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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: Discipline

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

Second and Third numbers: Course differentiation and sequencing



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

Course prerequisites are shown in parenthesis after course descriptions.

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Courses of Study 1980-81

Produced by RIT Communications

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

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

Rochester Institute of Technology Office of Admissions One Lomb Memorial Drive Rochester, New York 14623 or telephone 716-475-6631.

College of Business

School of Business Administration

Accounting

BBUA-210 Financial Accounting Registration #0101-210 Basic accounting principles and techniques within a framework of

sound modern theory. Methods of accounting for revenues, costs, property and debt. Typical records for various types of business enterprise. Preparation and use of classified financial statements. Class 4. Credit 4

BBUA-211 Registration #0101-211

2

Managerial Accounting

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 (offered upon demand)

BBUA-308, 309, 310 Intermediate Accounting I, II, III Registration #0101-308, 309, 310

A more advanced treatment of accounting theory and of accounting for proprietorships and corporations; determination of income realization and cost expiration; valuation of current and fixed assets and liabilities; funds and reserves; statement of changes in financial position. (BBUA-211) Class 4, Credit 4

BBUA-420 Cost Accounting Registration #0101-420

Cost accounting with emphasis on uses of cost data and reports for managerial decision making. Includes problems and proce-dures relating to job order, process, and standard cost systems, with explanation of the techniques of overhead distribution. Special emphasis on the roles of controllers and their organization in finishing the accounting data and reports required for efficient managerial planning and control. (BBUA-211) Class 4, Credit 4

BBUA-422

Tax Accounting I

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

Class 4, Credit 4

BBUA-423 Registration #0101-423

CPA Problems

A general view of accounting theory and practice designed both to assist students in preparation for the CPA examination and to review and improve their grasp of the various aspects and applica-tions of accounting. Emphasis is on the analytical reasoning required in problem solving rather than on the solutions themselves. (Senior Standing)

Class 4, Credit 4

BBUA-424 Registration #0101-424

Tax Accounting II

Advanced Accounting I, II

Seminar in Accounting

Auditing

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

Class 4, Credit 4

BBUA-504 Registration #0101-504

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

Class 4, Credit 4

BBUA-505, 506 Registration #0101-505, -506

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

Class 4, Credit 4

BBUA-554 Registration #0101-554

A seminar series covering selected topics in accounting, including management accounting, taxation, international accounting and accounting for non-profit organizations. Specific course topics to be announced when seminar is offered. (Permission of instructor) Class 4, Credit 4 (offered upon demand)

Management

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

BBUB-201

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 (offered upon demand)

BBUB-300

Career Seminar

Business Law I. II

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

Class 1, Credit 1

BBUB-301, 302 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

Business Management

BBUB-401 Behavioral Science in Management Registration #0102-401

Application of the behavioral sciences to management's problems in human relations. Emphasis on developing the student's understanding of the relationships existing among employees. (BBUB-201 or permission of instructor) Class 4, Credit 4

Administrative Policy **BBUB-404** Registration #0102-404

Applications of management principles and processes to problem solving. An integrated viewpoint on business operations by analysis and evaluation of actual cases. Course is intended to develop the student's competence in decision making. (BBUB-401, BBUB-434, BBUF-441, BBUM-263 and Senior Standing) Class 4, Credit 4

BBUB-407 Environment of Business Activity

Registration #0102-407 The impact and effect of law and social responsibilities on business activity and the managerial response to those environmental factors

Class 4, Credit 4

BBUB-434 Operations Management Registration #0102-434

Theory and practice of operations management utilizing quantitative methods and computer techniques as applied to business problems. (BBUQ-352 or BBUQ-411, ICSS-200) Class 4. Credit 4

Multinational Management **BBUB-450**

Registration #0102-450 Acquaints the student with the characteristics and impact of the multi-nation enterprise. It explores in depth the process of leadership, motivation and performance appraisal in a crosscultural setting. (BBUB-201 and BBUB-401) Class 4, Credit 5 (offered upon demand)

BBUB-531

Labor Relations

Purchasing

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

Class 4, Credit 4

BBUB-534 Registration #0102-534

Industrial purchasing, the organization of the function, the methods of procurement, purchasing policies, sources of supply, and legal aspects of purchasing are covered. Class 4, Credit 4

BBUB-535 Planning and Decision Making

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

Class 4, Credit 4

BBUB-536 Registration #0102-536

Organization Theory

Modern methods of organization including the task, structure, and behavior of organizations are presented. Current concerns such as centralization vs. decentralization, and the effects of automation are analyzed. (BBUB-201) Class 4, Credit 4

Small Business Administration BBUB-547

Registration #0102-547 A course dealing with management problems of the small business enterprise. Student teams assigned to examine, analyze and prepare reports on specific problems encountered by existing business firms in the local area. (Permission of the instructor). **Class Variable, Credit 4**

BBUB-554

Registration #0102-554

A seminar series covering selected topics in current management problems. Specific course topics to be announced when seminar is offered. (Permission of instructor) Variable

Economics

BBUE-381 Registration #0103-381

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

Class 4, Credit 4

BBUE-405 Registration #0103-405

A course in economic theory at an intermediate level dealing with the contemporary analysis of price and distribution under conditions of free competition and various degrees of monopoly control. Business applications are given along with the exposition of the theory itself. (GSSE-302, BBUQ-292 or BBUQ-411) Class 4, Credit 4

BBUE-406 Registration #0104-406

Macroeconomics

Microeconomics

The course is concerned with the overall performance of the economy. It deals with the aggregate analysis of saving and investment, the level of income, the level of employment, and the level of prices. Governmental monetary and fiscal policies will also be evaluated. (GSSE-302, BBUQ-292 or BBUQ-411) Class 4, Credit 4

BBUE-407

Managerial Economics

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

Class 4, Credit 4 (offered upon demand)

BBUE-408 Business Cycles and Forecasting Registration #0103-408

Analysis of economic conditions affecting the firm. Theory of business fluctuations. Forecasting techniques and services available to the firm. (BBUE-381)

Class 4, Credit 4 (offered upon demand)

BBUE-443 Registration #0103-443

Recent Economic Policies

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

Class 4, Credit 4

BBUE-509 Registration #0103-509

Advanced Money and Banking

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

Class 4, Credit 4

BBUE-530 Registration #0103-530

Labor Economics

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

Class 4. Credit 4 (offered upon demand)

Seminar in Management

Money and Banking

BBUE-554 Registration #0103-554

Investigation of advanced problems and policies in economics. Emphasis is on student reports and papers. (Permission of instructor)

Class 4, Credit 4

BBUF-441

Finance

Financial Management

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

Class 4, Credit 4

BBUF-502

Money and Capital Markets

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

Class 4, Credit 4 (offered upon demand)

BBUF-503 Registration #0104-503

Financial Problems

An examination of problems encountered in many areas of corporate finance. The emphasis is on analytical and decision making techniques used to develop acceptable solutions. The case approach is used extensively. (BBUF-441) Class 4, Credit 4

BBUF-504

International Finance

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

Class 4, Credit 4 (offered upon demand)

BBUF-507 Security Analysis Registration #0104-507

The course is introductory and provides background in the field of securities investment. It is both descriptive and analytical in nature. The course coverage emphasizes the securities markets, types of issues, the historical investment perspective, and the valuation of different types of securities. (BBUF-441) Class 4, Credit 4

BBUF-508 Portfolio Management Registration #0104-508

This course deals with the considerations involved in the construction and management of securities portfolios. The emphasis is on the requirements of the institutional investor, the examination of the efficient market hypothesis, modern portfolio theory, and the valuation of investment results. (BBUF-507) Class 4, Credit 4

BBUF-510

Financial Institutions

Registration #0104-510 Analysis of the different kinds of financial institutions such as commercial banks, savings institutions, insurance companies, pension funds, and others. It will cover their operations and relationships with the economic system (BBUE-381)

Class 4, Credit 4

BBUF-554

Seminar in Finance

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

Class 4, Credit 4 (maximum 12 hours credit)

Marketing **BBUM-263**

A basic course in which the student is introduced to the marketing system and specific marketing functions of the business firm. An analytical approach is used to develop an understanding of marketing strategy. (BBUA-210, GSSE-302) Class 4, Credit 4

BBUM-420

Registration #0105-420

Registration #0105-263

A course focusing on the role of the ultimate consumer in the marketing process. Emphasis will be on understanding the psychological, cultural and socioeconomic influences in the consumer decision making process. (BBUM-263) Class 4, Credit 4

BBUM-510

Consumer Services Analysis Registration #0105-510

A course designed to examine the common attributes and problems of consumer service institutions. Topics to be covered: factors of market segmentation, customer needs, models of present and future service organiza concerns, and external environmental organizations, organizational variables affecting consumer service industries. (BBUM-263) Class 4, Credit 4

BBUM-550

Marketing Management Problems Registration #0105-550

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

BBUM-551

Registration #0105-551

Marketing Research

Advertising

A study of research methods and procedures used in the marketing process. Topics include problem formulation, sources of market data, research methodology, data collection, data analysis, and the role of marketing research within the firm. (BBUM-263, BBUQ-352 or BBUQ-411) Class 4, Credit 4

BBUM-552

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 The course emphasizes the sales function of marketing management. It centers around the problems managers face in the direction, control, and supervision of sales activities. (BBUM-263) Class 4, Credit 4

BBUM-554 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 Registration #0105-555

International Marketing

Seminar in Marketing

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

Consumer Behavior

Marketing Logistics

A study of physical supply and physical distribution activities. Topics include transportation, inventory control, materials handling, warehousing, order processing, product scheduling, facility location a (BBUM-263, BBUB-201) , protective packaging, and customer service.

Class 4, Credit 4 (offered upon demand)

BBUM-557 Comparative Marketing Registration #0105-557

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

Class 4, Credit 4 (offered upon demand)

Quantitative Methods

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

The mathematical background required for the increasing use of quantitative methods in management. Topics include coordinate

geometry, functional relationships, and the fundamental con-

Interpretation and application of statistical techniques in busi-ness, to develop the ability to evaluate the results of statistical

research. Introduces student to basic techniques of summarizing

and presenting data, probability theory, hypothesis testing, re-gressions and correlation and non-parametric statistics as

Introduces the student to the techniques of rational decision

making under conditions of uncertainty and variability. The problem of determining the optimal amount of sampling is also

Fundamental mathematical principles and techniques used in management decision making. Topics include Cartesian coordi-nates and graphs; algebraic, exponential and logarithmic analy-sis; partial derivatives and applications; introduction to integral

Statistics for transfer students. A review of statistics covering descriptive statistics, probability, probability distribution, sampling, estimation, significance testing, and regression and correlation analysis. (BBUQ-410)

cepts and methods of differential and integral calculus.

applied to management decision making. (BBUQ-291)

considered. (BBUQ-352 or permission of instructor)

Class 4, Credit 4 (offered upon demand)

BBUQ-290 Registration #0106-290

Class Variable, Credit 4

Registration #0106-291, 292

Registration #0106-351, -352

BBUQ-291, 292

Class 4, Credit 4

BBUQ-351, 352

Class 4, Credit 4

Registration #0106-353

Registration #0106-410

Registration #0106-411

BBUQ-353

BBUQ^410

calculus.

BBUQ-411

Class 4, Credit 4

Class 4, Credit 4

logarithms.

Algebra

Mathematics I, II

Statistics I. II

Statistics III

Quantitative Methods I

Quantitative Methods II

Sanitation & Safety in Hospital Food Service Operation (Coordinated Dietetics Program)

Nutrition Principles

Survey of micro-organisms of importance to the food industry; emphasis on causes and prevention of food spoilage and poisoning. Responsibilities of administrative dietitians to provide and establish safe working conditions and policies; discussion of current problems confronting the hospitals as a result of recent legislative developments as they relate to safety and health. (BFAM-215)

Class 2, Credit 4 Practicum in hospital by arrangement.

BFAD-213

information.

Class 4, Credit 4 **BFAD-314**

Registration #0107-213

Registration #0107-314

BFAD-402 **Dietetics Environment** Registration #0107-402 (Coordinated Dietetics Program) Introductory dietetics course for students to interact and commu-

nicate with a representative sampling of the various categories of personnel in the general field of dietetics to study all major com-ponents of a total system in which a registered dietitian might function. (BFAM-215, BFAD-213)

Class 1, Credit 4 Clinical hours by arrangement.

Educational Principles and Methods BFAD-519 Registration #0107-519

Principles of learning: behavioral objectives, motivation, percepevaluation, guidance, teaching methods and audiovisual techniques; development of a teaching/learning unit for a specific group.

Class 4, Credit 4

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

Class 2, Credit 4 Practicum in hospital by arrangement.

BFAD-525, 526 Advanced Nutrition and Diet Therapy I & II Registration #0107-525, -526 Biological metabolism and interrelationships of nutrients, en-zymes, and other biochemical substances in humans. Etiology, symptoms, treatment and prevention of nutritional diseases; evaluation of nutritional diseases; evaluation of nutritional status. Role of the diet and dietetics in metabolic gastro-intestinal, renal, musculoskeletal, cardiac, endocrine, febrile, and other diseases. (BFAD-213, SCHG-203, SBI0-306)

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

BFAD-535 Registration #0107-535

Nutrition Seminar

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

Credit Variable

BBUM-556 Registration #0105-556

5

Tourist Industries Management

Food Administration and

Dietetics

The study of specific nutrients and their functions; physiological, psychological and sociological needs of humans for food; devel-

opment 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 mis-

BFAD-550 Registration #0107-550

Study of current nutrition problems in the community. Survey of agencies involved in giving nutrition information to the public and/or nutritional care to groups. An independent study project involving nutrition care in a clinical facility in the community is required. Assignments are arranged by the instructor. (BFAD-213, BFAD-526 or BFAD-562)

Class 2, Credit 4 Clinical hours by arrangement

BFAD-551 Management of Food Systems Registration #0107-551 (Coordinated Dietetics Program)

Principles of management in organizational structure, supervision and evaluation of employee performance, and use of computers in food management; the functions of an administrative dietitian in planning, organizing, directing, coordinating, and controlling dietetic activities. (BFAM-215)

Class 1, Credit 4 Practicum in hospital by arrangement

BFAD-552 Geriatric Nutrition Registration #0107-552

A course in applied geriatric nutrition. It includes the nutritional needs for the healthy aged person and addresses the nutritional needs caused by chronic health, psychological, economic and environmental problems. Students will be introduced to nutritional programs designed to help meet some of the problems of the aged person. (BFAD-213) Class 2, Credit 2

BFAD-554 Maternal & Infant Nutrition Registration #0107-554

Application of nutrition during pregnancy and infancy.

Class 2, Credit 2

BFAD-560, 561 Clinical Dietetics I & II Registration #0107-560, -561 (Coordinated Dietetics Program) An intensive integrated study and application of advanced nutrition and diet therapy theories and principles. The course is structured to integrate class lectures (BFAD-560) with clinical experience (BFAD-561) in a hospital setting. Designed for senior students in the Coordinated Dietetics Program. (BFAD-213, SCHG-203, SBIO-305)

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

BFAD-562, 563 Clinical Dietetics III & IV Registration #0107-562 -563 (Coordinated Dietetics Program)

A continuation of BFAD-560, 561 in the succeeding quarter with the clinical experience being conducted in the hospital. (BFAD-560, 561)

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

Food and Tourist Industries Management BFAH-400 Tourist Enterprises Registration #0111 -400

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

Class 4, Credit 4

BFAH-401 Ski Resort Management Registration #0111-401

The development, marketing and management of ski resorts. (BFAH-400) Class 1, Credit 1

Marina Management

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

Class 1, Credit 1

BFAH-402

BFAH-403

Golf Course Management

Campground Management

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

Class 1, Credit 1

BFAH-404 Registration #01/

BFAH-405

Registration #0111 -404 The development, marketing and management of campgrounds. (BFAH-400) Class 1, Credit 1

Theme Park Management

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

Class 1, Credit 1

Registration #0111-410

BFAH-406 Resorts, Clubs and Vacation Communities Registration #0111 -406

The development, marketing and management of resorts, clubs, and vacation communities. Class **1**, Credit **1**

BFAH-410

Tourist Consumption Analysis

A course designed to analyze the consumption of tourist goods and services. The analysis will include economic, recreation and personality theory in order to fully understand tourism consumption.

Class 4, Credit 4

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

Class 4, Credit 4

BFAH-412 Maintenance and Operation of Tourist Registration #0111-412 Resort Properties A course designed to expose the student to various problems of maintaining a resort property. Maintenance practices, equipment, record keeping, and specific needs of recreational surfaces will be discussed as to the proper maintenance for quality resort development.

Class 5, Credit 5

BFAM-210 Introduction to Food Management and Registration #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

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

Career Seminar

Food Principles

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

Class 1, Credit 1

BFAM-220

BFAM-310 Registration #0108-310

Mankind in Search of Food

Survey of foods including composition of foods, basic principles of nutrition, food spoilage, food poisoning, modern food processing, "health foods," world food problems and their possible solutions, with emphasis on practical application to daily food selection and composition. (Not open to those who have completed BFAD-213)

Class 4, Credit 4 (offered upon demand)

BFAM-311 Food Systems Design & Registration #0108-311 Equipment Layout 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 Registration #0108-314 Food Operations Survey of micro-organisms of importance to the food industry; emphasis on causes and prevention of food spoilage and poisoning. Responsibilities of management to provide and establish safe working conditions and policies; discussion of current problems confronting the industry as a result of recent legislative developments as they relate to safety and health. (BFAM-215, SBIG-210) Class 2 Credit 2

Food and Beverage Merchandising BFAM-321 Registration #0108-321 Recognizing, analyzing, researching and solving fundamental

merchandising techniques including menus for food and beverages found in the food service industry. (BFAM-215) Class 2, Credit 2

Food Production Management I & II BFAM-331, 332 Registration #0108-331,-332

Application of standards, specifications, principles and tech-niques 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 operation and maintenance of food service equipment. Application of purchasing principles and cash control; work simplification; planning and scheduling. Students in Coordinated Dietetics Program will have hospital practicum arranged in BFAM-332. (BFAM-215, 321)

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

BFAM-333

Operational Analyses in Food Systems Registration #0108-333

This course will deal with industry related problems which will combine classroom study of the fundamental principles of cost controls, as applied by management, with on-location application of financial practices and specialized accounting procedures in solving cost and management problems in the food and beverage operations. (BFAM-332, 423; BBUB-434) Offered in even years. Class 4, Credit 4

BFAM-415

Food Science I

Registration #0108-415 Consideration of fundamental chemical and physical reactions, the influence of kind and proportion of ingredients; evaluation of food products by sensory and objective methods. Open only to junior and senior students. (BFAM-215; SCHG-202) Class 2, Lab. 6, Credit 4

BFAM-416

Registration #0108-416

Food Science II

Individual study concerning chemical and physical reactions in foods; the influence of kind and proportion of ingredients, with special emphasis on experimental design for problem solving and on written and oral communication skills. (BFAM-415) Class 1, Lab. 8, Credit 4

BFAM-422 Registration #0108-422

Hotel/Motel Management

A study of methods, techniques, and tools of management used in the development and operation of hotels and motels, including ethics and policies. Class 4, Credit 4

BFAM-423 Management Systems for the Registration #0108-423 Lodging and Tourism Industry Analysis and evaluation of systems and operations, franchising; feasibility planning, development, financing and organization of facilities; rate structure determination, front office procedures, guest room salesmanship and analysis of demand; reservation systems, ethics, security and on-the-job application of opera-tional problems. (BFAM-210, BBUB-201 - Junior Standing) Class 4, Credit 4

BFAM-450 Marketing for Hotel and Registration #0108-450 **Tourism Industries** A study of tourism development, marketing and the interaction between the broad areas of the travel industry and its relationship to hotels, motels, restaurants, community economy, trade associations, competitive and non-competitive markets. (BFAM-423; BBUM-263, BBUB-434) Class 4, Credit 4

BFAM-499

Cooperative Education

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

BFAM-511 Advanced Food Service Operation Registration #0108-511

Management experience in planning, organizing, supervising pre-paration and service of foods for special functions. Emphasis is placed on experiences in organizational behavior, the responsibilities of management in marketing, promotion, sales production, personnel and customer relations and attitudes. Evaluation of management experience by preparation of operations reports. (BFAM-331, 332) Seniors only

Class 1, Lab. 8, Credit 4

BFAM-554 Seminar in Food and Hotel/Tourist Industries Registration #0108-554

Selected topics associated with food, hotel, resort and travel systems. The focus will be on current management problems to develop analytical and decision-making ability.

Class 4, Credit 4 (offered upon demand)

BFAM-555 Registration #0108-555

Research Problems

Independent study of research problems in food and hospitality management. Open to senior students only. Class and Credit Variable

School of Retailing

BRER-211 Registration #0109-211

This course provides an introduction to the management concepts applicable to a retail operation or store. Areas of emphasis include store location, store design and layout, store organization, merchandise management (buying, assortment, classification, and control), and customer relations. The functions of retailing in society are introduced and a perspective laid for all additional courses.

Retail Organization and Management

Class 4, Credit 4

BRER-212 Registration #0109-212

Retail Merchandising

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

Class 4, Credit 4

BRER-300

Retail Career Seminar

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

Class 1, Credit 1

BRER-410

Retail Sales Promotion

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

Class 4 Credit 4

BRER-415 Registration #0109-415

Junior Retail Seminar

Senior Retail Seminar

A core seminar which integrates and builds on the first co-op experiences. Topics are designed to address entry level and first level management problems and situations. The emphasis is on the interpersonal and organizational situations typically encountered in co-operative placements for retailers. Should be taken immediately after a co-op experience. Class 4, Credit 4

BRER-416

Registration #0109-416

A required seminar designed to follow the senior year co-op experience. The perspective is that of the store manager or middle level manager. Emphasizes contemporary readings and cases to analyse management strategies and the relationship of the indi-

vidual to the larger organization objectives. Class 4, Credit 4

BRER-435 Advanced Merchandising Registration #0109-435

An extension of basic merchandising dealing with advanced topics and complex merchandising applications. The emphasis is on merchandising as a control and management tool. The course will enable the student to develop and evaluate the impact of alternative merchandising decisions on the performance of the retail operation. (Senior standing; BRER-212)

Class 4, Credit 4

BRER-511

Textiles

Registration #0109-511 Analysis of textile fibers, weaves, and fabrics; methods of printing, dyeing and finishing; evaluation of fabrics and materials com-monly used in home furnishing. Class 4, Credit 4

BRER-512 Fashion Fabrics Registration #0109-512

Evaluation of fashion fabrics for selection of suitable fabrics for men's, women's, and children's clothing. Knowledge necessary for merchandising fashion goods.

Class 4, Credit 4

BRER-521

Registration #0109-521

Fashion History

Survey of the apparel arts from ancient times to the present. Study is made of the social, political, and economic factors influencing styles and merchandising of apparel throughout the ages and how history influences fashion today. Class 4, Credit 4

BRER-523 Registration #0109-523

A study of the present-day fashion industry including development of the production of fashion goods. European designers and the operation of the Parisian couture are surveyed in addition to the American fashion industry and American designers. Class 4, Credit 4

BRER-524 Registration #0109-524

Determination of quality, value, and selling points. Government regulations for leather goods, shoes, gloves, handbags, furs, lug-gage, jewelry, cosmetics, umbrellas, wigs, and other accessories;

Registration #0109-531

A study of the basic elements and principles of design. A variety of art media and techniques are explored as applied to interior de-

sign. Lab. 8. Credit 4

BRER-532

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

Class 2, Lab. 4, Credit 4

BRER-533 Registration #0109-533

Interior Design II

Development of afunctional plan for the interior, selection of merchandise and architectural materials; presentation of plan by means of elevations, perspective, renderings, or model; explora-tion of media for presentation; field trips. (BRER-532) Class 2, Lab. 4, Credit 4

BRER-534 Registration #0109-534

Interior Design History

A study of architecture and furnishings as expressive of social, economic, political, and technological developments. Emphasis on significant and lasting design developments from each period. This course covers the history of interior design from antiquity through the present. (BRER-533) Class 4, Credit 4

BRER-535

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

Lab 8, Credit 4

BRER-545 Registration #0109-545 **Color and Design**

Seminar in Retailing

Advanced Interior Design

Basic principles of design, color harmonies, associations and color schemes as they apply to both apparel and home furnishings. Practical application of these principles to determine the level of good taste.

Class 4, Credit 4 (offered upon demand)

BRER-554 Registration #0109-554

Selected topics associated with various aspects of retailing. Course content and structure will differ according to faculty assigned and quarter when offered. (Permission of instructor)

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

Current Fashion

Fashion Accessories

information necessary for selection and merchandising. Class 4, Credit 4 (offered upon demand)

BRER-531

Basic Interior Design

Interior Design I

Graduate Business Courses

Business Administration Courses

Accounting Group

BBUA-701 Financial Accounting Registration #0101-701 An introduction to financial accounting. Topics covered will in-

clude: financial statements; transaction analysis; accounting for revenues, costs, and expenses; accounting for assets, liabilities and owner's equity; measurement; and the use of financial statements.

Credit 4

BBUA-702 Cost and Managerial Accounting Registration #0101-702

Emphasizes the uses of cost data and reports for managerial decision making. Includes problems and procedures relating to job order, process, and standard cost systems with special attention to problems of overhead distribution. The planning process, the control process, and analytical processes are considered in detail. (Foundation courses) Credit 4

BBUA-704

Registration #0202-704 Theory and practice of accounting for assets based " latest pronouncements of the APB and FASB. Stud valuation systems and their impact on incr tion is the central focus of each asse detail. (Foundation courses) Credit 4

BBUA-705

Registration #0101-705 Continuation of Accounting Th equity, long-term debt and spe here is the Statement of Change leases, and accounting for chang Credit 4

BBUA-707

Registration #0101-707 Analysis and evaluation of current ac the nature, measurement and reporti financial position; concepts of income relating to consolidated statement, pa and installment sales. (BBUA-705 or ac Credit 4

BBUA-708

Registration #0101-708 The theory and practice of advanced public accounting are examined; critical study of auditing procedures and standards in the light of current practice; measurement and reliance of internal control covered by case studies; modern day auditing techniques by statistical sampling and electronic data processing applications. (BBUA-705 or admission to MS program)

Adva

Credit 4

BBUA-709 Basic Taxation Accounting Registration #0101-709

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

Credit 4

BBUA-710 Registration #0101-710

Advanced Taxation Accounting

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

BBUA-712 Seminar in Accounting Registration #0101-712

Course content will differ by instructor and quarter. Topics covered: taxation, international accounting and accounting for nonprofit organizations. (Permission of director of graduate programs)

Credit 4 (offered upon demand)

Business group

BBUB-741 Management and Organization Registration #0102-741

Analysis and description of management principles and processes from the classical and behavioral viewpoints. Study of organizations ational change from the structural, systematic erspectives. Text and reading of original case analysis and/or research paper. Sn

Business and Society

nager of the needs, demands and government, the consumer and ourse examines possible manawork of several definitions of courses)

Operations Management

ly and application of operations quantitative models and qualitativecong to forecasting, inventory management,

rol, and queuing analysis. Statistical reasoning and puter utilization are basic tools in problem solution. (Foundation courses)

Credit 4

Behavioral Science in Management BBUB-744 Registration #0102-744

The implications of studies from the fields of psychology are dis-cussed; 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 manage-ment, reliability, and human factors. (Foundation courses)

Credit 4 (offered upon demand)

Accounting Theory I

See 1980-81 Graduate Studies Bulletin for updated catalog

of Graduate Business Courses

areas

ignments o MS program)

Auditing

BBUB-748 Labor/Management Problems Registration #0102-748

Problems in labor/management relations as they influence managerial decision making. Topics may include collective bargaining, conflicts and agreements between labor and management, and contemporary issues. From the perspective of labor/management structure, concepts are developed concerning market forces, unionism and labor law as they influence wage levels and wage structure. (Foundation courses)

Credit 4

BBUB-750 Personnel Systems Registration #0102-750

This course introduces the concept of personnel systems and allows a detailed examination of the systems' different elements. The student will become acquainted with current theory and research in behavioral sciences. The course also allows the student to integrate theory with practical application through exercises and class projects dealing with problems in personnel selection, placement, training and evaluation. (Foundation courses) Credit 4

BBUB-751

Legal Environment of Business

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

Credit 4

BBUB-758

Registration #0102-758 This course will take on structor and quarter wher include management tho and behavioral aspects of particular quarter will be an (Permission of director of gr Credit 4

BBUB-759

Registration #0102-759 A course intended to give expe practice gained in other course w achieved by solving complex an problems that cut across the seve ing, production, finance and perso formulating and implementation the by top management. The case met! other core courses) Credit 4

BBUB-770

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

See 1980-81 Graduate Studies

Bulletin for updated catalog

aimed at

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ed extensively. (All

Business Research Methods

of Graduate Business Courses

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

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 (offered upon demand)

Finance Group

BBUF-722 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

Theory of Finance and Research **BBUF-723** Registration #0104-723

This course involves a study of the current literature and most recent developments relating to the theories of investment and valuation, cost of capital, risk and dividend policy. Also considered are specific areas of application and the policy implications of the theories studied. (BBUF-722) Credit 4

BBUF-724 **Problems in Financial Management** Registration #0104-724

This course is designed to give the student greater depth in the basic concepts of financial management and greater facility in using the analytical techniques. Extensive use will be made of case material. Prohi es to be considered include liquid asset udgeting, security \policy. (BBUF-722) mana security valuation, methods of

Securities and Investment Analysis

ous investment media and their marvalues based on financial and other as return, growth, and risk. (BBUF-

Seminar in Finance

Financial Management

content depending on the in-Topics which may be covered analysis techniques, financial inarkets. Specific content for a particular rounced prior to course offering. (Permission of

redit 4 (offered upon demand)

BBUF-745 Registration #0104-745

Economic Environment 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.

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 (offered upon demand)

BBUF-765 Registration #0104-765

Managerial Economics

Analysis of the economic conditions facing the firm. Topics include: demand and cost analysis, resource utilization, pricing, market structure, and other selected topics. (BBUF-745, BBUA-702 recommended)

Credit 4

Credit 4

BBUF-767 Advanced Microeconomic Theory Registration #0104-767

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

BBUF-768

Advanced Macroeconomic Theory

Registration #0104-768 An advanced study of the fluctuations and growth of economic activity in a modern complex society. Topics include measuring macroeconomic activity, modeling economic activity, micro-economic 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 groi¹

BBUM-761

Registration #0105-761 Critical examination of the tional relationships perform manufacturers, brokers, who costs, strategies and techniqu Both behavioral and quantitati sidered. (Foundation courses) Credit 4

B BUM-762

Registration #0105-762 An in-depth study of selected pro. managers concerned with promotio Material centers on staff marketing unique to the field of marketing are ci Credit 4 (offered upon demand)

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)

Adva

Credit 4 (offered upon demand)

BBUM-764 Registration #0105-764

Marketing Logistics

International Marketing

Semina consumer Behavior

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

BBUM-766

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-relation-ships with other functions; and product, pricing, promotion, and channel strategy. (BBUM-761) Credit 4 (offered upon demand)

BBUM-769 Registration #0105-769

Seminar in Marketing

Probability Theory

11

This course will take on different content depending on the instructor and quarter when offered. Topics which may be covered are: marketing models, marketing channels, articulation with top marketing executives, and marketing positioning. Specific content for a particular quarter will be announced prior to course offering. (Permission of director of graduate programs) Credit 4

Quantitative group

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 generaing functions and probability generating functions. (Differential and Integral Calculus and Foundation courses) Credit 4 (offered upon demand)

BBUQ-781

Statistical Analysis I

Registration #0106-781 A study of probability and classical statistics including set theory, discrete and contin irobability distributions, sampling distributions, point and hypothesis testing. Applications and hypothesis testing. Applications are mil decision making situation.

Statistical Analysis II

assical statistics including interval , analysis of variance, regression ries, and index numbers. (BBUQ-

Bayesian Decision Analysis

managerial decision situayesian decision analysis, of choice, the expected a value of information, revision of us prior distributions, the expected value of non, optimal sampling, utility functions, and deci-

gramming. (BBUQ-782) (Not open to decision science

Credit 4 (offered upon demand)

BBUQ-784 Registration #0106-784

ajors)

See 1980-81 Graduate Studies

Bulletin for updated catalog

of Graduate Business Courses

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 (offered upon demand)

BBUQ-786

Registration #0106-786 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 (offered upon demand)

BBUQ-787 Registration #0106-787

An introduction to the use of probability in operations research models. Probabilistic techniques are applied to the problems of forecasting, capital budgeting, PERT, inventory, queueing and Markov processes. (BBUB-778)

Credit 4 (offered upon demand)





Operations Research—

Decision Theory

BBUQ-789 Simulation Registration #0106-789 An introduction to the various use a management tool for decision making. M fsophistication employing simulate structed. (Foundation care con-See 1980-81 Graduate Studies Credit4 (offered See 1980-81 Graduate Studie Bulletin for updated Catalog Bulletin for updated catalog of Graduate Business Courses BBUQ-79 tion Regi TE BBUC es Regist, This COL on the instructora .ay be covered are: multi-\ is research, linear programmi pecific content for a particular qu lor to course offering. (Permission of dir ograms) Credit 4

College of Continuing Education

Graduate Courses in Applied and Mathematical Statistics

CTAM-711 Fundamentals of Statistics I Registration #0240-711

For those taking statistics for the first time. Covers the statistical methods used most in industry, business and research. Essential for all scientists, engineers, and administrators.

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

Credit 3 (offered each quarter)

CTAM-712 Registration #0240-712

Fundamentals of Statistics II

Continuation of CTAM-711. Topics: concepts and strategies of statistical inference for making decisions about a population on the basis of sample evidence; tests for independence and for adequacy of a proposed probability model; learning how to separate total variability of a system into identifiable components through analysis of variance; regression and correlation models for studying the relationship of a response variable to one or more predictor variables. (All standard statistical tests) (CTAM-711 or equivalent) Credit 3 (offered each quarter)

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

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

Credit 3 (offered in Fall and Spring Quarters)

CTAM-731 **Quality Control: Acceptance Sampling** Registration #0240-731

Investigation of modern acceptance sampling techniques with emphasis on industrial application.

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

Credit 3 (offered in Winter and Summer Quarters)

CTAM-751

Registration #0240-751 A first course in statistical decision theory featuring concrete situations and realistic problems.

Introduction to Decision Processes

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

Credit 3 (offered in Fall Quarter)

CTAM-761 Registration #0240-761

Reliability

A methods course in reliability practices: What a reliability engi-neer 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 con-fidence limits and risks; strength and stress models; reliability safety margins; truncated and censored life tests; sequential test plans; Bayesian test programs. (CTAM-712 or equivalent) Credit 3 (offered in Spring Quarter)

CTAM-801

Design of Experiments I Registration #0240-801

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

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

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

Design of Experiments II CTAM-802 Registration #0240-802 Continuation of CTAM-801.

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

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

CTAM-821

Theory of Statistics I

Registration #0240-821 Provides a sound theoretical basis for continuing study and reading in statistics.

Topics: constructs and applications of mathematical probability; discrete and continuous distribution functions for a single variable and for the multivariate case; expected value and moment generating functions; special continuous distributions. (Consent of the department)

Credit 3 (offered in Fall Quarter)

CTAM-822

Registration #0240-822 Continuation of CTAM-821.

Supporting theory for, and derivation of, sampling distribution models; applications and related material. (CTAM-821 or equivalent)

Credit 3 (offered in Winter Quarter)

CTAM-823

Registration #0240-823 Continuation of CTAM-821, 822.

