td>
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<td>BBUE-554</td>
<td>Seminar in Economics</td>
<td>#0103-554</td>
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<td>Investigation of advanced problems and</td>
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<td>policies in economics. Emphasis is on</td>
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<td>BBUF-441</td>
<td>Financial Management</td>
<td>#0104-441</td>
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<td>A management oriented approach to the fin­</td>
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<td>bution of capital, directing its use, and</td>
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<td>evaluating management's action in provid­</td>
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<td>ing a return on the firm's investment.</td>
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<td>BBUF-502</td>
<td>Money and Capital Markets</td>
<td>#0104-502</td>
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<td>Analysis and description of the money</td>
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<td>and capital markets, secondary distribu­</td>
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<td>tions, and government issues. (BBUE-381)</td>
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<td>BBUM-263</td>
<td>Consumer Services Analysis</td>
<td>#0105-263</td>
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<td>BBUM-550</td>
<td>Marketing Management Problems</td>
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<td>Algebra</td>
<td>#0106-290</td>
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<td>BBUF-504</td>
<td>International Finance</td>
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<td>BBUM-420</td>
<td>Consumer Behavior</td>
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**Marketing**

- **BBUM-263** Consumer Services Analysis
  - Specific topics covered include understanding consumer behavior, product policy and planning, pricing institutions and channel, logistics advertising, personal selling and sales promotion, market research, international marketing, organization and controlling marketing activities. (BBUA-210, GSSE-302)
  - Class: 4, Credit: 4

- **BBUM-550** Marketing Management Problems
  - A course designed to provide the student with an in-depth knowledge of middle and upper management level marketing problems. In addition, the student should become familiar with tools used by marketing managers at these levels. (BBUM-552, 553)
  - Class: 4, Credit: 4

- **BBUM-552** Advertising
  - Registration #0105-552
  - The role of advertising as a vital function of the marketing field. Material will be studied from the point of view of the manner in which advertising contributes to the marketing mix, rather than from the creative aspects of production and copy. (BBUM-263)
  - Class: 4, Credit: 4

- **BBUM-553** Sales Management
  - Registration #0105-553
  - Course emphasizes the sales function of marketing management. It centers around the problems managers face in the direction, control, and supervision of sales activities. (BBUM-263)
  - Class: 4, Credit: 4

- **BBUM-554** Seminar in Marketing
  - Registration #0105-554
  - The objective of this course is to enable the student to bring together interests, learnings and experiences obtained in previous marketing courses. Specific course content will vary. (Permission of instructor)
  - Class: 4, Credit: 4 (maximum 12 hours credit)

- **BBUM-555** International Marketing
  - Registration #0105-555
  - Management problems of marketing in foreign countries. Topics to be considered include the economic, cultural, and political roots of marketing systems. (BBUM-263)
  - Class: 4, Credit: 4

- **BBUM-556** Marketing Logistics
  - Registration #0105-556
  - A study of physical supply and physical distribution activities. Topics include transportation, inventory control, materials handling, warehousing, order processing, protective packaging, product scheduling, facility location and customer service. (BBUM-263, BBUB-201)
  - Class: 4, Credit: 4

- **BBUM-557** Comparative Marketing
  - Registration #0105-557
  - A study of marketing in selected foreign countries to acquaint the student with its functional role in various economic environments. Comparisons between geographic regions and cultural settings are explored. (BBUM-555)
  - Class: 4, Credit: 4

**Quantitative Methods**

- **BBUQ-290** Algebra
  - Registration #0106-290
  - A review of the fundamental concepts and operations of algebra that are necessary for BBUQ-291 and other quantitative courses. Topics include relations and functions, rational expressions and equations, special products and factoring, linear and quadratic equations, systems of linear equations, powers and roots, and logarithms.
  - Class Variable, Credit: 4
**BFUQ-291 , 292**  
**Mathematics I, II**  
Registration #0106-291, 292  
The mathematical background required for the increasing use of quantitative methods in management. Topics include set theory, coordinate geometry, functional relationships, and the fundamental concepts and methods of differential and integral calculus.  
Class 4, Credit 4

**BBUQ-351, 352**  
**Statistics I, II**  
Registration #0106-351, 352  
Interpretation and application of statistical techniques in business to develop the ability to evaluate the results of statistical research as presented in professional literature and government and business reports, and to develop an understanding of how statistical inference may be used as one method of evaluation for managerial decisions. (BBUQ-291)  
Class 4, Credit 4

**BBUQ-351, 352**  
**Statistics III**  
Registration #0106-353  
An introduction to Bayesian decision theory, including discontinuous prior and posterior probability functions, regret functions, the value of sample information, and normal prior and posterior functions. (BBUQ-352 or permission of instructor)  
Class 4, Credit 4

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

**BBUQ-411**  
**Quantitative Methods II**  
Registration #0106-411  
Statistical probability theory, regression and correlation, hypothesis testing, estimation and non-parametric techniques. (BBUQ-410)  
Class 4, Credit 4

**BBUQ-411**  
**Mathematics**  
Registration #0106-411  
Applications of quantitative methods in business decisions: linear and quadratic optimization techniques, using precalculus mathematics. Computer demonstrations will be used where possible. (BBUQ-352 or BBUQ-411)  
Class 4, Credit 4

**BFAD-213**  
**Nutrition Principles**  
Registration #0106-213  
The study of specific nutrients and their functions; physiological, psychological and sociological needs of man 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-214**  
**Sanitation & Safety in Hospital**  
Registration #0107-214  
Class 4, Credit 4  
Practicum in hospital by arrangement.

**BFAD-314**  
**Food Service Operation**  
Registration #0107-314  
Class 2, Credit 4  
Practicum in hospital by arrangement.

**BFAD-502**  
**Dietetics Environment**  
Registration #0107-502 (Coordinated Dietetics Program)  
Class 4, Credit 4  
Practicum in hospital by arrangement.

**BFAD-519**  
**Educational Principles and Methods**  
Registration #0107-519  
Class 2, Credit 4  
Practicum in hospital by arrangement.

**BFAD-520**  
**Communication & Instructional Techniques**  
Registration #0107-520 (Coordinated Dietetics Program)  
Class 2, Credit 4  
Practicum in hospital by arrangement.

**BFAD-525, 526**  
**Advanced Nutrition and Diet Therapy I & II**  
Registration #0107-525, 526  
Class 4, Credit 4  
Practicum in hospital by arrangement.

**BFAD-535**  
**Nutrition Seminar**  
Registration #0107-535  
Class 4, Credit 4  
Practicum in hospital by arrangement.

**BFAD-550**  
**Community Nutrition**  
Registration #0107-550  
Class 4, Credit 4  
Practicum in hospital by arrangement.

**BFAD-551**  
**Management of Food Systems**  
Registration #0107-551 (Coordinated Dietetics Program)  
Class 1, Credit 4  
Practicum in hospital by arrangement.
Food and Tourist Industries Management

BFAM-210 Introduction to Food Management and Registration #0108-210 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-215 Food Principles
Registration #0108-215 Introduction of foods and basic preparation of high quality food products. Topics include history, kinds, varieties, seasonal availability, sources, and composition of foods and ingredients; essential vocabulary. Organization and management of work area. Techniques and methods used for menu planning.
Class 3, Lab. 6, Credit 5

BFAM-220 Seminar #0108-220 Seminar designed to define career opportunities in the food, hotel, and tourist industries. Students will be aided in developing career objectives. Leading industry executives will participate.
Class 1, Credit 1

BFAM-310 Mankind in Search of Food
Registration #0108-310 Survey of foods including composition of foods, basic principles of nutrition, food spoilage, food poisoning, modern food processing, “health foods”, world food problems and their possible solutions. Emphasis on practical application to daily food selection and composition. (Not open to those who have completed BFAM-213)
Class 4, Credit 4

BFAM-311 Equipment in the Hospitality Industry
Registration #0108-311 Recognizing, analyzing and solving equipment and space problems in layouts of existing institutions and in designing new food service plans. Consideration of food service equipment; determination of needs, development of specifications, procedures of maintenance, sanitation, and safety. (BFAM-215)
Class 3, Lab. 2, Credit 4

BFAM-314 Sanitation and Safety in Food Operations
Registration #0108-314 Survey of micro-organisms of importance to the food industry; emphasis on causes and prevention of food spoilage and poisoning. Responsibilities of management to provide and establish safe working conditions and policies; discussion of current problems confronting the industry as a result of recent legislative developments as they relate to safety and health.
(BFAM-311)
Class 2, Credit 2

BFAM-321 Food and Beverage Merchandising
Registration #0108-321 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 Registration #0108-331, 332 Application of standards, specifications, principles and techniques of equipment selection, purchasing and preparation in quantity and service of high quality food. Recognizing, analyzing, solving and evaluating problems related to all aspects of quantity food production and management based 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-411 Management Problems
Registration #0108-411 Analyzing and solving problems encountered by management in planning, organizing, directing, coordinating, and controlling the activities of a food service institution. Approaches to problem solving include solutions of authorities in the field and readings in literature: journals, books, case studies. (BBUB-201, BBUB-401)
Class 4, Credit 4

BFAM-415 Food Science I
Registration #0108-415 Consideration of fundamental chemical and physical reactions, the influence of kind and proportion of ingredients. Evaluation of food products by sensory and objective methods. Open only to junior and senior students. (BFAM-212, SCHG-216)
Class 2, Lab. 6, Credit 4

BFAM-416 Food Science II
Registration #0108-416 Individual study concerning chemical and physical reactions in foods; the influence of kind and proportion of ingredients. 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
Registration #0108-422 A study of methods, techniques, and tools of management used in the development and operation of hotels and motels, including ethics and policies.
Class 4, Credit 4

BFAM-423 Management Systems for the Lodging and Tourism Industry
Registration #0108-423 Analysis and evaluation of systems and operations, franchising, feasibility planning, development, financing and organization of facilities. Rate structure determination, front office procedures, guest room salesmanship and analysis of demand. Reservation systems, ethics, security and “on-the-job” application of operational problems. (BFAM-210)
Class 4, Credit 4

BFAM-425 Introduction to the Tourist Industry
Registration #0108-425 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
Registration #0108-450 A study of tourism development, marketing and the interaction between the broad areas of the travel industry and its relationship to hotels, motels, restaurants, community economy, trade associations, competitive and non-competitive markets.
Class 4, Credit 4

BFAD-560, 561 Clinical Dietetics I & II Registration #0108-560, 561 (Coordinated Dietetics Program) A two-course sequence integrating Advanced Nutrition, Diet Therapy, Nutrition Seminar with the application of Dietetics to give nutrition care in a clinical (hospital) setting. Designed for senior students in the Coordinated Dietetics Program. Sequence offered in two consecutive quarters. (BFAM-213, SCHG-203, SBIG-212)
Class 4, Credit Biquarter
Clinical hours by appointment

SBIG-212 Clinical hours by appointment
### School of Retailing

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<th>Course Code</th>
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<tbody>
<tr>
<td>BFAM-511</td>
<td>Advanced Food Service Operation</td>
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<tr>
<td>Registration #0108-511</td>
<td>Management experience in planning, organizing, supervising preparation and service of foods for special functions. Emphasis is placed on the 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)</td>
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<td>Class 1, Lab. 8, Credit 4</td>
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<tr>
<td>BFAM-517</td>
<td>Ethnic Foods</td>
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<tr>
<td>Registration #0108-517</td>
<td>Study of regional and international foods and food customs of peoples of various backgrounds.</td>
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<td>Class 4, Credit 4</td>
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<tr>
<td>BFAM-554</td>
<td>Seminar in Tourist Industries</td>
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<tr>
<td>Registration #0108-554</td>
<td>Management</td>
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<tr>
<td>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.</td>
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<td>Class 4, Credit 4</td>
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<tr>
<td>BFAM-555</td>
<td>Research Problems</td>
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<tr>
<td>Registration #0108-555</td>
<td>Independent study of research problems in food and hospitality management. Open to senior students only.</td>
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<td>Class and Credit Variable</td>
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<tr>
<th>Course Code</th>
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<tr>
<td>BRER-211</td>
<td>Retail Organization and Management</td>
</tr>
<tr>
<td>Registration #0109-211</td>
<td>This 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.</td>
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<td>Class 4, Credit 4</td>
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<tr>
<td>BRER-212</td>
<td>Merchandising Concepts I</td>
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<tr>
<td>Registration #0109-212</td>
<td>A detailed examination of the merchandising 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)</td>
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<td>Class 4, Credit 4</td>
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<tr>
<td>BRER-213</td>
<td>Merchandising Concepts II</td>
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<tr>
<td>Registration #0109-213</td>
<td>A comprehensive study of retail mathematics associated with the merchandising function. Specific topics include markup, markdowns, retail method of inventory, turnover, the merchandise plan, and open-to-buy. (BRER-212)</td>
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<tr>
<td>BRER-300</td>
<td>Retail Career Seminar</td>
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<td>Registration #0109-300</td>
<td>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.</td>
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<tr>
<td>BRER-410</td>
<td>Retail Sales Promotion</td>
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<td>Registration #0109-410</td>
<td>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. (BBUM-552)</td>
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<td>BRER-511</td>
<td>Basic Textiles</td>
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<tr>
<td>Registration #0109-511</td>
<td>Analysis of textile fibers, weaves, and fabrics. Methods of printing, dyeing and finishing. Evaluation of fabrics and materials commonly used in home furnishings.</td>
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<td>BRER-514</td>
<td>Fiber Science and Design</td>
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<tr>
<td>Registration #0109-514</td>
<td>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.</td>
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<tr>
<td>BRER-524</td>
<td>Fashion Accessories</td>
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<tr>
<td>Registration #0109-524</td>
<td>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.</td>
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<tr>
<td>BRER-531</td>
<td>Basic Interior Design</td>
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<tr>
<td>Registration #0109-531</td>
<td>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.</td>
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<tr>
<td>BRER-532</td>
<td>Interior Design I</td>
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<tr>
<td>Registration #0109-532</td>
<td>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.</td>
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<td>Class 2, Lab. 4, Credit 4</td>
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<tr>
<td>BRER-533</td>
<td>Interior Design II</td>
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<tr>
<td>Registration #0109-533</td>
<td>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)</td>
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<tr>
<td>Class 2, Lab. 4, Credit 4</td>
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<tr>
<td>BRER-534</td>
<td>Interior Design History</td>
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<tr>
<td>Registration #0109-534</td>
<td>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)</td>
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<td>Class 4, Credit 4</td>
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<tr>
<td>BRER-535</td>
<td>Advanced Interior Design</td>
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<tr>
<td>Registration #0109-535</td>
<td>Conformation of Basic Interior Design. (BRER-531)</td>
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<td>Lab. 8, Credit 4</td>
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Graduate courses, Business Administration

BBUA-713 Basic Financial Accounting
Registration #0101-713
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-714 Basic Accounting Theory
Registration #0101-714
A treatment of basic accounting theory and concepts and an analysis of the special problems that arise in applying these underlying concepts to financial accounting. Valuation of assets, liabilities and capital. Adjustments for price level changes. Analysis of financial statements for credit, investment, and managerial purposes. (Foundation courses)
Credit 4

BBUA-715 Accounting Controls
Registration #0101-715
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-716 Advanced Public Accounting
Registration #0101-716
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-714 or admission to M.S. program)
Credit 4

BBUA-717 Basic Taxation Accounting
Registration #0101-717
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. (Foundation courses or admission to M.S. program)
Credit 4

BBUA-718 Seminar in Advanced Accounting
Registration #0101-718
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-714 or admission to M.S. program)
Credit 4

BBUA-719 Seminar in Accounting
Registration #0101-719
Course content will differ by instructor and quarter. Topics covered: taxation, international accounting and accounting for non-profit organizations (Permission of Director)
Credit 4

BBUA-720 Advanced Taxation Accounting
Registration #0101-720
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-717 or admission to Master of Science in Accountancy)
Credit 4

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, systemic, 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 queue 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 system's different elements. The student will become acquainted with current theories and research in behavioral sciences. The course also allows the student to integrate theoretical applications 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. The background and sources of law, law enforcement agencies and procedures. Typical 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)
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, BBUA-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
Problems in Financial Management
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, 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-745 Economic Environment
Registration #0104-745
Economic Environment
Registration of American Business
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.
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
Business Economics and Applied Econometrics

BBUM-765 Registration #0104-765
The course stresses model building, with emphasis on the economic foundations of the models. Econometric techniques are employed in the development and testing of aggregate, industry, and company models, with attention given to the feedback relationship from the aggregate (macro) model to the industry and company models. Forecasting and analysis of the industry and company models are employed. Simulation of the models under alternative policy assumptions is performed. Bank data, model-tools, and computer programs are supplied. (Foundation courses)
Credit 4

Advanced Microeconomic Theory

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

Advanced Macroeconomic Theory

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

Marketing Concepts

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

Advanced Marketing Management

BBUM-762 Registration #0105-762
An in-depth study of selected problems which face marketing managers concerned with promotion, place, price, and product. Material centers on staff marketing functions. Research topics are covered and are those unique to the field of marketing. (BBUM-761)
Credit 4

Seminar in Consumer Behavior

BBUM-763 Registration #0105-763
A study of the market in terms of the psychological and socio-economic determinants of the buyer’s behavior, including current trends in purchasing power and population movements. (BBUM-761)
Credit 4

Marketing Logistics

BBUM-764 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 marketing institutions as well as within marketing institutions. Specific topics covered are unit geographic location, internal product flow, inter-unit transportation, and warehousing. (BBUM-761)
Credit 4

International Marketing

BBUM-765 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

Seminar in Marketing

BBUM-769 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)
Credit 4

Probability Theory

BBUQ-778 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

Statistical Analysis I

BBUQ-781 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

Statistical Analysis II

BBUQ-782 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

Bayesian Decision Analysis

BBUQ-783 Registration #0106-783
An introduction to decision theory for managerial decision situations with a strong emphasis on Bayesian decision analysis. Topics include modeling, principles of choice, the expected opportunity loss, the expected value of information, revision of discrete and continuous prior distributions, the expected value of sample information, optimal sampling, utility functions, and decision diagramming. (BBUQ-782) (Not open to Decision Science Majors)
Credit 4

Decision Theory

BBUQ-784 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-778)
Credit 4

Quantitative group
CASM-711  Fundamentals of Statistics I
Registration #0219-711
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

CASM-712  Continuation of CASM-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) (CASM-711 or equivalent.)
Credit 3

CASM-721  Quality Control: Control Charts
Registration #0219-721
A practical course designed to give depth to practicing quality control personnel.
Topics: statistical measures; theory, construction, and applications 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

CASM-722  Quality Control: Acceptance Sampling
Registration #0219-722
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

CASM-731  Introduction to Decision Processes
Registration #0219-731
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 management strategies, practical applications. (Consent of the department.)
Credit 3

CASM-741  Techniques for Investigational Analysis
Registration #0219-741
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. (CASM-712 or equivalent.)
Credit 3

CASM-751  Reliability
Registration #0219-751
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. (CASM-712 or equivalent.)
Credit 3

BBUQ-786  Operations Research- Mathematical Programming
An introduction to the application of operations research techniques to business decision making. Specific topics covered are linear programming, algebraic and geometric concepts, simplex method, sensitivity testing and duality, optimization, dynamic programming and integer programming. (BBUB-743)
Credit 4

BBUQ-787  Operations Research- Probabilistic Models
An introduction to the use of probability in operations research models. Probabilistic techniques are applied to the problems of forecasting, capital budgeting, PERT, inventory, queuing and Markov processes. (BBUB-778)
Credit 4

BBUQ-789  Simulation
Registration #0106-789
An introduction to the various uses of simulation as a management tool for decision making. Models of varying levels of sophistication employing simulation programming languages are constructed. (Foundation courses)
Credit 4

BBUQ-792  Concepts in Computer Utilization
Registration #0106-792
An introduction to the use of computers in problem solving. Students are exposed to the BASIC programming language. Computer systems and their use in business are examined.
Credit 4

BBUQ-795  Seminar in Decision Sciences
Registration #0106-795
This course will take on different content depending on the instructor and quarter when offered. Topics which may be covered are: multivariate analysis, simulation, operations research, linear programming and Bayesian techniques. Specific content for a particular quarter will be announced prior to course offering. (Permission of Director)
Credit 4

College of Continuing Education
Graduate courses in Applied and Mathematical Statistics

CASM-712  Fundamentals of Statistics II
Registration #0219-712
Continuation of CASM-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) (CASM-711 or equivalent.)
Credit 3
CASM-801 Design of Experiments I
Registration #0219-801
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, agriculture, agronomy, photoscience, genetics, psychology, and advertising. (CASM-712 or equivalent.)
Credit 3

CASM-802 Design of Experiments II
Registration #0219-802
Continuation of CASM-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. (CASM-801.)
Credit 3

CASM-811 Probability Theory and Applications I
Registration #0219-811
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. (CASM-822 or equivalent.)
Credit 3

CASM-812 Probability Theory and Applications II
Registration #0219-812
Continuation of CASM-811, with more on stochastic processes.
Topics: Algebraic methods useful for solving Markov chains, non-lime and continuous Markov chains, limiting distributions, and an introduction to queuing theory. (CASM-811 or equivalent.)
Credit 3

CASM-821 Theory of Statistics I
Registration #0219-821
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

CASM-822 Theory of Statistics II
Registration #0219-822
Continuation of CASM-821
Supporting theory for, and derivation of, sampling distribution models; applications and related material. (CASM-821 or equivalent.)
Credit 3

CASM-823 Theory of Statistics III
Registration #0219-823
Continuation of CASM-821, 822.
Point estimation theory and applications; the multivariate normal probability model, its properties and applications; interval estimation theory and applications. (CASM-822 or equivalent.)
Credit 3

CASM-841 Regression Analysis I
Registration #0219-841
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. (CASM-802 or equivalent.)
Credit 3

CASM-842 Regression Analysis II
Registration #0219-842
A continuation of CASM-841.
Topics: selection of best linear models; regression applied to analysis of variance problems; nonlinear estimation and model building. (CASM-841 or equivalent.)
Credit 3

CASM-851 Nonparametric Statistics
Registration #0219-851
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. (CASM-712 or equivalent.)
Credit 3

CASM-853 Managerial Decision Making
Registration #0219-853
Continuation of CASM-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. (CASM-751 or equivalent.)
Credit 3

CASM-861, 862 Reliability Certification
Registration #0219-861, 862
Seminars I & II
The American Society for Quality Control (ASQC) offers Certification as a Reliability Engineer by written examination. 861-862 (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, apportionment, 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.

CASM-871 Sampling Theory and Application
Registration #0219-871
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. (CASM-712 or equivalent.)
Credit 3

CASM-881 Bayesian Statistics I
Registration #0219-881
Probability as a degree of belief; how we learn the applications of Bayesian principles to: estimation of failure rates, revising odds, testing precise hypotheses, finding credible regions; entropy and information; description of errors in measurements; analysis of experimental results. (CASM-712 or equivalent.)
Credit 3

CASM-882 Bayesian Statistics II
Registration #0219-882
Continuation of CASM-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. (CASM-881.)
Credit 3
CASM-891, 892, 893 Special Topics in Applied Statistics
Registration #0219-891, -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.

CASM-895 Statistics Seminar
Registration #0219-895
This course is a 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

CASM-896, 897, 898 Thesis
Registration #0219-896, -897, -898
For students working for the M.S. degree in Mathematical Statistics under Plan A. (Consent of the department.)
Credit 3/Qtr.

CASM-899 Individual Achievement Program
Registration #0219-899
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, qualify 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.

CASM-830 Multivariate Analysis
Registration #0219-830
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 independent experimental item are correlated and certainly one should not apply univariate analysis 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, partial correlation and profile analysis. (CASM-801, 802.)
Credit 3

EENG-201 Introduction to Engineering I
Registration #0302-201
The basic objective of the lecture portion of the course is to introduce the student to the engineering profession and to the fields of electrical, industrial, and mechanical engineering. Problems at an introductory level are used to give the student an immediate sense of identification with engineering. The laboratory portion of the course is devoted to the fundamentals of graphical communication.
Class 3, Lab. 2, Credit 4

EENG-202 Introduction to Engineering II
Registration #0302-202
This course is offered in three distinct versions. The intent is to give the student greater in-depth understanding of one of the three engineering fields—electrical, industrial, and mechanical—than was possible in the first course. Course format varies among the three versions.
Credit 4

EEE-351, 352, 353 Circuit Analysis I, II, III
Registration #0301-351, -352, -353
Basic circuit laws, network theorems, RLC circuits and their responses. Sinusoidal analysis, complex notation, phasors and power. The concept of complex frequency. Special topics including magnetically coupled circuits, two-port networks, network topologies, and Fourier analysis. (SMAM-253, SPSG-207 and concurrent with SMAM-305, 306)
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. (EEE-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. (SPSG-207, SMAM-306)
Class 3, Lab. 3, Credit 4

EEE-471, 472 Electromagnetic Fields I, II
Registration #0301-471, -472
Vector analysis, electrodynamics, electricity, 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. 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 Electronics III
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

Technical Electives

EEE-532 Electrical Machines I
Registration #0301-532
The design and operating characteristics, both static and dynamic, of transformers and synchronous and induction machines. (EEE-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 inverter, AC and DC line control and frequency conversion using thyristors. The laboratory is an integral part of the course where the experiments complement the classroom lectures by providing exposure to the device characteristics, testing and measuring techniques and various thyristor systems. (EEE-441, EEEE-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-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 JFT, 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-650 Introduction to Logic and Switching
Registration #0301-650
Class 4, 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-666 Introduction to Microprocessors
Registration #0301-666
This course will discuss currently available microcomputer systems and also 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 5th 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)
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-EE670)
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. Instructors and practice will be provided in the techniques of programming and operating the DE-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, Chebychev 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
Class 4, Credit 4

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

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
Credit 4

EEE-705 Electromagnetic Waves
Registration #0301-705
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
Linearity, superposition, impulse response, convolution. Fourier series and Fourier transform. Laplace transform. Z transform. Matrices and linear equations. Solution of homogeneous equations, eigenvalues and eigenvectors. Functions of a matrix. This course is a prerequisite for many of the graduate E.E. courses and should be one of the first courses in a graduate student’s program.
Credit 4

EEE-708 Passive and Active Filter Design
Registration #0301-708
Credit 4

Graduate courses in Electrical Engineering

The courses listed below are normally open only to students who have been formally admitted into the graduate E.E. programs. Students with a baccalaureate degree in engineering or science may be permitted to enroll in any of these courses as a special student if they have already completed the stated prerequisites for a particular course. Undergraduate students may be permitted to take some of these courses as undergraduate technical electives provided they are fourth or fifth year students and have already completed the prerequisites. The permission of the director of Graduate Programs is required for enrolling in these courses except in the case of graduate students on regular or provisional status. Wherever a prerequisite is stated in the form of a specific course number, the words “or equivalent” are always implied. Prerequisites, if any, are shown in parentheses following the description of the course.

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
Credit 4

EEE-705 Electromagnetic Waves
Registration #0301-705
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
Linearity, superposition, impulse response, convolution. Fourier series and Fourier transform. Laplace transform. Z transform. Matrices and linear equations. Solution of homogeneous equations, eigenvalues and eigenvectors. Functions of a matrix. This course is a prerequisite for many of the graduate E.E. courses and should be one of the first courses in a graduate student’s program.
Credit 4

EEE-708 Passive and Active Filter Design
Registration #0301-708
Credit 4
EEE-709  Active Network Synthesis
Registration #0301-709
Fundamentals of network synthesis. Energy functions, P R. func-
tions. Properties of network functions. Synthesis of RC one-port
and two-port networks. Approximation, normalization and fre-
quency scaling. Active network analysis. Active network ele-
ments: funnel diodes, gyrators, impedance converter, imple-
dance 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
Differential amplifier small signal characteristics. Stages of an
operational amplifier. Multistage operational amplifier. Phase
coping theory, Limit the op- and Z transform. Operational ampli-
fiers in non-linear circuits. Analog/digital, digital/analog and
sampling networks. Waveform generators. Modulation and de-
modulation. The emphasis will be on the practical aspects.
EEE-707 or instructor's approval
Credit 4

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 pro-
gram. It is not open to those who have already had an intro-
ductory control systems course.
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 tech-
niques for the analysis and compensation of single and multiple
loop systems. (Elementary knowledge of LePlace 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, and state variables, matrices and matrix
functions, controllability, observability and stability theory.
EEE-611
Credit 4

EEE-714  Introduction to Nonlinear Control Systems
Registration #0301-714
An introduction to the physical nature and mathematical theory
of nonlinear control systems' behavior using phase plane tech-
niques, Liapounov Theory, describing function techniques and
Globuño's criterion. These are applied to both piecewise-linear
and analytical nonlinear systems. (EEE-713)
Credit 4

EEE-715  Analysis of Nonlinear Control Systems
Registration #0301-715
Further development of Liapounov Theory including Aizerman's
method, variable gradient methods and the Lure Forms. Petur-
bating methods. Variational techniques, Kryloff and Bogoliuboff
method. Analysis of switching and relays. (EEE-714)
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 sta-
tionary random inputs with or without additive noise. Design
with constraints.
Credit 4

EEE-719  Sampled Data Control Systems
Registration #0301-719
Brief review of the theory of sampling and quantizing. Modified
Z transform properties and application. Design and compensa-
tion 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
methods, dynamic programming and by Pontryagin's maxi-
mum 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 im-
portant in the area of power control and conversion. The ob-
jective of this course is to provide an adequate, application-orien-
ted 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,
commutators. Rectifiers: principles of controlled rectification,
analysis of single- and three-phase controlled rectifiers. Inver-
tors: series and parallel SCR inverters, design of inverters, sine-
wave inverters, forced commutated inverter, McMurray inverter.
DC Systems: principles of dc-dc conversion, choppers, dc motor
control, single-phase dc motor drives, three-phase dc motor
controls, 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
converters, areas for further research. Demonstration experiments will be set up. Also, individual projects by interested students will be encouraged.
Credit 4

EEE-734  Communication Techniques
Registration #0301-734
Study of different modulation schemes. Linear modulation.
Angle modulation. Heuristic discussion of noise in linear modu-
lation 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. Car-
rier systems, FSK and PSK systems. DCPSK system. Signal
space representation of data signals and discussion of signal
space. (EEE-702, 734)
Credit 4

EEE-736  Information Theory
Registration #0301-736
An introduction to the fundamental concepts of information
theory: entropy, equivocation, transinformation and redu-
dancy. 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 ran-
dom process. Noise through a linear system. Physical sources
of noise. Noise figure. Statistical decision theory. (EEE-702)
Credit 4
EEE-738 Physical Basis of Integrated Circuits
Registration #0301-738
A study of semiconductor physics to develop an understanding of the operation of various devices such as bipolar transistors and MOS transistors. The emphasis will be on the development of models useful in circuit analysis and design. Fabrication and characteristics of integrated circuits will be discussed.
Credit 4

EEE-740 Digital Integrated Circuits
Registration #0301-740
Analysis of logic circuit process. Components, properties, models and equations. Different types of digital IC’s. Applications of digital IC’s to circuits as well as systems. Emphasis will be on the TTL family and problems most often faced by the practicing designer. (EEE-850 or EEE-750, 751, 755 may be taken concurrently)
Credit 4

EEE-742 Computer Methods in Electrical Engineering
Registration #0301-742
A study of mathematical 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 to illustrate methods of interfacing microcomputers to digital systems. Typical microprocessor applications which illustrate conventional logic replacement, hardware and software design trade-offs and design flexibility will be discussed. Most discussions will be based upon the Intel 8080 and the Motorola M6800. (EEE-743)
Credit 4

EEE-750 Switching Circuits I
Registration #0301-750
Credit 4

EEE-751 Switching Circuits II
Registration #0301-751
A study of sequential logic circuits and applications. Iterative networks. Analysis and synthesis of synchronous and asynchronous, fundamental and pulse mode, sequential circuits. Applications of sequential circuits to shift registers and counters. (EEE-750)
Credit 4

EEE-752 Switching Circuits III
Registration #0301-752
This course will study finite state models of sequential circuits (sequential machines) and fault detection in logic circuits. Topics discussed will include decomposition and interconnection of sequential machines, state identification experiments, tests for detection of faults and their diagnosis in combinatorial and sequential logic circuits. (EEE-750 and 751)
Credit 4

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 EEE-800; Variable (maximum 4) for EEE-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)

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

Industrial Engineering

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

EIEI-402 Introduction to Operations Research II
Registration #0303-402
A survey of elementary mathematical models within the field of systems and industrial engineering. Areas of study include queuing theory, network analysis, replacement theory, and inventory theory. (EIEI-401 or consent of instructor)
Class 4, Credit 4

EIEI-415, 516 Human Factors I, II
Registration #0303-415, 516
A survey of human factors from 1) physiological constraints of the human; 2) behavioral/psychological characteristics of the human; and 3) the psychomotor skills ability of the human. Emphasis is placed on practical applications of each area.
Class 3, Lab. 2, Credit 4

EIEI-420 Work Measurement and Analysis I
Registration #0303-420
Methods of measuring and analyzing work human capabilities, micromotion, memomotion study, process and operation analysis. Emphasis placed on methods of operation analysis as applied to the design and evaluation of simple man-machine systems.
Class 3, Lab. 2, Credit 4
EIEI-422 Systems and Facilities Planning
Registration #0303-422
Review of firm economics and market relationships, mass production economies, the plant location problem. The plant location problem: factors influencing layout (products, equipment, manpower, movement of materials, service factors), materials handling systems and factors influencing its design, methods of layout evaluation.
Class 4, Credit 4

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

EIEI-481 Management Theory and Practice
Registration #0303-481
Development of the fundamental principles of the industrial enterprise. Internal organization as well as general economic conditions are considered. Comparison of theoretical techniques and actual practice is encouraged through case studies.
Class 4, Credit 4

EIEI-482, 483 Production Control I, II
Registration #0303-482, 483
Fundamental principles of the control of industrial production. The relation of market demands, profits, facilities, economic flow of processes, utilization of machines, labor, costs.
Class 4, Credit 4

EIEI-503 Simulation
Registration #0303-503
A continuation of Operations Research II. Areas of study include waiting line models, Markov chains and application, simulation and its application to mathematical models. (EIEI-402 or consent)
Class 4, Credit 4

EIEI-504 Introduction to Operations Research III
Registration #0303-504
A course intended to provide an integrated view of advanced programming techniques and their applications to industrial problems.
Class 4, Credit 4

EIEI-510, 511 Applied Statistical Analysis
Registration #0303-510, 511
for Engineers I, II
An applied approach to statistics utilizing theoretical tools acquired in other math-stat courses. Heavy emphasis on understanding and applying statistical analysis methods in real-world situations in engineering. Topics include quality control, analysis of variance, and regression.
Class 4, Credit 4

EIEI-512 Reliability
Registration #0303-512
Concept of reliability, basic failure laws, reliability measurement, structural analysis of reliability, repair problems, surveillance problems, maintenance problem.
Class 4, Credit 4

EIEI-520 Engineering Economy
Registration #0303-520
Time value of money, methods of comparing alternatives, depreciation and depletion, income tax consideration, replacement, retirement and obsolescence, and capital budgeting.
Class 4, Credit 4

EIEI-530 Engineering Design
Registration #0303-530
A case study approach of ten real world experiences in engineering design.
Class 4, Credit 4

EIEI-540 Introduction to Operations Research IV
Registration #0303-540
An introduction to some more advanced topics in operations research and industrial engineering. Areas of study include game theory, Markov chains and their applications, network analysis, including PERT.
Class 4, Credit 4

EIEI-545 Techniques of Systems Engineering
Registration #0303-545
LaPlace, Fourier and Z transforms; transform methods for solving differential, difference and differential-difference equations; feedback networks; flow graphs.
Class 4, Credit 4

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

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

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

Graduate courses in Industrial Engineering

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

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

EIEI-680 Engineering Planning and Control
Registration #0303-680
A course designed to introduce the student to the basic concepts of long range planning control, and project management. Topics will include budgeting, planning cycles, planning models, and related topics. Related topics will depend on the interest and direction of the class and may include such areas as aggregate planning models, linear decision rule, management coefficient model, search decision rule.
Credit 4
Mechanical Engineering

EMEM-332 Registration #0304-332 Mechanics II (Dynamics)
Rectilinear and curvilinear motion using vector calculus. Work, power, and energy. Impulse, momentum, and impact. Mechanical vibrations. Special problems. For students majoring in Electrical and Industrial Engineering. (SMAM-305 and EMEM-336)
Class 4, Credit 4

EMEM-335 Registration #0304-335 Strength of Materials
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 3, Lab. 2, 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 metal fabrication processes as cutting, forming, casting, and welding. Plastics are covered from the standpoint of thermosetting and thermo plastic processing. Forming, drying, and firing of ceramics are considered.
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 movements, and phase changes. The intent of the course is to develop a basic understanding of the structure of materials and to study the behavior of materials in service environments.
Class 3, Lab. 2, Credit 4

EMEM-401 Mechanical Engineering Laboratory I
A basic laboratory course stressing the fundamentals of experimental mechanics. 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.
Class 2, Lab. 4, 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-206, 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 characteristics, dimensional analysis, flow through pipe. (SMAM-308, EMEM-413)
Class 3, Lab. 2, Credit 4

EMEM-431 Thermodynamics
Registration #0304-431
A fundamental course in thermodynamics to meet the needs of students in the electrical engineering program. The course is taught from the microscopic point of view using the techniques of statistical mechanics. Topics covered include kinetic theory, transport parameters, classical Maxwell-Boltzmann statistics, quantum statistics and applications to gases, liquids, and solids.
Class 4, Credit 4

EMEM-432 Dynamics
Registration #0304-432
A continuation of Fluid Mechanics I with introduction to one dimensional compressible flow, life 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-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 3, Lab. 2, Credit 4

EMEM-440 Mechanical Systems Analysis
Registration #0304-440
The course is a basic introduction to automatic control systems. Topics include writing and solving differential equations for physical systems, vibration theory review, transfer functions and signal flow graphs, and feedback system response. System stability analysis using Routh-Hurwitz criterion, root locus method and Bode diagram. Introduction to compensation and system design. Analog computer laboratory. (EMEM-678)
Class 3, Lab. 2, Credit 4

EMEM-502 Mechanical Engineering Laboratory II
Two four-hour periods per week are provided during which the student applies the experimental techniques learned in EMEM-401 to the engineering systems studies 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 will be required for some of the experiments performed. (EMEM-401)
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 3, Lab. 2, Credit 4

EMEM-532 Introduction to Machine Design
Registration #0304-532
The analysis and theory of machine design and applications to systems design problems. Particular emphasis is placed on the design and analysis of machine elements. (EMEM-338)
Class 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

EMEM-661 Fluid Mechanics II
Registration #0304-661
A continuation of Fluid Mechanics I with introduction to one dimensional compressible flow, life 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-678 Mechanical Vibrations
Harmonic and nonharmonic vibration of systems with one degree of freedom, vibration of systems with several degrees of freedom; generalized coordinates and Lagrange's equations, vibration of elastic bodies. (EMEM-439)
Class 4, Credit 4

Technical electives in Mechanical Engineering
EMEM-632 Advanced Mechanical Systems Design
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 classroom experience. (EMEM-514)
Class 4, Credit 4

EMEM-650 Gas Dynamics
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 shockwaves. (EMEM-415)
Class 4, Credit 4

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

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-415)
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 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 interpretations 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-675 Probabilistic Approach to Design
Registration #0304-675
This course should be a first course in probability theory. The statistical nature of design variables, usually ignored, is considered. Reliability ("probability of survival after a certain period") is to be stressed as opposed to the conventional "factor of safety" concept.
Class 3, Lab. 2, Credit 4

EMEM-676 Kinematic Analysis of Mechanisms
Registration #0304-676
A course in mechanisms: motion, velocity, acceleration analysis; the design of linkages, cams, special gearing, variable speed drives. (EMEM-532)
Class 3, Lab. 2, Credit 4

EMEM-677 Modern Energy Conversion
Registration #0304-677
Principles of energy conversion, introduction to semiconductors, thermoelectric generators, photovoltaic generators, thermionic generators, magnetohydrodynamic power generators. (EMEM-414)
Lab. 4, Credit 4

EMEM-679 Mechanical Systems Analysis II
Registration #0304-679
A continuation of EMEM-440. Review of stability analysis techniques. Nyquist stability criterion. Design and compensation of feedback control systems. Nonlinear system analysis. Introduction to state variable time-domain analysis of control systems. Students will be required to undertake learn projects involving the design, analysis and fabrication of a device or system incorporating control and feedback principles. (EMEM-440)
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
ENEM-683  Statistical Thermodynamics
Registration #0304-683
The fundamentals of thermodynamics are developed from a statistical model of discrete particles. Topics covered include kinetic theory, elementary transport parameters, Maxwell-Boltzmann statistics, Fermi-Dirac and Bose-Einstein statistics with applications to gases and vapors. (EMEM-414)
Class 4, Credit 4

ENEM-684  Advanced Dynamics
Registration #0304-684
Newton’s equations of motion for a system of masses, their solution, momentum, energy. Systems with variable mass, rocket equations, Variational principles of mechanics, stability of motion, gyroscopes. (EMEM-439, SMAM-308)
Class 4, Credit 4

ENEM-685  Advanced Strength of Materials
Registration #0304-685
Curved beams, beams on elastic foundations, thick-walled cylinder, energy methods. (EMEM-439)
Class 4, Credit 4

ENEM-689  Patent Law and Protection
Registration #0304-689
A study of protection of intellectual property including study of patent rights, inventions, procedures for obtaining patents as well as a study of the law and drafting techniques of patents and their claims. Insights to invention protection and legal ramifications of inventor’s and attorney’s activities will be included.
Class 4, Credit 4

ENEM-690  Environment and the Engineer
Registration #0304-690
This course will study the role of the engineer in society and in particular his responsibility in the analysis and solution of the problems facing the environment in an increasingly technological society. Problems to be studied from a “case study” standpoint will include such things as air, water, and noise pollution, thermal pollution, and the effects of population growth. The course will include field trips, outside expert speakers, and each student will be expected to participate in the in-depth study of one problem of particular interest to him and to submit a formal report to the class. Use of the digital and analog computing facilities as a systems simulation tool will be encouraged.
Class 4, Credit 4

ENEM-694  Stress Analysis I
Registration #0304-694
Complex stress in two and three dimensions including Mohr’s circle and polynomial solution for principal stresses. Theories of failure and experimental verification for ductile and brittle materials. Fracture mechanics fundamentals. Energy methods for structural analysis. Virtual work, Maxwell-Betti theorem, Castigliano’s theorems. Applications including blending, shear, change of section and complex loading. (EMEM-338)
Class 4, Credit 4

ENEM-695  Solid Waste Management
Registration #0304-695
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.
Class 4, Credit 4

ENEM-696  Nuclear Power
Registration #0304-696
Class 4, Credit 4

ENEM-697  Stress Analysis II
Registration #0304-697
A continuation of Stress Analysis, EMEM-694. The course will include topics such as stress concentrations, fatigue, contact stresses, wear, brittle fracture, viscoelastic behavior, dynamic stress analysis, impact, and a continuation of experimental stress analysis.
Class 4, Credit 4

Graduate courses in Mechanical Engineering

ENEM-692*  Analysis for Engineers
Registration #0304-692*
Partial differentiation, chain rule, and total differential. Multiple integration and manipulation of multiple integrals. Linear constant coefficient ordinary differential equations. Vector algebra and differentiation of vectors or complex variables.
Credit 4

ENEM-693*  Thermo Fluid System Analysis
Registration #0304-693*
Credit 4

ENEM-699*  Applied Mechanics System Analysis
Registration #0304-698*
Methods currently employed in component and system analysis of the static and dynamic behavior of rigid and elastic bodies. The topics will include a review and advanced studies of vector statics and dynamics of rigid and elastic bodies and systems.
Credit 4

ENEM-800  Applied Engineering Analysis I
Registration #0304-800
Use of matrices including matrix algebra, matrix inversion, diagonalization of a matrix, eigenvalues and eigenvectors. Application of matrices to the solution of sets of linear ordinary differential equations. Introduction to solving partial differential equations by separation of variables using orthogonal functions. (SMAM-308 or EMEM-692)
Credit 4

ENEM-801  Applied Engineering Analysis II
Registration #0304-801
Continued discussion of separation of variables, Bessel functions, etc., Laplace transform methods for solving linear partial differential equations. Introduction to complex variables, and their use in LaPlace transform inversion. (EMEM-800)
Credit 4

ENEM-802  Applied Engineering Analysis III
Registration #0304-802
Introduction to optimization techniques: calculus of variations, Hamilton’s principle, Rayleigh-Ritz method; Volterra and Fredholm integral equations with applications. (EMEM-801)
Credit 4

ENEM-806  Numerical Analysis
Registration #0304-806
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