Point estimation theory and applications, the multivariate normal probability model, its properties and applications; interval estimation theory and applications. (CTAM-822 or equivalent)

Credit 3 (offered in Spring Quarter)

CTAM-830

Multivariate Analysis

Theory of Statistics II

Theory of Statistics III

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

Credit 3 (offered in Fall and Spring Quarters)

CT AM-831 Registration #0240-831

Multivariate Analysis II

Regression Analysis I

Regression Analysis II

A continuation of CTAM-830, this course covers the use of advanced multivariate techniques. Topics include principal compo-nent analysis, cluster analysis, multidimensional contingency tables, discrete discriminant analysis, multi-dimensional scaling and regression with errors in the independent variables. Practical applications will be emphasized. (CTAM-830)

Credit 3 (offered Summer Quarter only)

CTAM-841 Registration #0240-841

A methods course dealing with the general relationship problem. Topics: the matrix approach to simple and multiple linear re-gression; analysis of residuals; dummy variables; orthogona orthogonal models; computational techniques. (CTAM-802 or equivalent) Credit 3 (offered in Winter Quarter)

CTAM-842 Registration #0240-842

A continuation of CTAM-841.

Topics: selection of best linear models; regression applied to analysis of variance problems; nonlinear estimation and model building. (CTAM-841 or equivalent) Credit 3 (offered in Spring Quarter)

CTAM-851

CTAM-853

Nonparametric Statistics

Registration #0240-851 Distribution-free testing and estimation techniques with emphasis on applications.

Topics: sign tests; Kolmogorov-Smirnov statistics; run tests; Wilcoxin-Mann-Whitney test; Chi-Square tests; rank correlation; rank order tests; quick tests. (CTAM-712 or equivalent) Credit 3 (offered in Fall, Spring, and Summer Quarters)

Managerial Decision Making

Registration #0240-853 Continuation of CTAM-751, statistical decision analysis for management.

Topics: utilities; how to make the best decision (but not necessarily the right one); many action problems; optimal sample size; decision diagrams. Applications to marketing; oil drilling, portfolio selection; quality control; production; and research pro-grams. (CTAM-751 or equivalent)

Credit 3 (offered in Winter Quarter)

CT AM-861, 862

Reliability Certification Seminars I & II

Bayesian Statistics

Registration #0240-861, -862 The American Society for Quality Control (ASQC) offers Certifica-tion as a Reliability Engineer by written examination. These two-quarter courses prepare students for this examination. Purpose is to increase reliability expertise. Offered are lectures, handouts, workshops, and practice examinations.

Topics: reliability management, prediction, estimation, analysis, 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. (offered in Fall and Winter Quarters)

CT AM-871 Sampling Theory and Application

Registration #0240-871 An introduction to sample surveys in many fields of applications with emphasis on practical aspects.

Topics: review of basic concepts, sampling problem elements; sampling; random, stratified, ratio, cluster, systematic, two-stage cluster; wild life populations, questionnaires, sample sizes. (CTAM-712 or equivalent)

Credit 3 (offered in Winter and Summer Quarters)

CTAM-881 Registration #0240-881

Probability as a degree of belief; how we learn; the applications of Bayesian principles to: estimation of failure rates, revising odds, testing precise hypotheses, finding credible regions, tests of sig-nificance and goodness of fit from Bayesian point of view; hand-ling several variables; straightline analysis. A potpurri of applications; reliability, acceptance sampling, decision-making, etc. (CTAM-712 or equivalent)

Credit 3 (offered in Fall Quarter)

CTAM-886 Sample Size Determination Registration #0240-886

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

Credit 3 (offered in Summer Quarter)

CTAM-891, 892, 893 Special Topics in Applied Statistics Registration #0240-891,-892, -893

This course provides for the presentation of subject matter of important specialized value in the field of applied and mathematical statistics not offered as a regular part of the statistics program. (Consent of the department)

Quarter)

CTAM-895 Registration #0240-895

Statistics Seminar

This course or sequence of courses, provides for one or more quarters of independent study and research activity. This course may be used by other departments at RIT (or other colleges) to provide special training in statistics for students who desire an in-dependent study program in partial fulfillment of graduate degree requirements. (Consent of all departments involved) Credit 3 (offered each quarter)

CTAM-896, 897, 898

Thesis

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

Credit 3 (offered each quarter)

College of Engineering

Electrical Engineering

Required Courses and Scheduled Technical Electives

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

EEEE-201 Introduction to Electrical Engineering Registration #0301-201

This course is actually divided into two parts. The first part is an introduction to electrical engineering. It consists of a 3 hr./week lecture-laboratory dealing with various facets of electrical engineering. Each week a topic is discussed with a section of students

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

Class 3, Lab. 2, Credit 4

EEEE-340 Registration #0301 -340

Introduction to Digital Systems

This course will survey the components used in the construction of digital systems. These will include MSI and LSI components, as well as digital analog and analog digital conversion. The circuits will be described in terms of logical interaction between commercially available circuit packages. Analytical and design techniques used in creating subsystems will be discussed. (SPSP-207 concurrently)

Class 4, Credit 4

EEEE-351, 352, 353 Registration #0301-351, -352, -353

Circuit Analysis I, II, III

Basic circuit laws, network theorems, RLC circuits and their responses. Sinusoidal analysis, complex notation, phasors and power. The concept of complex frequency. Special topics includ-ing magnetically coupled circuits, two-port networks, and net-work topology. (SMAM-253, SPSP-207 and concurrent with work topology. SMAM-305, 306)

Class 3, Lab. 3, Credit 4

EEEE-430

Registration #0301-430

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

EEEE-441,442

Registration #0301-441, -442

Electronics I, II

Linear Systems

Solid-state electronic devices, their external characteristics and models. Analysis of electronic circuits for rectification, amplifica-tion, instrumentation and control. Introduction to electronic circuit design (EEEE-352 concurrently)

Class 3, Lab. 3, Credit 4

EEEE-461, 462 Registration #0301-461, 462

Electrical Engineering I, II

A course for non-electrical engineering majors. Circuit analysis, electronics, machines, switching circuits, logic and the elements of communication. (SPSP-207, SMAM-306)

EEEE-461 Class 3, Lab. 3, Credit 4 EEEE-462 Class 3, Lab. 3, Credit 4

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

EEEE-471, 472 Registration #0301-471, -472

Electromagnetic Fields I, II

Vector analysis, electrostatics and dielectrics, conduction current fields, magnetics, time varying fields, Maxwell's equations and wave equations. Concepts of retarded potentials. Electromagnetic propagation in waveguides, free space and transmission lines. Concepts of reflection, transmission and impedance matching. (SMAM-308) EEEE-471 Class 4, Credit 4

EEEE-472 Class 3, Lab. 3, Credit 4

EEEE-531 Electromechanical Energy Conversion Registration #0301-531

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

Class 3, Lab. 3, Credit 4

EEEE-590

Thesis

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

Credit 4

EEEE-613 Introduction to Automatic Controls Registration #0301 -613

A one-quarter study of linear control systems and their physical behavior including stability and transient response. This is approached through the classical methods of the LaPlace domain; Routh's Criterion, Nyquist, Bode and Nichols charts and root locus. Lead and lag compensators are introduced using these tools. Analog computation techniques are studied and used, in laboratory, as a means of verifying the analysis and design of complex systems. (EEEE-430, SMAM-420)

Class 3, Lab. 3, Credit 4

Introduction to Communications

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

Class 4, Credit 4

EEEE-634

EEEE-643 Registration #0301 -643

Digital Electronics

The objective of this course is to teach students how to analyze digital electronic circuits. Topics include: transistors in thesaturation, active, and cutoff regions; normal and inverse modes; and JFETs and MOSFETs in the saturation and triode regions. The following logic families are covered in considerable detail: RTL, I²L, DTL, T²L, ECL, CMOS, NMOS, and PMOS. A discussion of the applications and characteristics of analog switches concludes the course. This course is a prerequisite for EEEE-665. (EEEE-340, 353, 430, 442, SMAM-306) Class 3, Lab. 3, Credit 4

EEEE-645

Special Semiconductors

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

Class 3, Lab. 3, Credit 4

EEEE-650 Introduction to Logic and Switching Registration #0301-650

This is a course on the logical design of digital systems. Topics include: switching elements, switching (Boolean) algebra, Karnaugh maps and applications. Multiplexers, NAND-NOR networks, encoders, decoders, ROM's. Sequential circuits, flip flops, counters, shift registers, RAM's. Additional topics such as logic networks using shift registers, arithmetic logic unit may also be covered. The emphasis on the course will be on the logic design using available logic gates and packages rather than on the electronic circuitry of the logic components. (EEEE-643 desirable) Class 4, Credit 4

EEEE-660 Registration #0301-660

Interfacing Electronics and Logic

Topics include: brief review of translators between ECL, TTL, MOS, I²L and CMOS logic families. Detailed presentation of digitally controlled analog switches, multiplexors and sample/hold circuits. Line driver and receiver applications including impedance matching, reflection suppression, interfaces for teletype, audio tape recorder, telephone and acoustic coupler, and EIA-RS-232C. Presentation of some important microprocessor oriented interface chips: PIA (6820), UARTs, and MODEMS. Topics in sequential logic including a brief review of counters and conventional logic, then considerations of unclocked logic and race conditions, hang-up states, initializing logic, programmed logic and state space concepts. Microprocessor controllers and sequencers will be discussed as time permits. Individual student projects required.

Class 3, Lab 3, Credit 4

EEEE-665

Microcomputer Systems I

Registration #0301-665 This is the introductory course dealing with the structure and operation of microcomputers. It includes descriptions of computer number systems and computer architecture and analyzes the major parts of a computer including the CPU, memory and I/O structure. Computer instruction sets and addressing methods are discussed and then applied to the machine language programming of computers. Software and hardware aspects of input/ output are discussed along with consideration of special I/O chips. The course concludes with discussions of subroutine and stack operations. Most discussions are based upon the Motorola 6800 and Intel 8085 microprocessors. Lab sessions are an integral part of the course. (EEEE-643, ICSP-220) Class 3, Lab. 3, Credit 4

EEEE-666

Microcomputer Systems II

Registration #0301-666 This course will cover the effective application of microprocessors in the design of digital systems. It will develop an understanding of assembly language programming and hardware design techniques. The role of macro-assemblers, editors, linking loaders, and other system software aids used in microcomputer development systems to produce efficient modular code will be covered. Several aspects of hardware/software organization of input/output programs will be considered including interrupts and direct memory access. The use of special LSI interface devices to connect a microcomputer with peripheral devices such as AID and DIA converters, CRT terminals, floppy disks, etc. will be studied. Laboratory sessions will be used to provide experience in the use of software development systems, in-circuit emulators, and logic analyzers in developing and testing a microcomputer design. (EEEE-665)

Class 3, Lab 3, Credit 4

EEEE-670 Introduction to Microelectronics Registration #0301 -670

Hybrid and monolithic microelectronic technology; processes in thick film and thin film circuit fabrication; complementary nature of monolithic and film circuits; impact of fabrication, testing and quality control on microcircuit design. (EEEE-442)

Class 4, Credit 4

EEEE-671

Registration #0301-671 An electronic design course utilizing the medium of thick film hybrid technology. Functional electronic modules will be designed, produced and tested, from original specifications to finished package, with students performing all steps. (EEEE-670) Class 3, Lab. 3, Credit 4

EEEE-679 Registration #0301-679

Active and Passive Filters

Hybrid Microelectronic Design

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

Class 4, Credit 4

EEEE-693 Digital Data Communications Registration #0301-693

A course on the principles and practice of modern data communications systems. Topics covered include pulse amplitude modulation, frequency shift keying, phase-shift keying, pulse code modulation, digital error control, and fundamentals of system design. (EEEE-634, SMAM-351)

Class 4, Credit 4

EEEE-696 Communication Circuit Design Registration #0301 -696

Design and operation of representative circuits used in radio systems. Oscillators, directional couplers, amplifiers, matching networks, phase-locked loops and antennas. A project-type laboratory and computer simulation problem are included. (EEEE-442, EEEE-634, EEEE-472)

Class 3, Lab 3, Credit 4

Technical Elective Courses Offered Upon Sufficient Demand **Electrical Machines I**

EEEE-532 Registration #0301 -532

The design and operating characteristics, both static and dynamof transformers and synchronous and induction machines. (EEEE-531)

Class 3, Lab. 3, Credit 4

EEEE-535 Introduction to Power Electronics Registration #0301 -535

This course provides an introduction to the theory of thyristor circuits with emphasis on applications. The course builds upon the theory of static switching, SCR characteristics, triggering and commutation. This leads the way to the study of controlled and uncontrolled rectification and inversion, AC and DC line control and frequency conversion using thyristors. The laboratory is an integral part of the course where the experiments complement the classroom lectures by providing exposure to the device characteristics, testing and measuring techniques and various thyristor systems. (EEEE-441, EEEE-531 or concurrent registration for EEEE-531)

Class 3, Lab. 3, Credit 4

EEEE-536 Motor Application and Control Registration #0301 -536

A review of the speed torque characteristics of DC and AC motors. A study of the characteristics of mechanical loads and the transient response of electromechanical systems. A review of thyristor characteristics and the design of solid state motor control systems. (EEEE-430, 531)

Class 3, Lab. 3, Credit 4

EEEE-614

EEEE-621

Design of Control Systems

Registration #0301-614 This course builds upon the classical analysis techniques introduced in EEEE-613. Practical experimental and mathematical approaches to 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. (EEEE-613)

Class 3, Lab. 1, Credit 4

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. (EEEE-472)

Class 3, Lab. 3, Credit 4

Registration #0301-672

Optical Devices and Systems

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

Class 3, Lab. 3, Credit 4

EEEE-673

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. (EEEE-643)

Class 3, Lab. 3, Credit 4

EEEE-674 Fiber Optics: Theory and Application Registration #0301-674

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

Class 3, Lab 3, Credit 4

EEEE-675

Analog/Hybrid Computation

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

Class 4, Credit 4

EEEE-677 Digital Filters and Signal Processing Registration #0301-677

This course deals with the analysis and design of systems which are discrete in nature. General topics include difference equation description of discrete systems, definition of linearity, impulse response and Z-Transform analysis. Digital signal processing topics will include the definition and design of digital filters and the use of Fast Fourier Transforms (FFT) in signal processing. The effects of quantization errors in digital computations will be con-sidered. Digital processing will be related to analog processing through the sampling theorem and a discussion of the methods of sampling, A/D and D/A conversion. Class projects will deal with digital filter design and implementation using microcomputer hardware. (EEEE-430 and consent of instructor) Class 4, Credit 4

EEEE-687

Power System Analysis

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

EEEE-672

Applied Electronic Design

EEEE-695 Registration #0301-695

Passive and Active Filter Design

Registration #0301-708 Network analysis (review); classical frequency domain filters and passive filter design; filter transformations: low pass to high pass and bandpass; active filter design using single Op amps and RC networks; filter design using multiple Op amps for two-pole and two-zero sections; realization of n-pole filters using two-pole sections; sensitivity analysis; tuning of filters; effect of non-ideal Op amp characteristics on filter performance; design examples and demonstrations. (EEEE-700, 701)

Credit 4 (Spring 82 and every other spring)

EEEE-708

EEEE-709 Active Network Synthesis Registration #0301-709

Fundamentals of network synthesis; energy functions, P.R. functions; properties of network functions; synthesis of RC one-port and two-port networks; approximation, normalization and frequency scaling; active network analysis; active network ele-ments; tunnel diodes, gyrators, impedance converter, imped-ance 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. (EEEE-700, 701)

Credit 4 (offered upon sufficient demand)

Integrated Circuit Operational Amplifiers **EEEE-711** Registration #0301-711

Analysis of operational amplifier circuits using the ideal op amp; development of circuit models to predict non-ideal op amp char-acteristics; study of feedback systems, stability (using Bode plots), and compensation; direct-coupled amplifiers and operational amplifier design; interpretation of manufacturers' specifi-cations and basic applications with emphasis on practical aspects. (EEEE-442, 700, 701)

Credit 4 (Fall 80 and every other fall)

EEEE-712

EEEE-714

Control System Fundamentals

Registration #0301-712 This course is intended for graduate students who have not had a formal course in control systems in their undergraduate program. It is not open to those who have already had an introductory control systems course.

It is a study of linear control systems, their physical behavior, dynamical analysis and stability using mathematical models. This involves the use of root locus, Bode, and Nyquist techniques for the analysis of single and multiple-loop systems. (Elementary knowledge of LaPlace transforms)

Credit 4 (Fall 80 and every other fall)

EEEE-713 Registration #0301-713

The development of the analytical techniques of modern theory as applied to linear control systems. Topics include vector spaces, state space, state variables, matrices and matrix functions, controllability, observability and stability theory. (EEEE-613 or EEEE-700 and either 613, or 712)

Credit 4 (Spring 81 and every other spring)

Nonlinear Control Systems

Modem Control Theory

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

Credit 4 (offered upon sufficient demand)

EEEE-716 Registration #0301-716

Digital Signal Processing

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. (EEEE-700, 701) Credit 4 (Spring 81 and every other spring)

*"sufficient demand" normally is interpreted as a minimum of 10 students expressing interest in the course.

A course based on topics from dynamics, acoustics and audio systems. Topics include: electro-mechanical equivalents, plane and spherical acoustic waves, radiators and resonators, loudspeaker systems, equalization in recording and playback, and an introduction to the application of digital techniques to audio. (EEEE-430, EEEE-442, EEEE-472 or suitable equivalents) Class 4, Credit 4

Graduate Courses in Electrical Engineering

The courses listed below are normally open to students who have been formally admitted into the graduate electrical engineering programs. Students with a baccalaureate degree in engineering or science may be permitted to enroll in any of these courses as non-matriculated students if they have already completed the stated prerequisites for a particular course. Undergraduate stu-dents 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 matriculated graduate students.

Whenever a prerequisite is stated in the form of a specific course number, the words "or equivalent" are always implied. Pre-requisites, if any, are shown in parentheses following the description of the course.

EEEE-700, 701

Linear Systems I, II Registration #0301-700, -701

These two courses are required of all graduate students in Electrical Engineering (except those who we readmitted before Septem-ber 1977). Topics in the first course (700) include differential equations, linear algebra, linearity and superpositon convolution, Fourier series and Fourier Transforms. Topics in the second course include LaPlace Transforms, complex variables, Inverse LaPlace transformation, transfer functions of networks, state variables, Z transform and difference equations. Many of above topics might be familiar to the graduate student because they are covered in undergraduate EE courses in some form or other. However, these topics will be covered in these two courses in greater depth and the student will be expected to develop a higher level of understanding.

Credits 4/Quarter (EEEE-700 offered every fall)

(EEEE-701 offered every winter)

EEEE-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 (Winter 82 and every other winter)

EEEE-704 Electromagnetic Fields

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

Credit 4 (offered upon sufficient demand*)

EEEE-705 Registration #0301 -705

Maxwell's equations; propagation of plane waves in unbounded regions; reflection and refraction of waves; total reflection, polarizing angle, multiple dielectric boundaries; guided electromagnetic waves; characteristics of common waveguides; circular

Electromagnetic Waves

waveguides; resonant cavities; radiation and antennas. (EEE-471, 472)

Credit 4 (offered upon sufficient demand*)

EEEE-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. (EEEE-704, 705)

Credit 4 (offered upon sufficient demand*)

EEEE-718 Stochastic Estimation and Control Registration #0301-718

Review of random process theory; stochastic control and optimi-zation; estimation and filtering techniques such as Wiener filter-ing and Kalman filtering; stochastic stability; applications. (EEEE-713 or equivalent)

Credit 4 (Fall 81 and every other fall)

Digital Control Systems

Registration #0301-719 An introduction to the analysis and design of systems in which the mini/micro digital computer plays a central role. Topics include: mathematics of discrete-time systems, control algorithms, analy-tical design of discrete systems, computer word length require-ments, engineering characteristics of computer control systems. (EEEE-701, 702,713)

Credit 4 (Winter 82 and every other winter)

Optimum Control Systems

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

Credit 4 (Fall 80 and every other fall)

EEEE-721 Thyristor Power Control and Conversion Registration #0301-721

Thyristor family of semiconductors is becoming increasingly important in the area of power control and conversion. The objective of this course is to provide an adequate, application-oriented knowledge to those interested in the areas of control, power and power electronics. Topics to be discussed: preliminaries: basic principles of static switching, thyristor theory, triggering, commu-tations; rectifiers: principles of controlled rectification, analysis of single-and three-phase controlled rectifiers; inverters; series and parallel SCR inverters, design of inverters, sinewave filters, forced commutated inverter, McMurray inverter; DC systems: principles of DC-DC conversion, choppers, DC motor control, single-phase DC motor drives, three-phase DC motor drives, dual converter; cyclo converter: frequency conversion using SCR's phasecontrolled cycloconverters, cycloconverter controls.

Modeling and simulation of thyristor circuits; thyristor models, approximations, digital simulation of choppers, inverters and cyclo-converters, areas for further research.

Demonstration experiments will be set up. Also, individual projects by interested students will be encouraged.

Credit 4 (Spring 82 and every other spring)

EEEE-722 Control System Design Registration #0301-722

Evaluation of feedback control system performance; design using root locus and frequency response plots; compensating net-works; realization of transfer functions-cascade and feedback compensation; applications; analysis and design of AC feedback control systems; introduction to nonlinear system representation and design. (EEEE-613 or EEEE-712)

Credit 4 (Winter 82 and every other winter)

EEEE-734

EEEE-735

Communication Techniques Registration #0301-734 Study of different modulation schemes; linear modulation; angle

modulation; Heuristic discussion of noise in linear modulation and FM systems; noise figure; brief discussion of pulse modulation. (EEEÉ-700)

Credit 4 (Winter 81 and every other winter)

Digital Data Transmission

Registration #0301-735 Pulse code modulation and pulse amplitude modulation; carrier systems, FSK and PSK systems; DCPSK system; signal space representation of data signals and discussion of signal space. (EEEE-702.734)

Credit 4 (Spring 81 and every other spring)

EEEE-736

Information Theory

Registration #0301-736 An introduction to the fundamental concepts of information theory; entropy, equivocation, transinformation and redundancy; coding for binary channels; measurement of signal parameters in the presence of noise; bandwidth vs. accuracy. (EEEE-702) Credit 4 (Fall 81 and every other fall)

EEEE-737 Registration #0301-737

Random Signals and Noise

Random processes; correlation functions; spectrum of periodic functions and periodic random processes; orthogonal series fora random process; spectral densities; the Gaussian random process; noise through a linear system; physical sources of noise; noise figure; statistical decision theory. (EEEE-700, 702) Credit 4 (Spring 82 and every other spring)

EEEE-738 Physics of Semiconductor Devices Registration #0301-738

A basic course dealing with the physics of semiconductor devices. Topics include: physics of semiconductor materials, metalsemiconductor contacts, PN junctions, bipolar transistors, MOS structures, and IGFET transistors.

Credit 4 (Winter 81 and every other winter)

EEEE-739 Integrated Circuit Design Registration #0301-739

An introductory course in integrated circuit design and fabrica-tion. Topics include: evaporation, sputtering, epitaxial growth, diffusion, ion implantation, oxidation of silicon, photolithography, pattern generation, layout of silicon integrated circuits, resistors, MOS capacitors, isolation techniques, bipolar transistors, MOS transistors, assembly techniques, and in-process measurement and testing. (EEEE-738)

Credit 4 (Spring 81 and every other spring)

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

Credit 4 (offered upon sufficient demand)

NOTE: The microcomputer course sequence has been reorganized effective fall 1980, as reflected in the new titles for 743 and 744. The material covered in the new two-course sequence 743, 744 includes the material originally covered in the old two-course sequence, as well as some additional topics that were not taught before. Students who had taken the old 743,744 sequence will not be permitted to take the new 743. They may be permitted, however, to take the new 744.

EEEE-743 Registration #0301-743 **Microcomputer Fundamentals**

This course provides an understanding of the operation and use of micro computers. It begins with discussions of computer architecture and computer number systems. It then analyzes the major components of a computer including the CPU, memory and I/O structures. Computer instruction sets and addressing modes as well as machine language programming are studied in detail. The software and hardware aspects of input/output operations are considered including discussions of some special purpose I/O chips. The course concludes with an introduction to subroutines and stack operations. Most of the discussion is based on Motorola 6800 and Intel 8085 microprocessors. Laboratory exercises are an integral part of the course

Credit 4 (Offered every fall)

EEgE-719

EEEE-720

EEEE-744 Advanced Microcomputer Systems Design Registration #0301-744

The effective application of microprocessors in the design of digital systems requires a knowledge of both hardware and software. This course will develop an understanding of assembly language programming and hardware design techniques. The role of macro-assemblers, editors, linking loaders, and other system software aids used in microcomputer development systems to produce efficient modular code will be covered. Several aspects of hardware/software organization of input/output programs will be considered including interrups and direct memory access. The use of special LSI interface devices to allow a microcomputer to operate with peripheral devices such as A/D and D/A converters, CRT terminals, floppy disks, etc., will be studied. Concepts relating to the use of multiprocessor systems will also be discussed. Laboratory sessions will be used to provide experience in the use of software development systems, in-circuit emulators, and logic analyzers in developing and testing a microcomputer system design. (EEEE-743)

Credit 4 (Offered every winter)

EEEE-750

Logic Design of Digital Systems I

Registration #0301 -750 This is the first in a sequence of three courses dealing with the logical design of digital systems. The student is assumed to be already familiar with the fundamental concepts of logic, logic gates, logic networks, truth tables, as well as having some knowledge of Karnaugh maps and their applications. The topics that will be covered in this course are as follows

Boolean algebra and applications: A formal development of Boolean algebra and its theorems. Emphasis will be placed on algebraic proofs of theorems and their applications to the manipu-lation and simplification of switching functions. Karnaugh maps will be reviewed and discussed in a formal manner. *II. Number Sys*tems and Arithmetic: Binary, octal, and hexadecimal number systems; addition and subtraction in the different number systems; adders, subtractors, and high speed addition of numbers; subtraction using 1 's complement and 2's complement representation of negative numbers; arithmetic units. *III. Asynchronous Sequential Circuits:* Flip flops and their application to sequential circuits. Fundamental mode asynchronous sequential circuits will be studied in detail covering their analysis, design, equivalence of states and state minimization, races and the elimination of critical races. Pulse mode sequential circuits.

Credit 4 (Offered fall 81 and every other fall)

EEEE-751 Logic Design of Digital Systems II

Registration #0301-751 The objective of this course is to study the switching characteris-tics of transistors (BJT, JFET, MOSFET) and to teach the students how to analyze digital electronic circuits. Topics include: transistor in the saturation, active and cutoff modes-normal and inverse modes; JFETs and MOSFETs as switches. Logic families: RTL, $\rm I^2L,$ DTL, T²L, ECL, CMOS, NMOS, PMOS. Analog switches. (EEEE-441, 442 or equivalent background in electronic circuit analysis)

Credit 4 (Offered winter 82 and every other winter)

NOTE: The course EEEE-740 (Digital Integrated Circuits) is no longer offered. However, much of the material from that course has been included in 751.

EEEE-752 Logic Design of Digital Systems III

Registration #0301-752 This course will discuss a selected list of topics that follows those covered in 750 and 751. The exact list of topics and the outline of the course is in the process of being developed and will be available by fall 1981.

Credit 4 (Offered spring 82 and every other spring)

EEEE-760 Practical R & D Management

Registration #0301-760

The course is intended to help engineers currently in industrial R&D or engineering and students interested in R&D management careers, understand the concepts and practical aspects of project and organizational management and planning in RD&E environ-ment. Topics to be discussed will include: objectives of industrial R&D, types of R&D organizations, selection of new products for development, long and short range planning, methods of project scheduling and control, communication within R&D and with other organizations, task assignment, problem solving in R&D, financial controls and budget preparation, proposal and report writing. The participants will be expected to carry out planning, organization and control of a simulated R&D project.

Credit 4 (offered upon sufficient demand)

EEEE-772, 773, 774 **Special Topics in Electrical** Registration #0301-772, -773, -774 Engineering Topics and subject areas that are not among the courses listed above are frequently offered under the title of Special Topics. Such courses are offered in the normal course format (regularly scheduled class sessions taught by an instructor). The number of credits may vary from course to course, but usually it is 4 credits per course. (No regular schedule)

Credit variable (maximum 4 per course number)

EEEE-780

Registration #0301 -780

This course number should be used by students wishing to study a topic on an independent study basis. The student must obtain the permission of the faculty member prior to registration.

Credit 4

EEEE-800, 801 Registration #0301-800, -801

This course number is used to fulfill the graduate paper requirement under the non-thesis option for the master of science degree in electrical engineering. The graduate paper is an extensive term paper on a topic of professional interest. The student must obtain the consent of a faculty member to supervise the paper before registering for these course numbers.

Credit 4 for EEEE-800; variable (maximum 4) for EEEE-801

EEEE-890

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)

EENG-790

Engineering Internship Registration #0302-790 This course number is used by the students in the master of engi-

neering degree program for earning internship credits. The actual number of credits is to be determined by the student's faculty advisor and subject to approval of the Graduate Committee of the College of Engineering. Credit variable

Industrial Engineering

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

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

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

Class 3, Lab. 1, Credit 4

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

A first course in computer programming for engineers and in particular industrial engineers. The course involves extensive devel-opment of programming skills required in the engineering disciplines.

Class 4, Credit 4

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

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

Class 4, Credit 4

Introduction to Operations Research II **EIEI-402**

Registration #0303-402 A survey of elementary mathematical models within the field of

systems and industrial engineering. Areas of study include queueing theory, network analysis, and inventory theory. (SMAM-351 SMAM 306)

Class 4, Credit 4

Independent Study

Graduate Paper

Research and Thesis Guidance

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

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

Class 3, Lab. 2, Credit 4

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

Methods of measuring and analyzing work, human capabilities, process and micromotion, memomotion study, operation analysis. Emphasis placed on methods of operation analysis as applied to the design and evaluation of man-machine systems. Class 3, Lab. 2, Credit 4

EIEI-422

Systems & Facilities Planning

Registration #0303-422 A basic course in plant layout. Topics covered include product-quantity analysis, flow of materials, relationship charts, activity charts, material handling systems, and factors influencing the layout design. The course includes basic drafting application as well as state of the art computer aided layout design. (EIEI-401 or consent of instructor)

Class 3, Lab. 2, Credit 4

Management Theory and Practice EIEI-481

Registration #0303-481 Development of the fundamental principles of the industrial enterprise. Internal organization as well as general economic conditions are considered. Emphasis is placed on the role of behavioral science.

Class 4, Credit 4 EI EI-503

Simulation

Registration #0303-503 A first course in simulation emphasizing the role of the computer in developing simulation models. The GASP IV simulation language is emphasized. (EIEI-202, SMAM-351 or equivalent)

Class 4, Credit 4 EIEI-510,511

Applied Statistical Analysis

Registration #0303-510, -511 for Engineers I, II An applied approach to statistics utilizing theoretical tools acquired in other math-stat courses. Heavy emphasis on understanding and applying statistical analysis methods in real-world situations in engineering. Topics include quality control, reliability, analysis of variance, and regression. (SMAM-351, 352) Class 4, Credit 4

EIEI-520 Engineering Economy Registration #0303-520

Time value of money, methods of comparing alternatives, depre-ciation and depletion, income tax consideration, replacement, retirement and obsolescence, and capital budgeting.

Class 4, Credit 4

Class 4, Credit 4

EIEI-530

Engineering Design

Registration #0303-530 A case study approach of ten real world experiences in engineering design, (consent of instructor)

EIEI-560 Registration #0303-560

Project Design

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

The following courses can be used as professional electives within industrial engineering and are offered subject to sufficient demand. You should consult with your advisor for advice on professional electives outside of the industrial engineering discipline.

Applied Human Factors Design of Experiments EIEI-450 Registration #0303-450

An applied approach to the problem of how one goes about running a study or experiment in human factors. (EIEI-511 or consent of instructor)

Class 4, Credit 4

EIEI-482 Registration #0303-482

A basic course in production control emphasizing the systems approach. Topics covered include forecasting, mathematical inventory models, material requirements planning and scheduling including PERT. (EIEI-510 or consent of instructor) Class 4, Credit 4

EIEI-483

Production Control II

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

EIEI-504 Introduction to Operations Research III Registration #0303-504

A course intended to provide an integrated view of advanced programming techniques and their applications to industrial prob-lems. Selected topics might include a working knowledge of PGERT, QGERT, etc. (EIEI-401, 402 or consent of instructor) Class 4, Credit 4

EIEI-512

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

Class 4, Credit 4

EIEI-540 Introduction to Operations Research IV Registration #0303-540

An introduction to some advanced topics in operations research and industrial engineering. Areas of study may include game theory, Markov chains and their applications, decision analysis, network analysis. (5th year I.E. standing or consent of instructor) Class 4, Credit 4

EIEI-545 Techniques of Systems Engineering Registration #0303-545

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

Class 4, Credit 4

EIEI-550

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

Class variable, Credit variable

FIFI-599

Independent Study

Safety Engineering

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

Graduate Courses

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

Production Control I

Reliability

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-620

El El-715, 716 Statistical Analysis for Registration #0303-715, -716 Engineers I & II

A basic two-quarter course in probability and statistics designed to give the student a foundation for further study in areas such as design of experiments, stochastic systems, and simulation. Credit 4

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

EIEI-601

Value Analysis

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

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

Applied linear programming. Computational techniques for solving constrained optimization problems. Linear programming, the Simplex method and variations, duality and sensitivity testing. Credit 4

EIEI-702 Mathematical Programming Registration #0303-702

Application of non-linear programming techniques. Classical optimization techniques; quadratic, stochastic, integer programming and dynamic programming. Applications to industry. (EIEI-701) Credit 4

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

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

EI EI-710

Systems Simulation

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

Credit 4

EIEI-718 Inventory Design Registration #0303-718

Overview of inventory problems. Single period models under risk and uncertainty, dynamic models under certainty, dynamic models under risk and uncertainty. Forecasting, inventory system analysis. Credit 4

EIEI-720 Production Control Registration #0303-720

A systems approach to the design of production control operations. Investigation of forecasting, operations planning, inventory control, and scheduling. Case studies and the design of actual production systems is encouraged.

Credit 4

EIEI-723 Registration #0303-723

Facilities Planning

Principles of plant layout and material handling. Topics covered include criterion selection, cost elements, the layout design process, SLP, computerized plant layout and quantitative plant layout and material handling techniques relating to operations research.

Credit 4

Technological Forecasting

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

EIEI-730 Biotechnology and Human Factors I Registration #0303-703

Basic functional anatomy and physiology. Human body systems. Anthropometry. Applications on the design for man and manmachine systems. Work physiology. Industrial biomechanics. Credit 4

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

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

Credit 4

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

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

Credit 4

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

Measurements of human performance. Functions that man performs in man-machine systems. Techniques to quantify man's behavior at work. Credit 4

Systems Safety Engineering

Registration #0303-734 Accident study of the human component in occupational systems. Product systems safety analysis. Approaches in accident prevention.