*These courses are provided for students who have been out of school for a number of years and feel it necessary to revive or update their educational background.
EMEM-810  Introduction to Continuum Mechanics
Registration #0304-810
Careless 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

EMEM-811  Theory of Elasticity
Registration #0304-811
Credit 4

EMEM-812  Theory of Plates and Shells
Registration #0304-812
Credit 4

EMEM-813  Energy Methods in Mechanics
Registration #0304-813
Credit 4

EMEM-814  Advanced Mechanics of Materials
Registration #0304-814
Theories of failure. Thick walled cylinders and shrink fits. Rotating discs. Contact problems. Fatigue and creep. Introduction to plasticity and to limit analysis.
Credit 4

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

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
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
Vibration of discrete multi-mass systems using matrix methods, and their application to the translation of real vibratory systems to mathematical models suitable for computer solutions. (EMEM-600)
Credit 4

EMEM-822  Vibration Theory and Applications II
Registration #0304-822
Vibrations of continuous media including beams, frames, plates and shells. Use of variational methods such as Hamilton’s principle and Rayleigh-Ritz for approximations. Applications to practical problems. Introduction to wave propagation. (EMEM-800)
Credit 4

EMEM-823  Applied Vibrations I
Registration #0304-823
Nature of various types of vibration problems, and procedures for assessing their significance. Diagnosis of selected practical problems, including experimental techniques such as strain gages, displacement sensors, and an introduction to holography. The development of meaningful analytical models, based on either test data for problem diagnosis, or on layout drawings for design analysis. Prediction of natural frequencies, mode shapes, and vibration response amplitudes for discrete mass systems using Newton’s Law of Motion, and introduction to problems associated with continuum systems of bars, plates, and shells. Practical problem solving workshop sessions will consolidate the above topics.
Credit 4

EMEM-824  Applied Vibrations II
Registration #0304-824
Analysis of vibrations of linear continuous systems, involving beams, frames, plates, and shells. Solution by classical methods or by approximate methods, as expedient. Finite-element analysis of vibration and stability problems. System analysis techniques such as mobility and receptance methods. Applications of methods discussed to important practical problems. Problem solving workshop.
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-661 Fluid Mechanics II)
Credit 4

EMEM-826  Tribology
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-829, 829  Special Topics in Applied Mechanics
Registration #0304-829, 829
An opportunity for the advanced student to undertake an independent investigation in the areas 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  Conduction Heat Transfer
Registration #0304-830
Credit 4
EMEM-831 Radiation Heat Transfer
Registration #0304-831
Nature of thermal radiation, radiation properties of surfaces and gases, radiant energy interchange in an enclosure filled with absorbing, emitting and scattering media. Application to industrial problems involving simultaneous conduction, convection, and radiation. (EMEM-514)
Credit 4

EMEM-832 Convective Heat Transfer
Registration #0304-832
Principles of natural and forced convection, the differential and integral equations of hydrodynamic and thermal boundary layers and their approximate solutions. Convective heat transfer systems such as flows inside tubes, outside tubes, and over external surfaces. Empirical relations. Applications to heat exchangers. (EMEM-661)
Credit 4

EMEM-835 Therodynamics
Registration #0304-835
An advanced study of thermodynamic equilibrium and stability. 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 hydraulics, hydrodynamics, compressible flow, viscous flow, hydrodynamic instability and turbulence, depending on the 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 first course in control systems analysis at the graduate level. Topics include mathematical modeling and response of lumped parameter systems, stability analysis and multi-variable techniques. Bode and root-locus analysis of feedback systems. Introduction to the adaptive problem, gradient methods and examples of adaptive or self-optimizing control systems. (EMEM-851, 852, 800)
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 problem, gradient methods and examples of adaptive or self-optimizing control systems. (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, electromechanical, 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 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)
College of Fine and Applied Arts

School of Art and Design

FADC-301,302,303 Introduction to Graphic Communication Design: An introduction to the complex field of Communication Design through explorations of formal and perceptual understanding and control; deals with point, line, shape, color, pattern, organizational systems, Gestalt principles, dimension interaction and communications. The relationship of typography and graphic communication to Communication Design is included (Foundation program or equivalent)

Recommended co-related courses include introductory photography, introductory typography, photomechanics, motion picture, and television. No special sequence required.
Lab. 9, Credit 3

FADE-301,302,303 Communication Design Registration #0401-301, -302, -303 Creative problem-solving experiences relating to visual communication imagery based on strong emphasis of formal design values and their utilization for the communication of ideas. Assignments oriented towards developing a working knowledge of communication media areas such as print, television, film, photography, multi-media presentation, etc. Media Center facility available for extension and application of studio experiences. (FADC-301, 302, 303 or equivalent) Credit 6

FADE-411,412,413 Communication Design Registration #0402-411, -412, -413 A professional elective, providing the opportunity to carry on further the objectives of FADC-401, 402, 403.
Lab. 6, Credit 3

FADE-501,502,503 Communication Design Registration #0404-501, -502, -503 Advanced creative problem-solving experiences relating to visual communication imagery based on a strong emphasis of formal design values and their utilization for the communication of ideas. Assignments oriented to include media application in solving human needs, community, and environmental problems.
Lab. 27, Credit 9

FADE-511,512,513 Communication Design Registration #0405-511, -512, -513 A professional elective, providing the opportunity to carry on further the objectives of FADC-501, 502, 503.
Lab. 6, Credit 3

FADE-520 Professional Design Business Practices Registration #0404-520 and Ethics Elements of design for the furniture industry including anthropometric considerations, production procedures, and appropriateness of materials and form. (Foundation program or equivalent) Class 3, Credit 3

FADE-530 Environmental Design—Exhibit Registration #0403-530 Introduction to the integration of graphics, structure, three-dimensional form and space in the design of an exhibit system. (Foundation program or equivalent)
Lab. 6, Credit 3

FADE-302 Environmental Design—Product Registration #0403-302 Introduction to the design process of developing a simple utilitarian product for a specific use. (Foundation program or equivalent)
Lab. 6, Credit 3

FADE-303 Environmental Design—Interior Registration #0403-303 Introduction to the planning of interior space for a particular activity. (Foundation program or equivalent)
Lab. 6, Credit 3

FADE-320 Design Technology—Graphic Registration #0403-320 Graphic visualization techniques for the development and presentation of concepts for three-dimensional designs. Familiarization with various media in developing and improving graphic communication skills of value to the designer.
Lab. 6, Credit 3

FADE-321 Design Technology—Mechanical Drawing Registration #0403-321 Elements of descriptive geometry, architectural and engineering drafting for the delineation of design concepts.
Lab. 6, Credit 3

FADE-322 Design Technology—Materials Registration #0403-322 and Processes Introduction to basic processes and materials through lectures, discussion, projects, and visits to manufacturing facilities. The basic properties most significant to designers will be emphasized (achievable forms and textures, types of finish, methods for joining, etc.).
Class 3, Credit 3

FADE-401 Environmental Design—Furniture Registration #0403-401 Elements of design for the furniture industry including anthropometric considerations, methods and materials of manufacture, performance criteria, and marketing requirements. (Foundation program or equivalent)
Lab. 12, Credit 6

FADE-402 Environmental Design—Product Registration #0403-402 The design of products for manufacture emphasizing human factors, consumer safety, production procedures, and appropriateness of materials and form. (Foundation program or equivalent)
Lab. 12, Credit 6

FADE-403 Environmental Design—Interior Registration #0403-403 Design elements of the interior environment including the organization and function of space, acoustics, lighting, color, thermal control, safety and security. (FADE-301, 302, 303 or equivalent)
Lab. 12, Credit 6

FADE-411,412,413 Design Applications Registration #0403-411, -412, -413 Projects in industrial design, display interiors, and packaging, developed through visuals, materials, and processes.
Lab. 6, Credit 3

FADE-501 Environmental Design—Product, Package, Graphics Comprehensive design of inter-related product, package and graphic identity elements for consumer safety and convenience as well as the marketing function.
Lab. 18, Credit 9

FADE-502 Environmental Design—Interior, Product Systems Design of component interior and product systems for particular environments or facilities.
Lab. 18, Credit 9

FADE-503 Environmental Design—Thesis Registration #0403-503 Directed design project allowing individual program emphasis. (FADE-401, 402, 403)
Lab. 18, Credit 9
FADE-511, 512, 513 Design Applications
Registration #0403-511, 512, 513
A continuation of course FADE-411, 412, 413 with additional emphasis on professional procedures, function, structure, and processes as they apply to the field. (FADE-411, 412, 413)
Lab. 6, Credit 3

FADF-205, 206, 207 Creative Sources
Registration #0404-205, 206, 207
This course is designed to make the student aware of his environment, his physical being and his experiences as tools for creative problem solving. This will be accomplished through lectures, individual and group assignments and demonstrations.
Class 1, Lab. 1, Credit 2

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

FADF-221, 222, 223 Photo Design I
Registration #0404-221, 222, 223
The elements of design and color and their structural use as related to problems in two- and three-dimensional applications.
Lab. 6, Credit 2

FADF-230, 231, 232 Design
Registration #0404-230, 231, 232
The elements of design and color and their structural relationship as applied to problems in two dimensions.
Lab. 6, Credit 3

FADF-240, 241, 242 Design
Registration #0404-240, 241, 242
The elements of design and color and their structural relationship as applied to problems in three dimensions.
Lab. 6, Credit 3

FADF-261, 262, 263 Drawing (Craft Majors)
Registration #0404-261, 262, 263
Drawing in a variety of media. Introduction to line, form, and color as elements of pictorial expression. Organic and inorganic materials are used.
Lab. 6, Credit 2

FADF-321, 322, 323 Photo Design II
Registration #0404-321, 322, 323
Emphasis upon problems which are related to visual phenomena, fundamentals, and communications.
Lab. 3, Credit 2

FADF-301, 302, 303 Advanced Drawing
Registration #0405-301, 302, 303
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

FADF-313 Medical Illustration Carbon Dust Technique
Registration #0405-313-80
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

FADF-320 Color
Registration #0405-320
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

FADF-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. (FADP-301, 302, 303)
Lab. 12, Credit 6

FADF-411, 412, 413 Painting
Registration #0405-411, 412, 413
A professional elective, providing the opportunity to carry on further the objectives of FADF-401, 402, 403.
Lab. 6, Credit 3

FADF-420 Illustration
Registration #0405-420
Illustration
Registration #0405-420
One quarter course exploring the art of the illustrator; his relation 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

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

FADF-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 culture and society. Advanced drawing incorporated into studio procedure. (FADF-401, 402, 403)
Lab. 18, Credit 9

FADF-511, 512, 513 Painting
Registration #0405-511, 512, 513
A professional elective, providing the opportunity to carry on further the objectives of FADF-501, 502, 503.
Lab. 6, Credit 3

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

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

FADR-411, 412, 413 Printmaking
Registration #0406-411, 412, 413
A professional elective, providing the opportunity to carry on further the objectives of FADR-401, 402, 403.
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
Survey of the history of art from prehistory to the present.
Class 3, Credit 3
Lab. 6, Credit 3

FADS-411, 412, 413 Sculpture
Registration #0407-411, -412, -413
Three quarter course developing 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 #0407-200
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 Craft Elective I
Registration #0407-251, -252, -253
An elementary course in design and techniques in ceramics.
Lab. 6, Credit 3

FSCC-300 Ceramics Materials and Processes
Registration #0407-300
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 Craft Elective II
Registration #0407-351, -352, -353
A sequential course of study based upon the experiences of the prerequisite, providing opportunity for more advanced projects. (FSCC-251, 252, 253)
Lab. 6, Credit 3

FSCC-400 Ceramics Materials and Processes
Registration #0407-400
Sequential course for three quarters, treating problems of maintenance and construction of equipment. Summary of kiln types, fuels, and construction. Materials and sources of supply. Development of bodies and glazes for specific purposes. Problems requiring new uses, adaptations, and applications. Independent study, papers, reports.
Lab. 15, Credit 5

FSCC-500 Ceramics Techniques and Thesis
Registration #0407-500
Sequential course for three quarters, treating problems related to ceramic production culminating in a research and thesis project.
Lab. 24, Credit 8

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

FSCF-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

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

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-400 Glass Materials and Processes
Registration #0411-400
Sequential course for three quarters, introducing materials and their source of supply. An introduction to the mixing of batch glass. The formulation of various glass batches with an in-depth analysis of color and fuming techniques. The development of special glass batches for unique and specific purposes. At this stage the student will have developed a personal direction and rapport with glass.
Lab. 15, Credit 5

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 work in a manner to reflect a continuity and growth of style.
Lab. 24, Credit 8

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 Craft Elective I
Registration #0412-251, -252, -253
An elementary course in design and techniques in metalcrafts.
Lab. 6, Credit 3
FSCM-300  Metalcrafts Materials
Registration #0412-300 and Processes
Sequential course for three quarters, introducing study of jewelry, hollow ware, and flatware design, with production work in those areas. Analysis and discussion of design and production problems. Independent study, papers, reports.
Lab. 15, Credit 5

FSCM-351, 352, 353  Craft Elective II
Registration #0412-351, -352, -353
A sequential course of study based upon the experience of the prerequisite, providing opportunity for more advanced projects. (FSCM-251, 252, 253)
Lab. 6, Credit 3

FSCM-400  Metalcrafts Materials
Registration #0412-400 and Processes
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

FSCT-251, 252, 253  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  Craft Elective II
Registration #0413-351, -352, -353
A sequential course of study based upon the experiences of the prerequisite, providing opportunity for more advanced projects. (FSCT-251, 252, 253)
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  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  Craft Elective II
Registration #0414-351, -352, -353
A sequential course of study based upon the experiences of the prerequisite, providing opportunity for more advanced projects. (FSCW-251, 252, 253)
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 M.S.T. 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 studio. 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
FAE-780 (MFA) Design Applications
Registration #0403-780
FAE-750 (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

Painting
FADP-780 (MFA)
Registration #0405-780
FADP-750 (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

Printmaking
FADR-780 (MFA)
Registration #0406-780
FADR-750 (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

Thesis
FADC(C, E, P, or R)-890 Research and Thesis
Registration #0408(2, 3, 5 or 6)-890 Guidance
The development of a thesis project instigated by the student and approved by a faculty committee and the Graduate Faculty Chairman. 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.

FSCC-780 (MFA) Ceramics
Registration #0409-780
FSCC-750 (MST)
Registration #0409-750
FSCG-780 (MFA) Glassblowing
Registration #0411-780
FSCG-750 (MST)
Registration #0411-750
FSCM-780 (MFA) Metalcrafts and Jewelry
Registration #0412-780
FSCM-750 (MST)
Registration #0412-750
FSCT-780 (MFA) Weaving and Textile Design
Registration #0413-780
FSCT-750 (MST)
Registration #0413-750
FSCW-780 (MFA) Woodworking and Furniture Design
Registration #0414-780
FSCW-750 (MST)
Registration #0414-750
Lab. 27, Credit 12
College of General Studies

Criminal Justice

GCJC-201 Fundamentals of the Criminal Justice System
Registration #0502-201
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 special problems within the branches of the criminal justice system such as: using of force, improper evidence collection and admission, discretionary decision making, riots, strikes, natural disasters, narcotic traffic, sexual deviance, and vice control.
Class 3, Credit 4

GCJC-203 Introduction to Criminology
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
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
Registration #0501-206
The course is intended to provide the student review of the fundamental concepts of organization and administration, and to provide an understanding of the role and function of the police and other law enforcement agencies within the community. Emphasis will be placed on field visits, group projects, and research.
Class 3, Credit 4

GCJC-207 Fundamentals of Corrections
Registration #0501-207
This 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. Strategies for rehabilitation and their effectiveness will be surveyed.
Class 3, Credit 4

GCJC-301 Fundamental Concepts and Patterns of 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 in America
Registration #0501-302
Historical analysis of criminal associations in their various manifestations, informal types of cliques and mobs and formal 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 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. Emphasis will be placed on field visits, group projects, and research.
Class 3, Credit 4

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

GCJC-403 Field Experience and Seminar
Registration #0501-403, 404
Under the guidance of an instructor, the student is placed in a cooperating criminal justice agency in order that he may gain first-hand experience with their organization, programs, and methods of work. Closely supervised work at the agency is supplemented by meetings with the student's Field Placement instructor to discuss experiences and resolve placement problems encountered on-the-job. These meetings will be supplemented by assigned professional readings. (Offered in Winter and Spring Quarters of Junior Year)
Class variable, Credit 9

GCJC-407 Behavior Modification in Corrections
Registration #0501-407
A course surveying 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-408 Constitutional Law and Criminal Justice
Registration #0501-408
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.
Class 3, Credit 4

GCJC-409 Legal Rights of Convicted Offenders
Registration #0501-409
This course is designed to present an in-depth study of the substantive and procedural law as it affects convicted offenders. Considerable attention is devoted to the study of constitutional rights and privileges; how they apply to convicted offenders, and the methods employed to secure these rights.
Class 3, Credit 4

GCJC-410 Corrections Administration
Registration #0501-410
This course presents the history and development of the principles of management and organizational theory as they have developed in the field of corrections, prisons, probation, parole, and other community correctional programs.
Class 3, Credit 4 (1976-77)
various factors. The course is intended to provide the student with a broad
GCJC-520 Law and Discretion in Criminal
trial, punishment and pardon.
registration #0501-520 Sentencing
Class 3, Credit 4 (1976-77)
GCJC-518 Police/Community Relations
A course designed to explore the management of the criminal
process, specifically the operation of family court systems. In-
cluded will be discussion of the inter-relationships of the com-
ponents of the system, as well as the relationships among the
various factors.
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
Registration #0501-520
The 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 tradi-
tional methods of punishment now available in the courts-to
delude, but not necessarily restricted to: fines, imprisonment,
Probation and suspended sentence.
Class 3, Credit 4
Social Work

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 the student to people’s needs, especially the needs of members of society who differ from himself and to begin building social work attitudes of objectivity, inquiry, empathy and non-judgement.
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, and examine the issues of licenses, advocacy and the Hatch Act, and professional organizations.
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 pyramidization 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

GSWS-305 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

GSWS-411,412,413 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).
Methods of Social Work stresses the basic principles and skills of a generic approach to social work practice, emphasizing the differential use of social work techniques and intervention skills in a variety of client systems.
Through lectures, discussions, readings, lab simulations and case studies, it is the overall objective of the sequence to provide the student with the knowledge, skill and self-awareness for beginning professional social work practice. The development of this knowledge, skill and awareness is seen as a progressive process undergirding and underpinning the three-course sequence.
Class 3, Credit 4/Qttr.

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 may gain first-hand experience with their organization, programs, and methods of work. Close supervision at the agency is supplemented by periodic consultations with the instructor.
Credit 5/Qttr.

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

GSWS-431 Black Perspectives
Registration #0516-431
This seminar is designed to study the social structure of the Black or African community and their social movements directed towards social change. Aspects of Black or African life and culture will be dealt with and emphasis is placed on the various ideologies among Blacks.
Class 3, Credit 4

GSWS-432 Field Instruction I, II
Registration #0516-432
Under the guidance of an instructor, the student is placed in a cooperating social, governmental, or education agency in order that he may gain first-hand experience with their organization, programs, and methods of work. Close supervision at the agency is supplemented by periodic consultations with the instructor.
Credit 5/Qttr.

GSWS-501 Gerontology
Registration #0516-501
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

GSWS-510 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

GSWS-515 Community Organization
Registration #0516-515
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

GSWS-520 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

GSWS-521 The Advocacy Role in Social Work
Registration #0516-521
This course will examine the role of social workers in advocating with and on behalf of clients and others in their efforts to negotiate or bring about needed change in institutions or policies of our society. Discussion of the forces in the social, economic and political environment today which directly affect poverty, racism and related urban crises will be related to examining techniques for achieving change.
Class 3, Credit 4

GSWS-522 Community Organization
Registration #0516-522
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
This course provides a broad overview of the effects of deafness, its relation to his social and intellectual development, and an appreciation of the hearing impaired as a person. It provides basic information regarding the nature of sound, anatomy of hearing, and the causes and types of deafness.

Class 3, Credit 4

GSWS-531 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 models, formulation of hypotheses, collection of data, measurements, statistics, tests, and evidence evaluation. Instruction and practical demonstration is provided in techniques ranging from simple case studies to computer utilization.

Class 3, Credit 4

GSWS-535 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 4/4Qtr.

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.

CSWS-450 Group Work Methods
Registration #0233-450
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 techniques, 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

CSWS-460 Alcoholism Disability-Physiology
Registration #0233-460
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

CSWS-461 Alcoholism—Interventional Skills
Registration #0233-461
Teaches a variety of interventional skills to alcoholism care givers dealing with the alcoholic, his family and community. 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

CSWS-462 Alcoholism—Rehabilitation Modalities
Registration #0233-462
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

CGES-401 Psycho-Social Aspects of Deafness
Registration #0227-401
This course provides a broad overview of the effects of deafness on the individual, its relation to his social and intellectual development, and an appreciation of the hearing impaired as a person. It provides basic information regarding the nature of sound, anatomy of hearing, and the causes and types of deafness.

Class 3, Credit 4

CSWS-470 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 his personality development as described by Freud and Erikson, his behavioral patterns as described by S-R theory, and those factors leading to the development of "intelligence" and creativity.

Class 3, Credit 4

CSWS-471 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

CSWS-472 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

CSWS-473 Day Care—The Emerging Profession
Registration #0233-473
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 4, Credit 4

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-development conferences.