Credit 4

EIEI-734

Special courses related to a particular student's interest can be arranged via the following course:

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

Credit variable (maximum 4 per course number)

Mechanical Engineering

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

EMEM-201 Introduction to Mechanical Engineering Graphics Registration #0304-201

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

Class 2, Lab 4, Credit 4

EMEM-331 Registration #0304-331

Mechanics I

For students majoring in computer, electrical and industrial engi-neering. Statics and introduction to strength of materials, vector algebra, Newton's laws, the principle of transmissibility of forces, couples, centroids, trusses, frames, machines, internal force and moment diagrams for beams, and friction. Axial stresses and strains, statically indeterminate problems, thin-walled pressure vessels, direct shear, and torsion. (SMAM-253, SPSP-205) Class 4, Credit 4

EMEM-332 Registration #0304-332

Mechanics II

Statics

Additional topics in strength of materials and dynamics; stresses and deflections associated with beams in bending; kinematics and kinetics of particles and rigid bodies in one and two dimensions, work-energy methods, and principles of impulse momentum. (EMEM-331) Class 4, Credit 4

EMEM-336 Registration #0304-336

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

Class 4, Credit 4

EMEM-337 Registration #0304-337

Strength of Materials I

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

Class 3, Lab/Rec 2, Credit 4

EMEM-338

EMEM-340

EMEM-341

Strength of Materials II

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

Class 3, Lab/Rec 2, Credit 4

Engineering Communications I

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

Class 1, Lab 2, Credit 2

Engineering Communications II Registration #0304-341

The objective of this course is to provide an introduction to Fortran programming. Topics covered include terminal and batch processing, input-output statements, arithmetic and logical IF statements, implicit and explicit DO loops and subroutines Class 2, Credit 2

EMEM-343 Registration #0304-343

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

Class 3, Lab. 3, Credit 4

EMEM-344 Registration #0304-344

Materials Science

A study of the properties of metallic, organic, and ceramic materials as related to structural imperfections, atom movements, and phase changes. The intent of the course is to develop a basic understanding of the structure of materials and to study the behavior of materials in service environments. (SCHG-208) Class 3, Lab. 2, Credit 4

EMEM-413 Registration #0304-413

Thermodynamics I

A basic course that introduces the mathematical theory of thermodynamics via a series of classical experiments. After the com-plete first law analysis of air standard engines and refrigerators (Carnot, Otto, Diesel, etc.), the Clausius and Kelvin statements of the second law are correlated with the concept of entropy. Both real and reversible processes are studied on the pressure vs. specific volume and the temperature vs. entropy coordinate systems. (SMAM-306, EMEM-336) Class 4, Credit 4

EMEM-414

Registration #0304-414

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

Class 3, Lab/Rec 2, Credit 4

EMEM-415 Registration #0304-415

Fluid Mechanics I

Thermodynamics II

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

Class 3, Lab/Rec 2, Credit 4

EMEM-431 Registration #0304-431

Thermodynamics

Introduction to Machine Design

basic course in thermodynamics for electrical engineering students. Applications of the first and second law to closed and open systems; elementary heat transfer considerations. Class 4, Credit 4

EMEM-437

Registration #0304-437

The analysis and theory of machine design and applications to systems design problems; particular emphasis is placed on the design and analysis of machine elements. (EMEM-338)

Class 4, Credit 4

Materials Processing

EMEM-439 Registration #0304-439

Dynamics I

A basic course in the fundamentals of kinematics and kinetics of single-particle motion in one, two, and three dimensions. Vector algebra is reviewed and vector calculus is used to define the derivative of a unit vector in rotating coordinate systems. Newton's second law of motion is introduced, along with the review of "the free body diagram," to generate the differential equations of motion of particles. The differential equations of motion are solved by using classical methods. Variations of Newton's second law of motion, such as the work and energy technique and the impulse and momentum technique, are introduced and applied to various two-dimensional problems. Two-body collisions (impact) are defined, and the equations relating the velocities of the two particles before and after impact are derived. Kepler's three laws of Gravitation. The central force-field problem is thus defined, and problems involving satellite motion of satellites about the Earth are solved. (EMEM-336, SMAM-308)

EMEM-440

Numerical Modeling for Engineers

Registration #0304-440 The solution of engineering problems requiring numerical solution. Included are the formulation of mathematical models of the problems, a study of numerical procedures suitable for their solution, the development of computer programs to carry out the procedures, and the analysis of the results. Problems will be taken from the student's background in solid body mechanics and thermodynamics. Extensive use of the computer is required. (EMEM-341, or equivalent computer experience, and third year standing.) Class 4, Credit 4

EMEM-501 Mechanical Engineering Laboratory Registration #0304-501

A course in experimental methods, with laboratory experiments and lectures on the underlying theory. Topics considered are design of experiments, experimental error and error analysis including some statistical analysis of data, calibration of equipment, presentation of results in engineering reports. The theory and use of measuring devices for the determination of strain, pressure, temperature, flow rate, vibration, etc., and transient response of transducers. In addition to standard laboratory exercises and experiments, an original experiment to measure a particular physical phenomenon is to be designed and implemented by the student either individually or in a small group. (Fourth-year standing)

Class 2, Lab 4, Credit 4

EMEM-514

Registration #0304-514

Heat Transfer

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, and numerical and graphical techniques. (EMEM-413, EMEM-415) Class 4, Credit 4

EMEM-516

Registration #0304-516

Fluid Mechanics II

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

Class 3, Lab/Rec 2, Credit 4

EMEM-543 Registration #0304-543

Dynamics II

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

One laboratory period per week is devoted to the introduction and use of the analog computer. The analog flow diagram using the dimensionless computer variable is defined and used in all problems. Lumped parameter systems made up of masses, springs, and dashpots are analyzed by classical methods and by using the analog computer. The laboratory introduces the vibrations of single particle systems. (EMEM-439) Class 3, Lab/Rec 2, Credit 4

EMEM-544 Dynamics of Physical Systems I Registration #0304-544

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

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

This course completes the required core of courses in the Mechanics Option of the Mechanical Engineering Curriculum. (EMEM-543)

Class 3, Lab 2, Credit 4 EMEM-599 Registration #0304-599

Independent Study

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

Class variable, Credit variable

EMEM-632 Advanced Mechanical Systems Design

Registration #0304-632 Structural dynamics considerations in the design of advanced mechanical systems. Principles of modal analysis. Finite element analysis procedures, including concepts, modeling, and problem coding. Experience in the application of a large finite element program to a complex mechanical system. Fracture mechanics procedures and their use in the design process. A design project based on practical engineering situations is required. (EM EM-437, EMEM-685)

Class 4, Credit 4

EMEM-635 Industrial Heat Transfer Registration #0304-635

This course involves a detailed study of numerical methods in heat conduction, analytical methods in forced and free convection, design correlations for convection, an introduction to mass transfer and change of phase. Each student is required to submit an individual or group project on a practical heat transfer problem to reinforce his or her classroom experiences. (EMEM-514, EMEM-440)

Class 4, Credit 4

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

The conservation laws, Newton's second law, the second law of thermodynamics and appropriate equations of state are used to study water turbines, gas turbines, steam turbines, compressors, and centrifugal pumps. Dimensional analysis and empirical data are also used and studied. The student is expected to write a design-oriented term paper. (EMEM-415) Class 4, Credit 4

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

A basic course in the principles and the applications of refrigera-tion and air conditioning involving mechanical vapor compression and absorption refrigeration cycles, associated hardware, psychrometrics solar radiation, heat transmission in buildings, and thermodynamic design of air conditioning systems. Students are expected to do a design project. (EMEM-514) Class 4, Credit 4

EMEM-672 Registration #0304-672

Selected Machine Elements

The course treats static design of advanced machine elements and discusses the fundamentals of dynamic design of machinery. Topics include complete cycle dynamic analysis of mechanisms, the method of virtual work applied to dynamical systems, cam design, and balancing. The digital computer and the ZETA plotter are used. (EMEM-439)

Class 4, Credit 4 **EMEM-694**

Stress Analysis

Registration #0304-694 Experiments and lectures on topics in stress analysis; non-sym-metric bending, composite beams, curved beams, thick-walled cylinders, torsion, stress concentrations, plastic behavior, contact stresses; complex stresses; experimental verification of the theories of failure; energy methods; experiments with strain gages, photoelasticity applications, and brittle coatings. (EMEM-338)

Class 4, Credit 4

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

EMEM-601 Alternative Energy Sources

Registration #0304-601 Emphasis on the technical aspects of solar and wind energy. Wind characteristics and site analysis, aerodynamics of horizontal and vertical axis rotors, and the economics of wind power. Fundamentals of solar radiation, solar hot water heating and solar space heating, and the economics of solar utilization. Included, but to a lesser extent, are tidal power, wave power, geothermal energy, ocean thermal gradient, and energy from waste. Individual term projects are required. (EMEM-514 or permission of instructor) Class 4, Credit 4

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

Kinematic Analysis of Mechanisms EMEM-676 Registration #0304-676 A course in mechanisms: motion, velocity, acceleration analysis; the design of linkages, cams, special gearing, variable speed drives. (EMEM-543)

Class 4, Credit 4 EMEM-677

Modem Energy Conversion

Registration #0304-677 Principles of energy conversion, introduction to semiconductors, thermoelectric generators, photovoltaic generators, thermoionic generators, magnetohydrodynamic power generators. (EMEM-

Class 4, Credit 4

EMEM-679 Registration #0304-679

A continuation of EMEM-544. Review of systems analyses and negative transform) and its use in stating transform (one-sided negative transform) and its use in stating transfer functions. Stabi-lity criteria using Bode plots. Design of systems using root-locus method. Some real control systems will be discussed and analyzed.

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

Class 3, Lab 2, Credit 4

EMEM-680

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

Class 4, Credit 4

EMEM-685

Advanced Strength of Materials

Advanced Thermodynamics

Dynamics of Physical Systems II

Registration #0304-685 Statically indeterminate problems for beams; frames; continuous beams; beams of variable cross section, reinforced-concrete beams; beams on elastic foundation; stability of columns; plastic deformation in bending and torsion; limit analysis; energy methods with applications to beams, curved bars, and frames; rotating disks; introduction to bending of plates. (EMEM-338) Class 4, Credit 4

EMEM-689

Patent Law and Protection

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

Class 4, Credit 4

EMEM-696

Nuclear Power

Registration #0304-696 A first course in nuclear engineering: brief review of nuclear physics related to fission, fusion, and radiation emission; use of radioisotopes; biological effects of radiation and shielding; radiation detection, steady state reactor theory and reactor control. (Fourth-year standing) Class 4, Credit 4

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



EMEM-670 al Stresses Registration #0304-670 CANCELED Thermal stresses in bars + .alls; energy methods: introuns and to viscoelastic stress anal Class 4, Cre **Environment and the Engineer** EMEM-690 Registration #0304-690 This course will study the role of engineers in society and in par-ticular their responsibility in the analysis and solution of the problems facing the environment in an increchnological CANCELED society. Problems to be studied standpoint CANCELED growth. The course will opert speakers, and each student will opert speakers, and each student will will include such thin pollution, a include fiel

be expected particular interest to him or her and to submit a formal report to the class. Use of the digital and analog computing facilities as a systems simulation tool will be encouraged. (Fourth-year standing)

Class 4, Credit 4

Graduate course offerings:

EMEM-692*

Analysis for Engineers

Registration #0304-692* Partial differentiation, chain rule, and total differential; multiple integration and manipulation of multiple integrals; linear constant coefficient ordinary differential equations; vector algebra and differentiation of vectors or complex variables. Credit 4

EMEM-693* **Thermo Fluid System Analysis** Registration #0304-693*

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

Credit 4

Credit 4

EMEM-695		Solid Wa	ste Management
Registration #030 A study of the prace addition to the term	04-695 ctices and new	ED	disposal. In
the socio-j waste mai design casi	CANCEL	at is that o	al aspects of solid of an engineering
Class 4 Credit 4			

EMEM-699* Applied Mechanics System Analysis Registration #0304-699*

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

EMEM-812 **Theory of Plates and Shells** Registration #0304-812

Theory of thin plates for small deflections. Rectangular and circular plates with various boundary conditions, elliptic and triangular plates. Membrane theory of shells, cylindrical shells, pressure vessels, shells of revolution. (EMEM-338)

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 tech-niques; and the hydrodynamic, electrical, and membrane analogs. Laboratory tests of models. (EMEM-694 or equivalent) Credit 4

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

EMEM-816 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-821 Vibration Theory and Registration #0304-821 Applications

Vibration of discrete multi-mass systems using matrix methods. Normal mode theory, and matrix eigenvalue extraction proce-dures. Matrix forced response. Practical examples using two and three degrees of freedom. Computer situations. Credit 4

EMEM-828, 829

Special Topics in **Applied Mechanics**

Registration #0304-828, -829 An opportunity for the advanced student to undertake an independent investigation in the area of applied mechanics. Assistance will be given only when the student requests it. The project may be a comprehensive literature investigation, theoretical study, or an investigation involving laboratory experiment. Credit variable (maximum of 4 credits/quarter)

EMEM-833 Heat Exchanger Design Registration #0304-833

The course covers analytical models for forced convection through tubes and over surfaces, experimental correlations for the Nusselt number and pressure drop; design of single and multiple pass shell and tube heat exchangers; compact, baffled, direct contact, plate, and fluidized bed heat exchangers; radiators, recuperators, and regenerators. (EMEM-514) Credit 4

EMEM-845

Turbomachinery

Registration #0304-845 One-dimensional analysis of centrifugal pumps, water turbines, and axial flow turbines and compressors. Emphasis on blending the application of physical principles, dimensional analysis, and empirical data to design turbomachines. (EMEM-516) Credit 4

EMEM-848, 849 **Special Topics in Thermo** Registration #0304-848, -849 Fluid Systems An opportunity for the advanced student to undertake an independent investigation in the area of thermo fluid systems. Assistance will be given only when the student requests it. The project may be a comprehensive literature investigation, a theoretical study, or an investigation involving laboratory experiment. Credit variable (maximum of 4 credits/quarter)

EMEM-858, 859

Special Topics in Registration #0304-858, -859 Systems Analysis An opportunity for the advanced student to undertake an inde-

pendent 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-862 Registration #0304-862

Solid Wastes Engineering

A study of the collection, processing, disposal and reuse of solid wastes of municipal, industrial, and agricultural origin. A discus-sion 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

Finite Elements

EMEM-871 Registration #0304-871

Mathematics for Engineers

Vector calculus review, solutions to ordinary differential equations using the method of Frobenius, and Laplace transforms, phase plane analysis of linear and nonlinear differential equations, and an introduction to functions of complex variables. (SMAM-308, EMEM-692, or equivalent)

Credit 4

EMEM-872 Mechanics

Registration #0304-872 Advanced dynamics and vibrations are emphasized. Newtonian vector mechanics and energy formulations are applied to twoand three-dimensional problems of single and multi-degree of freedom. The concepts of Virtual Work, Hamilton's Principle, and Lagrange's equations are covered. The vibration of discrete multimass systems includes the formulation and eigenvalue solutions by computer, and the method of finite elements are included. The vibration of continuous systems and discrete modeling is introduced. (SMAM-308 or EMEM-692 and EMEM-543) Credit 4

EMEM-873

Heat Transfer

Registration #0304-873 Formulation of the heat conduction equation, solution of the onedimensional, unsteady heat conduction equation by separation of variables: Sturm-Liouville system, orthogonal functions, generalized Fourier series, Bessel functions. Solution of the two-dimensional, steady heat conduction equation; Cartesian and cylindrical geometry. (SMAM-308, EMEM-514) Credit 4

EMEM-874 Numerical Methods Registration #0304-874

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

Credit 4

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

Various displacement, strain, velocity, acceleration, pressure transducers will be discussed along with the associated electronic equipment and recorders to measure and record the variables. A laboratory session will be substituted in place of class when experiments are assigned. The static and dynamic characteristics of the instruments will be obtained as these instruments are mathematically modeled and subjected to impulse, step and ramp frequency functions of time. (Graduate standing) Credit 4

EMEM-876 Registration #0304-876

Review of physical metallurgy, effects of alloying elements in steel, corrosion, fatigue, fracture, high and low temperature behavior, plastics, welding. (EMEM-344) 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)

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

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

Engineering Materials

College of Fine and Applied Arts

School of Art and Design

FADC-301, 302, 303 Introduc Registration #0402-301, -302, -303 Communication Design Introduction to 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 communi-cations. The relationship of typography and photography 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 (offered each year)

FADC-401,402,403

Communication Design Registration #0402-401, -402, -403 (Junior Major) Creative problem solving experiences relating to visual communi-cation imagery based on strong emphasis of formal design values and their utilization for the communication of ideas. Assignments oriented to building 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)

Lab. 12, Credit 6 (offered each year)

FADC-411,412,413 **Communication Design** Registration #0402-411, -412, -413

An elective providing the opportunity to carry on problem solving in the communications area. Each quarter concentrates on specific design topics of study: design for reproduction, computer graphics, silk screen printing.

Lab. 6, Credit 3

FADC-501, 502, 503 **Communication Design** Registration #0402-501, -502, -503 (Senior Major) 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. 18, Credit 9 (offered each year)

FADC-511.512.513 **Communication Design**

Registration #0402-511,-512, -513 A professional elective providing the opportunity to carry on the objectives of the communicating arts. Each quarter concentrates on specific topics of design study.

Lab. 6, Credit 3 (offered each year)

FADC-520 Professional Design Business Practices Registration #0402-520 and Ethics Ethical principles will be discussed along with sound business practices; setting up in business; invoicing and costing; and designer and the law, professional associations.

Class 3, Credit 3 (offered each year)

Environmental Design-Exhibit FADD-301

Registration #0403-301 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 (offered each year)

FADD-302 Registration #0403-302

Environmental Design—Product

Introduction to the design process of developing a simple utilitarian product for a specific use. (Foundation program or equivalent)

Lab. 6, Credit 3 (offered each year)

FADD-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 (offered each year)

FADD-311, 312, 313 **Environmental Design** Registration #0403-311, -312, -313

Introductory instruction and specified projects in environmental design. 311 - Industrial design

- 312 Interior design
- 313 Exhibit design

Lab. 6, Credit 3 (offered each year)

Environmental Design—Graphic FADD-320 Registration #0403-320 Visualization Graphic visualization techniques for the development and presentation of concepts for three-dimensional designs. Familiar-ization with various media in developing and improving graphic communication skills of value to the designer. Lab. 6, Credit 3 (offered each year)

FADD-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 and marketing requirements. (Foundation program or equivalent)

Lab. 12, Credit 6 (offered each year)

FADD-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 (offered each year)

FADD-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 (offered each year)

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

Lab. 6, Credit 3 (offered each year)

FADD-501 Environmental Design—Product, Registration #0403-501 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 (offered each year)

FADD-502 Environmental Design-Interior, Registration #0403-502 Product Systems Design of component interior and product systems for particular environments or facilities.

Lab. 18. Credit 9 (offered each year)

FADD-503 Environmental Design—Thesis Registration #0403-503 Directed design project allowing individual program emphasis. (FADD-401, 402, 403)

Lab. 18, Credit 9 (offered each year

FADD-511,512, 513 Design Applications Registration #0403-511, -512, -513

An elective that provides additional emphasis on professional procedures, functions, structure and processes as they apply to the design environment.

Design (Crafts Majors)

Lab. 6, Credit 3 (offered each year)

FADF-201, 202, 203 Registration #0404-201, 202, 203

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

Lab. 6, Credit 3 (offered each year)

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

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

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

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

Lab. 9, Credit 4 (offered each year) FADF-221, 222, 223 Photo Design I Registration #0404-221,-222, -223

The elements of design and color and their structural use as related to problems in two- and three-dimensional applications. Lab. 6, Credit 2 (offered each year)

FADF-231, 232, 233 2-D Design Registration #0404-231, 232, 233 The elements of design and color and their structural relationship as applied to problems in two dimensions. Lab. 6, Credit 3 (offered each year)

FADF-241, 242, 243 3-D Design Registration #0404-241, 242, 243 The elements of design and color and their structural relationship as applied to problems in three dimensions.

Lab. 6, Credit 3 (offered each year) FADF-261, 262, 263 Drawing (Crafts Majors) Registration #0404-261, 262, 263

Drawing in a variety of media. Introduction to line, form, and color as elements of pictorial expression. Organic and inorganic materials are used.

Lab. 6, Credit 3 (offered each year)

FADF-321, 322, 323 Photo Design II Registration #0404-321,-322, -323 Emphasis upon problems which are related to visual phenomena

fundamentals, and communications. Lab. 3, Credit 2 (offered each year)

FADP-301, 302, 303 Advanced Drawing Registration #0405-301,-302, -303 Three-quarter core course for fine arts program in painting and printmaking. Initial emphasis 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

Lab. 6, Credit 3 (offered each year)

expanded media.

Medical Illustration Carbon Dust Technique **FADP-313** Registration #0404-313-80

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 (offered each year)

FADP-320 Registration #0405-320

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

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

FADP-322,323

Registration #0405-322, -323

One-quarter course exploring the art of illustrators; their relation to audience, publishers, and media. Studio problems will develop and expand basic concepts of 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 (offered each year)

FADP-401, 402, 403

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)

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

Lab. 6, Credit 3 (offered each year)

Lab. 12, Credit 6 (offered each year)

FADP-421,422, 423 Medical Illustration Applications

Registration #0405-421, -422, -423 Development of range and mastery of medical illustration techniques. Laboratory sessions scheduled in bio-medical illustration. (Lab orientation sessions to be scheduled in operating room facilities.)

Lab. 6, Credit 5, Fall (offered each year) Lab. 12, Credit 8, Winter, Spring (offered each year)

Painting

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

Lab. 18, Credit 9 (offered each year)

FADP-511.512.513 Painting Registration #0405-511, -512, -513 An elective that provides further exploration of personal expres-sive styles through a painting media.

Lab. 6, Credit 3 (offered each year)

Advanced Medical Illustration FADP-531, 532, 533 Registration #0405-531,-532, -533

Advanced medical illustration techniques. Graphic design related to illustrative and photographic practice. Lab sessions to be scheduled in operating room facilities.

Jointly sponsored between RIT and the University of Rochester Lab. 18, Credit 6 (offered each year)

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

Lab. 12, Credit 6 (offered each year)

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Color

Illustration

Painting

FADR-411,412,413 Printmaking Registration #0406-411,-412,-413 An elective providing the opportunity to explore personal statements through lithography, etching and relief (one per quarter) Lab. 6, Credit 3 (offered each year) Printmaking FADR-501, 502, 503

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 (offered each year)

FADR-511, 512, 513 Printmaking Registration #0406-511, -512, -513 An elective that provides further exploration of printmaking with emphasis on personal statement. Lab. 6, Credit 3 (offered each year)

FADS-411, 412, 413

Sculpture

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

Lab. 6, Credit 3 (offered each year)

School for American Craftsmen

FSCC-200 Registration #0409-200

Ceramics Materials and Processes

Ceramics Craft Elective I

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 (offered each year)

FSCC-251, 252, 253

Registration #0409-251, -252, -253 An elementary course in design and techniques in ceramics. Wheel and hand built pottery, along with glaze information, will be studied.

Lab. 6, Credit 3 (offered each year)

FSCC-300 Ceramics Materials and Processes

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

Lab. 15, Credit 5 (offered each year)

FSCC-351, 352, 353 **Ceramics Craft Elective II** Registration #0409-351, -352, -353

An elective course providing an opportunity for more advanced study in ceramics. Wheel and hand built pottery, along with glaze information, will be studied.

Lab. 6, Credit 3 (offered each year)

FSCC-400 **Ceramics Materials and Processes** Registration #0409-400

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 (offered each year)

FSCC-500

Registration #0409-500

Sequential course for three quarters, treating problems related to ceramic production culminating in a research and thesis project. Lab. 24, Credit 8 (offered each year)

FSCF-225, 226, 227

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. Lec-tures, independent study, discussion groups, assigned gallery visits, papers, reports.

Class 3, Credit 3 (offered each year)

FSCF-300

Registration #0410-300 Explores the historical precedents of two and three dimensional design including fine arts, industrial, graphic and environmental design. The course will provide a foundation for individual decisions on planning and designing to complement and enhance

present and future environments. Class 3, Credit 3 (offered each year)

FSCF-310 Registration #0410-310

Explores creative thinking and designing in the area of crafts through the ages with special emphasis on clay, fibers, glass, metal and wood. The course highlights the artistic achievements of the craftsmen of the past to enable present students to view their own time in its historical perspective and thereby understand more thoroughly their creative heritage and the efforts of contemporary craftsmen.

Class 3, Credit 3 (offered each year)

FSCF-320

Registration #0410-320 A study of what makes art "good," (philosophic theories of art and the aesthetic experience) and what art criticism is and does (types and principles of art criticism) with direct applications to the life and work of the artist and craftsman/designer.

Class 3, Credit 3 (offered each year)

FSCF-330

Philosophy in Art

Man and His Symbols

Asian Art

Registration #0410-330 Traces the historical changes that art has undergone. Traces the interaction between philosophic thought and artistic styles throughout art history. Explores art as a reflection of human values.

Class 3, Credit 3 (offered each year)

FSCF-340 Registration #0410-340

A concentration study of symbols, legends, and myths in the visual arts with emphasis on symbol making for communication. Class 3, Credit 3 (offered each year)

FSCF-350

Registration #0410-350 A study of the art of India, China, and Japan in the area of painting, printmaking, sculpture, architecture and the crafts with emphasis on their implications for contemporary artists/designer and craftsmen

Class 3, Credit 3 (offered each year)

FSCF-360 Registration #0410-360

18th & 19th Century Art

20th Century Art

The development of the arts in these two centuries in the areas of painting, printmaking, sculpture, architecture, and the crafts with emphasis on their influence of 20th century styles and focusing on their impact on the artist/craftsman/designer.

Class 3, Credit 3 (offered each year)

FSCF-370 Registration #0410-370

The development of the arts in the 20th century in the areas of painting, printmaking, sculpture, architecture, and the crafts with eir imnact the artist/craftsman/designer ocus o

Class 3, Credit 3 (offered each year)

History of Design

History of Crafts

Art and Civilization

Ceramics Techniques and Thesis

History of Art Criticism

FSCF-380 Contemporary Art Registration #0410-380

A study of the painting, printmaking, sculpture, architecture and crafts from the present year to the 1960's with focus on the current American scene

Class 3, Credit 3 (offered each year)

FSCF-390

Selected Topics

Registration #0410-390 Consideration of special art historical themes, areas, and topics not covered in regular courses.

Class 3, Credit 3 (offered each year)

FSCG-200 **Glass Materials and Processes** Registration #0411-200

Sequential course for three quarters, treating the organization •and construction of the glass studio, including the design and fabrication of furnaces, annealing ovens, burners, tools, and grinding equipment. The function and care of hand and machine glassworking tools. An analysis of glass as a material: its history, chemical makeup, intrinsic qualities, and potential. Fundamental techniques of glass fabrication, including gathering, marvering, and blowing the bubble; blocking; jacking; and puntying the piece. Lab. 15, Credit 5 (offered each year)

FSCG-251, 252, 253

Glass Craft Elective I

Registration #0411-251, -252, -253 An elementary course in design and techniques in cold glass Study of sandblasting, grinding, flexible shaft drawing, cutting and epoxy painting will assist in concepts.

Lab. 6, Credit 3 (offered each year)

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 (offered each year)

FSCG-351, 352, 353

Glass Elective II

Registration #0411-351, 352, -353 An elective course providing an opportunity for more advanced study in cold glass. Study of sandblasting, grinding, flexible shaft drawing, cutting and epoxy painting will assist in concepts.

Lab. 6, Credit 3 (offered each year)

FSCG-400 **Glass Materials and Processes** Registration #0411-400

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

Lab. 15, Credit 5 (offered each year)

FSCG-500 Glass Techniques and Thesis Registration #0411-500

Sequential course for three quarters, introducing problems related to glass fabrication, culminating in a research and thesis project. The student is expected to organize and present an exhibition of his or her work in a manner to reflect a continuity and growth of style.

Lab. 24, Credit 8 (offered each year)

ESCG-520 Registration #0411-520

Monumental Stained Glass

This elective teaches the basics to stained glass designing, cutting, soldering, leading, glazing and other fabrication techniques. Lab. 6, Credit 3 (offered each year)

FSCM-200 Registration #0412-200

Metalcrafts Materials and Processes

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 tech-niques 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 (offered each year)

FSCM-251, 252, 253

Registration #0412-251, -252, -253 An elective course providing an opportunity for more advanced study in metals either hollow ware or jewelry.

Lab. 6, Credit 3 (offered each year)

FSCM-300

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

Lab. 15, Credit 5 (offered each year)

FSCM-351, 352, 353

Metalcrafts Elective II

Metalcrafts Elective I

Metalcrafts Materials

Registration #0412-351, -352, -353 An elective course providing an opportunity for more advanced study in metals either hollow ware or jewelry.

Lab. 6, Credit 3 (offered each year)

FSCM-400 Metalcrafts Materials 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 (offered each year)

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 (offered each year)

FSCT-200

Textile Materials and Processes Registration #0413-200 Sequential course for three quarters, providing fundamentals of fabric design, yarn calculation, and pattern drafting. Analysis of

equipment and problems. Practice in basic weaves. Experiment in design and weaving of sample warps of drapery, linens, upholstery, and suiting fabrics. Study of qualities and color combinations of various yarns. Yardage weaving. Printing procedures: silk screen techniques.

Lab. 15, Credit 5 (offered each year)

FSCT-251, 252, 253

FSCT-300

Textile Craft Elective I Registration #0413-251, -252, -253 An elementary course in design and techniques in textiles. Each

quarter a different area of study is undertaken in printing, basketry, non-loom, stitchery or tapestry.

Lab. 6, Credit 3 (offered each year)

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 weav-ing. Practice in the use of various types of eight- to ten-harness looms. Experiments and research with novelty fibers. Independent study, papers, reports.

Lab. 15, Credit 5 (offered each year)

FSCT-351, 352, 353 **Textile Craft Elective II** Registration #0413-351,-352, -353

An elective course providing an opportunity for more advanced study in textiles. Each quarter a different area of study is undertaken in printing, basketry, non-loom, stitchery or tapestry. Lab. 6, Credit 3 (offered each year)

FSCT-400 **Textile Materials and Processes** Registration #0413-400

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 (offered each year)

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 (offered each year)

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

Sequential course for three quarters, covering function and care of hand and machine woodworking tools. Wood as a material: history, kinds, qualities, sources. Fundamental techniques of wood fabrication, including basic joinery, turning, and finishing. Lab. 15, Credit 5 (offered each year)

FSCW-251, 252, 253 Wood Craft Elective I

Registration #0414-251, -252, -253 An elementary course in design and techniques in woodworking. Hand and power tools will assist in the small scale making of wood objects

Lab. 6, Credit 3 (offered each year)

FSCW-300

Woodworking Materials and Processes

Registration #0414-300 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 iigs and templates and studies of small shop capacity and layout. Historical development of furniture and interiors. Independent study, papers, reports

Lab. 15, Credit 5 (offered each year)

FSCW-351, 352, 353 Wood Craft Elective II Registration #0414-351,-352, -353

An elective course providing an opportunity for more advanced study in wood. Hand and power tools will assist in the small scale making of wood objects.

Lab. 6, Credit 3 (offered each year)

FSCW-400

Woodworking Materials and Processes Registration #0414-400

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 con-struction methods. Independent study, papers, reports.

Lab. 15, Credit 5 (offered each year)

FSCW-500

project

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

Lab. 24, Credit 8 (offered each year)

Graduate Courses

School of Art and Design

Courses for the education concentration of the MST program are offered through the College of General Studies, and course descriptions are given under that heading with a GS call number.

Art Education

FADA-701, 702 Methods and Materials Registration #0401 -701, -702 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 (offered every year-Fall, Winter)

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

Evaluation and study of the practice teaching experience. Discussion of the professional role of the art teacher in terms of professional associations, supervision, teacher training, and research. A final project on some intensively studied aspect of art education is required.

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

FADA-860 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 (offered every year-Spring)

Communication Design

FADC-750 (MST, elective, minor) Communication Design Registration #0402-750

Advanced creative problem solving experiences in communication design imagery. Professional problems in graphic design and related visual techniques for communication media such as print, television, film, computer and business practices. Media Center facility available for extension of studio problems.

Lab. 6, Credit 3 (offered every quarter)

FADC-780 (MFA) Registration #0402-780

Communication Design

Advanced creative problem-solving experiences relating to visual communications imagery. Formal design values are emphasized and utilized in communications applications. Studio involvement is directed toward the solution of individual, group and assigned graphic design problems. Specification of the program is devel-oped in accordance with the professional goal of the individual student and work leading toward the master's thesis. Center facilities are available for application of studio imagery. Media

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

Environmental Design

FADD-750 (MST, elective, minor) **Design Applications** Registration #0403-750

Various problems will emerge from the study of products and interiors. The reasoned application of theoretical three-dimension-al design world will be probed by considering the importance of the decision making role of the designer in an industrialized world. Lab. 6. Credit 3 (offered every quarter)

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FADD-780 (MFA) Registration #0403-780

Design Applications

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. Studio involvement is directed toward the solution of individual, group and assigned product, in-dustrial to interior problems. The individualized solutions lead toward a master's thesis

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

Painting

Painting

Registration #0405-750 The pursuit and comprehension of the pertinent, the ecstatic and the beautiful, by a small group of those who intend to both paint and teach the young to understand and appreciate painting.

Lab. 6, Credit 3 (offered every quarter)

FADP-750 (MST, elective, minor)

FADP-780 (MFA) Registration #0405-780

Painting

The pursuit of the pertinent, the ecstatic, the beautiful, by a small group of those dedicated to the art. The student will become familiar with the trends and questings of modern painting, and by strengthening both his intellectual and technical facilities, be prepared for a career as a professional painter. The work leads toward the master's thesis.

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

FADR-750 (MST, elective, minor)

Printmaking

Printmaking

Registration #0406-750 Advanced techniques in etching, lithography and woodcutting, as well as in many experimental areas including color processes, photo-etching, photo-lithography, vacuum-forming and combina-tion printing. Students are expected to develop along indepen-dent lines, and direction is offered in contemporary thought and concept. The emphasis is toward developing a complete respect for the printmaking craft and profession.

Lab. 6, Credit 3 (offered every quarter)

FADR-780 (MFA) Registration #0406-780

FADS-750

Printmaking

Contemporary and historical print making concepts are presented as stimulant and provocation for the development of an individual approach to expression. Advanced techniques are demonstrated in intaglio, relief and lithography with resources available in nonsilver photo processes, paper making and combinations. A com-plete understanding of the development and maintenance of the print studio is supportive for the professional artist. The work leads toward the master's thesis

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

Sculpture

Sculpture

Registration #0407-750 Sculptural concepts are approached through a variety of pro-cesses and materials. The studio work is executed in paper, wood, fabrics, metal, stone, clay and plastics.

Lab. 6, Credit 3 (offered each year)

Thesis

FAD (C, D, P, or R)-890 **Research and Thesis Guidance** Registration #040 (2, 3, 5 or 6)-890

The development of a thesis project instigated by the student and approved by a faculty committee and the Graduate Academic Council representative. Primarily creative production, the thesis must also include a written report.

Credit 12 (offered every guarter)

Graduate Courses

School for American Craftsmen

Ceramics and Ceramic Sculpture

FSCC-750 (MST, elective, minor) Ceramics and **Ceramic Sculpture** Registration #0409-750 Basic instruction and experience in ceramic design, fabrication and production of ceramic forms is undertaken. This study provides ceramic technology and terminology and gives experience with clays and glazes along with fundamental forming techniques. The development of design awareness is encouraged through lectures and critiques.

Lab. 6, Credit 3 (offered every quarter)

FSCC-780 (MFA) Registration #0409-780

Ceramic Sculpture A program structured on the basis of individual needs, interests and background preparation as they may be determined through faculty counseling. There will be a strengthening of ceramic techniques, design fundamentals and encouragement of personal ceramic expression. The student will be encouraged to evaluate

Ceramics and

Glass

Glass

new techniques, materials and concepts through clay into its uses in pottery, murals, lights, fountains, space dividers and other forms. This sequence leads to the master's thesis, suggested by the student and approved by the faculty.

Lab. 9-27, (offered every quarter)

FSCG-720

Glass

Monumental Stained Glass

Registration #0411-720 This elective teaches the basics to stained glass designing, cutting, soldering, leading, glazing, and other fabrication techniques. Lab. 6, Credit 3 (offered each year)

FSCG-750 (MST, elective, minor)

Registration #0411-750 This will expand the appreciation of glass and add cold glass techniques to the student's understanding. Sandblasting, grinding, belt sanding, flexible shaft drawing, cutting and epoxy painting are techniques presented for student to apply toward design concepts.

Lab. 6, Credit 3 (offered every quarter)

FSCG-780 (MFA) Registration #0411-780

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

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

FSCM-750 (MST, elective, minor) Metalcrafts and Jewelry Registration #0412-750

This is the study and manipulation of metals for hollow ware/jewelry. Design sensitivity and concepts are approached through the raising, forming and planishing or casting, forging, and fabricating techniques.

Lab. 6, Credit 3 (offered every quarter)

FSCM-780 (MFA) Registration #0412-780 Metalcrafts and Jewelry

A program structured on the basis of individual needs, interests and background preparation as they may be determined through faculty counseling. Both hollow ware and jewelry areas will be explored. It is designed to give the student a broad exposure to metalworking techniques, expand the student's knowledge of parallel design extraction percentual parallel and philosephical applied design, strengthen perceptual and philosophical concepts and develop an individual mode of expression. This sequence leads to the master's thesis, suggested by the student and approved by the faculty.

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

Weaving and Textile Design

FSCT-750 (MST, elective, minor) Weaving and Textile Design Registration #0413-750

This is the study and appreciation of weaving and textile tech-niques, soft sculpture, off loom weaving and printing. Design approaches are stressed.

Lab. 6, Credit 3 (offered every quarter)

FSCT-780 (MFA) Weaving and Textile Design Registration #0413-780

A program structured on the basis of individual needs, interests and background preparation as they may be determined through and background performance and the start of master's thesis, suggested by the student and approved by the faculty.

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

Woodworking and Furniture Design FSCW-750 (MST, elective, minor) Woodworking and

Registration #0414-750 Furniture Design This is a course in woodworking techniques and procedures. It enables the student to gain design competency through wood and an individual solution to wood projects based on suggested needs. The MST student selects a chair, table or cabinet for design execution.

Lab. 6, Credit 3 (offered every quarter)

FSCW-780 (MFA)

 FSCW-780 (MFA)
 Woodworking and Furniture Design

 A program structured on the basis of individual needs, interests
and background preparation as they may be determined through faculty counseling. This provides an opportunity for technical, aesthetic and design competency to grow through the exploration of hand and machine tools; solid wood theory, joinery and practice; veneer theory, joinery and practice; production theory; chair, table, cabinet design and construction. This sequence leads to the master's thesis, suggested by the student and approved by the faculty.

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

Thesis

FSC (C, G, M, T or W)-890 Research and Thesis Guidance Registration #04 (09,11,12,13 or 14J-890

Research and presentation of an acceptable thesis with a focus on technique, design, production, or a combination of these approved by the faculty. The thesis subject will be chosen by the candidates with the approval of the faculty advisor. The thesis will include a written summation or report of the research and presentation program.

Lab. 27, Credit 12 (offered every quarter)

College of General Studies

Criminal Justice

GCJC-201 Fundamentals of the Criminal Justice System Registration #0501-201

The principles of the criminal justice system; administration and management within various agencies, including the relationship of the police to the courts; the courts to the probation, correction and parole functions. Consideration will also be given to specific problems within the branches of the criminal justice system.

Class 3, Credit 4 (offered annually)

GCJC-203

Criminology

Registration #0501-203 A survey of the field of criminology with emphasis on major forms of contemporary crime, definition of crimes and criminality, theories of criminality, the extent of crime, criminal typologies, and fundamental aspects of the social control of crime.

Class 3, Credit 4 (offered annually)

Introduction to Public GC.IC-204 Registration #0501-204 Administration

This course presents the principles of management and organizational theory as they relate to public agencies in general, and criminal justice agencies in particular. Case studies, as well as descriptive information concerning the classic issues involved in the administering of public institutions, will be offered to the student. (GCJC-201)

Class 3, Credit 4 (offered annually)

GCJC-206 Administrative Concepts in Law Enforcement Registration #0501-206

The course is intended to provide the student with an overview of the fundamental concepts of organization and administration, and to provide also the criteria and/or standards by which municipal police agencies may be evaluated or improved administratively. (GCJC-203)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-207 Registration #0501-207

Corrections

The course is designed to introduce the student to the basic organizations of the correctional system, their functions and performance. Prisons and jails, as well as probation and parole agencies, will be discussed within the context of historical and contemporary philosophy. Attention will also be focused on decision making functions, the role of various personnel within the correctional system and the population of offenders within it. Strategies for rehabilitation and their effectiveness will be surveyed. (GCJC-201)

Class 3, Credit 4 (offered annually)

GCJC-301 Fundamental Concepts of Criminal Law Registration #0501 -301

The subject matter of this course consists of an introduction to the fundamental principles upon which substantive criminal law is based. The basic characteristics and requirements of criminal conduct are examined. Included in the scope of this course are the following topics: the nature of criminal conduct, the meaning of criminal mental state, the requirement of concurrence between action and intent, and the requirement of legal causation. The elements of the principal defenses to criminal liability, such as insanity, entrapment, and self-defense, are also discussed. (GCJC-201)

Class 3, Credit 4 (offered annually)

GCJC-302 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. (GCJC-201, 203)

Class 3, Credit 4 (offered on sufficient demand)

Law Enforcement in Society

Registration #0501 -303 The social and historical origins of the various police systems, police culture, role and career, police in the legal system, social and legal restraints on police practices, police discretion in practice; police and the community, police organization and community control mechanisms. (GCJC-201)

Class 3, Credit 4 (offered annually)

GCJC-304 Registration #0501 -304

The Judicial Process

This course is designed to provide the student with a fundamental understanding of the various procedural steps involved from the time a person is charged with a criminal offense up to the time of sentencing. This course examines both federal and state criminal iudicial systems, their functions and operations, their similarities and differences, and their impact upon the accused and the victim. (GCJC-201)

Class 3, Credit 4 (offered annually)

GCJC-306 Registration #0501-306

GCJC-303

Introduction to Para-Legals

Criminal Investigation

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

Class 3, Credit 4 (offered on sufficient demand)

GCJC-307

Registration #0501 -307

The course is an introduction to the criminal investigative function and process which would include the history and theory of criminal investigation, crime scene searches, collection and presentation of physical evidence, the obtaining of testimony and confessions, scientific laboratory methods and the admissibility of evidence in a court of law. (GCJC-303)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-309

Registration #0501-309

Juvenile Justice

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

Class 3, Credit 4 (offered annually)

GCJC-401

Scientific Methodology

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

Class 3, Credit 4 (offered annually)

GCJC-403, GCJC-404 Registration #0501-403, #0501-404

Field Experience (2)

Under the guidance of an instructor, during the junior or senior year, the student is placed in a participating criminal justice agency in order that he or she may gain firsthand experience with its organization, programs, and methods of work. Closely supervised work at the agency is supplemented by communication with the student's field placement instructor to discuss experiences encountered on the job.

Class variable, Credit 9 each (offered annually)
GCJC-405 Major issues in the Registration #0501 -405 **Criminal Justice System** This course is designed as an advanced seminar which will focus on contemporary issues and topics not otherwise distinctly incorporated in established criminal justice courses. As a seminar the course will concentrateon student discussion and interaction surrounding required readings on topics such as political/official deviance, crime in the streets, issues in the prosecution/court system, deterrence, and female criminality. Topics may vary from offering to offering.

Class 3, Credit 4 (offered on sufficient demand)

GCJC-407 Behavior Modification in Registration #0501 -407

Criminal Justice System 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. Emphasis will be on utilization oriented models. (GCJC-201, 207)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-408 Constitutional Law and Criminal Justice Registration #0501-408

This course has been designed to provide the student with a basic understanding of the constitutional principles frequently encountered in the criminal justice profession. Landmark court decisions, relating to due process, equal protection, unlawful arrest, un-reasonable search and seizure, compulsory self-incrimination, the assignment of counsel and fair trial guarantees are discussed and critically evaluated. (GCJC-201, 301)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-409 Legal Rights of Convicted Offenders Registration #0501-409

This course is designed to present an in-depth study of the substantive and procedural law as it affects convicted offenders. Considerable attention is devoted to the study of constitutional rights and privileges, how they apply to convicted offenders, and the methods employed to secure these rights. Conviction and its consequences are explored, as is the sentencing process. The rights of prisoners, probationers, and parolees are reviewed. In addition, the various remedies for enforcement of these rights are discussed, including direct appeals, collateral attacks, and a variety of post-conviction remedies. The course is intended for students who wish to pursue a career in law enforcement, corrections, probation, parole, or law. However, students interested in some other aspect of criminal justice, which deals with convicted offenders, may find this course useful. (GCJC-201, 207)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-410 **Correctional Administration** Registration #0501410

This course presents the history and development of the principles of management and organizational theory as they developed in the field of corrections. This developmental evaluation is followed by a presentation of certain principles and philosophies concerning agency administration which have proved effective in business, industry, and many elements of government, with the intention of discussing their applicability to prisons, probation, parole, and other community correctional programs. (GCJC-201, 007) 207)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-411 Registration #0501-411

Issues in Corrections

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

Class 3, Credit 4 (offered annually)

GCJC-412 Social Control of Deviant Behavior Registration #0501-412

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

Class 3, Credit 4 (offered on sufficient demand)

GCJC-413 Civil Disobedience and Criminal Justice Registration #0501-413

A survey of the philosophy and history of civil disobedience, civil disobedience as a political tactic, differentiation between civil disobedience and "ordinary crime," civil disobedience and "non-criminals," civil disobedience within the criminal justice system, and the role of riot commissions. (GCJC-201, 203)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-505

White Collar Crime

Registration #0501 -505 An examination of the extent and character of white collar crime, with special emphasis upon business and professional deviance. (GCJC-201, 203)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-506 Registration #0501-506

Evidence

This course is designed to provide the student with an awareness of what types of evidence are admissible in a criminal trial. The course includes a comprehensive analysis of the most frequently used rules of evidence. There are readings and discussions pertaining to the nature of real, testimonial, hearsay, and circumstantial evidence. The course examines rules concerning the crossexamination of witnesses, exceptions to the exclusion of hearsay evidence, the burden of proof, the provinces of the judge and of thejury, legal presumptionsandtheexclusionof illegallyobtained evidence. (GCJC-201)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-510

GCJC-511

Counseling in the Criminal Justice System

Registration #0501-510 This course is designed to instruct the student in the various, accepted contemporary dynamics of interviewing and counseling generic to criminal justice and related human service agencies. Issues to be discussed will revolve around counseling and supervision strategies and conflicts among agencies, between administrators and staff, and between staff and clients. This course will present both the practical and theoretical aspects of these issues as well as devote attention to surveying prospective counseling strategies for accomplishing desired behavioral change. (GCJC-201)

Class 3, Credit 4 (offered on sufficient demand)

Alternatives to Incarceration

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

Class 3, Credit 4 (offered on sufficient demand)

GC.JC-512 Registration #0501 -512

Minority Groups and the **Criminal Justice System**

The course will examine the role traditionally attributed to the members of minority groups as criminals and analyze their interaction with the criminal justice system. Heavily relying on the conflict perspective, the course will review the literature on the creation of laws, the breaking of laws, and the processing of minor-ity members in the criminal justice system. (GCJC-201, 203)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-514 Planning and Changes in the Registration #0501-514 **Criminal Justice System** It is the objective of this offering to expose the student to issues of "change" within the criminal justice system. Police, courts and corrections will be discussed, in view of current and proposed changes. The planning of change will be emphasized with regard to both organizational and individual issues. In addition, attention

will be given to surveying various strategies for accomplishing

change. This course is designed to give the advanced student the opportunity to intensely scrutinize the prospective shape of the criminal justice system. (GCJC-203) Class 3, Credit 4 (offered annually)

Court Administration

Registration #0501-516 A course designed to explore the management aspects of the court and court process. There is a focus on the structure of the several levels of court that typically exist in modern urban America. Related to this structure are the various other criminal justice agencies that interact with the court at various stages of the process. In addition, operational problems, such as the bail process, record keeping, jury service and selection methods, and calendar management will receive significant attention.

Class 3, Credit 4 (offered on sufficient demand)

GCJC-517 **Comparative Criminal Law** Registration #0501-517

The course examines, in a comparative analysis, the criminal systems and the penal methods of Europe and the United States. Major emphasis will be given to the issues of intent, criminal responsibility, individual and public interests, purposes and modes of prevention, repression and punishment, methods of trial, punishment and pardon. (GCJC-201)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-518

GCJC-516

Police/Community Relations

Registration #0501-518 Police-public contact; uses of the communications media in projecting the police image; responsibilities of police in dealing ef-fectively with minority groups, civil rights, civil disorder, and public protection. An exploration of the role and function of the police in intergroup relations. (GCJC-303)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-520 Registration #0501 -520

Sentencing Process

This course is intended to provide the student with a broad overview of the law of sentencing and the alternatives presently available in this area. Emphasis will be placed on the traditional methods of punishment now available in the courts, including, but not necessarily restricted to: fines, imprisonment, probation and suspended sentences. The course will also look to the power of the court in exercising its discretion in the sentencing process. (GCJC-201, 207, 304)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-522

Victimless Crime and the Law Registration #0501-522

The course is designed to familiarize the student with many of the implications and ramifications of efforts to control "victimless" crimes. Course discussions concentrate on the illegal activity associated with prostitution, gambling, homosexuality, drug use and pornography. In this course the social, political, moral, legal and practical consequences of legalizing such activities are examined and evaluated. (GCJC-201, 203, 301)

Class 3, Credit 4 (offered on sufficient demand)

GC.IC-523 Registration #0501-523

Crime and Violence

The course will analyze the causes of the outbreak and rapid increase of violent and criminal trends in the world as the most serious realities of the 20th century. Primarily, emphasis will be given to the interdependence between socioeconomic instability and crime, underdevelopment and crime, urban crisis and social mobility, unequal opportunities and racial strife. The course will transcend the national boundaries of America and will focus on crime, violence, and urban crisis in other parts of the world. The course will be a comparative study of America's and the world's problems of violence, crime and urban crisis. (GCJC-201)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-525

Registration #0501 -525 Analysis of the major problems of industrial and business security, including college campuses, hospitals, etc. Emphasis on current security problems and methods of dealing with them effectively. Administrative, legal and technical problems will also be discussed. (GCJC-201)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-526 Registration #0501-526

Issues in Law Enforcement

A critical analysis of some of the current issues, problems and concerns in the area of law enforcement; emphasis on basic police functions as it relates to the courts, corrections and the community. Conflicts between theory and practice are examined and analyzed, and future trends in law enforcement will be explored. (GCJC-303)

Class 3, Credit 4 (offered annually)

GCJC-527

Advanced Criminal Law

Registration #0501-527 The course will investigate assumptions and concepts of criminal law. The course will emphasize major crimes against the person and major crimes relating to property. (GCJC-201, 203, 301)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-528 Registration #0501-528

Etiology of Crime

Physical Security

This course is a comprehensive survey of the sociological, psychological, and psychiatric views of the etiology of crime and other forms of deviant behavior. With major emphasis on the sociological forms of explanation, the course will undertake a historical review of criminality theory and progress to present-day concerns of both etiological and epidemiological origins. (GCJC-201, 203)

Class 3, Credit 4 (offered annually)

GCJC-529

Registration #0501 -529 This course will include an analysis of today's cost of crime against business, and the methodology utilized in creating such losses. Primary course emphasis will be placed upon methods, tech-niques, and approaches used in the professional field of loss prevention/security administration to provide the widest range of practical solutions in the reduction of losses and the enhancement of security as a tool of management. (GCJC-201)

Class 3, Credit 4 (offered on sufficient demand)

GCJC-530 Registration #0501-530

Women and Crime

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

Class 3, Credit 4 (offered annually)

GCJC-599 Registration #0501-599

Independent Study

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

Class variable, Credit variable (offered annually)

Industrial Security

Social Work

Core Courses

GSWS-210 Introduction to the Profession of Social Work Registration #0516-210

Designed to assist students in making decisions regarding their careers in social work. The course covers basic exercises for developing self-awareness and professional self-assessment, explores various fields of social work and helps students begin to build their concepts of social work as a profession.

Class 3, Credit 4 (offered fall, spring)

GSWS-211 **Social Welfare: Structure & Functions**

Registration #0516-211 Examines the provision of social services in four major fields of social welfare: public welfare, traditional voluntary agencies, voluntary social movements and the legal system. Course will also explore organization theory as it applies to the structure of these services, as well as major patterns and sources of funding.

Class 3, Credit 4 (offered fall, spring)

GSWS-302

Social Welfare: History

Registration #0516-302 Designed to explore social welfare institutions and processes and their history, philosophy and relationship to other social institutions in the United States. Emphasis is on the role of social work in various interrelated social 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. The development of the social work profession is traced along with its response to the changing needs of society. (GSWS-210 or concurrent)

Class 3, Credit 4 (offered fall, winter, & spring)

GSWS-310 Hispanic Culture for Social Workers

Registration #0516-310 This course, designed with a social-work emphasis, will attempt to portray objectively the life of Mexican-Americans, Puerto Ricans and other Spanish-speaking groups and the problems of assimila-tion into a predominantly Anglo-American society. (GSWS-210 or concurrent)

Class 3, Credit 4 (offered fall)

GSWS-311 Social Work from a Pan-Afrikan Perspective Registration #0516-311

This course is designed to analyze past, present and future social welfare policies, programs and practices from a Pan-Afrikan perspective. This perspective is viewed as essential if one is to attain skills needed to analyze programs and policies from their actual and predictable effects on black people. (GSWS-210 or concurrent)

Class 3, Credit 4 (offered winter)

GSWS-312

Registration #0516-312

Research Methods

Introduction to the methodology of research in behavioral and social sciences. Stress will be on the use of theoretical concepts, formulation of hypotheses, collection of data, measurements, statistics, tests and evaluation. Instruction and practical demonstra-tion are provided in techniques ranging from simple case studies to computer utilization. (GSWS-210)

Class 3, Credit 4 (offered fall, winter & spring)

Methods of Social Work I & Laboratory GSWS-411 Registration #0516-411

See GSWS-413 (GSWS-210, GSWS-211 or concurrent, GSWS-302)

Class 4, Credit 4 (offered fall, winter & spring)

GSWS-412

Methods of Social Work II Registration #0516-412

See GSWS-413 (GSWS-411, concurrent with GSWS-421)

Class 3, Credit 4 (offered every quarter)

GSWS-413 Registration #0516413

GSWS-422

Methods of Social Work III

Methods of Social Work is a three-course sequence offered concurrently with laboratory or field experience. Methods of Social Work stresses the basic principles and skills of a generic approach to social work-practice, emphasizing the differential use of social-work techniques and Interventive skills in a variety of client systems

Through lectures, discussions, readings, lab simulations and case analysis, it is the overall objective of the sequence to provide the student with the knowledge, skill and self-awareness for beginning professional social-work practice. The development of this knowledge, skill and awareness is seen as a progressive process underlying and underpinning the three-course sequence (GSWS-412, 421, concurrent with GSWS-422)

Class 3. Credit 4 (offered every quarter)

GSWS-421 **Field Instruction I & Seminar** Registration #0516-421

See GSWS-422 (GSWS-411, concurrent with GSWS-412)

Class 2, Field 300; Credit 5 (offered every quarter)

Field Instruction II and Seminar Registration #0516-422

Field Instruction I and II comprise a 20-week, 30 hr./week super-vised field placement. Under the guidance of an instructor, the student is placed in a cooperating social, governmental or education agency in order that he or she may gain first-hand experience with its organization, programs and client assignments. Closely supervised work at the agency is supplemented by consultations with the instructor in a seminar designed to integrate theory and practice. (GSWS-412, 421, concurrent with GSWS-413)

Class 2, Field 300; Credit 5 (offered every quarter)

Social Welfare: Profession and Issues **GSWS-532** Registration #0516-532

For social work students who have completed field experience. Examines the profession of social work and the values in socialwork practice, as stated in the Code of Ethics. Current prac-tice issues of the profession will be studied and discussed. Maintenance issues of the profession such as licensure, third-party payments and other topics will also be examined. (GSWS-413, 422)

Class 3, Credit 4 (offered fall, winter & spring)

Social Welfare: Policy & Planning

Registration #0516-533 For social work students who have completed field experience. Course will explore the development of social welfare services as it proceeds from the determination of social need through program design to implementation. Concepts of policy process, large system change, and grant and proposal writing are considered. Class 3, Credit 4 (offered fall, winter & spring)

GSWS-535 Registration #0516-535

GSWS-533

Seminar & Project

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

Class 3, Credit 4 (offered fall, winter & spring)

Social Work Electives

GSWS-212 Self-Awareness in the Helping Role

Registration #0516-212 This course helps to develop students' helping skills in essentially three broad areas:

- 1. Skills in noticing or observing 2. Observing one's professional use of self in the helping rela-
- tionship and evaluating the appropriateness of such behav-
- 3. Observing the client and evaluating the effect one's response has on him/her

Students are expected and required to increase their awareness skills, and this course offers a unified learning experience where students can concentrate on the theory and practice of awareness skills. (GSWS-210, concurrent with or before GSWS-411)

Class 3, Credit 4 (offered winter & spring)

GSWS-213 Gerontology Registration #0516-213

An introductory study of the second half of the life span with a design to increase understanding of the processes of social accom-modation, socialization and social change of the aged as they interact with the community and others. (GSSP-210) Class 3, Credit 4 (offered fall)

GSWS-214 Drug Abuse Registration #0516-214

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

GSWS-313 Women in the Social Work System Registration #0516-313

This course is designed to sensitize social-work students to the specific concerns of women as a minority group. The course will focus on a woman's cultural upbringing and specific problems and issues related to the worker-client relationship. The student who completes this course will have a better general understanding of the status of women in our society and a particular awareness of the position of women as workers and clients in the social welfare system

Class 3, Credit 4 (offered on sufficient demand)

GSWS-314 The Social Worker as Advocate Registration #0516-314

This course will examine the role of social workers in advocating with and on behalf of clients and others in their efforts to negotiate or bring about needed change in institutions or policies of our society. Discussion of the forces in the social, economic and political environment today which directly affect poverty, racism and related urban crises will be related to examining techniques for achieving change.

Class 3, Credit 4 (offered spring)

GSWS-320

Alcoholism Disability:

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

Class 3, Credit 4 (offered annually)

GSWS-321 Alcoholism: Interventive Skills and Techniques Registration #0516-321

Teaches a variety of Interventive skills to those giving cars to alcoholics, their families and communities. Emphasis is on the method of use of these skills. Role play, video tape and case study will be included. (Second-year standing)

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 4 (offered spring)

GSWS-323 Alcoholism—Supervision in an Alcoholism Setting Registration #0516-323

Presentation of current supervisory methods and principles with emphasis on their use in agencies serving the alcohol abuser. (Second-year standing)

Class 3, Credit 4 (offered occasionally)

GSWS-330

Rural Social Services

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

Class 3, Credit 4 (offered on sufficient demand)

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

Class 3, Credit 4 (offered winter)

GSWS-432

Supervision in Social Work

Registration #0516-432 This course identifies and teaches the supervisory skills required in social work and related agencies. Different methods and techniques are explored. Role play and video tape are used. (GSWS-413, 422)

Class 3, Credit 4 (offered winter)

GSWS-455 Contemporary Issues in Social Work Registration #0516-455

This course is designed to offer students an opportunity to examine and discuss contemporary issues in the field of social work. Course content will vary from quarter to quarter dependent on current issues and student interest. Areas related to expressed will be examined. Specific readings will be assigned with class-room discussions, special speakers, films, field trips or role plays included depending on the nature of the issues being addressed.

Class 3, Credit 4 (offered fall, winter & spring)

GSWS-509 Services to Children and Their Families Registration #0516-509

This course is designed to give social-work students a beginning knowledge of social-work services to children and their families. The development of each type of service will be discussed as well as the reasons why each service is needed and for what type of situation. The social worker's role in each area will also be considered. (GSWS-413, 422)

Class 3, Credit 4 (offered fall)

GSWS-512 Registration #0516-512

Intervention with Individuals

This course builds upon the methods sequence knowledge base and develops the students' understanding of the specific ways in which these concepts and theories are applied in social casework intervention with individuals and families. Use will be made of case studies and role-play situations to further develop the students' skills in this area. (GSWS-413, 422)

Class 4, Credit 4 (offered spring)

GSWS-522 Registration #0516-522

Intervention in Communities

This course examines community intervention as a social work method. Methods of assessing needs, the roles and functions of the community intervention practitioner and alternative models of practice are analyzed. The course will investigate specific applications of community intervention theory to political influence processes, coalition, neighborhood associations and regionalization. (GSWS-413, 422)

Class 4, Credit 4 (offered fall)

GSWS-523 Registration #0516-523

Intervention with Groups

This course examines social treatment as one form of group work practice. There are different service procedures and approaches which center on the use of client groups, and each may have utility in pursuing distinct service objectives. The course will investigate the scope, techniques and function of the group work concept as practiced in such diverse settings as social service agencies, busicorrectional institutions and communities. (GSWS-413, ness. 422)

Class 4, Credit 4 (offered winter)

GSWS-599

Independent Study Registration #0516-599

A combined student/faculty effort on a chosen topic beyond the normal sequence of course selections. It provides the self-motivated student with a creative orientation, the opportunity to develop an autonomous and personal sense of academic growth and achievement. Independent Study may include independent work in an agency setting.

Credit variable (offered every quarter)

courses GLLC-404 (Communication with the Handicapped) The and GLLZ-201, 202, 203 (Manual Communication I, II, ill) are offered by the College of General Studies as service courses (Page 49) but may be taken as electives by students enrolled in the Social Work Program.

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.

CBCP-401 **Psycho-Social Aspects of Deafness** Registration #0216-401

This course provides a broad overview of the effects of deafness on individuals, its relation to their social and intellectual development, and an appreciation for the hearing impaired as a person. It provides basic information regarding the nature of the sound anatomy of hearing and the causes and types of deafness. Class 3, Credit 4 (offered annually)

Advanced Aspects of Deafness

Registration #0237-541 Selected topics are presented for in-depth study. Possible topics include: legal and educational precedents and considerations of deaf persons in the range of mainstream settings, effects of deafness on cognitive development, impact of deafness on the family, the feasibility of integrating deaf and normally hearing college students, the scope of services available to deaf persons in Rochester and nationally, the relationship of the deaf community to the police. Students will participate in the final selection of course topics.

May be taken for 4 or 5 credits.

CHGS-541

General Studies Courses

Language and Literature **English Composition**

GLLC-220 Registration #0502-220

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

Class 3, Credit 4 (offered annually)

GLLC-421, 422 Registration #0502-421, -422

German I. II

The courses are designed to enable the student to read and understand technical and scientific German. Class 3, Credit 5/Qtr. (offered annually)

GLLC-501

Registration #0502-501

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

Class 3, Credit 5 (offered annually)

GLLC-511

Registration #0502-511 The history and theory of communication from basic human communication through the mass media extensional systems. Class 3, Credit 5 (offered alternate years)

GLLC-514

Mass Communication

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

Class 3, Credit 5 (offered annually)

GLLC-515 Uses and Effects of the Mass Media Registration #0502-515

An analysis of the "effects" and the "uses and gratifications" of mass communication research with focus on building mass com-munication theory. (Note: Students may find GLLC-514 a useful introduction to this course)

Class 3, Credit 5 (offered annually)

GLLC-518 Registration #0502-518

Students are given maximum freedom to write what they are concerned with in as wide a range of genres as they will attempt. Class 3, Credit 5 (offered annually)

GLLC-520 Registration #0502-520

Vocabulary Building

Creative Writing

Application to the process of vocabulary building of the various disciplines of language study will be provided. Included among these will be applications of dictionary study, etymology, seman tics, and structural linguistics. In addition, literary works, periodicals, and newspapers will be examined to strengthen the stu-dent's awareness of the contextual variation in the meaning of words. Ineffective and faulty devices of language usage will also be discussed

Class 3, Credit 5 (offered annually)

Modern Applications of

Effective Speaking

Language Theory

GLLC-547 Practical Writing Registration #0502-547

An intensive review of *practical* writing skills with emphasis on regular writing assignments. Class periods will be devoted chiefly to analysis and evaluation by students of their *writing*. The aim of the course is to enable *students to fulfill their academic and voca-tional writing demands with prose that is unified, coherent and accu-rate. By the end of the quarter students should be able to approach awriting assignment with reasonable ease and confidence.* Class 3, Credit 5 (offered annually)

GLLC-553 Creative Interpretation in Sign Registration #0502-553

Creative approaches to the interpretation of selected literary classics (prose, poetry, fiction, drama) through the visual medium of sign (sign language and sign-mime).

Class 3, Credit 5 (offered annually)

Note: The following Lower Division Literature courses (GLLL-320-335) enrich the student's self-understanding and cultural awareness through the study of our literary heritage. Readings will be drawn from the great works of the ancient world, the Medieval-Renaissance period, and modern times. Literary types will include drama, poetry, and prose fiction. The works will be studied in their historical context as well as for aesthetic and intellectual enrichment.

GLLL-320 Literature and Myth

Registration #0504-320 A study of the uses of myth in literature, emphasizing a selected group of commonly accepted archetypes and motifs which appear in a variety of literary forms.

Class 3, Credit 4 (offered annually)

GLLL-324 Guilt and Expiation Registration #0504-324

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

Class 3, Credit 4 (offered alternate years)

GLLL-325 Thematic Approach to Western Literature Registration #0504-325

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

Class 3, Credit 4 (offered occasionally)

GLLL-328 Criticism of Literature Registration #0504-328

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

Class 3, Credit 4 (offered annually)

GLLL-330 Voyage Literature Registration #0504-330

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

Class 3, Credit 4 (offered on sufficient demand)

GLLL-331 Genres of World Literature

Registration #0504-331 Survey of the primary genres of world literature: drama, novel, short story and poetry.

Class 3, Credit 4 (offered annually)

GLLL-332 Survey of Western Literature Registration #0504-332

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

Class 3, Credit 4 (offered annually)

GLLL-334 Registration #0504-334

Studies in the American Novel

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

Class 3, Credit 4 (offered occasionally)

GLLL-335

Registration #0504-335 This course is an introduction to the literature of Western civilization. It will trace the changing nature and treatment of the hero in literature from the time of ancient Greece to contemporary America.

Class 3, Credit 4 (offered occasionally)

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

Class 3, Credit 5 (offered annually)

GLLL-503

Great World Drama

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

Class 3, Credit 5 (offered annually)

GLLL-504 Shakespeare: Comedy and History Registration #0504-504

Several of Shakespeare's comedy and history plays are read and analyzed to reveal their literary excellence and their theatrical power.

Class 3, Credit 5 (offered annually)

GLLL-505 The American Spirit in Literature Registration #0504-505

A survey of the development of American philosophy (political and social) through the study of selected works from the colonial period to the 19th century. Particular attention will be given to the ideas of the writers under consideration and their effect on modern American philosophy.

Class 3, Credit 5 (offered annually)

GLLL-506 Literary Symbolism in Short Fiction

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

Class 3, Credit 5 (offered annually)

GLLL-513 Ecological Awareness in Literature

Registration #0504-513 A chronological examination of selected works dealing with man's relationship to nature.

Class 3, Credit 5 (offered alternate years)

GLLL-515 Contemporary American Novel

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

Class 3, Credit 5 (offered annually)

GLLL-516

Literature and Society

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

Class 3, Credit 5 (offered annually)

The Hero in Literature

Literature of the Bible

Mark Twain and the American Dream

Literature and Religious Experience

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

Class 3, Credit 5 (offered alternate years)

GLLL-522

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

Class 3, Credit 5 (offered annually)

GLLL-524 Contemporary Film Registration #0504-524

A study of contemporary world films, to be drawn from those presently showing in the Rochester area (theaters, television, film festivals). Emphasis will be on both technical and aesthetic aspects of the films.

Class 3, Credit 5 (offered annually)

GLLL-527 Shakespeare: Tragedy and Romance Registration #0504-527

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

Class 3, Credit 5 (offered annually)

Class 5, Credit 5 (Chered annua

GLLL-528 Great World Novels Registration #0504-528

A careful reading and analysis of novels selected from the best examples of the genre. The novels are selected to exhibit a wide range of techniques of narration, methods of characterization, and approaches to plot construction.

Class 3, Credit 5 (offered alternate years)

GLLL-529 Registration #0504-529

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Short Fiction

An interdisciplinary course which attempts to explore the complexity and variety of man's personal religious quest and its conflicts as these are portrayed by psychologists and literary artists. Class 3, Credit 5 (offered occasionally)

GLLL-530 Religions of the East: Hinduism, Buddhism Registration #0504-530

A study of the major religions of the East.

Class 3, Credit 5 (offered annually)

GLLL-531 American Literature of the 1920's and 1930's Registration #0504-531

A study of American writers of the 20th century with particular attention to the beginnings of realism, naturalism and symbolism. Class 3, Credit 5 (offered annually)

GLLL-532 Man, Nature, and Technology

Registration #0504-532 The interdisciplinary ecology course; texts include Commoner, *The Closing Circle.*

Class 3, Credit 5 (offered annually)

GLLL-533 The Modern Movement in Literature

Registration #0504-533 Examination of the philosophy and literary achievements of modernism through the works of Mann, Joyce, Proust, Beckett, Faulkner and Borges.

Class 3, Credit 5 (offered occasionally)

GLLL-535 Technology in American Literature Registration #0504-535

A study of 19th and 20th century short fiction and novels criticizing the impact of technology upon society.

Class 3, Credit 5 (offered annually)

GLLL-536

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

Class 3, Credit 5 (offered annually)

GLLL-538 The Nightmare of Technology: Studies in Registration #0504-538 19th Century British Writing

Study of British prose and poetry on the effects of industrialism and the social problems in 19th century England.

Class 3, Credit 5 (offered alternate years)

GLLL-539 Registration #0504-539

The Romantic Vision

A study of 19th century European prose and poetry (primarily British) with particular attention paid to the collapse of the Romantic vision, and its gradual absorption into the aesthetic and decadent literary traditions of late nineteenth century European literature.

Class 3, Credit 5 (offered alternate years)

GLLL-540 Hero Image in the Theater Registration #0504-540

An evolutionary survey of the image of the theatrical hero from ancient Greece to the mid-20th century, with emphasis on the changes which take place in the hero image and the reasons for such character changes.

Class 3, Credit 5 (offered occasionally)

GLLL-541 Literature and Cinematic Adaptation Registration #0504-541

The analysis of both the literary and cinematic qualities and characteristics of common works, with emphasis on their similarities and differences and their resultant strengths and weaknesses as creative endeavors.

Class 3, Credit 5 (offered occasionally)

GLLL-542 Registration #0504-542

Literature of Violence

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 (offered annually)

GLLL-545 Registration #0504-545

Deaf Studies in Literature

Philosophy of Justice

A study of the literature of deafness, with special emphasis on literary works which identify and illuminate "the deaf experience."

Class 3, Credit 5 (offered annually)

Class 3, Credit 5 (offered annually)

GLLL-546 Registration #0504-546

Examination of dissent and private conscience in collision with the claims of order and stability in a democratic society.