Class 4, Credit 4

*NOTE: Subject to the approval of the Intercollege Curriculum Committee, GLLC-220 will become a required course in Winter Quarter 1978-79, replacing all other lower division language courses.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Registration</th>
<th>Class</th>
<th>Credit</th>
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</thead>
<tbody>
<tr>
<td>GLLC-404</td>
<td>Communication with the Handicapped</td>
<td>#0502-404</td>
<td>3</td>
<td>4</td>
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<tr>
<td>GLLC-421,422</td>
<td>German I, II</td>
<td>#0502-421,422</td>
<td>3</td>
<td>4/5</td>
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<td></td>
<td>The courses are designed to enable the student to read and understand technical and scientific German. Class 3, Credit 5/Qtr.</td>
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<tr>
<td>GLLC-431,432</td>
<td>Spanish I, II</td>
<td>#0502-431,432</td>
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<td>4</td>
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<td>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 get in contact. Proficiency in Spanish would satisfy this requirement. Class 3, Credit 4/Qtr.</td>
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<tr>
<td>GLLC-501</td>
<td>Effective Speaking</td>
<td>#0504-501</td>
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<td>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</td>
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<tr>
<td>GLLC-511</td>
<td>Modern Applications of Language Theory</td>
<td>#0502-511</td>
<td>3</td>
<td>5</td>
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<td></td>
<td>The history and theory of communication from basic human communication through the mass media extensional systems. Class 3, Credit 5</td>
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<tr>
<td>GLLC-514</td>
<td>Mass Communication</td>
<td>#0502-514</td>
<td>3</td>
<td>5</td>
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<td></td>
<td>Content will cover the theoretical and practical aspects of the mass communications with particular emphasis on its consequent effect on human behavior. Class 3, Credit 5</td>
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<tr>
<td>GLLL-320</td>
<td>Literature and Myth</td>
<td>#0504-320</td>
<td>3</td>
<td>4</td>
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<td></td>
<td>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</td>
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<tr>
<td>GLLL-321</td>
<td>Oral Interpretation</td>
<td>#0504-321</td>
<td>3</td>
<td>4</td>
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<tr>
<td></td>
<td>The examination of our literary heritage to encourage the appreciation of the artistry of literature composed to be read aloud. Class 3, Credit 4</td>
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<tr>
<td>GLLL-322</td>
<td>Literature and the Visions of Man</td>
<td>#0504-322</td>
<td>3</td>
<td>4</td>
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<tr>
<td></td>
<td>A study of major modern and contemporary writers with special emphasis on the visions of man's human condition. Class 3, Credit 4</td>
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<tr>
<td>GLLL-323</td>
<td>The Cycle of Life in Literature</td>
<td>#0504-323</td>
<td>3</td>
<td>4</td>
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<td></td>
<td>A study of the literary uses of myths connected with the cycle of life. Class 3, Credit 4</td>
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<tr>
<td>GLLL-324</td>
<td>Guilt and Expiation</td>
<td>#0504-324</td>
<td>3</td>
<td>4</td>
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<tr>
<td></td>
<td>Masterpieces of world literature, ancient to modern, are selected to introduce literary forms (drama, prose, fiction, poetry) in various literary modes (Classical, Romantic, Realistic). Class 3, Credit 4</td>
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<tr>
<td>GLLL-325</td>
<td>Thematic Approach to Western Literature</td>
<td>#0504-325</td>
<td>3</td>
<td>4</td>
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<tr>
<td></td>
<td>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</td>
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<tr>
<td>GLLL-326</td>
<td>Literature in its Critical Perspectives</td>
<td>#0504-326</td>
<td>3</td>
<td>4</td>
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<tr>
<td></td>
<td>An analysis of short stories, poems, plays, and the novel from various critical perspectives. Class 3, Credit 4</td>
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<tr>
<td>GLLL-328</td>
<td>Modern Criticism of Literature</td>
<td>#0504-328</td>
<td>3</td>
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<tr>
<td></td>
<td>Critical approaches to literature to provide the student with a standard of judgment in literature. Class 3, Credit 4</td>
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<tr>
<td>GLLL-330</td>
<td>Voyage Literature</td>
<td>#0504-330</td>
<td>3</td>
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<td></td>
<td>The treatment of the voyage in literature from Homer to the present. Class 3, Credit 4</td>
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<tr>
<td>GLLL-331</td>
<td>Genres of World Literature</td>
<td>#0504-331</td>
<td>3</td>
<td>4</td>
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<td></td>
<td>Survey of the primary genres of world literature: drama, novel, short story and poetry. Class 3, Credit 4</td>
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<tr>
<td>GLLL-332</td>
<td>Survey of Western Literature</td>
<td>#0504-332</td>
<td>3</td>
<td>4</td>
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<td></td>
<td>A chronological survey of the major literary genres of the Classical, Medieval, Renaissance, Neo-Classical, Naturalism-Realism, and Modern periods, employing the analytical study of the individual works. Class 3, Credit 4</td>
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<tr>
<td>GLLL-334</td>
<td>Studies in the American Novel</td>
<td>#0504-334</td>
<td>3</td>
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<tr>
<td></td>
<td>A study of selected American novels of the 19th and 20th centuries which have become literary classics. Class 3, Credit 4</td>
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<tr>
<td>GLLL-335</td>
<td>The Hero in Literature</td>
<td>#0504-335</td>
<td>3</td>
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<td></td>
<td>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</td>
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<tr>
<td>GLLL-336</td>
<td>Man and His Fictions</td>
<td>#0504-336</td>
<td>3</td>
<td>4</td>
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<td></td>
<td>The study of literature as one among the many fabrications 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</td>
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<tr>
<td>GLLL-501</td>
<td>Speculative Fiction</td>
<td>#0504-501</td>
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<td></td>
<td>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</td>
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<tr>
<td>GLLL-603</td>
<td>Great World Drama</td>
<td>#0504-603</td>
<td>3</td>
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<td></td>
<td>A chronological survey of the major periods of theatrical evolution, with emphasis on the physical theatre and production techniques which influenced the playwrights' works within the respective periods. Class 3, Credit 5</td>
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</table>
Students are given maximum freedom to write what they are thetic aspects of the films.

A study of several books from the Old and New Testaments is investigated to reveal their literary excellence and their theatrical power.

A multi-disciplinary look at the tenets of the American Dream and the question of its present success or collapse.

A generous sample of Shakespeare’s tragedy and romance plays is investigated to reveal their literary excellence and their theatrical power.

A generous sample of Shakespeare’s comedy and history plays is investigated to reveal their literary excellence and their theatrical power.

Emphasis will be on both technical and aesthetic aspects of the films.

A generous sample of Shakespeare’s comedy and history plays is investigated to reveal their literary excellence and their theatrical power.

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### GLLL-539 Art Nouveau and Aestheticsism
**Registration #0504-539**
A multidisciplinary study of the relationship between the Art Nouveau and Aesthetic movements in late 19th century Europe. Attention will be devoted to parallel movements in literature, painting, and the crafts.

Class 3, Credit 5

### GLLL-540 Hero Image in the Theatre
**Registration #0504-540**
A close examination of the image of the heroic hero from Ancient Greece to the mid-20th century, with emphasis on the changes which took place in the hero image and the reasons for such character changes.

Class 3, Credit 5

### GLLL-541 Literature and Cinematic Adaptation
**Registration #0504-541**
The analyses of both the literary and cinematic qualities and characteristics of common works, with the emphasis on their similarities and differences and their resultant strengths and weaknesses as creative endeavors.

Class 3, Credit 5

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

Class 3, Credit 5

### GLLL-543 Deaf Studies in Literature
**Registration #0504-543**
A study of the literature of deafness, with special emphasis on literary works which identify and illuminate the deaf experience.

Class 3, Credit 5

### GLLL-545 Philosophy of Justice
**Registration #0504-545**
An introduction to the nature, form and significance of music and of the listening experience. Emphasis is placed on the development of a personal awareness of music through an examination of its structure, historical development and its purpose to society.

Class 3, Credit 5

### GLLL-546 GSHF-210 Introduction to the Performing Arts: Music
**Registration #0504-210**
An introduction to the nature, form and significance of music and of the listening experience. Emphasis is placed on the development of a personal awareness of music through an examination of its structure, historical development and its purpose to society.

Class 3, Credit 4

### GLLL-547 Modern Poetry
**Registration #0504-547**
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

### GLLL-548 Women in Literature
**Registration #0504-548**
A critical analysis of European building from the engineering and social, political, and cultural milieu in which the authors worked.

Class 3, Credit 5

### GLLL-550 English Literature Other
**Registration #0504-550**
This course is a survey of the development of American culture from the Civil War to the early 20th century.

Class 3, Credit 5

### GLLL-551 The American Spirit in Literature
**Registration #0504-551**
A critical examination of certain films as an integral part of modern culture.

Class 3, Credit 5

### GLLL-552 Hero Image in the Theatre
**Registration #0504-552**
A critical examination of European building from the engineering and social, political, and cultural milieu in which the authors worked.

Class 3, Credit 5

### GLLL-553 Art Nouveau and Aestheticsism
**Registration #0504-553**
A multidisciplinary study of the relationship between the Art Nouveau and Aesthetic movements in late 19th century Europe. Attention will be devoted to parallel movements in literature, painting, and the crafts.

Class 3, Credit 5

### GLLL-554 Modern European Architecture
**Registration #0504-554**
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

### GLLL-555 Women in Literature
**Registration #0504-555**
A critical analysis of the literary and cinematic qualities and characteristics of common works, with the emphasis on their similarities and differences and their resultant strengths and weaknesses as creative endeavors.

Class 3, Credit 5

### GLLL-556 Modern European Architecture
**Registration #0504-556**
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

### GLLL-557 Women in Literature
**Registration #0504-557**
A critical analysis of European building from the engineering and social, political, and cultural milieu in which the authors worked.

Class 3, Credit 5

### GSHF-211 Introduction to the Performing Arts: Film
**Registration #0505-211**
Emphasis on seeing and knowing good films. How the director exploits cinematic techniques to create a work of art is the focus for study and discussion of international cinema.

Class 3, Credit 4

### GSHF-212 Introduction to the Visual Arts
**Registration #0505-212**
An introduction to the nature, form and significance of music and of the listening experience. Emphasis is placed on the development of a personal awareness of music through an examination of its structure, historical development and its purpose to society.

Class 3, Credit 4

### GSHF-213 Survey of American Architecture
**Registration #0505-213**
A survey of American architecture from the 17th century to the present. Stress will be placed on a visual as well as an historical and social analysis of American building art.

Class 3, Credit 5

### GSHF-503 Modern European Architecture
**Registration #0505-503**
A critical analysis of European building from the engineering and social, political, and cultural milieu in which the authors worked.

Class 3, Credit 5

### GSHF-511 Modern European Architecture
**Registration #0505-511**
A survey of American architecture from the 17th century to the present. Stress will be placed on a visual as well as an historical and social analysis of American building art.

Class 3, Credit 5
GSHF-512 Master Drawings Since the Renaissance
Registration #0505-512
A study of drawings from the 15th to the 20th century, including the work by Leonardo da Vinci, Michelangelo, Durer, Rembrandt and Picasso.
Class 3, Credit 5

GSHF-513 Oriental Art
Registration #0505-513
A survey outlining the development of art in India, China and Japan and examining the philosophical circumstances that distinguish Eastern traditions.
Class 3, Credit 5

GSHF-514 Cubism to the Present
Registration #0505-514
An investigation into modern man’s struggle to preserve his identity in our fast developing technological world as reflected in the vitality and diversity of today’s visual arts. Differences and similarities with art forms of earlier eras and other cultures will also be discussed.
Class 3, Credit 5

GSHF-519 Rembrandt Van Rijn: His Art and Times
Registration #0505-519
A study of the life, art and times of the Baroque master. Emphasis will be placed on his stylistic evolution, his relations to his society and to the Baroque style, and on his humanistic world view.
Class 3, Credit 5

GSHF-520 The Life and Work of One of the Most Influential Artists of Our Century
Registration #0505-520
The life and work of one of the most influential artists of our century.
Class 3, Credit 5

GSHF-521 The Arts Under Communism, Fascism and Nazism
Registration #0505-521
The course will analyze the control the totalitarian regimes of Russia, Italy and Germany exercised over every form of artistic activity.
Class 3, Credit 5

GSHF-524 Survey of English Architecture from the Medieval Period to the Present
Registration #0505-524
An on-site examination of the stylistic development of English 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.
Class 3, Credit 5

GSHF-525 Major Symphonies
Registration #0505-525
A non-specialized humanistic approach to the understanding of the men, ideas, and times during which major musical compositions were created.
Class 3, Credit 5

GSHF-526 Twentieth Century Music
Registration #0505-526
A survey of major 20th century composers and their works. Emphasis will be placed on the development of music in the classical tradition, experimental music, and jazz.
Class 3, Credit 5

GSHF-530 Art, Music and Ideas
Registration #0505-530
This is a non-specialized course offering the student the opportunity to examine specific works of art and music against the background of ideas and concepts that influenced and animated the life of their times.
Class 3, Credit 5

GSHF-532 African Tribal Art
Registration #0505-532
After an investigation of the world of “primitive” man and the function of art in a tribal environment, this course will focus on preliterate societies of sub-Saharan Africa.
Class 3, Credit 5

GSHH-301 Modern American History
Registration #0507-301
Political, social, cultural, and economic development of the American people in the modern period.
Class 3, Credit 4

GSHH-302 Modern European History
Registration #0507-302
The major social, political, and intellectual movements of modern Europe.
Class 3, Credit 4

GSHH-303 Latin American History: From Independence to the Modern Period
Registration #0507-303
Survey of historical development of Latin America from independence through the 1960’s.
Class 3, Credit 4

GSHH-308 Man and Society
Registration #0507-308
The study of man and society as an insight into current social and individual problems.
Class 3, Credit 4

GSHH-310 The Future as History
Registration #0507-310
Through historical analysis, the course will show that the past has caused the problems of today, and that historical courses must be understood if these problems are to be solved.
Class 3, Credit 4

GSHH-311 Ethnic History
Registration #0507-311
The course will analyze the historical establishment and maintenance of minority patterns in inter-people relations derived from the migration of European peoples to Africa, to the Americas, to Southeast Asia, and intra-European countries.
Class 3, Credit 4

GSHH-313 Communism, Fascism and Democracy in Their Theoretical Foundations
Registration #0507-313
A political and historical appraisal of these philosophies. Emphasis is placed upon the claims they make with regard to the individual and the state, and the changes they demand for the future.
Class 3, Credit 4

GSHH-316 The History of the World Since 1945
Registration #0507-316
Survey of the major events of world history since 1945: Europe, Africa, Asia, and the United States.
Class 3, Credit 4

GSHH-319 Religious and Cultural Movements and the Shaping of Modern Society
Registration #0507-319
The influence of religion on our society will be the focus of the course.
Class 3, Credit 4

GSHH-320 The Unification of Europe: Achievements and Perspectives
Registration #0507-320
The European crises of this century, the American involvement in them, and the first attempts for reunification.
Class 3, Credit 4
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Course Description</th>
<th>Class, Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSHH-325</td>
<td>America's Greatest Presidents</td>
<td>Registration #0507-325 A review of the American Presidency through a review of the records of the eleven chief executives generally acknowledged by historians as the best: Washington, John Adams, Jefferson, Jackson, Polk, Lincoln, Cleveland, Theodore Roosevelt, Wilson, Franklin Roosevelt and Truman.</td>
<td>Class 3, Credit 4</td>
</tr>
<tr>
<td>GSHH-508</td>
<td>History of England</td>
<td>Registration #0507-508 A political and constitutional history of England from the Anglo-Saxon period to the present.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHH-510</td>
<td>Contemporary Middle East</td>
<td>Registration #0507-510 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.</td>
<td>Class 3, Credit 5</td>
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<tr>
<td>GSHH-514</td>
<td>Race and Society</td>
<td>Registration #0507-514 A social, historical, political, religious and anthropological appraisal of the factors which have produced the differences between social appearances and social attainments of the world’s population.</td>
<td>Class 3, Credit 5</td>
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<tr>
<td>GSHH-518</td>
<td>The Advance of Communism</td>
<td>Registration #0507-518 An examination of the rapid expansion of Communism from the Russian Revolution of 1917 to present time including the rise of Communism in China, Yugoslavia and Eastern Europe, and Cuba. Emphasis will be placed on the causes which favored such an expansion as well as a review of the various avenues by which countries have become communist.</td>
<td>Class 3, Credit 5</td>
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<tr>
<td>GSHH-519</td>
<td>United States-Latin American Diplomatic Relations</td>
<td>Registration #0507-519 The emphasis in this course will be on analyzing the United States’ relations with Latin America from independence to the present.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHH-520</td>
<td>Crime, Violence and Urban Crisis</td>
<td>Registration #0507-520 In the 20th Century The course will analyze the causes of the outbreak and rapid increase of violent and criminal trends in the world as the most serious realities of the 20th century.</td>
<td>Class 3, Credit 5</td>
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<tr>
<td>GSHH-522</td>
<td>20th Century American Diplomatic History</td>
<td>Registration #0507-522 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.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHH-523</td>
<td>Religion in Society</td>
<td>Registration #0507-523 This course will examine religion in the West-Christianity, Judaism and atheism as an integral and interrelated aspect of the totality of society.</td>
<td>Class 3, Credit 5</td>
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<tr>
<td>GSHH-524</td>
<td>The Italian-American Experience</td>
<td>Registration #0507-524 Examines the history and culture of the Italian-Americans from the colonial period to the present.</td>
<td>Class 3, Credit 5</td>
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<tr>
<td>GSHH-525</td>
<td>Culture and Counterculture in Historical Perspective</td>
<td>Registration #0507-525 This course will examine the cultural, social, political and economic conflicts which were prominent during the 1960’s in America and around the world.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHH-528</td>
<td>The United States and The Third World</td>
<td>Registration #0507-528 Revolutions in the 20th Century One of the dominant features of the 20th century has been the revolution of rising expectations in the countries of the third world. This course will study the underlying causes of these revolutions and the reaction of the United States government to this revolutionary ferment in Latin America, Asia, and Africa.</td>
<td>Class 3, Credit 5</td>
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<tr>
<td>GSHH-530</td>
<td>19th Century American Diplomatic History</td>
<td>Registration #0507-530 An examination of American diplomacy from the early years of American independence to the emergence of the United States as a world power. The War of 1812, Monroe Doctrine, and Manifest Destiny are among the topics considered.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHH-531</td>
<td>The Black Experience in America</td>
<td>Registration #0507-531 This course explores the history of blacks in America and treats it primarily from a social and cultural perspective.</td>
<td>Class 3, Credit 5</td>
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<tr>
<td>GSHH-532</td>
<td>Civil Liberties in American History</td>
<td>Registration #0507-532 The course will teach the history of civil liberties in America. Emphasis will be placed on the current state of civil liberties.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHH-533</td>
<td>China, Russia and United States</td>
<td>Registration #0507-533 Since 1949 This course is a follow-up of the other two courses on Russia, and on the advance of Communism.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHH-534</td>
<td>Ethnicity: A World in Retrospect</td>
<td>Registration #0507-534 Analysis of the establishment and maintenance of minority patterns in inter-people relations derived from the migration of Europeans to Africa, the Americas, Southeast Asia, and within Europe itself.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHH-535</td>
<td>The United States and Latin American Revolutions Since 1900</td>
<td>Registration #0507-535 A study of the key revolutions from Mexico in 1910 to Peru in 1968 and the effect on American foreign policy.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHH-536</td>
<td>History of Mexico</td>
<td>Registration #0507-536 The historical development of Mexico since 1821 including the independence movement, the liberal-conservation clash, and the revolution of 1910.</td>
<td>Class 3, Credit 5</td>
</tr>
</tbody>
</table>
This course will be an analysis of the human, intellectual, social and moral condition of Western man.

**Class 3, Credit 5**

**GSHH-550 The Ascent of Man**
A study of the development of human thought and culture, emphasizing intellectual, religious, political, scientific and historical development of the Western man.

Class 3, Credit 5
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.
GSSM-501 American Foreign Policy
Registration #0513-501
An analysis of trends and events in United States diplomacy from 1890 to the present, and an examination of the instruments and procedures pertinent to the development of foreign policy.
Class 3, Credit 5

GSSM-503 The Cold War
Registration #0513-503
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
Registration #0513-504
The major political, social and economic developments affecting the U.S. in the 20th century.
Class 3, Credit 5

GSSM-507 International Relations
Registration #0513-507
The basic concepts and theories of international relations, American foreign policy, and major developments in the contemporary world arena.
Class 3, Credit 5

GSSM-508 Government and Politics of the Soviet Union
Registration #0513-508
Designed to examine the Soviet political system with emphasis on ideology, Party apparatus, and governmental institutions.
Class 3, Credit 5

GSSM-510 Comparative Politics
Registration #0513-510
Designed to provide a mode of analysis for the study of political systems in the U.S., Great Britain, France, Federal Republic of Germany, and the U.S.S.R.
Class 3, Credit 5

GSSM-512 Urban Politics
Registration #0513-512
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
Registration #0513-513
A chronological and analytical study of Soviet foreign policy since its inception.
Class 3, Credit 5

GSSM-514 Theories of Political Systems
Registration #0513-514
A comparative examination of contemporary political theories viewed from the perspective of the earlier theories out of which they evolved. Emphasis is placed upon the value of theory, its practical application and its limitations.
Class 3, Credit 5

GSSM-520 Politics in China
Registration #0513-520
This course is designed to provide the students with the political dynamics of the People's Republic of China. Major emphasis will be given to the historical background, major aspects of the political system, and the foreign relations of China.
Class 3, Credit 5

GSSP-203 Psychology of Childhood and Adolescence
Registration #0514-203
A systematic, integrated, and interpretive study of a growing person. Includes physical, cognitive, social, moral and emotional development.
Class 3, Credit 4

GSSP-210 Introduction to Psychology
Registration #0514-210
A selection of topics drawn chiefly from social and clinical psychology, learning, motivation, and personality with some reference to neuropsychology when relevant.
Class 3, Credit 4

GSSP-501 Industrial Psychology
Registration #0514-501
Consideration of principles, application and current research in industrial psychology, with particular reference to personnel selection, training, motivation, morale, performance appraisal, leadership and communication.
Class 3, Credit 5

GSSP-503 Abnormal Personality
Registration #0514-503
Description and theories of the nature and development of behavioral disorders. Contemporary treatment procedures will also be discussed.
Class 3, Credit 5

GSSP-504 Attitude Formation and Persuasion Techniques
Registration #0514-504
The course will focus on current theories of attitude formation, and seek to apply them to contemporary events to achieve an understanding of how those who wish to shape or change attitudes do so.
Class 3, Credit 5

GSSP-508 Psychology of Learning
Registration #0514-508
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.
Class 3, Credit 5

GSSP-509 Psychology of Perception
Registration #0514-509
A study of methods and research findings primarily in the field of visual perception together with an evaluation of theoretical interpretations.
Class 3, Credit 5

GSSP-510 Social Psychology
Registration #0514-510
The course will attempt to give a general overview of those areas of social psychology currently under the most intensive investigation, and likely to be of most interest to the student.
Class 3, Credit 5

GSSP-511 Humanistic Psychology: An Introduction
Registration #0514-511
Emphasis on the value and worth of the individual with concern for the person's perception of the here-and-now in coping with life.
Class 3, Credit 5

GSSP-512 Psychology of Personality
Registration #0514-512
A consideration of theories of personality classification and development.
Class 3, Credit 5