GLLL-548

Modern Poetry

Women in Literature

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

Class 3, Credit 5 (offered annually)

GLLL-549 Registration #0504-549

Reading and analysis of literature by and about women, mostly in the 19th and 20th centuries.

Class 3, Credit 5 (offered annually)

GLLL-550 Jonathan Swift and the Age of Satire Registration #0504-550

Vicious satirical writings of Jonathan Swift and other early 18th century authors (Alexander Pope, John Dryden) will be read and analyzed, focusing on the intrigue and scandals marking the political and religious environment of the age. Class 3, Credit 5 (offered alternate years)

GLLL-551 World Literature in English Registration #0504-551

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

Class 3, Credit 5 (offered alternate years)

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GLLL-552 Milton: Literature of Revolution Registration #0504-552

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

Class 3, Credit 5 (offered alternate years)

GLLL-555 American Literature in the Industrial Age Registration #0504-555

This course is a survey of the development of American culture from the Civil War to the early twentieth century. The reading will consist of selected literary and philosophical works of this period, and the course will concentrate on the American response to several developments of the period: the increasing power of technology and industry, the use of America as a world power, the growth of new philosophies and Social Darwinism and Marxism, and the pressure for social change arising from various reform movements.

Class 3, Credit 5 (offered occasionally)

GLLL-560

Art of the Cinema

Registration #0504-560 A critical examination of certain films as an integral part of modern culture.

Class 3, Credit 5 (offered annually)

Science and Humanities

GSHF-210Introduction to the Performing Arts: MusicRegistration #0505-210An 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 (offered annually)

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 (offered annually)

GSHF-212 Introduction to the Performing Arts: Chorus Registration #0505-212

Examination of choral works from the 12th to the 20th century with emphasis on stylistic analysis and performance. Sight-reading and vocal production techniques will also be stressed. Genres include madrigals, motets, masses, chansons, and miscellaneous works by major composers. Some ability to read music is highly desirable.

Class 3, Credit 4 (offered occasionally)

GSHF-213 Introduction to the Visual Arts Registration #0505-213

To develop ability in perceiving worth in objects of art through consideration of fundamental concepts in fine arts, including organization, subject matter and principles of aesthetics.

Class 3, Credit 4 (offered annually)

GSHF-503 Survey of American Architecture Registration #0505-503

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 (offered annually)

GSHF-509 Impressionism to Analytical Cubism Registration #0505-509

This course deals with the historical and stylistic aspects of the avant-garde painters of the second half of the nineteenth century and the first decade of the twentieth century. It traces the struggles of these artists to break away from the traditional forms of expression and to attain a new vision of reality.

Class 3, Credit 5 (offered annually)

GSHF-512 Master Drawings Since the Renaissance Registration #0505-512

A study of drawings from the 15th to the 20th century, including the work by Leonardo da Vinci, Michelangelo, Durer, Rembrandt and Picasso.

Class 3, Credit 5 (offered occasionally)

GSHF-513

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 (offered annually)

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 (offered annually)

GSHF-519 Rembrandt Van Rijn: His Art and Times Registration #0505-519

A study of the life, art and times of the Baroque master. Emphasis will be placed on his stylistic evolution, his relation to his society and to the Baroque style, and on his humanistic world view. Class 3, Credit 5 (offered annually)

GSHF-520

Registration #0505-520

The life and work of one of the most influential artists of our century.

Class 3, Credit 5 (offered annually)

GSHF-525

Registration #0505-525 A non-specialized humanistic approach to the understanding of the people, ideas, and times during which major musical compositions were created.

Class 3, Credit 5 (offered occasionally)

GSHF-526 Registration #0505-526

Twentieth Century Music

Major Symphonies

Orchestral Music

Romanticism in Music

Oriental Art

Picasso

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 (offered annually)

GSHF-527 Registration #0505-527

Examination of selected orchestral works from the 18th to the 20th century with emphasis on listening and stylistic analysis. Works by Bach, Beethoven, Brahms, Tchaikovsky, Stravinsky, Bartok, and others.

Class 3, Credit 5 (offered occasionally)

GSHF-528 Registration #0505-528

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

Class 3, Credit 5 (offered occasionally)

GSHF-529 Visual Interpretation of the Drama Registration #0505-529

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

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

Class 3, Credit 5 (offered occasionally)

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 (offered annually)

GSHF-532

GSHF-530

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 (offered occasionally)

GSHH-301 Registration #0507-301

Political, social, cultural, and economic development of the American people in the modern period.

Class 3, Credit 4 (offered annually)

GSHH-302

Modern European History

The Future As History

Modern American History

Registration #0507-302 A thematic analysis of the major social, political, economic and intellectual movements of modern Europe. Special attention is given to the impact of European thought and institutions on the contemporary world.

Class 3, Credit 4 (offered annually)

GSHH-303 Latin American History: From Independence Registration #0507-303 to the Modern Period Survey of historical development of Latin America.

Class 3, Credit 4 (offered annually)

GSHH-310

Registration #0507-310 Through historical analysis from 1200 A.D. to the present, the course will study the social forces from the past that have caused today's major problems. Understanding this, it becomes possible to plan for the future to solve these problems.

Class 3. Credit 4 (offered annually)

GSHH-313 Communism, Fascism and Democracy in

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

The History of the World Since 1945 GSHH-316 Registration #0507-316

Survey of the major events of world history since 1945: Europe, Africa, Asia, and the United States.

Class 3, Credit 4 (offered alternate years)

GSHH-320

The Unification of Europe: Registration #0507-320 Achievements and Perspectives An analysis of the concepts of Europe, of its making and disinte-gration, of its resilience after two World Wars, of the movement for a political union and of its first achievements: the Common Market and its goals up to 1980.

Class 3, Credit 4 (offered annually)

GSHH-508

Registration #0507-508

A political and constitutional history of England from the Anglo-Saxon period to the present.

Class 3, Credit 5 (offered on sufficient demand)

GSHH-510

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. Class 3, Credit 5 (offered annually)

GSHH-514 Registration #0507-514

Race and Society

History of England

Contemporary Middle East

A social, historical, political, religious and anthropological appraisal of the factors which have produced the differences between social appearances and social attainments of the world's population.

Class 3, Credit 5 (offered alternate years)

The Middle Ages and the Rise of Europe **GSHH-516** Registration #0507-516

The Medieval society and its political, religious, economic, and social problems and achievements will be analyzed as the foundation and the cradle of our modern society.

Class 3, Credit 5 (offered annually)

GSHH-518 The Advance of Communism Registration #0507-518

An examination of the expansion of Communism from Marx up to the present time: an analysis of the basic ideas of Marxism, of the rise of communist parties and regimes in West and East Europe, in China and Southeast Asia, in Africa, and on the American continent.

Class 3, Credit 5 (offered annually)

GSHH-519 **United States-Latin America**

Registration #0507-519 **Diplomatic Relations** The emphasis in this course will be on analyzing the United States' relations with Latin America from independence to the present. Class 3, Credit 5 (offered annually)

GSHH-520 Crime, Violence and Urban Crisis Registration #0507-520 in the 20th Century The course will analyze the causes of the outbreak and rapid in-crease of violent and criminal trends in the world as the most serious realities of the 20th century.

Class 3, Credit 5 (offered annually)

20th Century American GSHH-522

Registration #0507-522 **Diplomatic History** A narration and interpretation of the events and forces which shaped American foreign relations from 1898 to 1950. Special emphasis will be placed on such issues as the Open Door Policy, the Treaty of Versailles, Pearl Harbor and the Yalta Conference.

Class 3, Credit 5 (offered annually)

GSHH-523 Registration #0507-523

Religion in Society

This course will examine religion in the West-Christianity, Judaism and atheism-as an integral and interrelated aspect of the totality of society.

Class 3, Credit 5 (offered annually)

GSHH-524 The Italian-American Experience

Registration #0507-524 Examines the history and culture of the Italian-Americans from the colonial period to the present.

Class 3, Credit 5 (offered annually)

GSHH-525 Culture and Counterculture in Registration #0507-525

Historical Perspective This course will examine the cultural, social, political and econom-ic conflicts which were prominent during the 1960s in America and around the world.

Class 3, Credit 5 (offered occasionally)

GSHH-526 The United States and The Third World Registration #0507-526 Revolutions in the 20th Century One of the dominant features of the 20th century has been the revolution of rising expectations in the countries of the Third World. This course will study the underlying causes of these revolutions

and the reaction of the United States government to this revolutionary ferment in Latin America, Asia, and Africa. Class 3, Credit 5 (offered annually)

GSHH-528 History of Popular Culture in America

Registration #0507-528 A study of selected special social and cultural issues and topics in American history from the colonial period to the present, focusing as well on leading personalities.

Class 3, Credit 5 (offered annually)

GSHH-529 Registration #0507-529

Military History

An analysis of the causes and nature of war. Class 3, Credit 5 (offered on sufficient demand)

GSHH-530 19th Century American Diplomatic History Registration #0507-530

An examination of American diplomacy from the early years of American independence to the emergence of the United States as a world power. The War of 1812, Monroe Doctrine, and Manifest Destiny are among the topics considered.

Class 3, Credit 5 (offered annually)

GSHH-531

The Black Experience in America Registration #0507-531

This course explores the history of blacks in America and treats it primarily from a social and cultural perspective. Class 3, Credit 5 (offered annually)

GSHH-532 **Civil Liberties in American History** Registration #0507-532

The course will teach the history of civil liberties in America. Emphasis will be placed on analyzing Supreme Court cases that explain the current state of civil liberties. This is a companion course to GSHH-538, Social Justice and the Constitution in American History.

Class 3, Credit 5 (offered annually)

GSHH-533 China, Russia and the United States Registration #0507-533 Since 1949 This course is a follow-up of the other two courses on Russia and on the advance of Communism.

Class 3, Credit 5 (offered annually)

GSHH-536 History of Mexico Registration #0507-536

The historical development of Mexico including the colonial period, independence movement, the liberal-conservative class, and the revolution of 1910.

Class 3, Credit 5 (offered alternate years)

GSHH-537 Russia: Imperial and Communist Registration #0507-537

An analysis of the last century of Czarist Russia and of the Communist Regime. Emphasis will be placed on the agricultural, social, industrial, economic, and political situation.

Class 3, Credit 5 (offered annually)

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

Class 3, Credit 5 (offered annually)

GSHH-540

Registration #0507-540 A seminar approach to the thought of key black leaders (Washington, Garvey, King) and the study of the civil rights and black power movements.

Selected Problems in Black History

Class 3, Credit 5 (offered occasionally)

GSHH-541 Registration #0507-541 A study of Germany in the 19th and 20th centuries.

Class 3, Credit 5 (offered annually)

GSHH-543 20th Century European Diplomatic History Registration #0507-543

The course seeks to appraise the crisis of diplomacy, and the quest for a higher level of political organization in Europe in the age of mass democracies, totalitarianism and contending political ideologies.

Class 3, Credit 5 (offered annually)

GSHH-544 19th Century European Diplomatic History Registration #0507-544

The course focuses on the relations of the European Great Powers, their rivalries and national jealousies which ultimately resulted in the first total war in the history of humanity. Class 3, Credit 5 (offered annually)

GSHH-545 Revolutionary Leaders in Latin America Registration #0507-545

In this course three movements will be studied: the rise of Juan Peron in Argentina in the 1940s; Fidel Castro's revolution in Cuba; and Salvador Allende's electoral victory in Chile in 1970. By studying these three "revolutionary" movements, it is hoped that the student will come to an understanding of the historical perspective and nature of the social discontent in Latin America. Class 3, Credit 5 (offered annually)

The Immigrant in American History GSHH-546

Registration #0507-546 This course traces the history of the Irish, Germans, Jews, and Polish in the United States.

Class 3, Credit 5 (offered occasionally)

History of Social Discrimination GSHH-547 Registration #0507-547

A study of the discriminatory practices, present and historical, found in the United States. To include the cultural values and problems of acculturation for the American Indian, Black, Puerto Rican, Chicano, Asian, women, and religious groups, with emphasis on its implications to social work.

Class 3, Credit 5 (offered annually)

GSHH-550 Registration #0507-550

The Ascent of Man

The Face of the Land

The course is a multi-disciplinary study-in societal, historical, technological and scientific perspectives-of biological and cultural adaptation; natural and genetic evolution; cosmological and physical relations; matter, elements, and energy; human behavior and the environment, among others. The course is based on the television series The Ascent of Man, created and narrated by Jacob Bronowski.

Class 3, Credit 5 (offered annually)

GSHN-210

Registration #0508-210 The course is concerned with those selected aspects of geology that pertain to surface features of the earth. The aim is to acquaint students with land forms and the processes that produce and change them, and to show that policy for man's use of the land is being developed to protect the surface of the earth and the people who live on it.

Class 3, Credit 4 (offered annually)

GSHN-211

Science and Human Values

Registration #0508-211 Concerned with the nature of scientific thought and the effect of scientific thinking and technological development on our values. Class 3, Credit 4 (offered annually)

GSHN-502 Social Consequences of Technology

Registration #0508-502 An attempt to identify, understand, and probe the causes of current technological problems.

Class 3, Credit 5 (offered annually)

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Modern Germany

Registration #0508-503 A study of the effects on the life of the individual due to the acceleration of technological change.

Class 3, Credit 5 (offered occasionally)

GSHN-504

Registration #0508-504 An analysis in lectures, films, off-campus trips, class discussion, and a course paper, of the twin crises facing this country and the world in the use of energy: depletion of resources and environmental impact.

Class 3, Credit 5 (offered annually)

GSHP-210 Introduction to Philosophy Registration #0509-210

An introduction to some of the major problems in philosophy with readings from classical and/or contemporary sources.

Class 3, Credit 4 (offered alternate years)

GSHP-211 Registration #0509-211

Ethics

Energy and the Environment

An introduction to ethics through an analysis, comparison and evaluation of the main theories that have been offered as systematic ways of making ethical decisions. Readings from classical and/or contemporary sources.

Class 3, Credit 4 (offered alternate years)

GSHP-212 Introduction to Biblical Studies Registration #0509-212

An introduction to the bases of Jewish and Christian beliefs through the Old and New Testaments and related texts. Class 3, Credit 4 (offered annually)

GSHP-213

Introduction to Critical Thinking Registration #0509-213 An introduction to philosophical analysis, especially as it may be

applied in contexts other than professional philosophy. Class 3, Credit 4 (offered alternate years)

GSHP-302 Greek and Roman Philosophy

Registration #0509-302

This course will provide an account of Greek and Roman philosophy from what is known as the pre-Socratic period to the early Christian era.

Class 3, Credit 4 (offered occasionally)

GSHP-502 Philosophy of Religion Registration #0509-502

A critical examination of a number of important issues connected with religion. These include the nature of religion itself, the exis-tence of God, the problem of evil, and questions about the language we use when we talk and write about religion.

Class 3, Credit 5 (offered annually)

GSHP-504 Registration #0509-504

Logic

Aesthetics

introduction to the basic principles of logic. The main emphasis will be on symbolic, or formal logic, but some attention may be paid to informal logic as well.

Class 3, Credit 5 (offered alternate years)

GSHP-507

Registration #0509-507 This course will introduce students to thinking philosophically about the nature of art and its relation to other human experiences. Among the topics considered will be: the aesthetic experience, the relation between morality and art, ugliness in art, and truth in art.

Class 3, Credit 5 (offered annually)

GSHP-511 Registration #0509-511

Social Philosophy

An introduction to some of the main problems of social philosophy through an analysis, comparison and critical examination of vari-ous views concerning the relation of morality to social policies, the nature of social justice, and the claim that there are certain natural human rights.

Class 3, Credit 5 (offered alternate years)

GSHP-512 Registration #0509-512

Philosophy of Science

An examination of the nature of the scientific enterprise; possible discussion topics include the presuppositions of science, its logic, its claims to reliability, and its relationships to society and to problems of human values.

Class 3, Credit 5 (offered alternate years)

GSHP-513 Registration #0509-513

Political Philosophy

The Great Thinkers

An introduction to the philosophical foundations of political thought: a critical examination of one or more of the most influential works in the field.

Class 3, Credit 5 (offered alternate years)

GSHP-514 Registration #0509-514

This course will introduce the student to the thought of some of those philosophers who have been most influential in the history of ideas. An attempt will be made to cover in some depth the works of one or more of those "great thinkers." It is hoped that the student will begin to recognize the enduring nature of some of our most pressing problems, as well as the intellectual foundation of proposed solutions.

Class 3, Credit 5 (offered alternate years)

Social Science

GSSA-205 **Deafness in American Culture** Registration #0510-205

Using principles of cultural anthropology, this course investigates the cultural patterns of hearing and hearing impaired Americans. Emphasis is placed on how these patterns compare and contrast, how they are learned and outcomes of social interaction between members of both groups.

Class 3, Credit 4 (offered annually)

GSSA-210

Cultural Anthropology

Registration #0510-210 A study of the basic institutional patterns of behavior and of thought which the human animal uses to provide the means of life and experience.

Class 3, Credit 4 (offered annually)

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

Class 3, Credit 5 (offered occasionally)

GSSA-525 Registration #0510-525

Planned Society

A study of the principles of economic planning, of political decision making and of institutions of social control required to implement the plans of mankind for human survival. This course features a simulation laboratory

Class 3, Credit 5 (offered annually)

GSSA-530 Registration #0510-530

Man Builds/Man Destroys

A study of the nature, method, and scope of environmental responsibility confronting mankind in the eco-system of the planet earth. A multi-media presentation including the U.N.-SUNY television series.

Class 3, Credit 5 (offered annually)

GSSE-210 Registration #0511-210

Introduction to Economics

A study of the basic macro-economics concepts. Along with demand and supply topics such as determination of G.N.P., inflation, unemployment and money will be discussed.

Class 3, Credit 4 (offered annually)

GSSE-503 Personal Finance Registration #0511-503

An introduction to basic problems and techniques of managing personal finances, based on the study of such main topics as budgeting, the use of credit, insurance and investment. Considerable emphasis will be placed on investment in stocks and bonds. Students will be required to do a considerable amount of library research, and to prepare research papers.

Class 3, Credit 5 (offered annually)

GSSE-508

GSSE-510

Urban Economics and Public Policy Registration #0511-508

The course analyzes the following aspects of urban policy: employment, education and housing. The analytical framework places emphasis on interdisciplinary reasoning and institutional dynamics of policy implementation.

Class 3, Credit 5 (offered annually)

Human Resources Registration #0511-510

The first section of the course will contain a microeconomic analysis of the labor market. The latter section will contain discussion of topics in human resources including education, manpower planning, and discrimination.

Class 3, Credit 5 (offered annually)

GSSE-511 Economics and Politics of Consumer Protection Registration #0511-511

The course discusses the analytical background for simulation of decision-making in consumer protection policy from the perspec-tives of the consumer, the industry and the government. Emphasis is placed on interdisciplinary reasoning and current economic policy.

Class 3, Credit 5 (offered annually)

GSSE-515 Contemporary International Economics Problems Registration #0511-515

The first part of the course will concentrate on major commercial and investment issues in international economics. The second part will focus attention on adjustment mechanisms for a balance of payments disequilibrium and various structural and institutional aspects of the international monetary scene.

Class 3, Credit 5 (offered annually)

The Economics of Undeveloped Countries **GSSE-516** Registration #0511-516

The first part of the course will concentrate on the basic characteristics of "underdeveloped" countries and major limitations on their achieving a higher rate of development. The second part will discuss several policy measures needed to transform "underde-veloped" nations into "developed" nations and will also examine some case studies.

Class 3, Credit 5 (offered annually)

GSSE-517 Fiscal Problems of Metropolitan Areas Registration #0511-517

The course will be divided into two parts. Part one will deal with the existence of a large number of autonomous government jurisdictions in a metropolitan area and the major problems it poses, particularly the problem of efficient supply of local public services. Part two will deal with causes and cures of recent fiscal crisis of urban areas, with special reference to New York City.

Class 3, Credit 5 (offered annually)

GSSM-210 Introduction to Political Science Registration #0513-210

An introduction to the complex issues of politics, political behavior, and types of governmental structures. The purpose of this course is to develop analytical skills so that students as citizens may identify and deal with political alternatives

Class 3, Credit 4 (offered annually)

GSSM-211 Registration #0513-211

American Politics

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

Class 3, Credit 4 (offered annually)

GSSM-212 American Political Development Registration #0513-212

An examination of the development of the American political system from the Constitutional Convention through the post-Civilera. Emphasis will be placed upon personalities, theories, War events, and trends which influenced the political evolution of the United States.

Class 3, Credit 4 (offered annually)

GSSM-215

Registration #0513-215

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

Class 3, Credit 4 (offered annually)

The American Presidency GSSM-216 Registration #0513-216

A study of the role of the presidency in the American political system. Among the topics to be examined are: evolution and expansion of presidential powers, nomination and election of the president, and the process of impeachment. Presidential administrations will be cited to illustrate the various subjects.

Class 3, Credit 4 (offered annually)

GSSM-501 Registration #0513-501

American Foreign Policy

The Cold War

Ideology and Politics

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

Class 3, Credit 5 (offered annually)

GSSM-503

GSSM-504

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 (offered annually)

Twentieth Century America

Registration #0513-504 An examination of the major political, social, and economic developments affecting the United States in the 20th century. Emphasis will be placed upon the reactions of the various presidential administrations to conditions in both the domestic and foreign fields. Class 3, Credit 5 (offered annually)

GSSM-507

International Relations

Registration #0513-507 This course is designed to provide the student with an understanding of basic concepts and theories of international relations, American foreign policy, and the major developments in the con-temporary world arena. Additionally, selected ideologies, doctrines, and institutions operative in the present international system will be analytically examined in order to shed light on the relationship between myth and objective reality in world politics. Class 3, Credit 5 (offered annually)

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GSSM-508 Government and Politics of the Soviet Union Registration #0513-508

The course is designed to examine various aspects of the Soviet political system. Emphasis will be placed on the role of ideology, the Party apparatus, governmental institutions and the political leadership.

Class 3, Credit 5 (offered annually)

GSSM-510 Comparative Politics Registration #0513-510

This course is designed to provide a mode of analysis for the study of political systems. There will be a basic overview of such nations as the United States, Great Britain, France, the Federal Republic of Germany, and the Soviet Union, although relevant examples of other nations will be presented when warranted. A study of each nation's governmental process and political culture will be emphasized.

Class 3, Credit 5 (offered annually)

GSSM-513 Foreign Policy of the Soviet Union Registration #0513-513

A chronological and analytical study of Soviet foreign policy since its inception. Special emphasis will be placed on the importance of ideology, the institutions and people who make policy and the past and present relations with the United States, Western Europe, Eastern Europe, China and the Third World.

Class 3, Credit 5 (offered annually)

GSSM-514 Theories of Political Systems Registration #0513-514

A comparative examination of contemporary political theories viewed from the perspective of the earlier theories out of which they evolved. Emphasis is placed upon the value of theory, its practical application and its limitations.

Class 3, Credit 5 (offered annually)

GSSM-520 Registration #0513-520

Politics in China

This course is designed to inform students of the political dynamics of the People's Republic of China. Major emphasis will be given to the historical background, major aspects of the political system, and the foreign relations of China.

Class 3, Credit 5 (offered annually)

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 (offered annually)

GSSP-501 Registration #0514-501

Industrial Psychology

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 (offered annually)

GSSP-503

Abnormal Personality

Registration #0514-503 Description and theories of the nature and development of behavioral disorders. Contemporary treatment procedures will also be discussed.

Class 3, Credit 5 (offered annually)

GSSP-504 Attitude Formation and Persuasion Techniques Registration #0514-504

The course will focus on current theories of attitude formation, and seek to apply them to contemporary events to achieve an understanding of how those who wish to shape or change attitudes do so.

Class 3, Credit 5 (offered annually)

GSSP-508

Registration #0514-508

Psychology of Learning

Social Psychology

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 (offered annually)

GSSP-509 Registration #0514-509

Psychology of Perception

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 (offered annually)

GSSP-510

U tion #0514 540

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 (offered annually)

GSSP-511 Humanistic Psychology: An Introduction Registration #0514-511

Sometimes called "the new psychology." Based on the assumption that each individual has inherent powers of growth toward self-realization. Emphasis on conscious awareness, perception, meaningfulness, and uniqueness in human experience. Class 3, Credit 5 (offered annually)

GSSP-512

Registration #0514-512

A consideration of theories of personality classification and development.

Class 3, Credit 5 (offered annually)

GSSP-513

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 (offered annually)

GSSP-514 Registration #0514-514

Behavior Modification

Psychology of Personality

Psychology of Motivation

This course will teach you the skills of changing your behavior by controlling your environment and the consequences of your behavior.

Class 3, Credit 5 (offered annually)

GSSP-515 Psychology of Human Adjustment Registration #0514-515

This course will teach you the skills of coping with a variety of every-day experiences. Particular attention will be given to the areas of self validation, interpersonal tactics, and interpersonal relations.

Class 3, Credit 5 (offered annually)

GSSP-516 Registration #0514-516

Adult Psychology

A study of adult life until the time of retirement, of the challenges adults face and the stages through which they typically pass. The approach will be chronological, examining the challenges at each life stage. If time allows, the differing perspectives by sex, social class, and cultural background for a particular stage will be examined.

Class 3, Credit 5 (offered annually)

GSSP-517

Death and Dying

Registration #0514-517 This course will view America's last taboo subject from a socialpsychological 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 (offered annually)

GSSP-518 Psychology of Aging Registration #0514-518

The Psychology of Aging course will present a psychological overview of human aging with some study of the dynamic problems of the elderly in contemporary society. Psychological aspects of adulthood and aging will be emphasized within the perspectives of an interdisciplinary approach.

Class 3, Credit 5 (offered annually)

GSSP-519 Psychology of Altered States of Consciousness Registration #0514-519

This course will cover such topic areas as the specialized consciousness in the two halves of the brain, dreaming, hypnosis, meditation, systematic relaxation, and parapsychology. The course format will be discussion/demonstration.

Class 3, Credit 5 (offered annually)

GSSP-520 Psychology of Creativity

Registration #0514-520 A psychological investigation of the creative process and creative individuals with a focus on techniques which stimulate creativity.

Class 3, Credit 5 (offered annually)

Psychology and Politics GSSP-521 Registration #0514-521

This course examines how political attitudes are acquired and altered, how politicians and ordinary citizens satisfy psychological needs through participation in politics and how principles of learning can illuminate processes of political leadership, persuasion and control.

Class 3, Credit 5 (offered annually)

GSSP-522

Psychology of Art

Registration #0514-522 An introduction to psychological research in the area of cognition (thinking, perception, memory) and the application of these findings to the study of art.

Also included will be a critical examination of certain theories of personality and abnormality in terms of their relevance to the understanding of the artistic process. Emphasis will be on the areas of painting, sculpture, ceramics, photography and film.

Class 3, Credit 5 (offered annually)

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 (offered annually) **GSSS-502**

Contemporary Social Problems Registration #0515-502

Essential sociological insights necessary for an understanding of social problems. The principal aim of this course is to develop an understanding of the multiple factors involved in the development and amelioration (remedial actions) of social problems. These will be viewed primarily on the American scene although extending both into history and the future. Conflicts of values (and goals and interests) are analyzed along with signs of social disorganization and change and various personal deviations.

Class 3, Credit 5 (offered annually)

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

Class 3, Credit 5 (offered occasionally)

Juvenile Delinquency **GSSS-505** Registration #0515-505

Problems of juvenile delinquency in the United States: etiology, extent and significance of the problem. This course features an indepth study of family court and its procedures as well as modern methods of prevention, treatment and control.

Class 3, Credit 5 (offered annually)

GSSS-511

Population & Society

Registration #0515-511 Study of demographic variables of mortality, fertility, and migration as they affect the rise and quality of population.

Class 3, Credit 5 (offered annually)

Urbanization: Urban Man and Society GSSS-512 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 (offered annually)

GSSS-517 Sociology of Deviant Behavior

Registration #0515-517 Examination of conditions under which deviance develops and changes over time. Study of individual deviance, deviant subcultures, and the transformation of a deviant identity. Class 3, Credit 5 (offered annually)

GSSS-519 Women's Studies: Selected Topics Registration #0515-519

An analysis of selected factors that contribute to our understanding of the present status of women. Class 3, Credit 5 (offered annually)

GSSS-520 Registration #0515-520

The development of sociological and socio-psychological types of knowledge that have relevancy for or logical connections to educational practices. This course will be based on substantive material about social phenomena making up the social order in which the educational systems are operating and by which they are influenced.

Class 3, Credit 5 (offered occasionally)

GSSS-521

Registration #0515-521 A course of minimum procedural as well as substantive structure which approaches matters of contemporary concern from a sociological perspective.

Class 3, Credit 5 (offered annually)

GSSS-522

Medical Sociology

Registration #0515-522 This course is a survey of the sociological aspects of health and illness. Some areas of study will be the definition, causes (etiology) and cure of disease in various societies and social groups.

Class 3, Credit 5 (offered annually)

GSSS-524 Registration #0515-524

Applied Sociology

This course is an effort to provide the student with useful sociological knowledge applicable to solutions of practical problems. The inventory of problems is not fixed beforehand, and the specific course content reflects the problems either already encountered by students or very likely to represent a significant portion of their anticipated professional concern upon graduation. (Admission with instructor's approval only)

Class 3, Credit 5 (offered annually)

Sociology of Work

Registration #0515-525 This course will analyze the structural properties, group pro-cesses and social meanings of work. Work, like all other social realities, is studied as a product wrought out of social relationships

Class 3, Credit 5 (offered annually)

GSSS-531

GSSS-525

Marriage

Registration #0515-531 Contemporary trends in courtship patterns, male-female relationships and marital systems.

Class 3, Credit 5 (offered annually)

Educational Sociology

Sociological Seminar

GSSS-569 Registration #0515-569

Human Sexuality

An overview of various aspects of human sexuality including basic physiology, sex roles, sexual myths, legal and social issues, pre-marital and marital sexual behavior, and alternative sexual behav-

Class 3, Credit 5 (offered annually)

Open Elective or Independent Study The student has the freedom to select any course within the Institute or to create an independent study project subject to the approval of the student's dean or department chairperson, the faculty sponsor and the dean of the College of General Studies. An independent study course enables the interested student and his or her faculty sponsor to coordinate their efforts on subject and topics that range beyond the normal sequence of course selections. The student may, for example, participate in a volunteer community human service experience. Credit variable (offered annually)

Service Courses

Service courses are required courses offered by the College of General Studies for specific professional departments. courses may not be taken as general studies electives.

GLLC-402 **Conference Techniques** Registration #0502-402 Basic theories of conference techniques including leadership,

participation, types, and functions of public and private conferences and their evaluation. Student participation in training, problem solving, and informational-developmental conferences. Class 4, Credit 4 (offered annually)

Communication with the Handicapped GLLC-404 Registration #0502-404

An examination of the communication difficulties with the handicapped: specifically the deaf, blind and others with physical handicaps. To include inter-personal, family, social and rehabilitation modes of communication. (Introduction to Psychology)

Class 3, Credit 4 (offered annually)

GLLC-431, 432, 433

Spanish I, II, III

Registration #0502-431,-432, -433 This is a specially designed course in conversational Spanish which lays stress upon communications in different languages or in argot, slang, and vernacular of the various groups of clients with whom the social worker is likely to come in contact. Proficiency in Spanish would satisfy this requirement. Class 3, Credit 4 (offered annually)

GSSE-301, 302

Principles of Economics I, II

Registration #0511-301, -302 A study of the basic concepts and principles pertaining to the economic behavior of the consumer and the firm (micro-economics), the economic problems of the nation (macro-economics), and international economic relations.

Class 3, Credit 4 (offered annually)

GSSP-203 Psychology of Childhood and Adolescence Registration #0514-203

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

Class 3, Credit 4 (offered annually)

GLLZ-200 Basic Communications Registration #0518-200

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

Class 3, Credit 4 (offered on sufficient demand)

GLLZ-201, 202, 203 M Registration #0518, 201,-202, -203 Manual Communication I, II, III A course designed to provide the student with the basic vocabu-

lary of frequently used signs and the American manual alphabet. Class 3, Credit 4 (offered annually)

Graduate Courses

GLLL-701 Registration #0504-701

Film History and Criticism

A critical examination of key aspects of film criticism and of the development of film as an art. The emphasis of the course will be historical, with the development of cinema being traced through major films by important directors. There will be an opportunity to pursue individual interests.

Class 3, Credit 5 (offered occasionally)

GSHF-703 Registration #0505-703

American Architecture

An examination of American architecture from the 17th century to the present designed for the graduate level of study. Emphasis will be placed on American building art in the late 19th and 20th centuries.

Class 3, Credit 5 (offered annually)

GSHF-705 Registration #0505-705

Theories of Aesthetics

Cubism to the Present

Oriental Art

Registration #0505-705 and Art Criticism A course for the art-oriented graduate student centering on the student's search for a supportable and reliable basis for making value judgments about works of art as well as introducing the student to major concepts in aesthetics.

Class 3, Credit 5 (offered occasionally)

GSHF-707 Registration #0505-707

Cubism as a way of seeing and as an expression of 20th century

thinking. Differences and similarities with art forms of earlier eras and other cultures will be discussed Class 3, Credit 5 (offered occasionally)

GSHF-708 Registration #0505-708

A seminar exploring the philosophical and cultural perspectives underlying traditional Far Eastern art as a prelude to examining selected topics in Indian, Chinese and Japanese art. Emphasis will be placed on the application of research techniques and critical methods to an individually selected area of interest which may serve as a foundation for continuing study.

Class 3, Credit 5 (offered occasionally)

GSHF-711 Registration #0505-711

20th Century American Art

An investigation of American art from the Civil War to the present. Emphasis will be placed on the visual arts but many references will be made to music and architecture.

Class 3, Credit 5 (offered occasionally)

GSHF-712 Arts and Crafts in Tribal Societies Registration #0505-712

A study of the function of "primitive" art and the techniques of its production, including the use of clay, stone, fibers, bark, wood, bronze, gold, etc. Hair-styling, body painting and scarification will also be discussed.

Class 3, Credit 5 (offered occasionally)

GSHF-713 Registration #0505-713

This course offers the graduate art student the opportunity to in-vestigate those aspects of 20th century art that question the very nature of art and the role of the artist in today's and tomorrow's society

Class 3, Credit 5 (offered occasionally)

GSHF-714 Registration #0505-714

Art: Vision and Concept

Contemporary Issues in Art

Though the course will develop chronologically from the Renaissance to the present, emphasis will be placed on a close analysis of (1) selected works of art, including paintings, sculpture and architecture, and (2) the development of the unique oeuvre of selected artists. Topics chosen for study will be limited in number but treated in depth. Topical choices will be based on richness and import of the formal and/or conceptual content embodied therein. Some background in the history of art is helpful but not necessary.

Class 3, Credit 5 (offered occasionally)

GSHF-715 Registration #0505-715

Picasso

Rembrandt

The impact of Picasso and his circle on 20th century art. Their affinities with modern scientific and philosophical attitudes will also be discussed.

Class 3, Credit 5 (offered occasionally)

GSHF-716

Registration #0505-716 A detailed analysis of the art and times of the Baroque master. Emphasis will be placed on the development of his style and technique, on his and other artists' relationship to their society and to

the character of the Baroque outlook.

Class 3, Credit 5 (offered annually)

GSHF-717

Music Literature

Registration #0505-717 A comparison of various musical styles from the 17th to the 20th century with emphasis on music's relationship to the other fine arts and its socio-cultural environments. Representative composers include Bach, Beethoven, Chopin and Stravinsky.