GSSP-513 Psychology of Motivation
Registration #0514-513
The nature and development of motive and emotion and the role of these processes in adjustment. Covers concepts and theories of motivation.
Class 3, Credit 5

GSSP-514 Behavior Modification
Registration #0514-514
A study of the dynamics and control of human behavior.
Class 3, Credit 5
GSSS-515 Psychology of Human Adjustment
Registration #0514-515
This course will take a look at various conceptions of adjustment to see what their diverse implications are for human behavior.
Class 3, Credit 5

GSSP-517 Death and Dying
Registration #0514-517
This course will view America’s last taboo subject from a social-psychological perspective. After dealing with topics such as the leading causes of death, attitudes toward death, suicide, and American funeral practices, it will focus on such questions as how people can better cope with their own mortality and that of loved ones, and how people can help others face death, and help themselves and others during periods of bereavement.
Class 3, Credit 5

GSSP-518 Psychology of Aging
Registration #0514-518
The Psychology of Aging course will present a psychological overview of human aging with some study of the dynamic problems of the elderly in contemporary society. Psychological aspects of adulthood and aging will be emphasized within the perspectives of an interdisciplinary approach.
Class 3, Credit 5

GSSP-519 Psychology of Altered States of Consciousness
Registration #0514-519
This course will cover such topic areas as the specialized consciousness in the two halves of the brain, dreaming, hypnosis, meditation, systematic relaxation, and parapsychology. The course format will be discussion/demonstration.
Class 3, Credit 5

GSSS-202 Introduction to Social Science
Registration #0515-202
An introductory examination of causes, patterns, and consequences of human behavior, individually and in groups, drawing upon the findings of contemporary social science.
Class 3, Credit 4

GSSS-210 Introduction to Sociology
Registration #0515-210
An introduction to the structure, function and development of human societies, with special attention to modern industrial societies in general and U.S. society in particular.
Class 3, Credit 4

GSSS-502 Contemporary Social Problems
Registration #0515-502
Contemporary problems of human living in society will be studied with recourse to local conditions and resources as aids to learning.
Class 3, Credit 5

GSSS-504 Intergroup Relations: American Racial and Ethnic Minorities
Registration #0515-504
A sociological analysis of relations between ethnic, racial, and religious groups.
Class 3, Credit 5

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
Registration #0515-520 (Undergraduate)
The development of sociological and sociopsychological 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 African Experience
Registration #0515-523
This seminar is designed to study the social movements directed towards social change. Aspects of Black or African 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.
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-533 Sociology of Intergroup Relations: Black and White Americans (Undergraduate)
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
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
<th>Class, Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSSS-569</td>
<td>Human Sexuality</td>
<td>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.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSSS-570</td>
<td>The Homophiles and Their Society</td>
<td>Registration #0515-570 The course will examine the world of the homosexual, and an analysis of the diverse types to be found in it.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHH-701</td>
<td>20th Century American Art</td>
<td>Registration #0505-701 An investigation of American art from the Civil War to the present. Emphasis will be placed on the visual arts but many references will be made to the music and architecture.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHH-711</td>
<td>Arts and Crafts in Tribal Societies</td>
<td>Registration #0505-711 A study of the function of &quot;primitive&quot; 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.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHF-703</td>
<td>American Architecture</td>
<td>Registration #0505-703 An examination of American architecture from the 17th century to the present designed for the graduate level of study. Emphasis will be placed on American building art in the late 19th and 20th century.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHF-705</td>
<td>Practice and Theories of Art Criticism</td>
<td>Registration #0505-705 A course for the art oriented graduate student centering on the student’s search for a supportable and reliable basis for making value judgments about works of art as well as introducing him to major historical and philosophic concepts of art criticism.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHF-707</td>
<td>Cubism to the Present</td>
<td>Registration #0505-707 Cubism as a way of seeing and as an expression of 20th century thinking. Differences and similarities with art forms of earlier eras and other cultures.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHF-708</td>
<td>Oriental Art</td>
<td>Registration #0505-708 A survey outlining the development of art in India, China and Japan and examining the philosophical circumstances that distinguish Eastern artistic traditions.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHF-710</td>
<td>Art, Music and Ideas</td>
<td>Registration #0505-710 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.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHH-716</td>
<td>Rembrandt</td>
<td>Registration #0505-716 A detailed analysis of the art and times of the Baroque master. Emphasis will be placed on the development of his style and technique, on his and other artists’ relationship to their society and to the character of the Baroque outlook.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHF-720</td>
<td>English Architecture</td>
<td>Registration #0505-720 An on-site examination of the stylistic development of English 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.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHH-701</td>
<td>History of American Educational Thought and Practice</td>
<td>Registration #0507-701 Traces the history of American education from the pre-Civil War years to the present.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHH-703</td>
<td>History of the Renaissance</td>
<td>Registration #0507-703 The course will analyze the revival in society, literature, the arts, architecture, and political thought that occurred in Europe from 1300 to 1600. Major emphasis will be given European effor­escence associated with the ideal of Renaissance art and life.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSHP-704</td>
<td>Ethics and Philosophy of Education</td>
<td>Registration #0509-704 To develop insights into various philosophies of education through a critical examination of their origins and viewpoints.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSSP-701</td>
<td>Developmental Psychology</td>
<td>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.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSSP-702</td>
<td>Educational Psychology</td>
<td>Registration #0514-702 This course is designed to furnish the 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.</td>
<td>Class 3, Credit 5</td>
</tr>
<tr>
<td>GSSS-701</td>
<td>Educational Sociology</td>
<td>Registration #0515-701 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.</td>
<td>Class 3, Credit 5</td>
</tr>
</tbody>
</table>
College of Graphic Arts and Photography

School of Photographic Arts and Sciences

Biomedical Photography

PPHB-201, 202, 203
Registration #0901-201, -202, -203
Basic 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

PPHB-211 Survey of Biomedical Photography
Registration #0901-211
Career opportunities, typical biomedical photography settings, types of photography performed. Ethical, professional, and personal relationships with patient, physicians, research and staff personnel.
Class 1, Credit 1

PPHB-301, 302, 303
Registration #0901-301, -302, -303
Further study and practice of theory and principles used in Biomedical Photography, including photomicrography, photomicrography, operating room techniques, infrared and ultraviolet light, biological field studies.
Class 2, Lab. 10, Credit 5

PPHB-331, 332, 333 Preparation of Biomedical Visuals
Registration #0901 -331, -332, -333
Study of basic principles of effective visual communication and design. Student will produce slide and motion picture presentations and exhibition displays.
Lab.F-4, W-4, S-6, Credit 3

PPHB-501, 502, 503 Senior Thesis Production
Registration #0901-501, -502, -503
An investigation, planning, organization and production of an audiovisual presentation, a learning package and informational program for a biomedical communications client. The biomedical communications package will be reviewed for appropriateness of design and content.
Class 2, Lab. 8, Credit 4

PPHF-207, 208, 209 Introduction to Film Making and Television
Registration #0902-207, -208, -209 Making and Televison
Film as a means of communication. Involves students in the basic aesthetic principles, production, processes and techniques governing modern film making as it relates to dynamics to all basic phases of motion picture production in the Super 8mm format and are engaged in a variety of production projects, individual and crew, each quarter. Special regard is given to Art and Design students in relation to film making; comparison and contrast of film with other forms of artistic expression; seeing and representing movement through cinematography and editing; the non-representational abstractionist movement in film making; animation, titles and storyboards as art work; set and costume design. Students furnish film and processing; equipment is furnished. The spring quarter (PPHF-209) is devoted to the television medium. (The previous two quarters, PPHF-207, 208 are NOT prerequisites for the TV quarter.) Students will learn how to communicate with the medium, producing programs of their own design within a fairly wide latitude. Course includes work as a crew member on the production of programs designed by the other students in the class. The commonalities and differences as regards film and television will be emphasized.
Class, Lab., Studio, 7 hours, Credit 3

PPHF-401 Introduction to Film Making and Registration #0902-401 Conceptual Film Production
Film making as a means of interpretation and expression. Film as a medium of communication, as a structural unity, the main elements of structure, organizational principles with special application to the conceptual film form. A combined theoretical-practical approach to the dynamics of the film medium. The student is expected to demonstrate 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 Registration #0902-402 Film Production
Film making as a means of interpretation and expression with an emphasis in the non-fictional narrative film, 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 Registration #0902-403 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. 6, Credit 4

PPHF-407, 408, 409 Film History
Registration #0902-407, -408, -409
Survey of developments in film from the early beginnings to the present. Objective is to explore the uses of the medium within a historical, cultural, and theoretical context. Each quarter will emphasize a different film form: 407 fiction feature, 408 documentary, 409 experimental and animation. No prerequisites. Admission during any quarter of the academic year.
Class 3, Credit 3
PPHG-201, 202, 203  Photography  Registration #0903-201, 202, 203
A ten-week summer course for students entering the transfer program in Photographic Illustration and Professional Photography. This course is equivalent to PPHG-201, 202, 203.
Credit 12

PPHG-210, 211, 212, 213  Materials and Processes of Photography  Registration #0903-210, 211, 212, 213
A ten-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

PPHL-301, 302, 303  History and Aesthetics of Photography  Registration #0904-301, 302, 303
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, photomechanical processes, 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

PPHL-311, 312, 313  B.F.A. Photography II  Registration #0904-311, 312, 313
A ten-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
The major emphasis is placed on the individual's learning to express himself through the medium of photography. 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

**PHPL-401, 402, 403**  
Photography as a Fine Art I  
Registration #0904-401, -402, -403

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

**PHPL-411, 412, 413**  
Photojournalism I  
Registration #0904-411, 412, 413

Journalistic photography for mass media publication with emphasis on the development of specialized skills in projects dealing with various aspects of reportage and all related editorial problems from caption writing, law and history, to organizational structures, printing processes, layout and design. Special emphasis is placed on the story as a total concept from inception to finished layout. Research and origin of material as well as the study of publications is explored. (PPHL-313)

Class 2, Lab. 8, Credit 4

**PHPL-421, 422, 423**  
Nature Photography  
Registration #0904-421, -422, -423

A course designed to help students become more concerned and visually aware of the natural environment. This is accomplished principally by direct involvement through study and photography of major natural forms. The student also acquires valuable basic understanding of the natural world, special photographic techniques and a broader concept of man's attitudes toward and impact on his environment. (PHPL-203)

Class 2, Lab. 8, Credit 4

**PHPL-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 imagination and aesthetic aspects of creating illusions. Investigating into the photographic medium as a means of communicating ideas. The development of individual vision and self expression through the disciplines of photography, both in black and white and color images. (PPHL-313)

Class 2, Lab. 8, Credit 4

**PHPL-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

**PHPL-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 create and express personal statement through the medium of photography. Students select their own projects and work within the boundaries of the assignment with the guidance of the instructor, who acknowledges the limitations of using the medium. Development of awareness to the other arts is continued. (PPHL-403)

Class 2, Lab. 8, Credit 4

**PHPL-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

**PHPL-521, 522, 523**  
Color Photography  
Registration #0904-521, -522, -523

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. (PHPL-313 or equivalent, and permission of instructor)

Class 2, Lab. 6, Credit 4

**PHPL-531, 532, 533**  
Illustration Photography II  
Registration #0904-531, -532, -533

Advanced individual creative approaches to visual problem solving. Conceptual ideas employing the photographic medium are stressed. The student is encouraged to find a personal photographic approach and to develop a portfolio. (PPHL-433)

Class 2, Lab. 8, Credit 4

**Photographic Processing and Finishing Management**

**PHPM-201, 202, 203**  
Basic Principles  
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

**PHPM-300**  
Machine Processing  
Registration #0905-300

A ten-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

**PHPM-301, 302, 303**  
Machine Processing  
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

**PHPM-310**  
Survey of Machine Processing  
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

**PHPM-320, 321**  
Mechanics of Photographic Processing  
Registration #0905-320, -321

Data not provided.
PPHM-501, 502, 503  
Training and Supervision of  
Registration #0905-501, -502, -503  
Photographic Processing  
and Finishing Laboratory Personnel  
provides an opportunity for the processing and finishing management students to experience supervisory and training techniques as they prepare and use training aids and techniques in the actual supervision of the various work areas in the processing and finishing laboratory. (PPHM-303)  
Class 1, Lab. 8, Credit 4

PPHM-511, 512, 513  
Advanced Machine  
Registration #0905-511, -512, -513  
Processing  
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

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

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

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.  
Class 2, Lab. 8, Credit 4

PPHP-408  
Scientific and Technical Application  
Registration #0906-408  
of Photography  
An introduction to the field of photography as it applies to technical problem solving. Event timing, photo sensing, visible and invisible radiation recording are presented in class and laboratory projects.  
Class 2, Lab. 8, Credit 4

PPHP-409  
Corporate and Special Interest  
Registration #0906-409  
Publications  
A survey of this type of publication with particular emphasis in the photographic problems involved. Skill building assignments to improve competence and an introduction into the problems of the art director, editor, printer, layout man, 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. (SMAM-212, PPHG-203)  
Class 3, Lab. 3, Credit 4

PPHP-421, 422, 423  
Advertising Photography  
Registration #0906-421, -422, -423  
A course built strictly to the standards of professional photography. Only those students who seriously aspire to be professional craftsmen should enroll. The assignments are specific and vary from strictly commercial to advertising illustration. In addition, the student is encouraged to specialize in the direction of his 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

PPHP-431  
Forensic Photography  
Registration #0906-431  
The use of photography in forensic application for business and industry, surveillance, photographic evidence, forgery 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

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

PPHP-511, 512, 513  
Photographic Process Control  
Registration #0906-511, -512, -513  
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

PPHP-521, 522, 523  
Advanced Color Seminar  
Registration #0906-521, -522, -523  
This course is designed to give the advanced student an opportunity to work relatively independently to either develop his portfolio 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 professional related experiences. (PPHP-303 and PPHP-313, or PPHL-313 and permission of instructor)  
Class 2, Lab. 6, Credit 4
Credit variable of students and faculty desire to investigate specialized topics. A seminar approach offered on demand when adequate numbers of upper level students.

Registration #0906-551, -552, -553

Photography Class 2, Lab. 6, Credit 4

and white and color retouching are included and instruction is given in special printing and finishing techniques. (PPHS-203)

PPHS-541, 552, 553 Special Topics in Photography A seminar approach offered on demand when adequate numbers of upper level students. Available to upper level students. Credit variable

Photographic Science and instrumentation

The two courses, PPHS-200 and PPHS-210, are special intensive summer courses designed for students transferring into the Photographic Science and Instrumentation program, and for others who desire a background in photographic science and instrumentation at an introductory engineering level. Students planning entrance at the third year take both courses concurrently.

PPHS-200 Fundamentals of Photographic Registration #0907-200 Science I

An intensive course presenting the subject matter normally taken by Photographic Science and Instrumentation students during their first year. Topics include the basic physics and chemistry of photosensitive systems, characteristics of radiation, introduction to sensitometry and tone reproduction, and applied photography. Credit 9

PPHS-201, 202, 203 Photography for Scientists Registration #0907-201, 202, 203 and Engineers An introduction to the theory and applications of radiation-sensitive materials and systems. Physical properties of photographic materials, characteristics of radiation, sensitometric properties of photo-sensitive materials, processing chemistry, and fundamentals of black and white and color photography. Credit 9

Class 3, Lab. 3, Credit 4

PPHS-210 Fundamentals of Photographic Registration #0907-210 Science II

An intensive course presenting the subject matter normally taken by Photographic Science and Instrumentation students during their second year. Topics include basic photographic instrumentation optics, the chemistry of non-conventional black-and-white and color processing, and a continuation of the topics covered in PPHS-200. (PPHS-200 or PPHS-203) Credit 9

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 applications to machine control. (SCHG-207, PPHS-202)

Class 2, Lab. 6, Credit 4

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

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 densitometric tests; spectral response measurements; 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 space and time information from object fields; principles for selection of camera, lens parameters, recording material and recording rate; the use of time and space references to facilitate date retrieval. 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. (SM AM-205, SPSP-513, 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


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

PPHS-413 Statistical Quality Control Registration #0907-413

Basic probability, control charts, sampling plans, power and O.C. curves, and modern applications of product and process control.

Class 2, Lab. 2, Credit 3

PPHS-421, 422, 423 Photographic Chemistry Registration #0907-421, 422, 423

The chemistry and photographic properties of photographic emulsions and developer solutions at the intermediate level. Topics in physical, organic, and analytical chemistry necessary to the continued study of photographic science. (PPHS-301, SCHG-207)

Class 3, Lab. 3, Credit 4
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

Registration #0907-511, -512, -513

principles of geometrical and physical optics, image evaluation, optical instruments, and instrumentation. (SMAM-305, SPSP-313, PPHS-303)

Class 3, Credit 3

PPHS-521, 522, 523 Image Systems and Evaluation

Registration #0907-521, -522, -523

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

Class 2, Lab. 6, Credit 4 (Fall)

PPHS-531, 532, 533 Theory of the Photographic Process

Registration #0907-531, -532, -533

An advanced course in photographic theory: sensitivity, emulsions, latent image, and processing of both black-and-white and color materials. Chemistry and physics of selected non-silver and other non-conventional processes. (PPHS-423, SPSP-313)

Class 3, Credit 3

Graduate courses

(Fifth year of five-year program)

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 processes, sensitivity, image reproduction, principles of color measurement, and color photographic systems. (PPHS-407, PPHS-413)

Class 3, Credit 3

PPHG-700 Fundamentals of Photographic Science

Registration #0907-700, -701, -702, -703

Science

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 15 (Summer only)

Credit 15 (Not applicable to 45 required graduate credits)

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

Registration #0907-711, -712, -713

Physical structure and optical properties of the silver halide emulsion and their relations to the characteristic curve; chemistry and preparation of emulsions; 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.

Class 3, Credit 3

Master of Fine Arts in Photography

PPHG-700 Fundamentals of Photographic Science

Registration #0907-700

A 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 photog-</p>
with the Institute.

A major photographic exhibit under the sponsorship of majors will plan, assemble and take full responsibility for mountable report and record of the thesis with the Institute. Museum Credit 1-9

acceptable exhibition with emphasis on technique, design, and communication. The candidate will select his thesis subject with the approval of Graduate Coordinator and the director of the school.

Both will sign the proposal which must also be approved by the coordinator and the director of the school.

Required for still photography majors.

Credit 3/Qtr.

Film making workshop. Individually planned studies in cinematography, as determined by faculty-student consultation, group critiques, seminars, studio and laboratory practice, field trips. This cannot be selected as a minor concentration.

Credit 3-9

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.

Credit 1-9

Development and statement of written thesis proposal with emphasis on research required and exposure to various concepts of M.F.A. thesis possibilities.

Credit 1

Research, execution of a creative project and presentation of an acceptable exhibition with emphasis on technique, design, and communication. The candidate will select his 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

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.

School of Printing

Management courses

Introduction to Technical Writing

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

Applications of Computers to 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
Class 4, Credit 4

PPRM-402 Estimating II
Registration #0910-402
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, scheduling, production decision making, production planning and control, purchasing, inventory control, quality control, methods analysis, work measurement. Some simple analytical models based on graphs or elementary algebra are introduced.
Class 3, Credit 3

PPRM-404 Printing Production Management II
Registration #0910-404
Explores certain analytical models which can be used practically in an ordinary printing company. Includes such topics as decision theory, 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 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
Class 4, Credit 4

PPRM-503, 504 Statistics of Quality Control I, II
Registration #0910-503, 504
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
Class 4, Credit 4

PPRM-509 Economics of Production Management
Registration #0910-509
Intended as a seminar in management for seniors, this course combines readings in managerial economics with case studies, most of which describe real printing company situations involving price, product or equipment decisions. Students analyze situations, prepare, present and defend arguments for specific 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. Introduction to major management concepts as they relate to the printing field. Management functions and organization theory are considered in the light of behavioral science. Supervisory practices are analyzed. (PPRM-302)
Class 4, Credit 4

PPRM-511 Labor Relations in Graphic Arts
Registration #0910-511
Makeup and measurement of the labor force. History of organized labor. Wages, hours, union security, and other issues. Collective bargaining and contract negotiations emphasizing the printing industry. Labor law. (PPRM-302)
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 Graphic Arts
Registration #0910-513
Exploring 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 Staffing and Training
Registration #0910-514
Staffing and training employees in the printing industry, with emphasis on methods of recruitment, selection, on-the-job training and development of human resources. (SMAM-201)
Class 4, Credit 4

PPRM-515 Organizational Behavior
Registration #0910-515
Study of the leadership and management in the printing industry. (SMAM-201)
Class 3, Credit 3

PPRM-516 Organizational Development
Registration #0910-516
Organizational development: the study of the functions and activities of leadership. (SMAM-201)
Class 3, Credit 3
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 to 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/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 packaging 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 phototypesetting. Laboratory projects in setting composition photographically and in hot metal. Utilization of various tape systems.
Class 2, Lab. 3, Credit 3

**PPRT-203**  **Layout and Printing Design**
Registration #0911-203
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
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. Course 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-250**  **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-280**  **Lithographic Press**
Registration #0911-208
An introductory study of the principles and methods of offset presswork. Press functions, the operation and care of presses. Exercise in running simple jobs.
Class 2, Lab. 3, Credit 3

**PPRT-289**  **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
Registration #0911-304
Advanced Relief Press
A study of pressroom problems in letterpress printing on cylinder press equipment. Commercial forms, single color and multi-color work. Make-ready system. Operation and care of equipment. (PPRT-204)
Class 2, Lab. 6, Credit 4

PPRT-305
Registration #0911-305
Gravure
Laboratory and technical course embracing the theories and practices of gravure presswork using sheet-fed presses. Demonstrations and class use of three-unit web press will also be incorporated. Study of related information on techniques, equipment, materials, and supplies.
Class 2, Lab. 3, Credit 3

PPRT-306
Registration #0911-306
Tone Reproduction Photography
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 sensitiometry and process control. (PPRT-206)
Class 2, Lab. 3, Credit 3

PPRT-307
Registration #0911-307
Lithographic Plates
An 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 non-light-contact films.
Class 2, Lab. 3, Credit 3

PPRT-308
Registration #0911-308
Lithographic Press Problems
An advanced course in the theory, practice, and problems of offset presswork. Development of technical knowledge of materials and equipment. Practice in running multicolor work. (PPRT-208)
Class 2, Lab. 6, Credit 4

PPRT-309
Registration #0911-309
Advanced Screen Printing
Further study of the theory and practice of screen printing covering areas such as experiments with fabrics or screens; stencil forming materials and the effects these have on finished product. Further study into the inks and substrates that are common to the screen printer. Introduction to 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
Registration #0911-311
Relief and Gravure Plates
A study of 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
Registration #0911-311
Impostion and Finishing
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 folding. Material for binding. Laboratory experiences include operation of modern bindery equipment and the binding of a hardcover bound book.
Class 4, Credit 4

PPRT-312
Registration #0911-312
Stripping
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
Registration #0911-313
Copy Preparation
Preparation of copy or 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 photo-engraving. Proper instrutional specification writing. (PPRT-203)
Class 2, Lab. 6, Credit 4

PPRT-314
Registration #0911-314
Flexography
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
Registration #0911-315
Ink and Color
Theory of light and color; basic theory of process color and correction; use of color comparator and spectrophotometer. The study of color systems and color matching systems. Theory and application of various ink systems; practice in standard ink mixing and color matching emphasizing offset and letterpress processes. Correlation of ink properties with applications; emphasis on relationship of ink to paper and press. Study of ink problems and their correction.
Class 2, Lab. 6, Credit 4

PPRT-316
Registration #0911-316
Production for Book Publishing
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
Registration #0911-317
Calligraphic Forms
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-318
Registration #0911-318
Newspaper Design
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-319
Registration #0911-319
Newspaper Production
A study of methods of producing a newspaper by both the letter-press 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-320
Registration #0911-320
Web Offset
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. Opportunities are 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 fundamentals of electricity and electronics as related to the graphic arts field. Theory and application are combined as major topics are studied, implicating numerous graphic arts machines and devices.
Class 2, Lab. 2, Credit 3

PPRT-403 Layout and Printing Design
Registration #0911-403
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

PPRT-404 Color Separation Photography
Registration #0911-404
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

PPRT-501 Development of Printing Types
Registration #0911-501
Present-day typefaces studied with relationship to their historical development and current use. Type classification and nomenclature.
Class 3, Credit 3

PPRT-502 Advanced Color Reproduction
Registration #0911-502
Further study of color measurement and color reproduction. The emphasis will be on the analysis of a color reproduction system using such tools as color measurement instrumentation, visual color evaluation, color tone reproduction, and process control. (PPRT-406)
Class 2, Lab. 3, Credit 3

PPRT-591 Reproduction Photography
Registration #0911-591
An intensive course designed to enable photography students to gain a basic understanding of the various printing processes, the application of photography to each, with an emphasis on problems involved in obtaining optimum tone and color reproduction of their photographs.
Class 2, Lab. 3, Credit 3

PPRT-592 Printing Plates
Registration #0911-592
A specialized course for photography students to develop understanding of various imaging methods and characteristics, processing steps, applications, and major problems of plate-making.
Class 2, Lab. 3, Credit 3

PPRT-593 Printing Presses
Registration #0911-593
Course offered for photography students. Theory and practice of the methods of relief, planographic, flexographic and intaglio processes.
Class 2, Lab. 3, Credit 3

PPRE-701 Introduction to Graphic Arts
Registration #0908-701
Education
A prerequisite course for all students working in the printing education major. A study of historical trends along with the development and overview of philosophy and methodology. Also includes a survey of current industrial education teaching problems.
Credit 4

PPRE-702 Teaching Methods in Graphic Arts
Registration #0908-702
Education
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-713 Typographical Procedures
Registration #0908-713
Credit 4

PPRE-720 Photographic Reproduction
Registration #0908-720
Technology
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-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. A one-hour, weekly seminar is provided for the discussion of overall student teacher progress.
Credit 12

PPRM-701 Computers in Graphic Arts
Registration #0910-701
Introduction to basic computer characteristics. Function of hardware components in relation to software requirements. Discussion of computer languages as they relate to applications in printing. An independent graduate research project is required.
Credit 4

PPRM-702 Computers in Management
Registration #0910-702
Discussion of printing requirements in relation to computer system configurations. Applications of computers to management and production control problems. Investigation of computer-oriented production control techniques. (PPRM-701)
Credit 4
Printing Technology Courses

**PPRT-701**  Research Methods in Graphic Arts
Registration #0911-701
Methods common to most types of experimental and survey research and how they may be applied to research in the graphic arts.
Credit 4

**PPRT-702**  Graphic Reproduction Theory
Registration #0911-702
Orientation in the interpersonal, man-machine, and machine relationships inherent in the management role. Areas of investigation include aspects of behavioral and mechanistic theory as it pertains to various aspects of the graphic arts industry. Distinguished speakers contribute to breadth.
Credit 4

**PPRT-703**  Statistical Inference
Registration #0911-703
Hypothesis testing, confidence intervals, and sample size for variables. Introduction to analysis of variance and regression analysis.
Credit 5

**PPRT-704**  Design of Experiments
Registration #0911-704
Basic designs for experiments, objectives, conclusions, error estimation, data analysis. Continuation of analysis of variance and regression analysis. Response surfaces and factorials. (PPRT-703)
Credit 5

**PPRT-705, 706, 707**  Application of Mechanics and Machine Design, and Processes in Printing
Force systems, elementary dynamics. Work, power, and energy. Relation to stress and strain, 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.

Preparation of copy for camera. Working from layouts, making corrections, producing copy, relation to production steps in follow-up for offset plate-making and photo-engraving. Proper instructional specification writing. An independent graduate research project is required.
Credit 4

**PPRT-708**  Introduction to Systems Analysis
Registration #0911-708
Problems of systems analysis in printing operations for the highest quality product at the minimal cost including optimal floor designs and methods 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**  Ink and Substrates
Registration #0911-710
The study of ink components by process and their relationship to "printability" on various substrates. Ink receptivity. Ink and substrate compatibility to meet process requirements. Printing demands for various substrates, paper, polyethylene, polypropylene, foils, and plastics.
Credit 4

**PPRT-711**  Tone and Color Analysis
Registration #0911-711
Methods and instrumentation necessary for the evaluation of printed tone and color and the photographic intermediate images required for their production by the photomechanical process.
Credit 4

**PPRT-712**  Printing Plate Methodology
Registration #0911-712
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. An independent graduate research project is required.
Credit 4

**PPRT-713**  Lithographic Press Methodology
Registration #0911-713
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

**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 and Screen Printing Methodology
Registration #0911-715
Survey of gravure and screen printing incorporating lectures and laboratory sessions. The study of techniques, equipment, materials, and supplies necessary to arrive at a finished product by either process. 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 separation mechanics, use of photographic and typographic copy, relation to production steps in follow-up for offset plate-making and photo-engraving. Proper instructional specification writing. An independent graduate research project is required.
Credit 4

**PPRT-718**  Imposition and Finishing Procedures
Registration #0911-718
Theory and practice of imposition of various kinds of forms. Imposition planning as related to and governed by folding and other finishing operations. Imposition and lockup principles and procedures for letterpress forms. An independent graduate research project is required.
Credit 4

**PPRT-719**  Machine Composition Technology
Registration #0911-719
Emphasis on use of perforated tape in automated 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 relates 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 demonstrations lectures and audiovisual presentations. (F, W, S)
Class 4, Credit 4

SSEG-204 Contemporary Science—Mathematics
Registration #1018-204
A non-technical presentation of topics in mathematics especially designed for the non-specialists. Specific topics will be chosen to examine the mathematics of contemporary societal problems and natural phenomena. (F, W, S)
Class 4, Credit 4

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

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

SBIG-300 Biological Literature
Registration #1004-300
Use of libraries as sources of scientific information. Classification of scientific literature into original and secondary sources and techniques for making accurate literature searches. Discussions of journals, bibliographies, technical journals, and abstracts used in preparation of technical literature reports. Preparation of a literature research report. (F, W)
Class 2, Credit 2

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

SBIO-302 Vertebrate Zoology
Registration #1006-302
Morphology, physiology, behavior classification, and ecology of chordates. (SBIG-203) (W, S)
Class 3, Lab. 3, Credit 4

**Not acceptable for biology credit for biology department majors.

General Biology

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 and malfunctions 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

Developmental, Genetic & Environmental Biology

SBIG-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

SBIG-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, SR)
Class 3, Lab. 3, Credit 4

SBIG-421 Genetics
Registration #1003-421
Genes and cytoplasmic factors as units of inheritance; the nature and origin of inheritable characteristics and variations. Principles of inheritance in plants, animals, and man. (SBIG-203) (S)
Class 3, Lab. 3, Credit 4

SBIG-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 will be considered. (SBIG-203) (F, W)
Class 2, Lab. 6, Credit 4

General Biology

SBIO-201,202,203 General Biology
Registration #1006-201, 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. (SBIG-201-F; SBIG-202-W; SBIG-203-S)
Class 3, Lab. 3, Credit 4

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

SBIO-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

SBIO-301 Invertebrate Zoology
Registration #1006-301
Biology of invertebrate animals with reference to classification, structure, function, and ecology. (SBIG-203) (W, S)
Class 3, Lab. 3, Credit 4

SBIO-302 Vertebrate Zoology
Registration #1006-302
Morphology, physiology, behavior classification, and ecology of chordates. (SBIG-203) (W, S)
Class 3, Lab. 3, Credit 4

SBIO-304 Botany
Registration #1006-304
Distribution of the major groups of plants and their adaptation to their particular environment. (SBIG-203) (W, S)
Class 3, Lab. 3, Credit 4

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-203, SBIG-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.) (W, S)
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 plants with special emphasis on local flora. Practice in use of manuals and interpretation of morphological characters. (SBIO-304) (F)
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. (SBIT-203) (W, S)
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. (S)
Class 3, Lab. 3, Credit 4

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, W)
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. (SBIO-2030) (W)
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, fluorimetry, electrophoresis, chromatography, and radioactive particle counters. The second quarter is devoted to applications in the clinical laboratory. (432-W, 433-S)
Class 2, Lab. 6, Credit 4

SBIT-470 Advanced Radiation Biology
Registration #1007-470
A study of the biological effects of ionizing radiation, and uses in the medical and biological laboratories. Emphasis will be placed upon dosages and responses. (SPSP-351 or SBIT-430) (S)
Class 3, Lab. 3, Credit 4

SBIT-541, 542, 543 Biology Research
Registration #1007-541, 542, 543
Faculty directed student projects or research usually involving laboratory work and/or calculations over a period of at least two quarters that could be considered of an original nature.
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 low and medium resolution electron microscopes. (Permission of instructor) (Offered upon sufficient request)
Class 2, Lab. 3, Credit 3

Chemistry

SCHA-261, 262, 263 Introduction to Chemical Analysis
Registration #1008-261, 262, 263
An introduction to qualitative and quantitative analysis. Introduction to the chemistry of inorganic ions by qualitative analysis. Classical methods of gravimetric analysis and titration analysis based on acid-base, precipitation, oxidation-reduction and complex formation as well as non-aqueous solvent acid-base reactions, introduction to electro-chemical techniques, and fundamentals of spectroscopy are stressed. Equilibrium concepts and statistical evaluation of results are incorporated. (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; flame photometry; electrochemistry; Nernst Law; pH meters and electrodes. (SCHC-213) (F)
Class 3, Lab. 4, Credit 4

SCHA-312 Analytical Chemistry—Separations
Registration #1008-312
Inorganic and organic separations; Raoult and Henry Laws; phase rules; distillation; extraction; adsorption and surface effects; electrophoresis; chromatography including gas, liquid, column, paper, thin layer, and ion exchange. (SCHC-213) (W)
Class 3, Lab. 5, Credit 5

SCHA-612 Instrumental Analysis
Registration #1008-612
Theory, applications and limitations of instrumental methods ir qualitative, quantitative, and structural analysis. Topics covered include fluorescence 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 titriment. 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
SCHB-604 Biochemistry—Nucleic Acids & Molecular Genetics
The biochemistry of inheritance, expression of genetic information, protein biosynthesis, differentiation, viral and bacterial infection and the "origin of life." (SCHG-603) (S)
Class 3, Credit 3

SCHB-605, 606, 607 Biochemistry-Case Studies
Biological and clinical case studies of biochemistry. The cases are arranged to be correlated with the lecture topics of Biochemistry. SCHB-602, 603, 604. (Concurrent registration in SCHB-602, 603, 604. (605-F, 606-W, 607-S)
Class 1, Credit 1

SCHC-211,212,213 General Chemistry
For chemistry majors and others who desire an in-depth study of general chemistry. Atomic structure, chemical bond, properties of elements and compounds; states of matter; solutions; acids and bases; oxidation-reduction reactions; chemical calculations. (211-F; 212-W; 213-S)
Class 3, Credit 3

SCHC-401 Chemical Literature
Organization of technical libraries, classification of scientific literature into original and secondary sources and techniques for making literature searches. Use of card catalog, indexes, abstracts, monographs, handbooks, critical tables, journals, bibliographies, technical catalogs, and patents. Preparation of literature research reports. (SCHD-431, SCHP-441) (F, W)
Class 2, Credit 2

SCHC-541,542,543 Chemistry Research
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

SCHC-670 Introduction to Electron Microscopy
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 low and medium resolution electron microscopes. (Permission of instructor) (Offered upon sufficient request)
Class 2, Lab. 3, Credit 3

SCHC-671 Independent Study-Chemistry
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

SCHC-672 Special Topics—Chemistry
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, Biochemistry
Terminal, four quarter survey of chemistry presented for the non-science majors, e.g., Dietetics students. Laboratory emphasis on structure, chemical equilibrium, oxidation-reduction, electrochemistry, thermodynamics, organic chemistry and instrumental methods of sample analysis. Laboratory experiments are designed to complement the lecture material. (205-F; 206-W; 207-S)
Class 3, Lab. 3, Credit 4

SCHG-205, 206,207 Chemical Principles
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)
Class 5

SCHG-270 Chemistry of Water
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
Chemistry of organics, metals, construction materials, radioactive and other environmental pollutants, and other substances related to water analysis. Laboratory practice in water analysis, including use of instrumentation. (S, SR)
Class 2, Lab. 3, Credit 3

SCHG-281, 282, 283 General Chemistry
For printing students. Aspects of general chemistry of widest applicability to graphic arts technology; first quarter includes definitions of terms, basic concepts and laws; second quarter devoted to properties of solutions and organic materials; third quarter deals with applications in ink, paper, photo-lithographic processes and other topics as time allows. (281-F; 282-W; 283-S)
Class 3, Lab. 2, Credit 4

SCHI-681, 682 Inorganic Chemistry
The properties and structures of the element and their compounds in relation to electronic and stereo-chemical principles; inorganic lab techniques. (SCHD-433, SCHP-443) (681-S, SR; 682-F, W)
Class 3, Lab. 3, Credit 4

SCHO-231, 232 Organic Chemistry
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 Organic Chemistry
Registration #1014-431, -432, -433
Study of organic compounds: nomenclature, preparations, reactions, and properties including spectral structural determinations. Electronic mechanistic interpretations emphasized. Laboratory work emphasizes technique, 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 #1014-631
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 #1014-632
Topics include activation parameters, kinetic and non-kinetic treatment of mechanism elucidation, linear free energy concepts, quantitative analysis of conformational and electronic effects, simple Hückel Molecular Orbital Theory, electrocyclic reactions, acidity functions, and primary and secondary isotope effects. (SCHP-442, SCHP-443) (Note: SCHO-631 is recommended but not required) (Offered upon sufficient request)
Class 3, Credit 3

SCHO-638 Spectrometric Chemical Identification
Registration #1014-638
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 Physical Chemistry for the Life Sciences
Registration #1014-642
This course will present the elements of physical chemistry to students who have a strong interest in the health related sciences. Molecular structure, thermodynamics, and kinetics will be discussed with a minimum of mathematics and with view to their biological applications. (SCHG-215, 216, 217; SCHO-231, 232) (W)
Class 3, Credit 3

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
Registration #1015-241
This course will be taught by the chemistry faculty and will include the study of the basic fundamentals of thermodynamics and their application 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

SCHT-242 Chem Tec II
Registration #1015-242
Formation of molecules and ionic compounds, sampling techniques, sample preparation, gravimetric and titrimetric analysis, measurement of pH. (W, S)
Class 4, Lab. 9, Credit 7

SCHT-243 Chem Tec III
Registration #1015-243
Oxidation and reduction, coordination compounds, classes and reactions of organic compounds, infrared spectrophotometry. (F, SR)
Class 3, Lab. 9, Credit 6

SCHT-244 Chem Tec IV
Registration #1015-244
Continuation of classes and reactions of organic compounds, kinetics, nuclear magnetic resonance and ultra-violet spectrophotometry, mass spectrometry atomic absorption. (W, S)
Class 2, Lab. 9, Credit 5

SCHT-251 Mathematics for the Technologist
Registration #1015-251
This course will be taught by the chemistry faculty and will form an integral part of the laboratory experiments that are conducted in the Chem Tec courses. Topics will be covered as they appear in the experimentation. Suggested topics for this course include slide rule operation, the use of significant figures, accuracy and precision, errors and dimensional analysis, concentration in terms of moles, normality, stoichiometry, preparation of standard curves. (F)
Class 4, Credit 4

SCHT-305, 306 Chemistry Specialty
Registration #1015-305, -306
The final academic year 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 familiarization with biological laboratory techniques. (305-F, SR; 306-W, S)
Class 2, Lab. 6, Credit 4
SCHB-309, 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 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; 308-W, S)
Lab. 6, Credit 3

SCHB-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

SCHA-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 radiocchemistry, and electrochemistry. (SCHA-312)
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. (SCHA-312, SCHA-612)
Class 3, Lab. 3, Credit 3 or 4

SCHA-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. (SCHA-612)
Class 3, Credit 3

SCHB-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 bio-polymers. Solution behavior, catalytic properties and structure of proteins and enzymes. (SCHO-433 or SCHO-232)
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)
Class 3, Credit 3

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

SCHB-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 SCHB-602, 603, 604 is required)
Credit 1

SCHC-650 Media Design Project
Registration #1010-650
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

SCHC-651 Media Design Seminar
Registration #1010-651
A seminar workshop on evaluation and critique, human information processing, and instructional systems management as applied to media production.
No-Credit

SCHC-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 students and freshmenn with remedial work as well as provide advanced work for rapid learners and those with advanced high school preparation.
Credit 2

SCHC-671 Independent Study—Chemistry
Credit variable

SCHC-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

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

SCHC-770 Chemistry Seminar
Registration #1010-770
Credit 1

SCHC-779 Research and Thesis Guidance
Registration #1010-779
Hours and credits to be arranged. Chemical research in a field chosen by the candidate, subject to approval of the Department Head and advisor.
Credit variable

SCHC-661,662 Inorganic Chemistry
Registration #1012-661, 662
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 4Qtr.

SCHI-671 Advanced Inorganic Chemistry
Registration #1012-761
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
SCHL-720, 721, 722 Advanced Clinical Chemistry
Registration #1021-720, -721, -722
I, II, III
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/Qt.

SCHL-799 Clinical Chemistry Research
Registration #1021-729
Credit 0-3

SCHO-631 Advanced Organic Chemistry
Registration #1013-631
Selected topics in physical organic chemistry including: techniques for elucidation of mechanism (kinetic, linear free energy relationships, isotope effects), molecular orbital theory, electrocyclic reactions; natural and synthetic polymers. (SCHO-433)
Class 3, Credit 3

SCHO-632 Advanced Organic Chemistry
Registration #1013-632
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-635 Spectrometric Chemical Identification of Organic Compounds
Registration #1013-635
The laboratory utilizes systematic chemical and spectral tests to deduce the structure of organic compounds. (SCHO-433)
Credit 2

SCHO-636 Systematic Identification of Organic Compounds
Registration #1013-636
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 is recommended but not required)
Class 3, Credit 3

SCHO-731 Physical Organic Chemistry
Registration #1013-731
The preparation, properties, and reactions of heterocyclic systems, especially heteroaromatic rings. (SCHO-433)
Class 3, Credit 3

SCHO-732 Stereochemistry
Registration #1013-732
Applications of quantum mechanics to problems of chemical interest. Group theory, calculation of vibrational frequencies and selection rules for complex molecules. Molecular orbital energies of complex molecules. (SCHP-744)
Class 3, Credit 3

SCHO-733 Heterocyclic Chemistry
Registration #1013-733
Mechanisms of condensation, free radical and ionic polymerization. (SCHO-433)
Class 3, Credit 3

SCHO-734 Natural Products
Registration #1013-734
Application of 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/Qt.