Class 3, Credit 5 (offered on sufficient demand)

GSHH-701 History of American Educational Registration #0507-701 Thought and Practice This course traces the history of formal and informal education in America from the colonial era to the present. It examines the growth of progressive education and the evolution of the open education movement of the 1960s and 1970s. The course evaluates the role of education among women and ethnic and religious minorities. Emphasis is given to such educative institutions as family, television, churches, factories, business corporations, public libraries and art galleries.

Class 3, Credit 5 (offered annually)

GSHP-704 Ethics and Philosophy of Education Registration #0509-704

This graduate seminar is designed to raise for discussion a variety of issues regarding the purpose of education, the value of education, and the proper role of the educator vis-a-vis the student, the educational institution, the "community," and the academic profession represented by the teacher. Ethical issues will occupy a prominent place among those discussed, and these issues may sometimes involve a discussion of particular teaching techniques.

Class 3, Credit 5 (offered annually)

GSHP-705

Seminar in Aesthetics

Registration #0509-705 A range of questions will be addressed in the seminar. What is it to perceive something aesthetically? Are there any essential or defining properties shared by all works of art? Are our evaluations and interpretations of art works objective or subjective? Are an artist's intentions relevant factors in critical arguments? Understanding how answers to these questions are constrained by features of actual art works will be an important part of discussion.

Class 3, Credit 5 (offered occasionally)

GSSP-701 Registration #0514-701

Developmental Psychology

Educational Psychology

Educational Sociology

This course seeks to investigate the broad developmental patterns of human behavior with emphasis upon the cognitive and moral aspects of development, personality and culturally patterned behaviors. Consideration is given to major theoretical perspectives. It is strongly suggested that students have a background in introductory psychology before taking this course.

Class 3, Credit 5 (offered annually)

GSSP-702

Registration #0514-702

This course is designed to furnish students with an understanding of the basic psychological processes underlying the educational process and to help students apply them to concrete situations that may arise when teaching. Students will find the material covered in Developmental Psychology (GSSP-701) useful for this course.

Class 3, Credit 5 (offered annually)

GSSS-701

Registration #0515-701 This course is designed to furnish students with an understanding of the basic sociological processes underlying the educational process and to help students apply them to concrete situations that may arise for teachers.

Class 3, Credit 5 (offered annually)

College of Graphic Arts and Photography

School of Photographic Arts and Sciences

All courses in the School of Photographic Arts and Sciences will be offered at least once annually, except as noted.

Biomedical Photography

PPHB-201,202,203 **Biomedical Photography I** Registration #0901 -201, -202, -203 Basic photography program for biomedical photographers with emphasis on theory, craftsmanship and visual communication. Patient photography, close-up and other photography as a foun-

dation for future biomedical photography.

Class 4, Lab. 8, Credit 6/Qtr.

PPHB-211 Survey of Biomedical Photography Registration #0901 -211

Career opportunities, typical biomedical photography settings, types of photography performed. Ethical, professional, and personal relationships with patient, physicians, research and staff personnel.

Class 1, Credit 1 (Spring Quarter only)

PPHB-301, 302, 303 **Biomedical Photography II**

Registration #0901-301,-302, -303 Further study and practice of theory and principles used in biomedical photography, including photomacrography, photomicrography, hospital photography techniques, infrared and ultraviolet light, biological field studies.

Class 2, Lab. 10, Credit 5/Qtr.

Preparation of Biomedical Visuals PPHB-331,332,333 Registration #0901-331, -332, -333

Study of basic principles of effective visual communication and design. Student will produce slide and slide/tape presentations and exhibition displays

Lab. F-4, W-4, S-6, Credit 3/Qtr.

PPHB-402 Advanced Photography in Registration #0901-402 Biomedical Communications

Sophisticated and creative applications of photography serving the needs of the scientific community. Students explore a variety of specialized photographic techniques and a variety of philoso-phies. Assignments are performed which are similar to those encountered in biomedical and research institutes.

Class 2, Lab 4, Credit 4

PPHB-413 Biomedical AV Design and Production Registration #0901-413

Design, creation, and presentation of 35mm slide and 35mm slide/ tape productions as applied to medical and scientific needs. Planning, researching, scripting, production, revision, evaluation. Multiple projector uses. Multiple screen uses. Lap dissolve; programming; graphics; eclectic combination of music, words, and images.

Class 2, Lab 4, Credit 4

PPHB-501,502,503

Senior Thesis Production

Registration #0901-501, -502, -503 An investigation, planning, organization and production of an audiovisual presentation, a learning package or an informational program for a biomedical communications client.

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

Film and Television

Introduction to Film Making

PPHF-207 Registration #0902-207 A basic course for novices. Emphasis is on film making and the use of the medium as an interpretive and expressive form. There is no restriction on the choice of style or content. Learning will take place in a communal, participatory environment so that ideas can be shared and the medium experienced as a total, integrated process.

Short films by contemporary film makers will be screened to familiarize students with the diversity and potential of the medium.

> A minimum of two independent film making projects are required of each student. One of these includes the use of sound.

Super 8 equipment and facilities are provided by RIT. Students are responsible for film and processing costs, 1/4 inch recording tape and editing incidentals. Approximate cost to students is \$50.00 for the quarter.

Class, Lab., Studio, 7 hours, Credit 3

PPHF-208

PPHF-209

Introduction to Film Making II

Registration #0902-208 An exploration of the diverse contemporary forms used to interpret and express subject matter in film. This course provides an opportunity for the student to make films which exploit traditional and experimental uses of camera, editing, sound, and atti-tudes toward subject matter. Although complete films can be attempted, the primary objective will be to create short film experiments.

Short films by film makers from the past and present will be screened to familiarize students with the diversity and potential of the medium.

Super 8 equipment and facilities are provided by RIT. Students are responsible for film and processing costs, 1/4 inch recording tape and editing incidentals. Approximate cost to students is \$50.00 for the quarter. (Introduction to Film Making)

Class, Lab., Studio, 7 hours, Credit 3

Basic Television Production Registration #0902-209

This is an overview course designed to familiarize students with the entire television production process. Emphasis is placed on design of graphics for television, shooting film and slides which conform to video system limitations and operation of the filmchain. Topics covered include basic visualization, camera operation, portable video equipment, studio production techniques and set design. Limited hands-on experiences include half inch portable systems, "real time" studio production, limited studio electronic assembly techniques and video art techniques. (Permission of the Art and Design Department/SPAS. No previous media experience required.)

Lab and lecture required. Class 3 hrs., Lab. 4 hrs. (Spring Quarter only) Class 3, Credit 3

PPHF-301 **Conceptual Film Production**

Registration #0902-301 A fundamental course in Conceptual Film Production. Film making as a means of interpretation and expression. Film as a medium

of communication, as a structural unity, the main elements of structure, organizational principles-with special application to the conceptual film form. A combined theoretical-practical approach to the dynamics of the film medium. The student is expected to demonstrate the techniques in film assignments. Production will be in non-sync (Super 8) format. Students furnish film processing; equipment is furnished by the department. Elec-tive to all undergraduate 3rd and 4th year Photographic Illustra-tion or Professional Photography students, and other students by special permission.)

Class 2, Lab 6, Credit 4

PPHF-302 Narrative Film Production Registration #0902-302

A fundamental course in straight Narrative Film Production. Film making as a means of interpretation and expression with empha-sis on the straight narrative but not to the exclusion of the conceptual film form. Application of the elements of structure and organizational principles appropriate to the main area of empha-A combined theoretical-practical approach to the dynamics of the film medium. The student is expected to demonstrate technical and theoretical knowledge of the film making process through a series of film assignments. Production will be in non-sync (Super 8) format. Students furnish film and processing; equipment is furnished by the department. (PPHF-301 or a satisfactory equivalent or by permission of instructor) Class 2, Lab 6, Credit 4

PPHF-303

Fiction and Dramatic Short Film Production

Registration #0902-303 A fundamental course in Fiction and Dramatic Short Film Production. Film making as a process of interpretation and expression with an emphasis in the narrative film form as applied to fiction and dramatic short films. Included will be the non-fictional narrative and conceptual film form. Application of the elements of structure are organizational principles appropriate to the main area of emphasis. A combined theoretical-practical approach to the dynamics of the film medium. The student is expected to demonstrate technical and theoretical knowledge of the film making process through a series of film assignments. Production will be in non-sync (Super 8) format. Students furnish film and processing: equipment is furnished by the department. (PPHF-302 or a satisfactory equivalent)

Class 2, Lab 6, Credit 4

PPHF-407,408,409 Registration #0902-407, -408, -409

Film History

Survey of developments in film from the early beginnings to the present. Objective is to explore the uses of the medium within a historical, cultural and theoretical context. Each quarter will emphasize a different film form: 407 fiction feature, 408 documentary, 409 experimental and animation. No prerequisites. Admission during any quarter of the academic year. Class 3, Credit 3/Qtr.

PPHF-411 **Visualization and Commercial** Registration #0902-411 Film Production A general review of professional production methods and the theory and practice of visualizing an expressive film continuity. Basic synchronous sound recording is included. (PPHF-303 or

permission of the instructor) Class 2, Lab. 6, Credit 4

PPHF-412 Film Planning and Studio Operations Registration #0902-412

Introduction to studio crew work and editing systems for professional film. Budgeting and an elementary view of the economics of production are also included. Film writing is introduced and related to production planning (PPHF-411 or permission of the instructor)

Class 2, Lab. 6, Credit 4

PPHF-413 Film Project with Synchronous Sound Registration #0902-413

A short (5-10 min. suggested) film is produced by student teams. Advanced sound editing, sound mixing and A&B roll conforming are included; Cameras, lighting and editing equipment are provided but students are expected to provide sensitized goods and processing.

Class 2, Lab. 6, Credit 4

PPHF-417 Registration #0902-417

Basic Television Production

A general, rigorous "hands on" introduction to the art and technology of video communications designed as a foundation experience for the intensive year's course. It stresses that the student become involved in both the practical-technical and aesthetic responsibilities of studio television and portable video production. The student gains experience in: video editing, camerawork, soundwork, basic lighting, real time switching and portapack taping. Scriptwriting, visual continuity and composition, story-boarding, graphics design, set design and Television directing provide creative challenge. Each Lab section produces a full studio production at the end of the quarter.

Class 2, Lab 4, Credit 4

PPHF-418 Studio and Documentary Video Registration #0902-418

Refinement of skills learned in the first quarter is achieved through the design and production of individual student programs. Staging, camera blocking, pre-production planning, film in television, broadcast history, copyrights; and a tour of local broadcast facilities supplements the emphasis placed on the development of professional producing and directing skills. The viewing of and discussion of several commercial and independent single camera productions. A two person team mini-documentary assignment provides further experience in color portapack taping and editing. (PPHF-417 or permission of the instructor)

Class 2, Lab 4, Credit 4

Advanced Television and Video Production **PPHF-419** Registration #0902-419

Lab work explores advanced lighting and staging, television re-motes, video art, technical limits of the video image and Industrial/educational taping techniques. Lectures include the present and future of cable television, production budgeting, equipment update and selection, public broadcasting, experimental video and the educational/industrial and broadcast television job markets. The major spring project, a final "portfolio" production, concludes the broad based three quarter program.

Class 2, Lab 4, Credit 4

PPHF-421,422 Writing for Film and Television Registration #0902-421,-422

This course explores the writing of non-fiction and fiction for the-atrical and non-theatrical films, and television. Experience in the writing of fiction concentrates on the elements of dramatic construction. The exploration of non-fictional writing examines infor-mation gathering techniques and methods of investigation. Both non-fiction and fiction are treated as expository, story-telling forms. Students are responsible for writing film or television scripts on subjects of their own choosing and for completing several brief written exercises in areas such as character, dialogue, the interview, suspense, and plot. Although this course is designed primarily to meet the needs of film and television majors, it is not restricted to those students.

Class 2, Lab. 3, Credit 3 (winter and spring quarter)

PPHF-424,425, 426 Introduction to Animation and Registration #0902-424, -425, -426 Graphic Film Production An introduction to the techniques and practice of graphic and animated film production. This course provides training and practical experience in a wide variety of approaches to single frame motion picture production. Students produce a number of short film exercises utilizing both existing and original artwork. Some techniques covered in the course are: direct modification of the film surface, cel, ink and paint animation, and kinestasis. Screenings of professionally made films will illustrate each technique. Proficiency in drawing is not required. No prerequisites. Class 3, Lab 2, Credit 4 (fall and winter)

PPHF-520 Registration #0902-520

Sound Recording

Specialized information and work in sound. To give information and lab work beyond the regular course. To encourage the beginning of vocational level work in sound. Each student prepares a mixed sound track to professional quality standards.

Class 2, Credit 2

PPHF-521 Visualization for Film and Television Registration #0902-521

A basic course in the mechanics and aesthetics of visualization for film and television. Emphasis is on editing, camera, and subject dynamics and their interrelationship. Combined theoreticalpractical approach to the development of visual images for film and television.

Class 2, Credit 2

Credit 4

PPHG-200

PPHF-522 Registration #0902-522

The Film Director

An indepth penetration into the role of the film director as a specialization and a profession in the film making process. Included will be the related organic nature of the structure and function of the film crew and the film; the emerging role of the contemporary director; the categorization of the roles of the film crew; the director's relationship to each category; the director as a creative artist; viewing of films of famous directors and observation of a director in action. (PPHF-303,413,419 or equivalents) Class 2, Credit 2

PPHF-541 Senior Production I— Registration #0902-541 (Film/Television) Continuation of the introduction to business and legal factors begun in the basic film and Video Production activities. The course assists the student in detailed budgeting and shooting, script preparation and break-down. Final project shooting begins in this quarter. (PPHF-413orPPHF-419)

PPHF-542 Registration #0902-542 Continuing the senior project shooting phase to completion. Production teams meet as sections with faculty whose experience matches the kind of production involved. (PPHF-541) Credit 4

PPHF-543

Registration #0902-543(Film/Television)Completion of senior projects. Includes a review of post production techniques. (PPHF-542)Credit 4

General Photography

Photography I

Post Production—

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

PPHG-201, 202, 203

Class 3, Lab. 12, Credit 7/Qtr.

Photography I

Registration #0903-201, -202, -203 A program in basic photography with emphasis on craftsmanship, theory, and visual communications. The major aim is to enable the student to form a broad foundation of understanding and skills necessary for advanced study in photography available in upperclass programs. The completion of this foundation year allows the student to select a more specific program culminating in a bachelor of fine arts or a bachelor of science degree.

PPHG-207, 208, 209 Still Photography

Registration #0902-207, -208, -209 In the first quarter the students become familiar with the 35mm camera, processing and printing. The work is restricted to black-and-white photography. The aesthetics and basic understanding of photographic practice is covered.

The second and third quarters deal with more advanced techniques and principles of photography.

Class 1, Lab. 6, Credit 3/Qtr.

PPHG-210 Registration #0903-210

210

Materials and Processes of Photography

An intensive 10-week summer course for students entering the transfer program in film and television, photographic illustration, and professional photography. This course provides the minimum study necessary to gain second year standing. It replaces PPHG-211, 212, 213. Credit 6

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

Class 2, Lab. 1, Credit 3/Qtr.

Photographic Illustration

PPHL-301, 302, 303 Registration #0904-301, -302, -303 Covering the history and aesthetics of photography from 1839 to the present, with special emphasis on the development of photographic seeing, and its related effect on other media. A survey of the numerous processes and how their development affected the image-making of their particular period, i.e., daguerreotypes, callitypes, ambrotypes, etc. Student projects are designed to illuminate phases of photographic history best understood by personal visual exploration. Class 3. Credit 3/Qtr.

PPHL-311, 312, 313

BFA Photography II

Registration #0904-311, -312, -313 This is a common core course which is required of all Second year illustration students.

Emphasis is placed on an integrated learning experience as an essential foundation to upperclass study in the various photographic disciplines. The course, therefore, is not taught as a complete body of knowledge, but rather as an open-ended investigation into many areas of technique and image-making.

The course should aid the student to make a selection in one of the four major areas of specialization offered to upperclass BFA degree candidates. (PPHG-200, -203 or equivalent)

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

PPHL-401,402,403 Photography As a Fine Art I Registration #0904-401,-402, -403

The major emphasis is placed on the individual's learning to identify and articulate personal response to his environment through the medium of photography. Students design their own projects and work under the guidance of the professor. Traditional silver, as well as non-silver print-making techniques, may be utilized. (PPHL-303)

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

PPHL-411,412,413 Registration #0904-411,-412, -413

Photojournalism I

Journalistic photography for mass media publication with emphasis on the development of specialized skills in projects dealing with various aspects of reportage and all related editorial problems from caption writing, law and history, to organizational structures, printing processes, layout and design. Special emphasis is placed on the story as a total concept from inception to finished layout. Research and origination of material as well as the study of publications is explored. (PPHL-313) Class 2, Lab. 8, Credit 4/Qtr.

PPHL-421,422, 423

Registration #0904-421,-422, -423

Nature Photography

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

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

53

PPHL-431,432,433 Illus Registration #0904-431,-432, -433

Illustration Photography I

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. Investigation into the photographic medium as a means of communicating ideas. The development of individual vision and self expression through the disciplines of photography, both in black-and-white and color images. (PPHL-313)

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

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

PPHL-440 News Writing and News Reporting Registration #0904-440

Principles and practices of observing, interviewing, investigating, analyzing, organizing, and writing for publication in the news media. Emphasis will be on actual student work in all phases of news reporting and news writing, and class work will be focused on critical editorial appraisal of student projects.

Class 3, Credit 4 (offered every quarter)

PPHL-460

Photo for Printers

Registration #0904-460 A workshop in black and white and color photography for nonphotography majors. Technical and esthetic information will be given to enhance the non-vocational photographers' use of their equipment. Darkroom work will be limited to the black and white negative and print. Color work will emphasize improvement of camera techniques.

Class 2, Lab. 4, Credit 4

PPHL-501,502,503 Photography as a Fine Art II Registration #0904-501,-502, -503

The major emphasis is placed on the individual's learning to generate and intensify personal statement through the medium of photography. Students select their own projects and work with their own ideas under the guidance of an instructor. Class discussions center around certain common problems found in working with this medium, such as the self-imposition of unnecessary limitations. Development of awareness of the other arts is continued. (PPHL-403 or t PPHL-400)

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

PPHL-511, 512, 513 Registration #0904-511, -512, -513

Photojournalism II

A workshop course with emphasis upon the production of photographic images for publication in mass media. Study includes market research, marketing methods, accepted industry practices, as well as the production of photographic images for the market. (PPHL-413)

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

PPHL-521,522, 523 Color Photography Workshop 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. (PPHL-313 or equivalent, and permission of instructor) Class 2. Lab. 6*. Credit 4/Qtr.

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PPHL-531,532,533 Illustration Photography II Registration #0904-531, -532, -533

Advanced individual creative approaches to visual problem solving. Conceptual ideas employing the photographic medium are stressed. The student is encouraged to find a personal photographic approach and to develop a portfolio. (PPHL-433 or † PPHL-400)

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

*Lab hours may be nonscheduled, to be completed during available time. †Summer course.

PPHL-551, -552, -553 Registration #0903-551, -552, -553

Special Topics

A seminar approach offered on demand when adequate numbers of students and faculty desire to investigate specialized topics not normally offered in the regular curriculum.

Credit variable

Photographic Processing and Finishing Management

PPHM-201, 202, 203 Basic Principles of Photography Registration #0905-201,-202, -203

The program of study is designed to provide photographic marketing students with a thorough knowledge of the basic photographic process in order that they may have an understanding of how photographic products work. The course will include units of study in film characteristics, lighting, optics, photographic chemistry, sensitometry and color theory. Each of these will be related to the actual practice of photography.

Class 2, Lab. 6, Credit 4/Qtr.

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

Credit 1 (spring only)

PPHM-300 Production Processing and Finishing Registration #0905-300

A10-week summer course which provides an opportunity for students who have completed basic photography to gain an understanding of all aspects of production processing, and finishing. They will be involved with machine processing on a full production basis. A hands-on-type of learning experience will be the method most often employed in this course. (Permission of the instructor)

Class 2, Lab. 30, Credit 12

PPHM-301,302,303 Production Processing and Finishing Registration #0905-301,-302, -303

Provides an opportunity for photographic students to gain an understanding of the mechanical, electrical, electronic, chemical, and production concepts of automated processing and finishing. Students will be involved with automated processing and finishing on a full production basis. (PPHS-203, or PPHG-213 and PPHG-203)

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

PPHM-310 Registration #0905-310 Provides the non-photographic processing and finishing major with an opportunity to become knowledgeable in the operational procedures and services of a processing and finishing laboratory. (PPHM-203)

Class 2, Credit 2 (spring only)

PPHM-320,321 Mechanics of Photographic Hardware

The course will cover causes, effects and benefits of the application of basic principles optics, mechanisms and electronics embodied in the type of hardware handled by retail and wholesale photographic establishments catering to the general public. (PPHM-203)

Class 4, Credit 4/Qtr. (winter and spring only)

PPHM-401,402,403 Photographic Process Control Registration #0905-401, -402, -403

Statistical methods of studying repetitive processes, with special application to photographic processing; methods of obtaining data about processes, including chemical and physical factors; methods of making process adjustments, including automatic control methods. (PPHM-303)

Class 2, Lab. 6, Credit 4/Qtr.

PPHM-410,411,412 Training and Supervision of Registration #0905-410, -411, -412 Photographic Processing and Finishing Laboratory Personnel

Provides an opportunity for the processing and finishing management students to experience supervisory and training techniques as they prepare and use training aids and techniques in the actual supervision of the various work areas in the processing and finishing laboratory. (PPHM-303 or PPHM-300)

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

PPHM-501,502,503 Senior Seminar in Production Processing Registration #0905-501,-502, -503 and Finishing Management

This course is designed to help the photo management student make last minute preparations for entering the world of work. Procedures for obtaining employment, i.e., preparing resumes, taking interviews, plant visitations, etc., will be covered in detail. Information on the latest business practices and procedures will be discussed in depth as well as the current condition of the processing and finishing market. Prerequisite: senior standing.

Class three times a quarter for three quarters. Credit 1

PPHM-511,512,513 Advanced Production Processing Registration #0905-511, -512, -513 and Finishing This course taken during the last year of study provides the student with an opportunity to study in depth, on an independent basis, those areas of processing and finishing which the student finds most interesting. This course may also be used to strengthen those areas of interest in which the student feels a weakness. (PPHM-303)

Lab. 12, Credit 4/Qtr.

PPHM-520 Operation, Care and Maintenance of Registration #0905-520 Photofinishing Equipment This course will provide the student with an opportunity to gain a thorough understanding of the mechanical, optical, and electrical aspects of the major pieces of photofinishing equipment. This course will employ the latest techniques in programmed learning, demonstrative hands-on experience, and lectures so that the student will be able to operate and perform basic care and maintenance on major pieces of processing and finishing equipment. Broad principles learned here will be applicable over a wide range of equipment. (PPHM-Senior Standing)

Lab. 3, Credit 1 (Winter Only)

Professional Photography

PPHP-301, 302, 303 Photography II Registration #0906-301, -302, -303 Advanced applied photography in black and white and color with

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 2, Lab. 7, Credit 4/Qtr.

PPHP-311, 312, 313 Registration #0906-311, -312, -313

Basic Color

Color photographic image-making based on the study of color principles, color vision and color photographic material and processes. Part of this course is a visual design workshop which explores what constitutes an image, concentration in visual awareness, perception and sensitivity. Color transparencies are emphasized in the design workshop, and practices in negative-positive printing, negative analysis, internegative making, transparency duplicating, and the use of special processing techniques are used to emphasize theory. (PPHG-213) Class 2, Lab. 4, Credit 3/Qtr.

PPHP-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. (PPHP-313, -303, orPPHL-313)

Class 2, Lab. 8, Credit 4

PPHP-408 Scientific and Technical Applications Registration #0906-408 of Photography An introduction into the field of photography as it applies to technical problem solving. Event timing, photo sensing, visible and invisible radiation recording are presented in class and laboratory projects. (PPHP-303, PPHP or PPHL-313) Class 2, Lab. 8, Credit 4

Class 2, Lab. 6, Cleuit 4

PPHP-409 Corporate and Special Interest Registration #0906-409 Publications A survey of this type of publication with particular emphasis on the photographic problems involved. Skill building assignments to improve competence and an introduction into the problems of the art director, editor, printer, layout person, and writer form the basis of the course content. (PPHP-303, PPHP or PPHL-313) Class 2, Lab. 8, Credit 4

PPHP-421,422,423 Advertising Photography Registration #0906-421,-422, -423

A course built strictly to the standards of professional photography. Only those students who seriously aspire to be professional craftspeople should enroll. The assignments are specific and vary from strictly commercial to advertising illustration. In addition, the student is encouraged to specialize in the direction of his or her own natural ability and interests. Approximately 2/3 of the photography will be in color. (PPHP-303 and PPHP-313, PPHL-313) Class 2, Lab. 7*, Credit 4/Qtr.

PPHP-431 Registration #0906-431

Forensic Photography

The use of photography in forensic application for business and industry, surveillance, photographic evidence, forgery detection, safety. (PPHP-203)

Class 2, Lab. 6, Credit 4 (spring only - on sufficient demand)

PPHP-441, 442, 443 Advanced Color Printing Registration #0906-441, -442, -443

This course is designed to give the student an advanced study in color techniques and theory in relation to quality and creative use of photographic materials. The student may choose a section for intensive study such as the dye transfer process, quality control methods in printing and processing and special masking. PPHP-31 3 or equivalent is required. (Permission of the instructor)

Lecture 1, Lab. 6, Credit 4/Qtr.

PPHP-461 Registration #0906-461

Micrographics

A one-quarter course designed to acquaint the professional photography student with a career in the micrographic industry. It is directed to familiarize the student with microimaging techniques and materials utilized in microfilm production situations as well as in media production situations where the creation and reproduction of illustrative imagery is of prime importance. (PPHP-303) Class 1, Lab. 5, Credit 4 (offered on sufficient demand)

PPHP-501,502,503 Industrial Photography Seminar Registration #0906-501,-502, -503 Depending on the student's interest, the course is subdivided into

- 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 PPHP-409 or permission of the instructor)

Class 2, Lab. 3, Studio 5, Credit 4/Qtr.

*Lab hours may be nonscheduled, to be completed during available time

PPHP-521,522, 523 Advanced Color Seminar Registration #0906-521,-522, -523

This course is designed to give advanced students an opportunity to work relatively independently to develop their portfolios and/or to explore specific areas of interest in depth, in the picture making areas. It combines the individual initiative aspects of independent study with the advantages of shared class critiques. Lectures and other profession related experiences. (PPHP-303, -313, or PPHL-313and permission of instructor are required) (PPHP-423, -443, or PPHL-433 are suggested)

Class 2, Lab. 6*, Credit 4/Qtr.

PPHP-541 **Basic Portrait Photography** Registration #0906-541

Basic portraiture with the professional photographer's approach Black-and-white and color retouching are included and instruc-tion is given in special printing and finishing techniques. (PPHP-303, PPHP-313 or PPHL-313)

Lecture 3, Lab. 2, Credit 4 (fall, winter, spring)

PPHP-542 Advanced Portrait Photography Registration #0906-542

Advanced portraiture with the professional photographer's approach. Black-and-white and color retouching are included, and instruction is given in special printing and finishing techniques. (PPHP-541)

Lecture 3, Lab. 2, Credit 4 (winter only)

PPHP-543 Contemporary Portrait Photography Registration #0906-543

Contemporary portraiture with the professional approach. Black-and-white and color retouching photographer's are included, and instruction is also given in special printing and finishing techniques. (PPHP-542)

Lecture 3, Lab. 2, Credit 4 (spring only)

Special Topics in Photography PPHP-551, 552, 553 Registration #0906-551,-552, -553

A seminar approach offered on demand when adequate numbers of students and faculty desire to investigate specialized topics not normally offered in the regular curriculum. Available to upper level students. (PPHP-303) Credit variable

Perceptual Principles for Photographers PPHP-561,562 Registration #0906-561,-562

An introductory course into the ways we select and organize pictorial information based primarily on gestalt principles. The emphasis is not on the technical aspects of the photographic process (the medium) but rather on the communicative aspects (the message).(No prerequisites)

4 Qtr. Cr.

Photographic Science and Instrumentation

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

PPHS-200 Fundamentals of Photographic 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 photo-sensitive systems, characteristics of radiation, introduction to sensitometry and tone reproduction, and applied photography.(Permission of the department) Credit 9 (summer only)

*Lab hours may be nonscheduled, to be completed during available time

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

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

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

An intensive course presenting the subject matter normally taken by photographic science and instrumentation students during their second year. Topics include the chemistry and physics of black-and-white and color materials and processes as a continua-tion of topics covered in PPHS-200. (Permission of the depart-ment and PPHS-200 or PPHS-203)

Credit 9 (Summer only)

PPHS-311 Advanced Sensitometry of Black-and-White Registration #0907-311 **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 data from sensitometric tests; spectral response measurement; objective and subjective tone reproduction; the performance of the human visual system. The laboratory includes two extended prob-lems on topics chosen by the student. (PPHS-203) Class 2, Lab. 6, Credit 4

PPHS-312

Registration #0907-312

Problems in applied processing and the application of analytical chemical techniques to the control of black-and-white and color processing solutions. Processing faults, and image restoration, trouble shooting, archival permanence, ecology and processing machine operation. Statistical techniques application to machine control. (SCHG-206, PPHS-203)

Class 2, Lab. 6, Credit 4 **PPHS-313**

Registration #0907-313

Color Systems

Introduction to color and color imaging systems; systems of color specification; additive and subtractive trichromatic systems of color recording and reproduction; the technology of color pho-tography; sensitometry and densitometry of color materials; introduction to graphic reproduction and electronic systems. Laboratory work in the exposure and evaluation of color photo-graphic materials. (SMAM-305, PPHS-201 through PPHS-312) Class 3, Lab. 3, Credit 4

PPHS-401 Registration #0907-401

Radiometry

The course serves as an introduction to the physics of light, its generation, propagation, absorption and measurement. This is combined with an introduction to the human visual process, to general photometry and radiometry, to light sources and to light receivers. (SMAM-205, SPSP-313, PPHS-311) Class 3, Lab. 6, Credit 5

PPHS-402 Registration #0907-402

Image Microstructure mathematical

Introduction to image formation and structure; models for spread functions of image-forming elements and detectors; superposition and convolution; noise; sinusoidal response functions; figures of merit; characteristics of instruments used for small-scale image measurements. Laboratory work in microdensitometry and subjective image (SMAM-305, PPHS-203, SPSP-313) evaluation Class 3, Lab. 5, Credit 5

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Applied Processing

PPHS-404Introduction to Scientific ResearchRegistration #0907-404A course for third-year students in photographic science and in-

strumentation designed as preparation for the fourth-year research project. Project selection and the use of scientific literature; preparation of proposals; research notebooks; patents; considerations in data collection and analysis; written and oral presentations. (Third-year status in Photographic Science and Instrumentation or permission of the instructor)

Class 2, Credit 2/Qtr.

PPHS-411 Statistical Inference Registration #0907-411

Hypothesis testing, confidence intervals, and sample size for variables; introduction to analysis of variance and regression analysis.

Class 2, Lab. 2, Credit 3

PPHS-412 Design of Experiments Registration #0907-412

Basic designs for experiments, objectives, conclusions, error estimation, data analysis; continuation of analysis of variance and regression analysis; response surfaces and factorials. Class 2, Lab. 2, Credit 3

PPHS-413 Statistical Quality Control Registration #0907-413

Basic probability, control charts, sampling plans, power and O.C. curves, and modern applications of product and process control. Class 2, Lab. 2, Credit 3

PPHS-421,422,423 Photographic Chemistry

Registration #0907-421,-422, -423 The chemistry and photographic properties of photographic emulsions and developer solutions at the intermediate level; topics in physical, organic, and analytical chemistry necessary to the continued study of photographic science. (PPHS-312, SCHG-207)

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

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

Research

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-404, 413)

Class 2, Credit 2 (fall)

Class 2, Lab. 6, Credit 4 (winter and spring)

PPHS-511, 512,513 Optical Instrumentation Registration #0907-511, -512, -513

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

Class 3, Credit 3/Qtr.

PPHS-521,522,523 Image Systems and Evaluation Registration #0907-521,-522, -523

An analytical approach to analysis and evaluation of photooptical and other image recording systems; objective and subjective evaluation techniques and their correlation. The use of convolution, correlation, autocorrelation, and Fourier methods in the analysis of the image recording systems. Laboratory work in the design of photo-optical systems. (PPHS-402, SMAM-305, SPSP-313)

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

Class 2, Credit 2 (winter and spring)

PPHS-531,532,533 Theory of the Photographic Process Registration #0907-531,-532, -533

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

Class 3, Credit 3/Qtr.

PPHS-551,552,553 Special Topics in Photographic Science Registration #0907-551, -552, -553 Topics of special interest, varying from quarter to quarter,

Topics of special interest, varying from quarter to quarter, selected from the field of photographic science and not currently offered in the Division's curriculum. Specific topics are announced in advance. (Not offered each quarter. Consult staff chairman of the Photographic Science Division) Class, Credit: variable

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PPHS-599

Independent Study

Registration #0907-599 Faculty directed study of appropriate topics on a tutorial basis. Approval of the proposal by the staff chairman of the Photographic Science Division required.

Class, Credit: variable

PPHS-600 Principles of Photographic Science Registration #0907-600

A course intended for students who have completed their undergraduate programs in engineering or the sciences and who desire to prepare themselves for entry into the graduate program in photographic science and instrumentation or who desire a working knowledge of photographic science at an undergraduate level. It is an intensive course, assuming working knowledge of undergraduate mathematics, physics and chemistry. Course topics include radiation and radiometry, properties of radiation-sensitive materials, chemistry of photographic processing, sensitometry, tone reproduction, principles of color measurement, color photographic systems, image microstructure, and photographic instruments. The course includes both lectures and laboratory work. (Registration requires consent of the graduate coordinator.) Credit 15 (summer only)

(Not applicable to the 45 required graduate credits in the photographic science and instrumentation graduate program)

PPHS-601,602,603 Principles of Photographic Registration #0907-601, -602, -603 Science Equivalent to PPHS-600, but offered in the evening and Saturdays during the regular fall, winter, and spring Quarters. (Preliminary admission to the MS program in Photographic Science or consent of graduate coordinator. Not offered every year. Consult coordinator of photographic science graduate program.) Credit 5/Qtr.

(Not applicable to 45 required graduate credits)

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Master of Fine Arts in PhotographyPPHG-500Fundamentals of PhotographicRegistration #0903-500Communication

A special 10 week summer course for students entering the graduate program with insufficient undergraduate credits and experience in photography and/or the visual arts.

An intensive survey of photographic materials, processes, equipment and practice; workshop in the application of photography to the solution of problems in visual communication and design.

Undergraduate credit (15 hours) will be granted upon completion.

PPHG-701, 702,703 History and Aesthetics of Photography Registration #0903-701, -702, -703

An intensive inquiry into the history and aesthetics of photography to the present. Some of the areas of exploration: the rise and development of portrait, architectural and landscape photography in the 19th and 20th centuries; a survey of old and recent processes and how they affect the image-making of their particular period; exploring new frontiers; the photographers of the geological and geographical U.S. Surveys and NASA moonscapes; "straight" photography vs. pictorialism: 135-year battle; the document and Robert Frank's *Americans* and the evolution of color photography.

Credit 3/Qtr.