SCHO-735 Organic Chemistry of Polymers
Registration #1013-735
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 gaseous, liquid, and solid phases will be studied. (SCHP-443 and SMAM-307)
Class 3, Credit 3

SCHP-642 Physical Chemistry for the Life Sciences
Registration #1014-642
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 resonance, infrared, mass spectrometry, and electron spin resonance spectroscopy. (SCHP-443)
Class 3, Credit 3

SCHP-646 Radiochemistry
Registration #1014-646
Advanced treatment of steric relationships and stereoisomerism. (SCHO-433 and SCHP-443)
Class 3, Credit 3

SCHP-647 Principles of Magnetic Resonance
Registration #1014-647
Mechanisms of steric relationships and stereoisomerism in organic compounds. (SCHO-433, SCHP-443)
Class 3, Credit 3

SCHP-743 Chemical Kinetics
Registration #1014-743
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 resonance, infrared, mass spectrometry, and electron spin resonance spectroscopy. (SCHP-443)
Class 3, Credit 3

SCHP-744 Quantum Mechanics
Registration #1014-744
Not open to students with credit in SCHP-443. (SCHP-443)
Class 3, Credit 3

SCHP-745 Quantum Chemistry
Registration #1014-745
Introduction to the chemistry of synthetic, high molecular weight polymers and a survey of their diverse structures and properties. (SCHO-433)
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
Mathematics

SMAM-201, 202, 203
Registration # 1016-201, -202, -203
Algebra, Trigonometry, and Analytic Geometry
A standard course in college algebra and trigonometry and a study of selected topics in analytic geometry. (201—F: 202-W; 203-S)
Class 3, Credit 3

SMAM-204
Modern Algebra
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 #1016-210, -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 3, Credit 3

SMAM-216, 217
Mathematics of Business and Finance
Registration #1016-216, -217
Simple and compound interest, annuities, amortization, depreciation, bond, stock, life insurance, break-even analysis, concept of optimization. (SMAM-201) (216-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

SMAM-250
Calculus
Registration #1016-250
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-265
Discrete Mathematics
Registration #1016-265
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

SMAM-300
Transfer Math
Registration #1016-300
Content includes material taught in SMAM-253 and SMAM-305
Class 8, Credit 8

SMAM-305
Differential Equations
Registration #1016-305
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
Calculus
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
Differential Equations
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
Engineering Math
Registration #1016-308
Vector algebra and vector calculus including line, surface, and volume integrals, Stokes’ Theorem, Gauss’ Theorem. (SMAM-306) (S)
Class 4, Credit 4

SMAM-309
Statistics
Registration #1016-309
Handling of statistical data; measures of central tendency and dispersion; sample space, events; probability and its basic laws; conditional probability; basic rules of counting; binomial, geometric, Poisson and normal distributions; sampling distributions; estimation of population mean; t-distributions, testing of 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

Note: Quarter usually offered follows course description in parentheses; F—Fall, W-Winter, S-Spring, SR-Summer
Numbers in parentheses indicate prerequisites.
SMAM-341 Foundations of Higher Mathematics
Registration #1016-341
A general introduction to several elementary concepts of higher mathematics including the rudiments of logic, the theory of sets, relations and functions between sets, cardinality of sets, and a brief discussion of the Peano postulates. (S)
Class 4, Credit 4

SMAM-351,352 Introduction to Probability
Registration #1016-351, 352
and Statistics
Discrete and continuous probability, random variables; probability, density, and distribution functions. Measures of central tendency and dispersion. Sampling theory; confidence limits; correlation. (SMAM-253) (351 -F, S, SR; 352-W, S)
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 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-391,392 Real Variables
Registration #1016-391, 392
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) (391 -F,W; 392-S, 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 sequences, 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 of preliminary topics 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. Theory, application to physical problems and computational aspects are all stressed. Topics include the theory of systems of linear equations, their solution by several algorithms, vector spaces, inner products and norms; independence, dimension, rank, Gram-Schmidt theorem; matrix inversion and determinants; eigenvalues, eigenvectors and their approximation. (431 -F,W; 432-S, SR)
Class 4, Credit 4

SMAM-445 Linear Programming
Registration #1016-445
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

SMAM-451,452 Abstract Algebra
Registration #1016-451, 452
351: A review of pertinent basic set theory and number theory. Groups, subgroups, cyclic and permutation groups, LaGrange's theorem, quotient groups, isomorphism theorems, applications to scientific problems. 352: The basic theory of rings, integral domains, fields, modules, the theory of vector spaces in the context of modules. Applications of the theory of vector spaces to differential equations and problems in engineering such as stability of control systems. (SMAM-341 or permission of instructor) (531-F, W; 532-S, SR)
Class 4, Credit 4

SMAM-461,462 Numerical Analysis
Registration #1016-461, 462
Class 4, Credit 4

SMAM-465 Linear Programming
Registration #1016-465
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
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, Schroedinger’s equation and its solutions, atomic spectra and atomic structure. (SPSP-551; 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.
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

ICSP-205 Computer Techniques
Registration #0601-205
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-CS&T Majors.
Class 3, Credit 3

ICSP-209 Introduction to Data Systems
Registration #0601-209
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

ICSP-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 CS&T Majors. (ICSS-202)
Class 4, Credit 4

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. (EEEEE-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
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
<th>Class</th>
<th>Credit</th>
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</thead>
<tbody>
<tr>
<td>ICSP-305</td>
<td>Assembly Language Programming</td>
<td>A study of assembly language programming techniques, macro, 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)</td>
<td>Class 4</td>
<td>Credit 4</td>
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<tr>
<td>ICSP-308</td>
<td>Advanced Assembly Language</td>
<td>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)</td>
<td>Class 4</td>
<td>Credit 4</td>
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<tr>
<td>ICSP-318</td>
<td>APL Programming Techniques</td>
<td>A study of APL programming techniques and applications; topics include APL program design, APL report writing facilities, file I/O subsystem, graphics. I/O, scientific and business systems design using APL case studies, (a programming course in FORTRAN or BASIC)</td>
<td>Class 4</td>
<td>Credit 4</td>
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<tr>
<td>ICSP-330</td>
<td>PL/1 Programming</td>
<td>A study of PL/1 language coding and programming techniques. Topics include structured programming, statements, attributes, defaults, I/O statements, looping, pictures, storage allocation, functions, and subroutines. (A high-level language)</td>
<td>Class 4</td>
<td>Credit 4</td>
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<tr>
<td>ICSP-331</td>
<td>Advanced PL/1 Programming</td>
<td>A study of 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)</td>
<td>Class 4</td>
<td>Credit 4</td>
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<tr>
<td>ICSP-350</td>
<td>Programming Language Concepts</td>
<td>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. Semantic problems will be considered. Programs will be written in selected languages. (ICSS-320)</td>
<td>Class 4</td>
<td>Credit 4</td>
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<tr>
<td>ICSP-432</td>
<td>Computer Applications in Analysis and Design</td>
<td>A study of techniques of using computers in the field of physical science. 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 and Technology majors. (ICSP-205 or equivalent)</td>
<td>Class 4</td>
<td>Credit 4</td>
</tr>
</tbody>
</table>
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, bilateral analysis, bilateral synthesis, sequential iterative systems and space-time transformations. (ICSS-230, ICSS-315)
Class 4, Credit 4

ICSS-355 The Human Side of Computers
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 on 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, concentrators, 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-251-52 or SMAM-214 and ICSP-215 or ICSP-206)
Class 4, Credit 4

ICSS-440 Operating Systems
Registration #0603-440
A general survey of operating system modules. Topics include linkers and loaders; I/O and file systems; memory management, paging, segmentation, virtual memory; interrupt handling; resource allocation; scheduling algorithms; deadlocks; multiprogramming 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 CS&T major.)
Class 4) Credit 4

ICSS-465 Introduction to Management
Registration #0603-465
Information Systems
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 historic development of data bases, data organization and structure, data security, recovery, relationship and retrieval, system design using the Xerox EDMS, comparison of the data base approach with traditional file organization and access methods, a study of other existing data bases such as IMS and TOTAL. (ICSS-320)
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 CS&T standing)
Class 4, Credit 4

ICSS-520 Computer Architecture
Registration #0603-520
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)
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—design to give graduating or upper-division level 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 CS&T 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 CS&T 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 System 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 CS&T 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 CS&T Major with an average higher than 2.5)
Class 2-4, Credit 2-4

Graduate courses
Computer Science and Technology
Computer Systems Management

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-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

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, 741 Computer System Personnel & Management I, II
Registration #0611 -740, -741
A study of computer installation personnel and management structure with topics that include system programmer and system analyst 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 with topics that 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 discussed include management problems, production problems, maintenance problems, hardware and software system problems, and invited topics given by Computer Center directors.
Credit 4

ICSM-799 Independent Study
Registration #0611-799
Credit Variable (2-4)
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-720 Computer Architecture
Registration #0603-720
The PMS and the ISP descriptive systems. Organization of processors, memories, switches, input-output devices, controllers, and communication links. Basic theories, hardware technology, parallel and distributive logic, asynchronous and synchronous machines. Computer families.
Credit 4

ICSS-725 Assemblers, Interpreters and Compilers
Registration #0603-725
A survey of the software processors with topics including 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
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)
Credit 4

ICSS-736 Data Base Systems
Registration #0603-736
Data base concepts, information storage structures, data models and data sublanguages, the relational approach, the hierarchical approach, and the network approach, data security and integrity, performance and restructuring application and management issues. (ICSS-485)
Credit 4

ICSS-746 Information Storage and Retrieval
Registration #0603-746
Credit 4

ICSS-750 Computability
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)
Credit 4

ICSS-752 Coding Theory
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)
Credit 4

ICSS-755 Real-time Computation
Registration #0603-755
Principles and applied problems in real-time computation with topics including processor subsystems, communication networks, terminal subsystems, A/D conversion, D/A conversion, interface, noise problems, the major cycle mode, message switching system, through-put rate calculations, system efficiency, and system optimization.
Credit 4
ICSS-756 Theory of Parsing
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 backtrack parsing algorithms. (ICSS-480)
Credit 4

ICSS-760 Compiler Construction
Registration #0603-760
Language definition, lexical analysis, syntactic analysis, storage allocation and management, code generation, code optimization, diagnostic generation, bootstrapping (ICSS-480 and ICSS-505)
Credit 4

ICSS-770 Computer Graphics
Registration #0603-770
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-775 Microcomputer Systems and Applications
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 system is emphasized.
Credit 4

ICSS-780 Systems Programming
Registration #0603-780
Computer system programming techniques with topics that include system specifications, system generations, utility, service routines, operating systems language processors, resource allocation, system protection, and system efficiency optimization.
Credit 4

ICSS-785 Systems Programming Laboratory
Registration #0603-785
A follow-up study of Systems Programming to provide actual experience on a computer system.
Credit 4

ICSS-790 Registration #0603-790
Credit Variable 2-4

ICSS-799 Independent Study
Registration #0603-799
Credit Variable 2-4

ICSS-890 Registration #0603-890
Credit Variable 4-8

Instructional Technology

Undergraduate courses
Audiovisual Communications

ICAV-401 Message Design
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 design messages and analyze examples illustrating such principles.
Credit 4

ICAV-405 Audiovisual Seminar
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.
Credit 2

ICAV-440 Audiovisual Program Design I
Registration #0612-440
Students learn how to produce programmed instructional materials by working through a programmed text. Students must write a program, developmental test it and validate the final version. Emphasis is on mastery of skills and techniques involved rather than on theory. Required for all students.
Credit 4

ICAV-450 Audiovisual Program Design II
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)
Credit 4

ICAV-460 Selection, Storage and Dissemination of Media Resources
Credit 2

ICAV-485 Electronics in AV
Registration #0612-485
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
Registration #0612-490
Covers the theory and practice of sound recording with both studio and field grade tape recorders in reel-to-reel and cassette formats. Major topics include hardware, microphone selection and use, acoustical considerations, dubbing, editing and recording techniques under a variety of environmental conditions. Emphasis is on mastery of techniques and equipment selection for specific uses.
Credit 4
ICAV-500 Practicum in a Special Interest Area
Registration #0612-500
Credit Variable (1-4)
Allows a student to explore or develop a special competence in an area of special interest and to work with "clients" in real or simulated work environments. A proposal (guidelines available from the department) must be submitted prior to registration. For Audiovisual Communications majors only.

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

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

ICAV-503 Practicum in Audiovisual Production
Registration #0612-503
Credit Variable (1-4)
Allows a student to explore or develop a special competence in audiovisual 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.

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

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

ICAV-560 Media Facilities Design
Registration #0612-560
Credit 4
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.

ICAV-570 Survey of Audiovisual Equipment
Registration #0612-570
Credit 4
Permits the student to survey the wide spectrum of AV equipment available 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.

ICAV-580 Producing Multimedia Presentations
Registration #0612-580
Credit 4
Multimedia here refers to either using combinations of media (as in a slide/tape plus movie or videotape presentation) or the use of multi-image techniques. While both the theory and programming devices will be examined, the student's major task is to design, produce and present a multi-media and/or multi-image production.
ICIT-720 Research in Instructional Technology
Registration #0613-720
Examines the fundamentals of educational research—hypothesis stating, designs, statistical procedures, reporting techniques, and types of research. Specifically examines the research in Instructional Technology. Students learn to critique research articles.
Credit 4

ICIT-722 Research Project
Registration #0613-722
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 Psychology of Learning and Teaching
Registration #0613-735
Examines the various theories of learning and teaching by such authors as Gagne, Briggs, Merrill, Skinner, and Tyler. Relates these theories to instructional methods. Covers various instructional paradigms proposed by such authors as Hall, Popham, and Bruner.
Credit 4

ICIT-745 Instructional Facility Design
Registration #0613-745
This course is designed to enable the instructional technological to assist and participate in the design of spaces and related utilities for effective learning. Specific topics include acoustics, lighting, ventilation, electric circuits, related electronic controls, cable laying, duct planning, 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.
Credits 4, 4

ICIT-762 Instructional Development III
Registration #0613-762
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-765 Individual Learning Style Analysis
Registration #0613-770
Examines the proposition that individuals learn in different ways and therefore instructional strategies must be dependent on learner style. Covers the area of Cognitive Style Mapping and the applicability of standardized and criterion referenced tests to the description of individual learning styles. Prequisite: 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

Community/Junior College Relations
Note: Graduate courses applicable to the M.S. 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.

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

LCG-702 The Student Registration #0604-702
Advancing/counseling relationships, learning styles, student activities, motivations, developmental education, and the implications of the “open door” policy are investigated.
Credit Variable (1-3 credits)

LCG-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.
Credit 2

IJCG-752  Goal Projections and New Developments
Registration #0604-752 in Selected Career Disciplines
This is a series of specialized seminars on new knowledge, trends, and projected competency goals for different career curricula. Each scheduled section of this course will concentrate on an identified cluster of associate degree-certificate programs.
The participants will understand the current and projected knowledge and be able to apply such information to their own teaching.
Credit 2

IJCG-755  Career Counseling
Registration #0604-755
A summer seminar for counselors concentrating upon manpower forecasting, career trends, emerging occupations, and related advising/counseling techniques.
(Special registration arrangements)
Credit 5

IJCG-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, impairment analysis, strategies, preparations, procedures, and mock negotiation sessions.
Credit 2

IJCT-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)

IJCT-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.
Credit 2

IJCT-752  Goal Projections and New Developments
Registration #0604-752 in Selected Career Disciplines
This is a series of specialized seminars on new knowledge, trends, and projected competency goals for different career curricula. Each scheduled section of this course will concentrate on an identified cluster of associate degree-certificate programs.
The participants will understand the current and projected knowledge and be able to apply such information to their own teaching.
Credit 2

IJCT-755  Career Counseling
Registration #0604-755
A summer seminar for counselors concentrating upon manpower forecasting, career trends, emerging occupations, and related advising/counseling techniques.
(Special registration arrangements)
Credit 5

IJCT-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, impairment analysis, strategies, preparations, procedures, and mock negotiation sessions.
Credit 2

IJCT-705  Mechanical Engineering Concepts
Registration #0606-705
The first and second laws of thermodynamics are applied to fundamental problems in mechanical engineering technology.
Credit 4

Registration #0606-707
A special graduate level course to update knowledge in solid body mechanics. Statics of rigid bodies, deformable bodies, and dynamics of rigid bodies, dynamics of deformable bodies are reviewed and extended, using modern mathematical techniques, i.e., vectors, matrices, and Cartesian tensors in three dimensions. Mathematical models are constructed and integrated with laboratory exercises and/or projects using analog and digital computers as aids in obtaining effects on systems by varying the parameters.
Credit 4

IJCT-708  Engineering Technology Analysis
Registration #0606-708
The fusion of three significant elements: 1) the historical base, 2) which led to the development of certain areas of mathematics, and 3) how this mathematics is used in engineering design. This course also develops the knowledge in selected mathematical topics necessary for teaching engineering technology. Instructional topics are selected on the pre-assessment of the course participants’ understanding.
Credit 3

IJCT-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

IJCT-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. Design concepts of solid state design.
Credit 3

IJCT-713  Computers in Engineering
Registration #0606-713
Introduction to digital computers and application to solution of technical problems with FORTRAN programming methods, solution of equations, and numerical methods. Simultaneous linear equations, and numerical methods. Simultaneous linear equations, finite differences, method of least squares, numerical integration, and solution of ordinary differential equations are discussed. (College Mathematics through Calculus or equivalent)
Credit 3

IJCT-714  Computers in Engineering Technology I
Registration #0606-714
This course continues the study, use and application of digital computers and numerical methods to solve engineering technology problems. Additional programming languages, programming techniques, finite differences, methods of solution to ordinary and partial differential equations, methods for linear systems, and numerical analysis are included. Programming assignments are pertinent to the student’s area of specialty.
Credit 4
IJCT-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 thermostats, thermocouples, strain gauges, control valves, open and closed loop systems and digital systems.
Credit 3

IJCT-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

IJCT-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

IJCT-718 Applications of Linear Integrated Circuits
Registration #0606-718
The course reviews the advantages and disadvantages of integrated circuits, and increases the student’s familiarity with integrated circuits specifications and circuits for obtaining these specifications, and his/her ability to design circuits using integrated circuits. Also familiarity with the many types of circuits using op-amps is stressed.
Credit 3

IJCT-719 Communication Theory
Registration #0606-719
Introduction to the communication theory system design.
Credit 3

IJCT-720 Integrated Physics
Registration #0606-720
The objective of the course are 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

IJCT-721 Digital Fundamentals
Registration #0606-721
Boolean algebra with extensive applications to digital systems.
Credit 3

IJCT-722 Digital Integrated Circuits
Registration #0606-722
A comprehensive review of the design, manufacture, application, and evaluations of integrated digital circuits, with the major emphasis on the uses of the circuits and related laboratory work (IJCT-721 or equivalent).
Credit 3

IJCT-723 Numerically Controlled Machines
Registration #0606-723
Basic principles and capabilities of N/C: N/C machine and its controls, increment and absolute systems, point-to-point and continuous path systems, manual programming; use of computers and programs for N/C; N/C turning, design criteria and managing of N/C: non-machining applications.
Credit 3

IJCT-724 Advanced Electrical Measurements
Registration #0606-724
A continuation of Electrical Measurements (IJCT-717) stressing current industrial applications, electronic instrumentation, and trouble shooting. Biomedical applications will be included.
Credit 3

IJCT-725 Active Filter Design
Registration #0606-725
This course deals with modern approaches to the design of frequency selective filters. Concepts of transfer functions, poles and zeros, and graphical evaluation of frequency response are discussed. Following this, the classical filter approximations (e.g., Butterworth, Chebyshev, and Elliptic) are developed for low pass, band pass, and high pass passive designs. The final portion of the course includes the design of active R-C filters using operational amplifiers.
Credit 3

IJCT-726 Electric Power Transmission
Registration #0606-726
A survey of modern power systems including symmetric components, transmission line constants, relay operation, control techniques, system stability and economic operation. The impact of large power solid state electronics and ecological studies is discussed.
Credit 3

IJCT-727 Mechanical Systems Design
Registration #0606-727
The study of the principles of manufacturing organization and management as they relate to teaching the material in the two-year college.
Credit 3

IJCT-728 Packaging Science
Registration #0606-728
This series of discussions to analyze and propose solutions for instructional problems peculiar to teaching technical courses. Guest discussion leaders are invited at appropriate times. Individual projects are assigned.
Credit 1

IPKP-201 Principles of Packaging
Registration #0607-201
The materials, processes, and technology employed to protect goods during handling, shipment, and storage. A brief review of materials and container types, package design and development, and research and testing will be presented.
Class 4, Credit 4

IPKP-301 Packaging Materials
Registration #0607-301
The manufacture, properties, uses, and testing of all common packaging materials and components will be presented. Opportunities for reuse, recycling, and proper disposal will be discussed.
Class 3, Lab. 2, Credit 4

IPKP-401 Packaging Equipment
Registration #0607-401
A survey of package making and filling machinery available, plus handling and conveying equipment. The characteristics and maintenance of different types of equipment will be studied, and students will gain practice in setting up complete lines for packaging various products.
Class 2, Lab. 4, Credit 4
The analysis and design of continuous reinforced concrete beams and frames are reviewed as well as the method of moment distribution and ultimate design theory using ACI Code. A design project is emphasized.
Class 3, Recitation 2, Credit 4

ITEC-510 Soil Mechanics and Foundations
Registration #0608-510
The properties of soils, stresses and settlement in soils, seepage, slope stability, earth pressures on structures, determination of bearing capacity, types of foundations and their interrelation with the supporting soil are explored.
Class 3, Credit 3

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

ITEC-546 Professional Principles and Practices
Registration #0608-546
A treatment of legal and ethical aspects of the profession. Review of codes of ethics and current professional problems. Several guest speakers representing different segments of the Civil Engineering field.
Class 1, Credit 1
Civil Technology Electives

ITEC-510 Design of Water Treatment Facilities
Principles of water treatment plant design with conceptual and hydraulic water purification and conditioning facilities. The topics discussed include the design of a rapid sand filtration plant with water softening treatment.
Class 2, Lab. 3, Credit 3

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

ITEC-549 Environmental Engineering Design
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. 5, Credit 4

ITEC-550 Construction Practices
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 II
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

Upper-Division Electrical Engineering Technology

ITEE-310 Electricity
Basic circuits for photographic management majors. Topics covered include basic circuit elements, A.C./D.C. voltages and currents, elementary circuit analysis, A.C. power systems and equipment.
Class 3, Lab. 3, Credit 4

ITEE-311 Electronics
The continuation of ITEE-310 with basic electronic devices and applications, rectifier circuits, electronic amplifiers, control circuits, and instrumentations. Principles and application of electronic optic devices are also discussed. (ITEE-310)
Class 3, Lab. 3, Credit 4

ITEE-401 Circuit Theory I
An introductory course in the use of Laplace transform to determine the complete response of circuits containing independent and dependent sources, resistance, inductance, and capacitance. Application of basic circuit theorems to the solution of transformed networks.
Class 4, Rec. 2, Credit 5

ITEE-402 Circuit Theory II
Frequency response network functions as solved by use of pole-zero diagrams or Bode diagrams of network functions. Mutual inductance. The Fourier series solution of circuits with non-sinusoidal inputs.
Class 3, Rec. 2, Credit 4

ITEE-404 Control Systems I
Analysis of closed loop control system using Routh’s and Nyquist’s stability criteria. Determination of steady-state error, phase and gain margin and static-error coefficients. Lead and lag compensating networks and their applications. Relationships of stability criteria and related control theory to actual time response characteristics.
Class 3, Lab. 3, Credit 4

ITEE-411 Electrical Principles for Design I
A service course offered to non-electrical majors studying in the technical disciplines. Covers basic electrical circuits, network theorems, applications of Ohms and Kirchoff’s laws in D.C. and A.C. circuits, power and energy concepts, efficiency, and metering.
Class 3, Lab. 3, Credit 4

ITEE-412 Electrical Principles for Design II
A review of A.C. resonance in series and parallel circuits, three-phase circuits, rotating machines and their application. Transformers, semiconductor theory, bridges, power supplies, phase shifting circuits and three-phase circuits.
Class 3, Lab. 3, Credit 4

ITEE-414 Basic Electrical Principles
Basic survey of important aspects of electricity including important laws of electrical networks for both A.C. and D.C. Emphasis is placed on such topics as power factor, efficiency, costs of electricity, lighting, line losses, breakers and fusing, transformers, motors and three phase fundamentals.
Class 3, Lab. 3, Credit 4

ITEE-424 Logic & Digital Devices
The analysis and simplifications of logic equations using Boolean algebra with application to semiconductor integrated circuits and relay circuits. Truth tables and Kamaugh map reduction techniques, sequential circuits, state tables and counter circuits are also studied.
Class 3, Lab. 2, Credit 4

ITEE-428 Linear Amplifier Design
The design of transistor bias networks to meet specific circuit requirements is discussed. A study of the design and analysis of bipolar and FET amplifiers is done with emphasis placed on low and high frequency response characteristics. Also discussed are tuned amplifiers, special considerations necessary in dealing with transistor arrays, and transient response characteristics.
Class 3, Lab. 3, Credit 4

ITEE-520 Electrostatic and Magnetic Fields
Basic principles of electrostatic fields including vector analysis, Coulomb’s law, field intensity, Gauss’s law, energy and potential difference, potential gradient, conductors, dielectrics, capacitance, and experimental mapping methods are introduced.
Class 4, Credit 4

ITEE-521 Electromagnetic Fields and Antennas
The time varying fields, Maxwell’s equations, characteristic impedance and radiation patterns of the dipole antenna are explored. Design of antenna arrays for UHF-VHF and Microwave application are also discussed. Microwave antenna design.
Class 3, Lab. 2, Credit 4

ITEE-524 Microwave Systems
Microwave power sources, waveguide transmission systems, measurement of standing waves, impedance, power flow in waveguides, solid state microwave devices, and microwave communication system design are discussed.
Class 3, Lab. 3, Credit 4
ITEE-528 Semiconductor Physics
Registration #0609-528
Theoretical description of p-n junctions and semi-conductor phenomena. Transistor and FET models are developed to obtain parameters. Solid state device characteristics are derived.
Class 4, Credit 4

ITEE-532 Power Amplifier Design
Registration #0609-532
Design of Class A and B low frequency power amplifiers including distortion analysis, feedback, and class C.R.F. power amplifier design using transistors. Thermal considerations for power transistors and heat sink design are included.
Class 3, Lab. 3, Credit 4

ITEE-534 Communication Systems I
Registration #0609-534
An introduction to basic A.M. and F.M. modulation systems and their spectrum. Design of circuits for the generation and detection of modulated carriers, pulse modulation and sampling systems.
Class 3, Lab. 2, Credit 4

ITEE-535 Communication Systems II
Registration #0609-535
Class 4, Credit 4

ITEE-538 Control Systems II
Registration #0609-538
Design of control systems for specific application and performance criteria. A study of control motors and components for D.C./A.C. control systems. Application of control theory to the solution of practical system problems.
Class 3, Lab. 2, Credit 4

ITEE-539 Digital Computer Design I
Registration #0609-539
Design of logic circuits using 7400 series TTL gates. A study of TTL flip-flops, one shots and oscillator circuits. Design of arithmetic circuits, shift registers and counters.
Class 3, Lab. 2, Credit 4

ITEE-540 Pulse Circuit Design
Registration #0609-540
The response of R-C circuits as applied to pulse and square waves. Switching characteristics of transistors: rise, fall, and storage time. Clipping and clamping circuits. Design of transistor logic gates and inverters. Design of multivibrators, Schmitt triggers, differential amplifiers, comparators, trigger and counting circuits.
Class 3, Lab. 2, Credit 4

ITEE-544 Integrated Circuit Theory and Applications
Registration #0609-544
Fabrication techniques are considered. Logic families such as TTL, ECL, CMOS, and IIL are considered. RAMS and ROMS are reviewed. The basic OP-AMP is considered so as to understand its characteristics. Other 1C topics are covered depending upon student interest.
Class 3, Lab. 2, Credit 4

ITEE-545 Applications of Linear Integrated Circuits
Registration #0609-545
A study of the applications of linear integrated circuits including summers, integrators, differentiators, active filters, analog computation, comparators and regulators. Actual and ideal characteristics are compared and studied.
Class 3, Lab. 2, Credit 4

ITEE-546 Industrial Electronics
Registration #0609-546
Design of SCR/Tric control circuits for D.C. and A.C. motors.
Control of lights and heating elements with D.C. power supplies and polyphase rectifier circuits. Speed control of D.C. and A.C. motors. Process control systems utilizing solid state electronic circuits.
Class 3, Lab. 2, Credit 4

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

ITEE-550 Power Systems
Registration #0609-550
A review of three phase circuits and power calculations. Derivation and use of per unit quantities and symmetric components are reviewed with transformer tests, inductances and efficiency calculations. Inductance and capacitance of three phase transmission lines, energy sources and load cycles are also discussed.
Class 3, Lab. 2, Credit 4

ITEE-551 Protective Relaying
Registration #0609-551
Symmetrical components are derived. The physical construction and characteristics of electro-mechanical relays, short circuit calculation and line, bus, and transformer protection are studied.
Class 3, Lab. 2, Credit 4

ITEE-552 Power System Stability
Registration #0609-552
Class 4, Credit 4

ITEE-554 Electronic Optic Devices
Registration #0609-554
Class 3, Lab. 2, Credit 4

ITEE-556 Transmission Lines and Filters
Registration #0609-556
General transmission line equation and approximations. Lossless transmission line and analysis using the Smith chart. Matching stub design for transmission lines. Pole-Zero filter design principles and applications.
Class 3, Lab. 3, Credit 4

ITEE-580 Senior Project
Registration #0609-580
Selected independent study of design project by Electrical Technology students with the approval of the Department. Class/Lab. as required, Credit 4
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.
Class 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, Recitation 2, Credit 4

ITEM-405 Applied Dynamics
Registration #0610-405
Examines the principles of kinematics and the basic laws of motion as applied to the design and analysis of mechanical components and systems. (ITEM-404, SMAT-421 or concurrent)
Class 3, Recitation 2, Credit 4

ITEM-406 Dynamics of Machinery
Registration #0610-406
A study of the kinematics 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-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-415 is ITEM-414)
I. Class 3, Lab. 2, Credit 4
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 man-job-time relationship, job standards and recording, and work-space design for efficient use of manpower.
Class 3, Recitation 2, Credit 4

ITEM-485 Technical Communications
Registration #0610-485
An individually-paced course in written technical communication. Emphasis on laboratory reports. (Students must enroll in concurrent laboratory course(s))
Class 2, Credit 2

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 for Electrical Majors  Registration #0610-550
Principles 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

Reserve Officers’ Training Corps

First year
MMSM-201  The Military and American Society I  Registration #0701-201
Organization of the Army and ROTC. Warfare: its nature, origins, conduct and future. Leadership laboratory.
Class 1, Credit 1
MMSM-202  The National Security Structure  Registration #0701-202
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. Marksmanship training. Leadership laboratory.
Class 1, Credit 1

Second year
MMSM-301  Introduction to Basic Operation and Tactics  Registration #0701-301
Provides a knowledge of the fundamentals and techniques of tactics at squad level. Leadership, command and control in the tactical employment of small units is stressed.
Class 2, Credit 2
MMSM-302  Military History I  Registration #0701-302
Survey course in Military History. Scrutinizes technological and tactical innovations and their effect on the conduct of war. Covers the period to 1866.
Class 2, Credit 2
MMSM-303  Military History II  Registration #0701-303
American Military History from 1866. The involvement of the U.S. in the international conflicts of the 20th century. Emphasis is placed on the U.S. and its involvement overseas.
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.
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.
Class 3, Credit 3

NOTE: Exceptions to prerequisites can be made only by the consent of the Course Instructor.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Registration #</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMSM-403</td>
<td>Leadership and Management</td>
<td>#0701-403</td>
<td>3</td>
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<td>Provides future officers with the basic principles of leadership and management of human resources. Motivation, morale, communication, individual and group behavior are discussed.</td>
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<td></td>
<td>Class 3, Credit 3</td>
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<tr>
<td>MMSM-501</td>
<td>Military Justice/Administration and Staff Operations</td>
<td>#0701-501</td>
<td>3</td>
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<td>An in-depth study of the Uniform Code of Military Justice from its inception to the present. Particular emphasis is placed on the comparison and relationship of the civilian and military systems. Staff functions at battalion level and company administration.</td>
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<td></td>
<td>Class 3, Credit 3</td>
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<tr>
<td>MMSM-502</td>
<td>Theory and Dynamics of the Military Team</td>
<td>#0701-502</td>
<td>3</td>
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<td>Provides a broad understanding of the principles, fundamentals and tactics as they apply to employment of combat teams: Emphasis is on leadership responsibilities and the roles and contributions of various branches of the Army in support of the combat team.</td>
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<td></td>
<td>Class 3, Credit 3</td>
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<tr>
<td>MMSM-503</td>
<td>World Changes and Military Implications</td>
<td>#0701-503</td>
<td>3</td>
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<td>Provides an understanding of the component parts of the international system. The spectrum of force and use of force in the contemporary world. The major world events having military implications for the U.S.</td>
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<tr>
<td></td>
<td>Class 3, Credit 3</td>
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</tr>
<tr>
<td>Course Title</td>
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<td></td>
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<tr>
<td>------------------------------------------------------------------------------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>General Ecology</td>
<td>57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Psychology</td>
<td>43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Studies Graduate Courses</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General, Organic and Biochemistry</td>
<td>59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genetics</td>
<td>57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genres of World Literature</td>
<td>34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>German I, II</td>
<td>34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gerontology</td>
<td>32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government and Politics of the Soviet Union</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glass Materials and Processes</td>
<td>27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glass and Glass Engineering Techniques</td>
<td>52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glassblowing</td>
<td>61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glassblowing Techniques</td>
<td>61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goal Project and New Developments in Selected Career Disciplines</td>
<td>74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate Courses, Business Administration</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate Courses, Industrial Engineering</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate Courses, Fine and Applied Arts</td>
<td>29</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate Paper (Electrical Engineering)</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graphic Reproduction Theory</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gravure</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gravure Printing</td>
<td>52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Great World Drama</td>
<td>34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Great World Novels</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greek and Roman Philosophy</td>
<td>39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group Work Methods</td>
<td>33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth and Development of the Pre-School Child</td>
<td>34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guilt and Expiation</td>
<td>34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heat Transfer</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hero Image in the Theatre</td>
<td>62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heterocyclic Chemistry</td>
<td>62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic Culture for Social Workers</td>
<td>32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Historical Techniques</td>
<td>58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History</td>
<td>56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History and Aesthetics of Photography</td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of American Education</td>
<td>43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of American Thought and Practice</td>
<td>38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of England</td>
<td>38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of Mexico</td>
<td>38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of Organized Crime in America</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of Popular Culture in America</td>
<td>38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of Printing Technique</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of Social Discrimination</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of the Renaissance</td>
<td>43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of Information Systems</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of Exercise, Sorcery, Magic, and Athletics</td>
<td>39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Biology I</td>
<td>57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Biology II, III</td>
<td>57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Ecology</td>
<td>57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Factors II</td>
<td>57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Sexuality</td>
<td>63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humanistic Psychology: An Introduction</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hybrid Microelectronics Design</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydraulics</td>
<td>76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ideology and Politics</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illustration</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illustration Photography I</td>
<td>46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illustration Photography II</td>
<td>46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Image Microstructure</td>
<td>48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Image Systems and Evaluation</td>
<td>49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immunology</td>
<td>56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immunology</td>
<td>56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imposition and Finishing</td>
<td>53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imposition and Finishing Procedures</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent Study (Biology)</td>
<td>56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent Study (Chemistry)</td>
<td>59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent Study (Computer Science)</td>
<td>69, 71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent Study (Criminal Justice)</td>
<td>31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent Study (Industrial Engineering)</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent Study (Instructional Technology)</td>
<td>73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent Study (Mechanical Engineering)</td>
<td>65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent Study (Mechanical Technology)</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent Study (Packaging)</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent Study (Physics)</td>
<td>66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent Study (Printing)</td>
<td>52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual Achievement Program</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual Learning Style Analysis</td>
<td>73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial Electronic Engineering</td>
<td>76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial Engineering: Independent Study</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial Heat Transfer</td>
<td>21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial Design II</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial Security Administration</td>
<td>71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial Psychology</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information and Retrieval</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information Systems</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information Systems Analysis</td>
<td>67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information Systems Design</td>
<td>67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information Technology</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inorganic Chemistry</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inorganic Chemistry</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institute College</td>
<td>66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructional Development I, II</td>
<td>73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructional Development III</td>
<td>73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructional Facility Design</td>
<td>73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructional Techniques</td>
<td>71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructional Technology</td>
<td>73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructional Technology Internship</td>
<td>73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructional Technology: Senior Project</td>
<td>67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructional Television</td>
<td>72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrumental Analysis</td>
<td>58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integer Programming</td>
<td>64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integrated Business Analysis</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integrated Circuit Operational Amplifiers</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integrated Circuit Theory and Applications</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integrated Physics</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter-Group Relations: American Racial and Ethnic Minorities</td>
<td>42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interior Design History</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interior Design II</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate Accounting I, II</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate Mathematics</td>
<td>65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal Internship</td>
<td>61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>International Finance</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>International Marketing</td>
<td>4,10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>International Relations</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internship (Instructional Technology)</td>
<td>73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internship (Junior College Relations)</td>
<td>74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internship Research</td>
<td>61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpersonal Communications</td>
<td>73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Social Science</td>
<td>42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Management</td>
<td>68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information Systems</td>
<td>68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Air Pollution</td>
<td>21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Anthropology</td>
<td>40</td>
<td></td>
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</tr>
<tr>
<td>Introduction to Audio Engineering</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Basic Operation and Tactics</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Biblical Studies</td>
<td>39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Chemical Analysis</td>
<td>58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Classical Controls</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Communication Design</td>
<td>25</td>
<td></td>
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<tr>
<td>Introduction to Communications</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Computer Science</td>
<td>67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Continuum Mechanics</td>
<td>23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Criminology</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Cultural Anthropology</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Data Systems</td>
<td>66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Decision Processes</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Economics</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Electron Microscopy</td>
<td>58, 59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Engineering I</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Engineering I</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Film and Dramatic Documentary Film Production</td>
<td>44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Film Making and Conceptual Film</td>
<td>44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Food Management and Food Technology</td>
<td>44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Graphic Arts</td>
<td>54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Instructional Technology</td>
<td>72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Logic and Switching</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Machine Design</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Microcomputers</td>
<td>14</td>
<td></td>
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</tr>
<tr>
<td>Introduction to Microelectronics</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Moral Philosophy</td>
<td>39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Non-Fiction Film Production</td>
<td>44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Nonlinear Control</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Operations</td>
<td>17</td>
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<td>Introduction to Operations Research</td>
<td>17</td>
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<td>Introduction to Operations Research</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Research I</td>
<td>18</td>
<td></td>
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<tr>
<td>Introduction to Research I</td>
<td>18</td>
<td></td>
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</tr>
<tr>
<td>Introduction to Scientific Research</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Sociology</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Social Philosophy</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Social Science</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Television</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Television Random Variables and Signals</td>
<td>15</td>
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<td>Introduction to Television Social Science</td>
<td>40</td>
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<td>Introduction to Television Social Science</td>
<td>40</td>
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</tr>
<tr>
<td>Introduction to Television Television</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Urban Studies</td>
<td>36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Visual Arts</td>
<td>36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Water Pollution</td>
<td>21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Water Pollution</td>
<td>21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introductory Calculus</td>
<td>63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introductory Microbiology</td>
<td>56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inventory Design</td>
<td>19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invertebrate Zoology</td>
<td>57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issues in Corrections</td>
<td>31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issues in Law Enforcement</td>
<td>31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jonathan Swift and the Age of Satire</td>
<td>36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Juvenile Delinquency</td>
<td>42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Juvenile Justice</td>
<td>31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kinematic Analysis of Mechanisms</td>
<td>21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labor Economics</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labor Relations</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labor Relations in Graph Arts</td>
<td>51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labor/Management Problems</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laboratory and Project</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land Planning</td>
<td>77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latin American History, From Independence to the Modern Period</td>
<td>37</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Law and Discretion in Criminal Science</td>
<td>31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Law Enforcement and Society</td>
<td>31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Law and Society</td>
<td>31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Law and Society</td>
<td>31</td>
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<tr>
<td>Law and Society</td>
<td>31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laydown and Printing Design</td>
<td>52, 54, 55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leadership and Management</td>
<td>54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leadership and Management</td>
<td>54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leadership in Small-Unit Operations</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal Environment of Business</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal Environment of Business</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal Problems of Publishing</td>
<td>52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal Rights of Convicted Offenders</td>
<td>52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal Rights of Convicted Offenders</td>
<td>30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table of Contents

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistics III</td>
<td>5</td>
</tr>
<tr>
<td>Statistics of Quality Control I, II</td>
<td>51</td>
</tr>
<tr>
<td>Stereocclinicalogy</td>
<td>62</td>
</tr>
<tr>
<td>Still Photography</td>
<td>65</td>
</tr>
<tr>
<td>Strength of Materials</td>
<td>19</td>
</tr>
<tr>
<td>Strength of Materials I</td>
<td>20</td>
</tr>
<tr>
<td>Strength of Materials II</td>
<td>20</td>
</tr>
<tr>
<td>Stress Analysis I</td>
<td>22</td>
</tr>
<tr>
<td>Stress Analysis II</td>
<td>22</td>
</tr>
<tr>
<td>Structural Analysis and Design I</td>
<td>53</td>
</tr>
<tr>
<td>Structural Analysis and Design II</td>
<td>77</td>
</tr>
<tr>
<td>Studies in the American Novel</td>
<td>34</td>
</tr>
<tr>
<td>Survey of American Architecture</td>
<td>36</td>
</tr>
<tr>
<td>Survey of Audiovisual Equipment</td>
<td>72</td>
</tr>
<tr>
<td>Survey of Biomedical Photography</td>
<td>44</td>
</tr>
<tr>
<td>Survey of Computer Science</td>
<td>67</td>
</tr>
<tr>
<td>Survey of English Architecture and Perspectives</td>
<td>37</td>
</tr>
<tr>
<td>Survey of Materials and Processes</td>
<td>46</td>
</tr>
<tr>
<td>Survey of Operations Research</td>
<td>19</td>
</tr>
<tr>
<td>Survey of Western Literature</td>
<td>34</td>
</tr>
<tr>
<td>Switching Circuits I</td>
<td>17</td>
</tr>
<tr>
<td>Switching Circuits II</td>
<td>17</td>
</tr>
<tr>
<td>Switching Circuits III</td>
<td>17</td>
</tr>
<tr>
<td>System Programming Laboratory</td>
<td>68</td>
</tr>
<tr>
<td>Systematic Identification of Organic Compounds</td>
<td>60</td>
</tr>
<tr>
<td>Tax Accounting</td>
<td>2</td>
</tr>
<tr>
<td>Teaching Methods in Graphic Arts Education</td>
<td>54</td>
</tr>
<tr>
<td>Technical Communications</td>
<td>79</td>
</tr>
<tr>
<td>Technical Courses, School of Printing</td>
<td>52</td>
</tr>
<tr>
<td>Techniques for Investigational Analysis</td>
<td>11</td>
</tr>
<tr>
<td>Techniques of Systems Engineering</td>
<td>18</td>
</tr>
<tr>
<td>Technological Forecasting</td>
<td>18</td>
</tr>
<tr>
<td>Technology and the Individual</td>
<td>39</td>
</tr>
<tr>
<td>Television Production</td>
<td>45</td>
</tr>
<tr>
<td>Textile Materials and Processes</td>
<td>28</td>
</tr>
<tr>
<td>Textile Techniques and Thesis</td>
<td>28</td>
</tr>
<tr>
<td>The Advancement of Communism</td>
<td>38</td>
</tr>
<tr>
<td>The Advocacy of Social Work in Work.</td>
<td>32</td>
</tr>
<tr>
<td>The American Dream: Success or Collapse.</td>
<td>35</td>
</tr>
<tr>
<td>The American Spirit in Literature</td>
<td>35</td>
</tr>
<tr>
<td>The American Spirit in Literature II</td>
<td>36</td>
</tr>
<tr>
<td>The American Utopian Dream: History and Evaluation</td>
<td>39</td>
</tr>
<tr>
<td>The Arts under Communist, Fascism and Nazism</td>
<td>37</td>
</tr>
<tr>
<td>The Ascent of Man</td>
<td>39</td>
</tr>
<tr>
<td>The Black Experience in America</td>
<td>38</td>
</tr>
<tr>
<td>The Cold War</td>
<td>41</td>
</tr>
<tr>
<td>The Cycle of Life in Literature</td>
<td>34</td>
</tr>
<tr>
<td>The Face of the Land</td>
<td>39</td>
</tr>
<tr>
<td>The Future as History</td>
<td>37</td>
</tr>
<tr>
<td>The Hero in Literature</td>
<td>34</td>
</tr>
<tr>
<td>The History of the World Since 1945</td>
<td>37</td>
</tr>
<tr>
<td>The Homophiles and their Society</td>
<td>43</td>
</tr>
<tr>
<td>The Human Side of Computers</td>
<td>68</td>
</tr>
<tr>
<td>The Immigrant in American History</td>
<td>39</td>
</tr>
<tr>
<td>The Italian American Experience</td>
<td>38</td>
</tr>
<tr>
<td>The Judicial Process</td>
<td>30</td>
</tr>
<tr>
<td>The Student in the Two-Year College</td>
<td>73</td>
</tr>
<tr>
<td>The Two-Year Colleges</td>
<td>73</td>
</tr>
<tr>
<td>The U.S. and the Third World Revolutions in the 20th Century</td>
<td>38</td>
</tr>
<tr>
<td>The Unification of Europe: Achievements and Perspectives</td>
<td>37</td>
</tr>
<tr>
<td>The United States and Latin American Revolutions</td>
<td>38</td>
</tr>
<tr>
<td>Theoretical Approach to Western Literature</td>
<td>34</td>
</tr>
<tr>
<td>Theoretical Physics</td>
<td>65</td>
</tr>
<tr>
<td>Theories of Political Systems</td>
<td>41</td>
</tr>
<tr>
<td>Theory and Dynamics of the Military Team</td>
<td>81</td>
</tr>
<tr>
<td>Theory of Elasticity</td>
<td>23</td>
</tr>
<tr>
<td>Theory of Finance</td>
<td>9</td>
</tr>
<tr>
<td>Theory of Graphs and Networks</td>
<td>64</td>
</tr>
<tr>
<td>Theory of Optimal Control</td>
<td>65</td>
</tr>
<tr>
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<td>Training Health Professionals</td>
<td>72</td>
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<td>78</td>
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<td>Typographical Workshop</td>
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<td>38</td>
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<td>Urbanization: Urban Man and Society</td>
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