PPHG-705, -706, -707 Student/Faculty Seminar Registration #0903-705, -706, -707

An all-purpose weekly meeting to facilitate communication among members of the MFA community and to introduce them to the resources available on campus and in the community. **Credit 1/Qtr.**

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PPHG-720,721, 722 Photographic Workshop Registration #0903-720, -721, -722

Each faculty member offers a different opportunity for students to explore the multiplicity of ways that photography can be used as a vehicle for expression and for communication. Visual research, group critiques, seminars, field trips, studio and laboratory practice are used.

Credit 4/Qtr

Photography Core PPHG-725, 726, 727 Registration #0903-725, -726, -727

Major emphasis is placed on the individual's learning to generate and intensify his or her personal statement through photography. Some of the projects are assigned while others are selected by the candidate.

Credit 4/Qtr.

Cinematography

Registration #0903-730, -731, -732 Film making workshop. Individually planned studies in cinema-tography, as determined by faculty-student consultation, group critiques, seminars, studio and laboratory practice, field trips. Credit 3-9/Qtr.

PPHG-730, 731, 732

PPHG-740, 741,742 Photographic Museum Practice Registration #0903-740, -741,-742

Museum internship workshop, still or motion picture; research, assigned projects, seminars in history, function and administration of museums, with emphasis on photographic curatorial duties; practice in exhibition planning and development; field trips. This cannot be selected as a minor concentration. Credit 3-9/Qtr.

PPHG-750, 751, 752 **Special Topics Workshop** Registration #0903-750, -751,-752

Advanced topics of current or special interest designed to broaden and intensify the student's ability to use photography as a means of communication and expression. Credit 3-9/Qtr.

PPHG-760

Photography, Art and Perception

Registration #0903-760 An advanced course which provides an applied psychological framework for the ways we select, code, organize, store, retrieve and interpret visual images and explores how photographs relate to art and perception.

Credit 4 (offered on sufficient demand)

PPHG-799 Registration #0903-799

Independent Project

The student proposes an advanced project to an individual instructor. The student and the instructor are jointly responsible that the material to be covered is appropriate to the student's program and that the number of credits proposed are justified. Both will sign the proposal which must also be approved by the graduate coordinator and the director of the school. Credit 1-10/Qtr.

PPHG-889 Registration #0903-889

Pre-Thesis Seminar

An introduction to research and thesis procedures and requirements with a review of existing thesis proposals and accepted thesis reports. Each student will be encouraged to develop his/her own thesis proposal during the course.

PPHG-890

Credit 1 (fall only)

Research and Thesis

Registration #0903-890 The thesis is designed and proposed by the candidate. It is considered his culminating experience in the program, involving re-search, a creative body of work, an exhibition or suitable presentation, and a written illustrated report.

Credit 1-12

Master of Science

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

PPHS-721, 722 **Mathematics and Statistics** Registration #0907-721, -722 for Photographic Systems special graduate course in mathematics and applied statistics involving those areas of direct concern in design, analysis, and evaluation of photographic systems.

Credit 4/Qtr.

PPHS-731, 732, 733 Instrumental and Registration #0907-731, -732, -733 Photographic Optics The principles of geometrical and physical optics with application to photographic instrumentation systems. First-order imaging, aberrations and geometrical image evaluation, mirror and prism systems, the eye and vision characteristics, radiometry of optical images, basic instrument systems, electromagnetic waves, polarization, interference and interferometers, coherence, Fraunhofer and Fresnel diffraction, transfer function description of imaging system performance.

Class 3, Credit 3/Qtr.

PPHS-741, 742, 743 Analysis and Evaluation Registration #0907-741, -742, -743 of Imaging Systems Complex variables and Fourier analysis with application to the evaluation of imaging systems; properties of optical images, structure of photographic images; methods of photo-optical system evaluation.

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

Class 3, Credit 3 (fall and spring)

Special Topics in PPHS-751, 752, 753 Registration #0907-751, -752, -753 Photographic Science Advanced topics of current or special interest, varying from quar-ter to quarter, selected from the field of photographic science. Specific topics announced in advance. (Not offered every quarter. Consult coordinator of the photographic science graduate program.)

Credit varies **PPHS-890**

Research and Thesis Guidance

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

Credit 9 minimum for MS

School of Printing

All School of Printing courses are offered at least once annually, except as noted.

Management Courses

PPRM-201 Introduction to Technical Writing Registration #0910-201

Basic approach to fundamentals of modern technical writing: review of English and writing skills; consideration of principles, techniques, form and style.

Class 3, Credit 3

PPRM-210 Registration #0910-210

Financial Controls I

Gives the line manager an understanding of the firm's financial accounting system so that he or she can work with the accountant to use that system effectively. Includes balance sheet, income, funds and cash statements, ratio analysis and asset vs. expense decisions.

Class 4, Credit 3

Application of Computers to PPRM-301 Registration #0910-301 the Graphic Arts

A study of the applications of automated data processing involving 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-310

Industrial Organization and Management

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

Class 3, Credit 4

PPRM-401

Estimating I

Registration #0910-401 Introductory course in current estimating practices; the development of hourly costs and production rate standards; costs of materials and outside services; one-color offset press and flat sheet bindery operations; introduction to flat sheet imposition and pre-planning techniques; obtaining and interpreting specifications; design and use of estimating forms; pricing for a profit margin; preparing the quotation. (PPRT-311, PPRM-210) Class 4. Credit 4

PPRM-402

Registration #0910-402

Estimating II

Continuing study of sheet-fed offset lithography estimating; multi-color offset presses and signature-related bindery operations; signature imposition; camera, layout, stripping and plate processing production standards; phototypesetting and mechan-ical artwork costs; color separations and the costs associated with process color printing; finishing operations; the application of the computer to estimating procedures. (PPRM-301 and PPRM-401 required; PPRT-312 recommended)

Class 4, Credit 4

PPRM-403 **Printing Production Management I** Registration #0910-403

Examines the non-technological functions of production as com-ponents of a system, emphasizing organizational alternatives re-lating to human factors. Includes such topics as organization, systems approach, decision making, production planning and control, purchasing, inventory control, quality control, methods analysis, work measurement. Some simple analytical models based on graphs or elementary algebra are introduced.

Class 3, Credit 3

PPRM-404 Registration #0910-404

Printing Production

Management II Explores certain analytical models which can be used practically in an ordinary printing company. Includes such topics as decision theory, probability concepts, mathematical modeling, break-even and economic-order analysis under conditions of certainty and uncertainty, linear programming using computer, Markov chains, waiting line analysis, game theory, simulation. These topics are considered from conceptual and problem solving viewpoints without emphasis on mathematics beyond college algebra. Class 4, Credit 4

PPRM-502 Registration #0910-502

Cost accounting systems; measurement and allocation of manu-

facturing and non-manufacturing costs; uses of full cost informa-tion; differential accounting and alternative choice decisions; capital investment decisions; budget preparation, standard cost, variance analysis and the management control process. (PPRM-501)

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-506

Business Law

Financial Controls II

Registration #0910-506 Elements of the laws of contracts, agency, sales, negotiable instruments, partnerships, corporations, taxes, insurance, libel, copyright, and other laws pertaining to business, printing and publishing.

Class 3, Credit 3

PPRM-507 Computer Estimating Workshop Registration #0910-507

The design and writing of computer estimating algorithms; use of a full-scale computer estimating system; estimating for web-fed offset presses; estimating for non-lithographic printing processes; business forms and book manufacturing industries practices; addressing, mailing and order fulfillment; pre-planning and break-even analysis; techniques for competitive estimating and pricing. (PPRM-402 required)

Class 4, Credit 4

PPRM-509

Economics of Production

Registration #0910-509 Management 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 Registration #0910-510

Personnel Relations II

Advanced study of employer-employee relationships, introduc-tion to major management concepts as they relate to the printing field. Management functions and organization theory are considered in the light of behavioral science. Supervisory practices are analyzed. (PPRM-302) Class 4, Credit 4

PPRM-511

Labor Relations in Graphic Arts

Registration #0910-511 History and background for organized labor movement; makeup and characteristics of the contemporary labor force; collective bargaining and its effects on wages, hours, and conditions of work; the process of negotiating, administering, interpreting, applying, and enforcing the labor-management contract within the graphic arts area of the modern industrial society. Class 4, Credit 4

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PPRM-512 Collective Bargaining in the Graphic Arts Registration #0910-512

A study of the strategies and tactics of collective bargaining as applied to the graphic arts. Wage issues, fringe issues, and such concepts as seniority, discipline, grievance procedures, and managerial prerogatives are considered.

Class 3, Credit 3 (offered every other year)

PPRM-513 Sales in the Graphic Arts Registration #0910-513

Explores economic, psychological and sociological bases selling, with emphasis on customer and salesman interplay as well as techniques and practices of creative salesmanship in graphic arts companies. This course aims at benefiting both students considering a career in sales and those who will otherwise work with salesmen, either by supporting their company's salesmen in plant action or by buying from outside salesmen.

Class 4, Credit 4

PPRM-514 **Newspaper Management** Registration #0910-514

Consideration of personnel, organization, finance, maintenance, advertising, circulation, and other sources of revenue as they pertain to the metropolitan press; problems and practices of plant supervision. Class 4, Credit 4

PPRM-515

Legal Problems of Publishing

Registration #0910-515 Legal aspects of news gathering; freedom of the press; state and federal legislation; libel, privilege, obscenity, privacy, copyright, and laws applying to advertising, photography, and publishing. Class 4, Credit 4

PPRM-516 Marketing in the Graphic Arts Registration #0910-516

Primarily from a printing industry viewpoint, the class explores the marketing concepts (organizing a team to find out what customers want to buy and then produce it at a profit). Students examine marketing functions and consider alternative ways to perform them in various company situations.

Class 4, Credit 4

PPRM-518

Purchasing in the Graphic Arts

Registration #0910-518 Role of the purchasing agent in the printing plant. Methods of procurement, purchasing policies and sources of supply. Characteristics of paper, ink, sensitized materials and other graphic arts supplies. Inventory control, economic order quantity, role of trade shops, make or buy decisions, blanket orders, consignment agreements, capital investment decisions and the purchase order as a legal document.

Class 4, Credit 3

PPRM-551

Special Topics—Printing

Registration #0910-551 A management, or management related, course used to present and investigate special topics not normally covered in the curri-culum on a "one-time" basis. Guest lecturers such as industry leaders, as well as regular faculty are used to conduct this course. Subject to be covered is announced in advance.

Credit varies/Qtr.

PPRM-590 Senior Seminar Registration #0910-590

Consideration of related graphic arts areas not normally covered in regular courses; investigation of recent and possible future developments in technology, management, and scientific applications, and their implications and probable effects on the industry.

Class 2. Credit 2

PPRM-599 Registration #0910-599

Independent Study

Student selects and develops, with approval from a faculty sponsor, an independent study project of his or her own design. Project and amount of credit assigned must have final approval from the director of the School of Printing. (Generally seniors with qualifyng grade point average)

Credits 1 to 5

Technical Courses

Introduction to Printing Registration #0911-200

For packaging science students; study of different printing pro-cesses; analysis of process advantages and disadvantages relative to a variety of applications; examination of procedures for each process, from design through finished product; practice of basic operations necessary for the production of a simple package printing job.

Class 2, Lab. 3, Credit 3

PPRT-201

PPRT-200

Typography I

Registration #0911-201 Conventional rules of good traditional typography are reviewed through familiarization with basic terminology, type classification and typeface recognition; course includes lectures and laboratory exercises.

Class 2, Lab. 3, Credit 3

PPRT-202

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 Registration #0911-203

Layout and Printing Design

Composition Technology

A comprehensive introduction of essential requirements and principles of layout and printing design as applied to commercial printing and advertising; practical application of design concepts in solving printing problems. Basic rendering skills are encour-aged for model building, interrelationship of idea development, analyzing copy, logic of alphanumeric and related graphic images and copy preparation.

Class 2, Lab. 3, Credit 3

PPRT-204 Registration #0911-204

Relief Press

Gravure Printing

Theory and practice of letterpress presswork, using platen and cylinder presses; techniques, mechanics of equipment, care of equipment and materials used; application of special techniques of letterpresses, diecutting, scoring, numbering, perforating, embossing; makeready methods for line and halftone printing; introduction to flexographic principles and practices used in the industry. Mounting and proofing of plates and pre-press preparation. Press operation and printing on a variety of substrates.

Class 2, Lab. 3, Credit 3

PPRT-205 Registration #0911-205

Introductory course designed to survey the gravure printing process and the study of related information regarding applications, techniques, equipment, materials and supplies. The course is conducted by means of lectures, class discussions, demonstrations and supervised laboratory exercises using a 4-color Champlain Web Press.

Class 2, Lab. 3, Credit 3

PPRT-206

Reproduction Photography Registration #0911-206

A basic course in the fundamental principles, procedures, techniques, and applications of the photographic process as it is related to the production of film negatives or film positives for the major printing processes.

Class 2, Lab. 3, Credit 3

PPRT-207 Registration #0911-207

Printing Plates

Introductory course in the elements of platemaking procedures for letterpress, flexographic, and lithographic plates and gravure cylinders. Theoretical study plus practical involvement in making of various plates.

Class 2, Lab. 3, Credit 3

Registration #0911-208

presswork; press functions; operations and care of presses; exercise in running simple jobs. Class 2, Lab. 3, Credit 3

PPRT-209

PPRT-210

Registration #0911-209

Screen Printing

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

Newspaper Presses

Registration #0911-210 An introduction to major presses used to produce both weekly and daily newspapers. Letterpress and offset presses will be con-sidered, along with gravure presses used for the production of newspaper supplements.

Class 2, Lab. 3, Credit 3

Principles of Copy Preparation PPRT-213

Registration #0911-213 A basic course involving theory of camera copy requirements through lecture, examples and project work. Includes projects in black and white and color, register, veloxes, silhouettes cropping, "window," etc. Lectures cover all aspects of copy. Directed to those who do not require the depth of involvement given in PPRT-313.

Class 2, Lab. 3, Credit 3

PPRT-301

Typography II

Composition Systems

Registration #0911-301 Emphasis is put upon finished typographic problems. Topics included in lectures are typographic movements, design concepts, analysis of current typographic practices, private presses, and bookmaking. The lab work is designed to present interesting and challenging problems to the serious student of typography. (PPRT-201)

Class 2, Lab. 6, Credit 4

PPRT-302

Registration #0911-302 Detailed study of photocomposition with emphasis on systems approach; introduction to use of computers in composing rooms, and operation of specialized equipment. (PPRT-202) Class 2, Lab. 3, Credit 3

PPRT-303 Layout and Printing Design

Registration #0911-303 Typical printing design problems with emphasis on typographic arrangements, pictorial arrangement with consideration of production follow-through. Includes design of complete booklet dummy and other commercial items for black-and-white and color reproduction from roughs to comprehensive layout. Class 2, Lab. 6, Credit 4

PPRT-304

Advanced Relief Press Registration #0911-304

A study of pressroom problems in letterpress printing on cylinder press equipment; commercial forms, single and multi-color work; makeready system; operation and care of equipment. (PPRT-204) Class 2, Lab. 6, Credit 4

PPRT-306 Tone Reproduction Photography Registration #0911-306

The photographic processes as they relate to the measurement and reproduction of tones for the major printing processes. The emphasis will be on the scientific analysis of a complete system of halftone sensitometry and process control. (PPRT-206) Class 2, Lab. 3, Credit 3

PPRT-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 room-light-contact films.

Class 2, Lab. 3, Credit 3

PPRT-308

Lithographic Press Problems Registration #0911-308

An advanced course in the theory, practice, and problems of offset presswork; development of technical knowledge of materials and equipment; practice in running multicolor work. (PPRT-208)

Class 2, Lab. 6, Credit 4

PPRT-309 Advanced Screen Printing **Registration #0911 -309** Further study of the theory and practice of screen printing cover-

ing areas such as experiments with fabrics or screens; stencil forming materials and the effects these have on finished product. Further study into the inks and substrates that are common to the screen printer. Introduction to and running of automatic cylinder screen printing press and container press capable of printing cylindrical, conical and flat objects. (PPRT-209)

Class 2, Lab. 3, Credit 3

PPRT-310

Relief and Gravure Plates

Registration #0911-310 An introduction to the technological requirements involved in pro-ducing letterpress, flexographic and gravure plates. Chemical, mechanical, and electronic processes are discussed and illustrated in lecture. There is extensive project involvement in laboratory work on all plate systems.

Class 2, Lab. 6, Credit 4

PPRT-311 Registration #0911 -311

Imposition and Finishing

Printing production planning to correlate pre-press and post-press operations. Topics include preparing layouts, forms and a study of how they are affected by various bindery operations. Laboratory experiments include the operation of modern bindery equipment, evaluation and application of adhesives, binding materials and book performance testing. Several projects are followed through from design, signature layout to a finished product, including a gold stamped, hardcover bound book.

Class 2, Lab. 3, Credit 3

PPRT-312 Registration #0911-312

An introductory course covering the basic- and specialized procedures for films, including the new roomlight films. Stripping of line-halftone- and complementary flats is discussed and prac-ticed. Fake color and process color stripping assignments are given. Automated imposition is presented in form of slides and discussion. Hands on step-and-repeat projects on various units is assigned in lab.

Class 2, Lab. 3, Credit 3

PPRT-313 Registration #0911-313

Copy Preparation

Preparation of copy for camera; working from layouts, making analysis of requirements; paste-up techniques, methods of preseparation mechanicals, use of photographic and typographic copy, relation to production steps in follow-up for offset platemaking and photo-engraving; proper instructional writing (PPRT-203) specification

Class 2, Lab. 6, Credit 4

PPRT-314

Registration #0911-314 A study of the theory and practice of flexographic printing; uses and development of flexography; plate and ink requirements; press principles and operation; experiments in printing on a wide variety of surfaces. (PPRT-204)

Class 2, Lab. 6, Credit 4

Stripping

Flexography

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An introductory study of the principles and methods of offset

Lithographic Press

PPRT-315

correction.

Ink and Color

Newspaper Production II

production of a newspaper by photocomposition methods and the offset process. A continuation of PPRT-320 Newspaper Production I in more depth, with special emphasis on presswork on the Goss Community Offset Press. Also, emphasis will be made on the use of color in newspaper production. (PPRT-320) Class 2, Lab. 3, Credit 3 (offered every other year)

PPRT-333 Introduction to Book Production Registration #0911-333

This course is intended to give the student an insight into an understanding of how a production manager functions within a publishing firm. Emphasis is placed upon production decisions and purchasing requirements for producing a wide range of books including trade, textbooks, juveniles and special editions. Class 2, Lab. 3, Credit 4

PPRT-330

Registration #0911-330

PPRT-401 Registration #0911-401

Typographic Workshop

Allows the student to create and solve a typographic problem of his own choice. Complete freedom is given and experimentation is encouraged, giving the student the opportunity to meet his own objectives and satisfaction.

The project or projects that the student chooses should be of significant interest to the student to warrant taking this course. (PPRT-301)

Class 2, Lab. 6, Credit 4

Applications of Electronics to Graphic Arts **PPRT-402** Registration #0911-402

A basic course in the fundamentals of electricity and electronics covering DC, AC and semiconductors. Theory and application are combined as major topics and studied, implicating numerous graphic arts machines and devices. Students will perform laboratory experiments using basic electronic components and instruments.

Class 2, Lab. 3, Credit 3

PPRT-403

Layout and Printing Design

Color Separation Photography

Registration #0911-403 A project course with design problems which involves students in converting their designs into the actual camera copy, trying various media, learning to identify art techniques and printing processes; more individualized approaches emphasized, more advanced principles applied. (PPRT-303)

Class 2, Lab. 6, Credit 4

PPRT-406

Registration #0911 -406 Color separation and color correction methods in the graphic arts industry; color theory, masking requirements, tone reproduction for color, color proofing systems, electronic scanners.

PPRT-410

Class 2, Lab. 3, Credit 3

Introduction to Paper

Quality Control in the

Registration #0911-410 This course begins with a discussion of papermaking fibers, pulping procedures, papermaking machines, and proceeds to show how they affect paper properties and printing characteristics. Laboratory experiences include making paper from various raw materials, physical and optical testing of paper and paper identification.

Class 3, Lab. 2, Credit 3

PPRT-500

Registration #0911 -500 **Graphic Arts** A study of the methods and instrumentation necessary to produce a product consistent with the appropriate quality level. Topics will include process variability, waste reduction, problem analysis, materials testing, process control, process optimization, and quality assurance.

Prerequisite: Students should have completed all required 200 level technical courses in the School of Printing or have consent of the instructor.

Class 3, Credit 3

Registration #0911-315 Theory of light and color; basic theory of process color and correction; use of color comparator and spectrophotometer; the study of color systems and color matching systems; theory and application of various ink systems: practice in standard ink mixing and color matching emphasizing offset and letterpress processes; correlation of ink properties with applications: emphasis on relationship of ink to paper and press; study of ink problems and their

Class 2, Lab. 3, Credit 4

PPRT-317

Registration #0911 -317 An introduction to the basics of calligraphy; exercises in use of

methods and disciplines stressed.

Class 2, Lab. 3, Credit 3

PPRT-319 Registration #0911 -319

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-320 Registration #0911-320

Newspaper Production

A study of the methods of producing a newspaper by the use of photocomposition systems and the offset process. Students organize a staff, design a newspaper, set type, paste up paper, go to camera, make plates and go to press.

Class 2, Lab. 3, Credit 3

PPRT-321

Web Offset

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

PPRT-322

Circulation and Mailrooms Registration #0911-322

A study of the organization and functions of newspaper circulation departments. An overview of equipment and techniques used in modern newspaper mailrooms. Class 3, Credit 3

PPRT-323

Newspaper Color

Registration #0911-323 A study of the basic theory, materials and methods used in the graphic arts for the reproduction of color for newsprint.

Class 2, Lab. 3, Credit 3 (offered every other year)

PPRT-324 Registration #0911-324

Newspaper Composition

A study of composition techniques used in the publishing of weekly and daily newspapers, with emphasis on the systems approach to newspaper production.

Class 2, Lab. 3, Credit 3 (offered every other year)

Introduction to Book Design **PPRT-329** Registration #0911-329

A course intended to give the student an understanding of how a book designer functions within a book publishing firm. Emphasis is placed upon the many factors involved in book design decisions, including the important relationship between book design and book production in producing a readable, functional book. (PPRT-301, PPRT-303, or instructor's approval)

Class 3, Credit 3

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Calligraphic Forms

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

PPRT-501 Development of Printing Types Registration #0911-501

Present-day typefaces studied with relationship to their historical development and current use; type classification and nomenclature.

Class 3, Credit 3

PPRT-506

Advanced Color Reproduction Registration #0911-506

Further study of color measurement and color reproduction. The emphasis will be on the analysis of a color reproduction system using such tools as color measurement instrumentation, visual color evaluation, color tone reproduction, and process control. (PPRT-406)

Class 2, Lab. 3, Credit 3

PPRT-551

Special Topics—Printing

Registration #0911-551 This course presents and investigates technological topics which normally are not covered in the regular curriculum on a one-time basis. Guest lecturers such as industry leaders as well as regular faculty are used to conduct this course. Topics to be covered are announced in advance.

Credit varies/Qtr. **PPRT-591** Registration #0911-591

Reproduction Photography

An intensive course designed to enable photography students to gain a basic understanding of the various printing processes, the application of photography to each, with an emphasis on problems involved in obtaining optimum tone and color reproduction of their photographs.

Class 2, Lab. 3, Credit 3

PPRT-592 Printing Plates Registration #0911-592

A specialized course for photography students to develop understanding of various imaging methods and characteristics, processing steps, applications, and major problems of platemaking. Class 2, Lab. 3, Credit 3

PPRT-593 Printing Presses—Lithographic Registration #0911-593

Course offered for photography students; theory and practice of the methods of planographic processes. Class 2, Lab. 3, Credit 3

PPRT-594 Printing Presses—Screen Registration #0911-594

Course offered for photography students; theory and practice of the methods of screen processes. Class 2, Lab. 3, Credit 3

Graduate Courses Master of Science in Printing

Printing Education

PPRE-701 Introduction to Graphic Arts Education Registration #0908-701 A prerequisite course for most students working in the printing

education major. A study of historical trends along with the development and overview of philosophy and methodology, including a survey of current industrial education teaching problems. Credit 4 (offered every other year)

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 (offered every other year)

PPRE-713 Registration #0908-713

Typographical Procedures

An introductory course in the basic tenets of traditional typography. Areas that will be covered are: terminology, style, copyfitting, point systems, legibility, initials and typeface recognition. Laboratory demonstrations will be given to illustrate the theoretical areas covered in the lectures. Credit 4

PPRM-702

PPRF-860 Practice Teaching in the Graphic Arts Registration #0908-860

A 10-week teaching experience in a school offering an appro-priate exposure for the student teacher in the areas of student relationships and understanding, development of teaching methods and procedures, and a supervised involvement in the duties of the cooperating teacher.

Credit 12 (offered every other year)

Printing Management

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 computeroriented production control techniques. (PPRM-301) Credit 4

Printing Technology

PPRT-701 Research Methods in Graphic Arts Registration #0911-701

Theory and application of principles of laboratory oriented re-search in the graphic arts, analysis of research techniques, inter-disciplinary relationships, conditions for technology transfer and synergism; status of research in the graphic arts including organization, basic vs. applied research and organization of literature including patents, illustrations of techniques and research programs and methods followed in various research situations; systematic study theory of scientific methods including induction, deduction, hypothetico-deduction, hypothesis formation, theory development, etc.

Credit 4

PPRT-702 Graphic Reproduction Theory Registration #0911-702

Analysis of the basic theories of graphic reproduction and study of the principles underlying prevelant and proposed printing processes; special topics such as classification and description of the various light-sensitive systems as applied to the graphic arts, ink transfer theory, present and proposed systems of printing based on electrostatics, electrolysis, magnetism and lasers; study of hybrid systems and the significance and application of interdisciplinary methods. Credit 4

PPRT-703 Registration #0911-703

Statistical Inference

Descriptive statistics, patterns of variability, measures of variability, working with the normal curve, tests of hypotheses for means, tests of hypotheses for variance, internal estimates for means, internal estimates for variance, sample size for variables, intro-duction to analysis of variance, and applications of applied statistics to graphic arts. Credit 5

PPRT-704 Registration #0911-704

Design of Experiments

Analysis of variance, components of variance, crossed vs. nested experiments, studying individual effects, introduction to matrix algebra, regression analysis, planning experiments from a statistical point of view, basic experimental designs, factorial experi-ments, fractional factorials, determination of optimum conditions, introduction to nonparametrics and quality control concepts (as time allows). Credit 5

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PPRT-705, 706, 707 Application of Mechanics and Electronics Registration #0911 -705, -706, -707 to Materials, Machine Design, and Processes in Printing

Force systems, elementary dynamics, work, power, energy, stress and strain, axial loads, beams, torsion bars, and columns, particularly as applicable to printing equipment and processes. Design of machine elements; bearings, gears, shafts, fasteners, and frames. Application of basic circuits to electronic devices and systems. Credit 4/Qtr.

PPRT-708 Introduction to Systems Analysis Registration #0911-708

Problems of systems analysis in printing operations for the highest quality product at the minimal cost including optimal floor designs and methods of study. (PPRM-301)

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-711

Tone and Color Analysis

Registration #0911-711 Methods of instrumentation necessary for the evaluation and pro-cess control of printed tone and color and the photographic intermediate images required for the photomechanical reproduction of tone and color.

Credit 4

PPRT-799 Registration #0911-799

Student selects and develops, with approval from a faculty sponsor, an independent study project of his or her own design. Project and amount of credit assigned must have final approval from the director of the School of Printing.

Credits 1 to 5

PPRT-850

Registration #0911-850

Research Projects

Individual research projects in which independent data is collect-ed by the student, followed by analysis and evaluation. A compre-hensive written report is required. Consent of advisor required. Credit variable

PPRT-890 Registration #0911 -890

Research and Thesis Guidance

An experimental survey of a problem area in the graphic arts. Credit variable

College of Science

NOTE: Quarter offered follows course description in parentheses; F-Fall; W-Winter; S-Spring; SR-Summer

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

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.

Class 4, Credit 4 (F, W, S)

SSEG-202

Contemporary Science—Chemistry Registration #1018-202

The overall intent of this course is to relate the important role of chemistry to issues of immediate and contemporary concern. Basic chemistry principles are discussed qualitatively and then applied to environmental concerns, energy, pesticides, food and drugs, and the properties of polymers. Lap-dissolve projection, current films and invited speakers are integrated into the lecture schedule.

Class 4, Credit 4 (F, W, S)

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 soci-ety. A minimum of mathematics is used. A laboratory or discussion option is offered for the small-group meetings once a week, which reinforce the material given in demonstration lectures and audiovisual presentations

Class 4, Credit 4 (F, W, S)

Contemporary Science—Mathematics SSEG-204 Registration #1018-204

A basic survey of mathematical structures as well as an introduction to problem solving. Topics will be chosen from foundations of mathematics, algebra, topology, number theory, graph theory, and probability theory. These structures will be examined as they occur naturally in modern settings.

Class 4, Credit 4 (F, W, S)

Biology

SBIB-550

Biology Seminar

Registration #1001-550 Writing and oral reports and their discussion by class members covering topics of current interest in the biological sciences. (40 quarter hours in biology) Class 2, Credit 2 (S)

SBIB-559

Registration #1001-559

Special Topics—Biology

Advanced courses which are of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and have specified prerequisites, contact hours, and examination procedures Class variable, Credit variable (Offered every quarter)

SBIB-599

Independent Study—Biology

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

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Independent Study

SBIC-320 Registration #1002-320

Detailed study of the structure and function of normal and abnormal vertebrate tissue, (one year of general biology) Class 2, Lab 4, Credit 4 (F - alternate years)

SBIC-402

Registration #1002-402

Investigation of the basic concepts of immunology (antigens antibodies, immunologic specificity, antibody synthesis, and synthesis, and cell-mediated immunity) and the applications of immunology to infectious diseases, allergic reactions, transplantations, tumors, autoimmune diseases, immunosuppressive drugs and tolerance, (one year of general biology, one year of organic chemistry) Class 2, Credit 2 (W, S alternate years)

SBIC-403

Cell Physiology

Virology

Histology

Immunology

Registration #1002-403 Functional cytology, cellular water and electrolyte homeostasis, exchange of materials across cell membranes, regulation of cel-lular metabolism and control of cell growth, (one year of general biology, one year of organic chemistry) Class 3, Lab 3, Credit 4 (F)

SBIC-404 Introductory Microbiology Registration #1002-404

biochemistry, Principles of anatomy, genetics, taxonomy ecology of viruses, bacteria, molds, algae, and protozoa. Useful and harmful activities. Basic laboratory techniques, microscopy, staining, counting, identifying, (one year of general biology, one year of organic chemistry) Class 3, Lab 4, Credit 5 (F, SR)

SBIC-406

Registration #1002-406

Molecular biology, chemistry, epidemiology and clinical aspects of viruses: morphology, genetics, immunology, environmental effects; methods of isolation, cultivation, identification; assays. Human virus diseases. (One year of general biology) Class 4, Credit 4 (W/S alternates)

SBIC-409 Registration #1002-409 Plant Anatomy

A detailed study of the cellular structure and development of plant tissues and organs, (one year of general biology) Class 3, Lab 3, Credit 4 (F-alternate years)

SBIC-412 Immunology Laboratory Registration #1002-412

Laboratory work to complement the lectures in Immunology (SBIC-402). Each student experiences a variety of techniques (including use of laboratory animals) used in immunological re-search and clinical laboratories. Lab 3, Credit 1 (W/S alternates)

SBIC-710

Antibiotics & Chemotherapy Registration #1002-710 Antibiotics and therapeutic chemicals used clinically against

microbial infections. Chemotherapy of cancer. Discovery, production, sale and usage of antibiotics. Impact of antibiotics on viruses, bacteria, fungi, protozoa and on the patient. Medical consequences. Assay procedures, fermentation technology (SBIC-404, one year of organic chemistry)

Class 3, Lab 2, Credit 4 (W-alternate years)

Developmental, Genetic & Environmental Biology

SBID-340 **General Ecology** Registration #1003-340

Introduction to ecosystem ecology stressing the dynamic inter-relationships of plant and animal communities with their environments. A study to include such ecological factors as energy flow and trophic levels in natural communities, plant responses and animal behavior, population dynamics, bio-geography and representative ecosystems, (one year of general biology)

Class 3, Lab 3, Credit 4 (F)

SBID-420 Registration #1003-420

A consideration of the nature and variation of plant communities with a discussion of factors which limit, maintain, and modify communities both locally and regionally. Field studies of various plant communities will be conducted. (SBID-340) Class 3, Lab 3, Credit 4 (S-alternate years)

SBID-421

SBID-422

Registration #1003-421 Genes and cytoplasmic factors as units of inheritance; the nature and origin of inheritable characteristics and variations. Principles of inheritance in plants, animals and man. (one year of general biology, third year status)

Class 3, Lab 3, Credit 4 (S, SR)

Developmental Biology

Registration #1003-422 Study of the processes of growth, differentiation and develop-ment which lead to the mature form of an organism. Both plants and animal systems are considered, (one year of general biology) Class 2, Lab 6, Credit 4 (F/W alternate years/alternate quarters)

General Biology

SBIG-201 Registration #1004-201

Characteristics and origin of life; basic principles of modern cellular biology including cell organelle structure; physiological processes of gas exchange, internal transport, and osmoregulation and excretion.

Class 3, Credit 3 (F)

SBIG-202 Registration #1004-202

Chemical basis and functions of life including enzyme systems, respiration and photosynthesis; nutrient procurement in plants and animals, hormones and behavior.

Class 3, Credit 3 (W)

SBIG-203

General Biology

General Biology

General Biology

Registration #1004-203 A study of cellular and organismal reproduction, the principles of molecular biology, genetics, and developmental biology, introduction to evolution and ecology. Class 3, Credit 3 (S)

SBIG-205, 206, 207 **General Biology Laboratory** Registration #1004-205, -206, -207

Laboratory work to complement the lecture material of General Biology (SBIG-201, 202, 203). The experiments are designed to illustrate concepts, develop laboratory skills and techniques, and improve ability to make, record and interpret observations (Corequisite SBIG-201, 202, 203)

Lab 3, Credit 1 (F-205, W-206, S-207)

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

An introduction to microorganisms, their relationship to the environment and human health, and the causes, prevention and treatment of infectious diseases, (one year of high school biology or equivalent)

Class 4, Credit 3 or Class 3, Res. 1, Credit 4 (F, S)

Microbiology in Health & Disease SBIG-220** Registration #1004-220 Laboratorv

Laboratory culturing handling and identification of microorga-nisms with special emphasis on the relationship of bacteria to food handling and preservation, the production of food products by bacteria, and the prevention of food-borne diseases. (Corequisite SBIG-210)

Lab 3, Credit 1 (F, S)

SBIG-211** Registration #1004-211

Human Biology

An introduction to the structure and function of the human body. Class 4, Credit 4 (W)

**Not acceptable for biology credit for biology major

Plant Ecology

Genetics

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 (F)

SBIG-315** Medical Genetics

Registration #1004-315 A survey of selected human variations and diseases of medical importance, with emphasis on the underlying genetic principles. (SBIG-203, or equivalent) Class 2, Credit 2 (W)

SBIG-440** Environmental Microbiology Registration #1004-440

Microorganisms in water and sewage, biological and medical aspects; methods for detection, isolation, and enumeration. Treatment methods for eliminating and controlling harmful organism.

Class 3, Lab 2, Credit 4 (S, SR)

permission of instructor).

Organismal Biology

SBIO-301Invertebrate ZoologyRegistration #1006-301Biology of invertebrate animals with reference to classification,
structure, function, and ecology. (One year of general biology or

Class 3, Lab 3, Credit 4 (F, alternate years)

SBIO-302 V Registration #1006-302

Vertebrate Zoology

Morphology, physiology, behavior, classification, and ecology of chordates. (One year of general biology)

Class 3, Lab 3, Credit 4 (F-alternate years)

SBIO-303 Compartive Vertebrate Anatomy Registration #1006-303

A comparative study of the organ systems of representative members of the vertebrates with emphasis on structural changes which occur during evolution. (One year of general biology) Class 3, Lab 3, Credit 4 (S)

SBIO-304

Botany

Registration #1006-304 Distribution of the major groups of plants and their adaptations to their particular environment. (One year of general biology or per-

mission of the instructor) Class 3, Lab 3, Credit 4 (F/W)

SBIO-305 Registration #1006-305

Physiology and Anatomy

An integrated systems approach to cellular, nerve, muscle and cardiovascular physiology. Laboratory exercises include detailed studies of the human skeletal and muscular systems. (One year of general biology, SCHG-217 or permission of instructor)

Class 3, Lab 3, Credit 4 (W)

SBIO-306

Physiology and Anatomy

Registration #1006-306 Integrated systems approach to renal, respiratory and gastrointestinal physiology, metabolism and endocrinology. Laboratory exercises include studies of kidney function, lung performance, neuroanatomy and gastrointestinal anatomy and physiology. (SBIO-305)

Class 3, Lab 3, Credit 4 (S)

SBIO-410 Registration #1006-410

Plant Physiology

Physiological phenomena in the growth and development of higher plants. Water relationships, photosynthesis, translocation, mineral nutrition, growth hormonal control and reproduction. (One year of general biology, one year of organic chemistry) Class 3, Lab 3, Credit 4 (alternates W/S)

**Not acceptable for biology credit for biology major.

SBIO-411 Registration #1006

Registration #1006-411

Study of diversity existing in vascular plants. Its origin and its organization into a hierarchy of categories, orders, and families. Laboratory experience in collection, identification, and study of vascular plants with special emphasis on local flora. Practice in use of manuals and interpretation of morphological characters. (SBIO-304)

Class 3, Lab 3, Credit 4 (S-alternate years)

SBIO-412

Registration #1006-412 Structure, life cycle, and control of human parasites. Emphasis on forms of diagnostic importance. (One year of general biology)

Class 3, Lab 3, Credit 4 (W/S alternates)

SBIO-413 Comparative Animal Physiology Registration #1006-413

A comparative study of the physiological mechanisms of the animal kingdom. An interpretation of the physiological variations in terms of evolutionary significance, morphological variation and ecological conditions, (one year of general biology, one year of organic chemistry)

Class 3, Lab 3, Credit 4 (alternates W/S)

SBIO-705

Advanced Physiology

Registration #1006-705 An in-depth study of the functions of the human body. Both the chemical and physical factors of normal physiology will be studied along with the modified functions that are a result of disease. (SBIO-305, 306, SCHB-602, SCHB-603)

Class 3, Credit 3 (S-alternate years)

SBIO-720 Introduction to Pharmacology Registration #1006-720

The chemical properties, metabolism and excretion of drugs and their effects on physiological systems such as cardiovascular, renal, gastrointestinal, respiratory, endocrine, and central nervous system. Antimicrobial and cancer chemotherapeutic agents will also be discussed. (SBIO-305, 306 and permission of the instructor)

Class 3, Credit 3 (F/W alternate years and alternate quarters)

SBI0-721 Registration #1006-721

Pharmacology Laboratory

Laboratory work to accompany SBIO-720. Experiments relate to principles discussed in corresponding lectures. Lab 3, Credit 1 (alternate years, alternates F/W)

Biological Techniques

SBIT-320 Registration #1007-320

A course designed to prepare the student for small animal handling, biological administrations and preparations, minor surgery and autopsies. (Major status and permission of the instructor). Class 1, Lab 3, Credit 2 (alternates W/S)

SBIT-430

Radiation Biology

Small Animal Surgery

Registration #1007-430 Effects of radiation upon living tissue, both harmful and beneficial. Morphological changes, genetic effects, and pathological changes in both plant and animal tissues. Use of radioisotopes in plant and animal research. (Minimum of 20 credits in biological science)

Class 2, Lab 6, Credit 4(F)

SBIT-431 Registration #1007-431

Histological Techniques

Preparation of plant and animal tissues for slide mounts. Techniques in paraffin and frozen sectioning. Sectioning on the rotary and sliding microtomes and multiple staining techniques, (one year of general biology)

Class 1, Lab 4, Credit 3 (alternate years, alternates F/W)

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Systematic Botany

Parasitology

SBIT-460 Introduction to Registration #1007-460 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 a medium resolution electron microscope.

Class 1, Lab 6, Credit 3 (S)

SBIT-481 Electron Microscopy-Instrumentation Registration #1007-481

A comprehensive lecture/laboratory course in the operation. maintenance and performance testing of a medium resolution transmission electron microscope. Black-and-white darkroom photographic techniques are covered, (one year of genera biology or equivalent, or permission of instructor)

Class 1, Lab 6, Credit 3 (F)

SBIT-482 Electron Microscopy—Specimen Preparation Registration #1007-482

A comprehensive lecture/laboratory course covering all of the routine techniques for preparation of particulate and non-particu-late biological specimens for the transmission electron microscope. (SBI7-470, or SBIT-481).

Class 1, Lab 6, Credit 3 (W)

SBIT-483 Advanced Electron Microscopy Registration #1007-483

Preparation of EM portfolios; designing and supervising an EM facility; EM problem solving; interpretation of electron micro-graphs; individual EM projects; certification; preparation of specimens for, and operation of, scanning electron microscope. (SBIT-482)

Lab 6, Credit 2 (S)

SBIT-541 542 543 **Biology Research**

Registration #1007-541, -542, -543 Faculty directed student projects or research usually involving original laboratory work and/or calculation over a period of at least two quarters.

Class variable, Credit variable.

SBIT-730 Registration #1007-730

Advanced Radiation Biology

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 orSBIT-430) Class 3, Lab 3, Credit 4 (S)

Chemistry

SCHA-261, 262, 263 Introduction to Registration # 1008-261, -262, -263 **Chemical Analysis** 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 acidbase, precipitation, oxidation-reduction and complex formation as well as non-aqueous solvent acid-base reactions, introduction to electro-chemical techniques, and fundamentals of spectroscopy are stressed. Equilibrium concepts and statistical evaluation of results are incorporated.

Class 2, Lab. 5, Credit 3 (261-F, 262-W, 263-S)

SCHA-311 Analytical Chemistry—Instrumental Registration # 1008-311 Analysis Elementary treatment of instrumental theory and techniques, properties of light; refractive index; ultraviolet, visible and infrared spectrophotometry; emission spectroscopy; flame photometry; electorchemistry; Nernst Law; pH meters and electrodes (SCHC-212)

Class 3, Lab. 4, Credit 4 (offered every year) (F, W)

SCHA-312 Analytical Chemistry-Separations Registration #1008-312

Inorganic and organic separations; Raoult and Henry Laws; phase rules; distillation; extraction; adsorption and surface effects; electrophoresis, chromatography including gas, liquid, column, paper, thin laver, and ion exchange, (SCHC-212

Class 3, Lab. 4, Credit 4 (offered every year) (S, SR)

SCHB-605, 606 Registration #1009-605, -606

Biochemistry-Case Studies

Biological and clinical case studies of biochemistry. The cases are arranged to be correlated with the lecture topics of Biochemistry, SCHB-702, 703. (Concurrent registration in SCHB-702, 703)

Class 1, Credit 1 (offered every year) (605-F, 606-W)

Laboratory Safety and First Aid SCHC-200 Registration #1010-200

Discussion and demonstrations of protective devices and equipment; techniques for safely handling chemicals, glassware, and performing chemical reactions; basic first aid in case of accidents. Emphasis on flammable solvents, explosives, cryogens, and toxic materials; radiation hazards, storage of chemicals, waste disposal.

Class 1, Credit 0 (offered every year) (F)

Chemical Literature

Registration #1010-201 A survey of the techniques used to monitor the chemical literature. Chemical Abstracts, Science Citation index and Beilstern are covered. Technical writing is required. Thestructure and development of journals, theses, monographs, reviews and textbooks are covered. (SCHC-211, -212)

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

SCHC-211,212 Registration #1010-211,-212

SCHC-201

General Chemistry

For science and photoscience majors and others who desire an indepth study of general chemistry. Atomic structure and chemical bonding; thermodynamics and equilibrium; chemical equations and chemical analysis; gases; acids and bases; oxidation-reduc-tion; chemical kinetics. Course stresses problem solving applications of chemical principles.

Class 3, Credit 3 (offered every year) (211 -F, 212-W)

SCHC-402 Introduction to Research Registration #1010-402

Introduction to laboratory research projects of interest to chemistry faculty members. Students desiring to pursue active undergraduate research will investigate research opportunities with faculty members. Preparation and presentation of a research proposal in this course is a prerequisite to participation in research. (SCHO-431, SCHP-441)

Class 1, Credit 0 (offered every year) (F, W)

SCHC-541,542,543

Chemistry Research

Registration #1010-541, -542, -543 Faculty directed student projects or research usually involving laboratory work and/or calculations that could be considered of an original nature. (SCHC-402)

Class variable, Credit variable (offered every year) (F, W, S, SR)

SCHC-599 Independent Study-Chemistry Registration #1010-599

Faculty directed study of appropriate topics on a tutorial basis. This course will generally be used to enable an individual to pursue studies of existing knowledge available in the literature. Class variale, Credit variable (offered every year)

SCHG-201 Registration #1011-201 General Chemistry

One quarter survey of general chemistry for non-science majors, e.g., Dietetics and other Health Related Professions majors.

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

SCHG-202 Registration #1011-202

Organic Chemistry

One quarter survey of the fundamentals of organic chemistry that are essential to an understanding of biological molecules and biochemistry.

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

SCHG-203.204 Biochemistry

Registration #1011-203, -204 A two quarter survey of biochemistry for non-science majors, e.g., Dietetics and other Health Related Professions majors. (SCHG-202)

Lec. 3, Rec. 1, Credit 4 (offered every year) (S, F)

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SCHG-205, 206, 207 **Chemical Principles Laboratory** Registration #1011-205, -206, -207

A laboratory course for photoscience, mathematics, and physics majors who are taking general chemistry (SCHC-211, 212) and Introduction to Organic Chemistry (SCHO-230) concurrently. Laboratory experiments are designed to complement the lecture material in these courses.

Lab. 3, Credit 1 (offered every year) (205-F, 206-W, 207-S)

SCHG-208, 209 **College Chemistry** Registration #1011-208, -209

For engineering students. The concepts of energy and the work function is discussed in terms of industrial chemical processes. Topics include applications of the gas laws, equilibrium theory, nuclear and electrochemistry, thermodynamics, and modern instrumental methods of structure analysis. Students will have two lectures and one recitation period per week. One additional lec-ture period is scheduled for chemistry demonstration material, problem review and simulated laboratory experiments.

Class 4, Credit 4 (offered every year) (208-F, 209-S)

SCHG-221 **General Chemistry Laboratory** Registration #1011-221

Laboratory course to accompany SCHG-201. Emphasis on introduction to methods of chemical analysis, qualitative and quantatative techniques

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

Organic Chemistry Laboratory SCHG-222 Registration #1011-222

Laboratory course to accompany SCHG-202. Emphasis is on representative examples of typical organic techniques and syntheses

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

SCHG-215, 216, 217 General and Analytical Chemistry Registration #1011-215, -216, -217

Principles of chemistry presented for students in medical technology and the life sciences.

Class 3, Credit 3 (offered every year) (215-F, 216-W, 217-S)

SCHG-225, 226, 227 General and Analytical

Registration #1011-225, -226, -227 Chemistry Laboratory Laboratory sequence to accompany SCHG-215,216,217. Experi-ments in inorganic chemistry, separation techniques and quantitative analysis.

(225-F, Lab. 3, Credit 1) (226-W, Lab. 3, Credit 1) (227-S, Lab. 6, Credit 2) (offered every year)

SCHG-271

Chemistry of Water

Registration #1011-271 Basic training in general chemistry assuming no prior experience, concentrating on those aspects important in the field of water conservation. Laboratory work trains the student in volumetric analysis.

Class 2, Lab. 3, Credit 3 (offered every year) (F, W)

SCHG-272 **Chemistry of Water**

Registration #1011-272 Chemistry of organics, metals, construction materials, radioac-tive and other environmental pollutants, and other substances related to water analysis. Laboratory practice in water analysis, including use of instrumentation.

Class 2, Lab. 3, Credit 3 (offered every year) (S, SR)

SCHG-281, 282, 283

General Chemistry

Registration #1011-281, -282, -283 For printing students. Aspects of general chemistry of widest applicability to graphic arts technology; first quarter includes definitions of terms, basic concepts and laws; second quarter devoted to properties of solutions and organic materials; third quarter deals with applications in ink, paper, photo-lithographic processes and other topics as time allows.

Class 3, Lab. 2, Credit 4 (offered every year) (281 -F, 282-W, 283-S)

SCHO-230 Introduction to Organic Chemistry Registration #1013-230

Introduction to the structure and reactivities of organic molecules for physical science majors. An overview of the structure, nomenclature, bonding, and reactivity of the various functional groups. Chemistry of alkenes, alkynes, and aromatic molecules. (SCHC-21 2 or permission of instructor) (S)

Class 3, Credit 3 (offered every year)

SCHO-231, 232 Registration #1012-231, -232

Types of organic compounds, names, and structures, preparations, properties, and reactions. Laboratory work emphasizes techniques; involves preparations and analysis. (SCHG-216, or SCHC-212)

Class 3, Lab. 3, Credit 4 (offered every year) (231-F, 232-W)

SCHO-233

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)

Class 3, Lab. 3, Credit 4 (offered every year) (S)

SCHO-431,432, 433 **Organic Chemistry**

Registration #1013-431, -432, -433 A rigorous survey of the reactions of all major functional groups. Conformational Analysis, Stereochemistry and Spectral (IR, NMR) analysis are also covered. Prior coursework in Organic Chemistry is required. (SCHO-230 or its equivalent)

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

SCHO-435, 436 **Preparative Organic Chemistry** Registration #1013-435, 436

Synthesis of Organic Compound utilizing a variety of laboratory techniques. Purification and Spectral Characterization will be routinely used. (SCHO-230). (SCHO-431 should be taken concurrently with SCHO-435 and SCHO-432 with SCHO-436).

Lab. 6, Credit 2 (offered every year)

SCHO-437 Systematic Identification of Organic Compounds Registration #1013-437

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

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

SCHP-340 **Introduction to Physical Chemistry** Registration #1014-340

Properties of gases, kinetic molecular theory; Boltzmann distribution functions; non-ideal behavior; first law of thermodynamics; heat capacities. Euler's theorem and homogeneous functions; thermochemistry; and introduction to the second law. (SCHC-213

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

SCHP-441.442.443 Registration #1014-441, -442, -443

Atomic theory, states of matter, chemical thermodynamics, mo-lecular properties, solutions, equilibria, phase rule, electrochem-istry, kinetics, surface chemistry, and photochemistry. (SCHP-340, SPSP-311)

Class 3, Lab. 3, Credit 4 (offered every year) (441-S, SR;442-F, W; 443-S. SR)

SCHT-241 Registration #1015-241

Chem Tec I (General)

Physical Chemistry

Safety in the chemical laboratory, toxicity of chemicals, use of compressed gases, laboratory notebooks, separation techniques, paper and gas chromatography, properties of gases and their measurement, common units and conversion factors, weighing techniques, density of solids and liquids, chemical equilibrium, visible spectrophotometry, ionic and covalent bonding.

Class 3, Lab. 9, Credit 6 (offered every year) (F)

Organic Chemistry

Organic Chemistry

SCHT-242 Chem Tec II (Analytical) Registration #1015-242 Periodicity and chemical properties.

Qualitative detection of common metallic and non-metallic ions. Sampling techniques and sample preparation. Quantitative analysis by gravimetric and titrimetric procedures-acid base and redox. Measurement of pH. Class 3, Lab. 9, Credit 6 (offered every year) (W, S)

SCHT-243 Chem Tec III (Organic) Registration #1015-243

Techniques of handling organic compounds; recrystallization and melting points, distillation, extraction. Refractive index and optical activity. Reactions of functional group classes. Infra-red spectrophotometry.

Class 3, Lab. 9, Credit 6 (offered every year) (SR, F)

SCHT-244 Chem Tec IV (Organic) Registration #1015-244

Continuation of classes and reactions of organic compounds. Synthetic techniques, vacuum distillation, gas chromatography. Class 2, Lab. 9, Credit 5 (offered every year) (W, S)

SCHT-305 **Chemical Specialty (Spectrometry)** Registration #1015-305

Quantitative analysis including trace analysis by spectrometric methods involving visible, infra-red, ultra-violet and atomic ab-sorbtion. Techniques of sample preparation, spectral scanning and measurement using a variety of instruments. Interpretation of spectra.

Class 2, Lab. 6, Credit 4 (offered every year) (SR, F)

SCHT-306 Chemistry Speciality Registration #1015-306

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

SCHT-307, -308 **Research Familiarization** Registration #1015-307, -308

A chemical technician does exploratory work following general directions with little or no formal supervision and is often en-couraged to innovate afterconsultation with his or her supervising chemist or engineer. In this context each student will have the opportunity to work alongside one of our faculty or graduate students and perform a number of tasks related to the progress of a research operation. The choice of a faculty supervisor is left to the student.

Credit variable (offered every year) (307-F, SR)

SCHT-309

Glassblowing Techniques Registration #1015-309

Instrumental Analysis

Biochemistry

This course is designed to introduce and train each student in small scale scientific glassblowing techniques. Proficiency will be developed in rod manipulation, ring seals, construction of apparatus, annealing, use of a simple lathe and hand-torch work.

Lab. 4, Credit 2 (offered every year) (F, SR)

Graduate Courses

include fluorescence and phosphorescence, Raman, mass spec-

SCHA-711

Registration #1008-711 Theory, applications and limitations of instrumental methods in qualitative, quantitative, and structural analysis. Topics covered

trometry, nuclear magnetic resonance, X-ray and radiochemistry, and electrochemistry. (SCHA-312)

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

SCHB-702

Registration #1009-702 Introduction to biological chemistry. Chemical structures, reac-tions and physiological functions of molecular components of cells: amino acids, sugars, lipids, nucleotides and selected biopolymers. Solution behavior, catalytic properties and structure of proteins and enzymes. (SCHO-433 or SCHO-232)

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

SCHB-703 Registration #1009-703

Biochemistry—Metabolism

Bioenergetics principles; catabolism of carbohydrates, fatty acids and amino acids; photosynthesis, biosynthesis of carbohyfatty drates, lipids, and nitrogenous compounds; active transport; metabolic diseases. (SCHB-702)

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

SCHB-704 Biochemistry-Nucleic Acids and Molecular Registration #1009-704 Genetics The biochemistry of inheritance, expression of genetic information, protein biosynthesis, differentiation, viral and bacterial infec-tion and the "origin of life." (SCHB-702)

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

Special Topics—

Registration #1010-772 Advanced courses which are of current interest and/or logical continuations of the course already being offered. These courses should be structured as ordinary courses and should have specified prerequisites, contact hours, and examination procedures. Class variable, Credit variable (offered every year)

SCHC-850 Registration #1010-850

SCHC-772

Media Design Project

Media Design Seminar

Students in small groups will design, produce, test and evaluate a media form or device for use in the teaching of science at the twoyear college level.

Credit 2-4 (offered upon sufficient request)

SCHC-851

Registration #1010-851 A seminar workshop on evaluation and critique, human informa-

tion processing, and instructional systems management as applied to media production.

No Credit (offered upon sufficient request)

SCHC-852 Registration #1010-852

Internal Internship

External Research

Chemistry Seminar

Research and Thesis Guidance

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

Credit variable (offered upon sufficient request)

SCHC-899 Independent Study—Chemistry

Registration #1010-899 Credit variable (offered every year)

SCHC-859

Registration #1010-859 Industrial internship research.

Credit 1-16 (offered every year)

SCHC-870 Registration #1010-870

Credit 1 (offered every year)

SCHC-879 Registration #1010-879

Hours and credits to be arranged. Chemical research in a field chosen by the candidate, subject to approval of the department head and advisor.

Credit variable (offered every year)

SCHI-762, 763 Registration #1012-762, -763

Inorganic Chemistry

The properties and structures of the elements and their com-pounds in relation to electric and stereochemical principles; inor-ganic laboratory techniques. (SCHO-433 and SCHP-443)

Class 3, Lab. (optional) 3, Credit 3 or 4/Qtr. (offered every year)

SCHO-736 Spectrometric Chemical Identification of Registration #1013-736 Organic Compounds 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)

Class 2 (offered every year)

SCH0-737 Advanced Organic Chemistry Registration #1013-737

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

Class 3, Credit 3 (offered every year)

SCHO-738 Systematic Identification of Organic Compounds Registration #1013-738 The laboratory utilizes systematic chemical and spectral tests to

deduce the structure of organic compounds. (SCHO-433) Class 2 (offered every year)

SCHO-739 Advanced Organic Chemistry Registration #1013-739

Selected topics in physical organic chemistry including: techniques for elucidation of mechanism (kinetic, linear free energy relationships, isotope effects), molecular orbital theory, electrocyclic reactions, (SCHO-433 and SCHP-443. Note: SCHO-737 is recommended but not required)

Class 3, Credit 3 (offered every year)

SCHO-832 Stereochemistry Registration #1013-832

Advanced treatment of steric relationships and stereoisomerism in organic compounds. (SCHO-433, SCHP-443) Class 3, Credit 3 (offered upon sufficient request)

SCHO-833 Heterocyclic Chemistry

Registration #1013-833

The preparation, properties, and reactions of heterocyclic systems, especially heteroaromatic rings. (SCHO-433) Class 3, Credit 3 (offered upon sufficient request)

SCHO-835 Organic Chemistry of Polymers Registration #1013-835

Introduction to the chemistry of synthetic, high molecular weight polymers and a survey of their diverse structures and properties. Mechanisms of condensation, free radical and ionic polymerization. (SCHO-433)

Class 3, Credit 3 (offered in alternate years)

SCHP-741 Chemical Thermodynamics Registration #1014-741

A study of the basic fundamentals of thermodynamics and their use in deriving the interrelationships of thermodynamic functions. Thermodynamic properties of gases will be calculated based on spectroscopic data. (SCHP-443 and SMAM-307)

Class 3, Credit 3 (offered every year)

SCHP-742 Survey of Physical Chemistry Registration #1014-742

This course will present principles of physical chemistry to students who have an interest in the health related sciences. Molecular structure, thermodynamics and kinetics will be discussed with a view to their biological applications. (SCHG-217, SCHO-232)

Class 3, Credit 3 (offered upon sufficient request) Not acceptable for M.S. in Chemistry.

SCHP-743 Chemical Kinetics Registration #1014-743

Methods of investigating the kinetics of chemical reactions and the theories used to interpret their results. Focus on homogeneous reactions in gas and liquid phases. Discussions of references from recent chemical literature. (SCHP-443)

Class 3, Credit 3 (offered alternate years)

SCHP-744 Registration #1014-744 Quantum Mechanics

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

Class 3, Credit 3 (offered alternate years)

SCHP-745

Quantum Chemistry

Combinatorial Mathematics

Linear Programming

Registration #1024-745 Application of quantum mechanics to problems of chemical interest. Group theory; calculations of vibrational frequencies and selection rules for complex molecules; molecular orbital energies of complex molecules. (SCHP-744)

Class 3, Credit 3 (offered upon sufficient request)

SCHP-746 Physical Chemistry of Polymers Registration #1014-746

Study of the theoretical and experimental aspects of polymer characterization. In addition, theoretical considerations of the configuration of polymer chains and statistical thermodynamics of polymer solutions will be related to experimental results. (SCHP-443)

Class 3, Credit 3 (offered upon sufficient request)

SCHP-747 Principles of Magnetic Resonance Registration #1014-747

A development of the principal ideas of magnetic resonance including the theory of resonance line shapes, magnetic interactions, experimental considerations, and spectral analysis. These concepts are discussed in terms of nuclear magnetic, nuclear quadrupole, and electron spin resonance spectroscopy. (SCHP-443)

Class 3, Credit 3 (offered upon sufficient request)

Mathematics

SMAC-365

Registration #1022-365 An introduction to the mathematical theory of combination, arrangement and enumeration of discrete structures. Emphasis is on structural, not quantitative, aspects of problems. Topics include enumeration, recursion, inclusion-exclusion, blockdesigns,

Polya counting theory. (SMAM-265) Class 4, Credit 4 (offered every year) (S)

SMAC-465

Registration #1022-465

A presentation of the type of problem to be solved. A review of pertinent matrix theory including convex sets and systems of linear inequalities. The simplex method of solution, artificial bases, duality, parametric programming. Applications. (SMAM-431)

Class 4, Credit 4 (offered upon sufficient request)

SMAC-466 Integer Programming Registration #1022-466 The optimization of functions of integers, theory and practice of branch and bound, implicit enumeration, cutting plane duality and

related solution techniques, heuristics, applications. (SMAC-465) Class 4, Credit 4 (offered upon sufficient request)

SMAC-467 Theory of Graphs and Networks

Registration #1022-467 The basic theory of graphs with applications to problems in transportation, communications and computer networks. Mathematical techniques for analysis of design, performance, and reliability of network structures modeled by graphs. (SMAM-265 or permission of instructor)

Class 4, Credit 4 (offered upon sufficient request)
Registration #1016-221,-222, -223 A survey of selected topics from college algebra, trigonometry, analytic geometry and differential and integral calculus generally useful for laboratory technicians. The emphasis is placed on understanding of concepts, problem solving and graphs. The topics are divided roughly as follows:

221: Algebra (exponential, log & trig functions; linear equations, curve fitting and special graph papers) 222: Basic differential calculus with applications

223: Basic integral calculus with applications.

Class 4, Credit 4 (offered every year) 221-F, 222-W, 223-S)

SMAM-251, 252, 253 Registration #1016-251,-252, -253

SMAM-221, 222, 223

A standard first course in calculus intended for students majoring in mathematics, 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 definitive 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.

Class 4, Credit 4 (offered every year) (251 -F, W; 252-W, S; 253-S.F)

SMAM-265 Foundations of Discrete Mathematics Registration #1016-265

A study of several discrete mathematics topics with careful atten-tion given to the underlying concepts and developments. Topics include: logic, proofs, switching circuits, sets, Well-Ordering Prin-ciple, Mathematical Induction Theorem, relations, equivalence classes, functions, one-to-one, onto, permutations, discrete functions, counting principles, combinations, elementary probability, two-dimensional geometric linear programming.

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

SMAM-305

Calculus

Registration #1016-305 A continuation of SMAM-253 treating partial derivatives, multiple integrals, 3-dimensional analytic geometry and vector algebra. (SMAM-253)

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

SMAM-306 Registration #1016-306

Differential Equations

A first course. Solutions in closed form fora few common types of first order equations. Applications to a variety of physical prob-lems. Second order linear equations, methods of undetermined coefficients and variation of parameters, independence and the Wronskian. Applications to vibrating systems. Numerical techniques, Runge-Kutta. More applications. Power series solutions. (SMAM-305)

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

SMAM-307 Registration #1016-307

Differential Equations

Engineering Mathematics

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)

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

SMAM-308 Registration #1016-308

Topics will be chosen from among matrix algebra, vector analysis and applications of boundary-initial value problems to suit stu-dents' academic discipline. (SMAM-306)

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

Introduction to the theory of games with solution techniques and applications. Graphs, matrix games, linear inequalities and programming, convex sets, the minimax theorem, n-person games, Pareto optimality (SMAM-431 or permission of instructor)

Class 4, Credit 4 (offered upon sufficient request)

SMAC-566 Non-Linear Optimization Theory Registration #1022-566

The theory of optimization of non-linear functions of several real variables. Unconstrained optimization (Newton-Raphson, steepest ascent and gradient methods), constrained optimization (LaGrange multipliers, Kuhn-Tucker theorem, penalty concept, dynamic programming), computational aspects (rates of conver-gence, computational complexity). (SMAM-432and SMAM-305)

Class 4, Credit 4 (offered upon sufficient request)

SMAM-201, 202, 203 Algebra, Trigonometry and Analytic Registration #1016-201, -202, -203 Geometry

A sequence of courses covering essential skills and concepts in such topics as solutions of equations, graphing, exponents and radicals, logarithms, trigonometric functions and applications, vectors, determinants, inequalities and conic sections.

Class 3, Credit 3 (offered every year) (201-F, 202-W, 203-S)

SMAM-204

College Algebra Registration #1016-204

Topics include a review of the fundamentals of algebra; solution of linear, fractional and quadratic equations; functions and their graphs; polynomial, exponential, logarithmic and circular functions; systems of linear equations.

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

Freshman Seminar SMAM-210, 211 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.

Class 1, Credit 1 (offered every year) (210-F, 211-W)

SMAM-214, 215 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.

Introductory Calculus

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)

Class 3, Credit 3 (offered every year) (214-F, W; 215-S)

SMAM-216, 217 Mathematics of Business and Finance Registration #1016-216, -217

An introduction to selected topics from those areas of mathematics used extensively in business and finance applications. These topics are useful to any students interested in their personal fi-nances or the operation of a small business.

216: Lines, curves, break-even analysis, interest, cash flow, annubusiness applications and matrices, operations ities, matrices, systems of linear equations.

217: Optimizing business applications with linear programming methods, Simplex method, transportation and assignment problems, non-rigorous introduction to the derivative, modeling, opti-mization of applications through differentiation including profitrevenue-cost problems. (SMAM-202 or equivalent)

Class 3, Credit 3 (offered every year) (216-W, S; 217-S)

Calculus

SMAM-309 Registration #1016-309

Handling of statistical data; measures of central tendency and dispersion; sample space, events; probability and its basic laws; conditional probability; basic rules of counting; binomial, geometric, Poisson and normal distributions; sampling distributions; estimation of population mean; T-distributions, testing of hypothesis concerning the mean and difference between means. Use of chisquare in testing statistical independence and in estimating variance. (SMAM-203 or equivalent)

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

SMAM-351, 352 Introduction to Probability and Statistics Registration #1016-351, -352 Discrete and continuous probability; random variables; probabil-

Discrete and continuous probability; random variables; probability, density, and distribution functions. Measures of central tendency and dispersion. Sampling theory; confidence limits; correlation. (SMAM-253)

Class 4, Credit 4 (offered every year) (351-F, S, SR; 352-W, S)

SMAM-361 Mathematical Modeling

Registration #1016-361 The course will emphasize problem solving, formulation of the mathematical model from physical considerations, solution of the mathematical problem, testing the model and interpretation of results. Problems will be selected from the physical sciences, engineering, economics. (SMAM-352, SMAM-306) Class 4, Credit 4 (offered every year) (S)

Class 4, Credit 4 (Unered every year) (3)

SMAM-410 Advanced Calculus Registration #1016-410

Topics from Fourier Series, orthogonal functions, special functions, and asymptotic expansions. This course gives an introduction to function spaces and approximating solutions of certain differential equations by given classes of orthogonal functions. Additional topics may be chosen to suit special needs of students. (SMAM-306 or SMAM-308)

Class 4, Credit 4 (offered every year)

SMAM-411,412 Real Variables Registration #1016-411,412

Functions of one and several variables are considered, with the basic concepts of sequences, series, continuity, differentiation, and integration studied in depth. Included are the Heine-Borel, Mean Value, Taylor, and implicit function theorems. (SMAM-305 and either 265 or permission of the instructor)

Class 4, Credit 4 (411 -F, W; 412-S, SR) (Offered alternate years)

SMAM-420 Registration #1016-420

Complex Variables

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

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

SMAM-431

Matrix Algebra

Registration #1016-431, A first course in the algebra of matrices and n-tuple vectors over the complex numbers. Topics include addition, multiplication, transposes and inverses of matrices; symmetric and triangular matrices; partitioning; solution of Ax=b: Gauss algorithm, residual and error, partial pivoting, ill-conditioning, iterative techniques; elementary matrices; echelon form; determinants; eigenvalues and eigenvectors; real symmetric matrices and diagonalization.

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

SMAM-432 Registration #1016-432

Linear Algebra

Topics will be pursued to a greater depth, with more emphasis on theory than in Matrix Algebra. Topics include: Rⁿ, Cⁿ and function spaces; subspaces; spanning sets; linear dependence and independence; basis; dimension; inner products; Gram-Schmidt; orthogonality; linear transformations; representation relative to ordered bases; change of basis; similarity; eigenvalues and eigenvectors; diagonalization; Hermitian matrices; Jordan forms; unitary matrices; quadratic forms; principal axis theorem. (SMAM-431)

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

SMAM-501,502 Advanced Differential Equations Registration #1016-501, -502

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

Class 4, Credit 4 (offered upon sufficient request) (501 -F, W; 502-S, SR)

SMAM-511,512

Numerical Analysis

Registration #1016-511, -512 Numerical techniques for interpolation, differentiation, quadrature, solution of differential equations, non-linear equations, eigenvalue problems. Discussion of error propagation and estimation. Emphasis is on techniques appropriate for digital computers. (SMAM-306, ICSP-215)

Class 4, Credit 4 (offered alternate years) (511 -F, W; 512-S, SR)

SMAM-521,522

Probability Theory

Registration #1016-521,-522 Selected topics in applied probability and statistics to meet the needs and interest of the students. (SMAM-305, SMAM-352or permission of instructor)

Class 4, Credit 4 (offered upon sufficient request) (521 -F, W; 522-S, SR)

SMAM-531, 532 Registration #1016-531,-532

Abstract Algebra

531. A review of pertinent basic set theory and number theory. Groups, subgroups, cyclic and permutation groups, Lagrange's theorem, quotient groups, isomorphism theorems, applications to scientific problems.

532: The basic theory of rings, integral domains, ideals and fields, polynomial rings, quotient structures, finite Galois fields $GF(p^n)$, applications to coding theory, abstract vector spaces, function spaces, direct sums, applications to differential equations, applications to scientific problems.

Class 4, Credit 4 (531 -F, W; 532-S, SR) (offered every year)

SMAM-551 Registration #1016-551

Topics in Algebra

Topics in abstract algebra to be chosen by the instructor either to give the student an introduction to topics not taught in SMAM-531, 532 or to explore further the theory of groups, rings, or fields, (permission of instructor)

SMAM-552

 SMAM-552
 Topics in Analysis

 Registration #1016-552
 Topics in analysis to be chosen by the instructor, either to intro

Class 4, Credit 4 (offered upon sufficient request) (F, W)

Topics in analysis to be chosen by the instructor, either to introduce the student to topics not covered in SMAM-411, 412, or to explore further the topics covered there. (SMAM-265, SMAM-412) Class 4, Credit 4 (offered upon sufficient request) (S, SR)

SMAM-559 Special Topics—Mathematics

Registration #1016-559 Courses in which topics of special interest to a sufficiently large group of students, and not covered in other courses, may be offered upon request. These courses will be structured as ordinary courses and will have prerequisites, contact hours, and examination procedures specified in advance.

Class variable, Credit variable (offered upon sufficient request)

72

Statistics S

Introduction to the theory of functions of one complex variable. Limits, continuity, differentiability; analytic functions, complex integration, Cauchy integral theorem and formula; sequences and series, Taylor's and Laurent's series; singularities; residues; analytic continuation; conformal mapping. A more in-depth study of analytic function theory than SMAM-420. (SMAM-305)

Class 4, Credit 4 (offered upon sufficient request) (561 -F, W; 562-S, SR)

SMAM-571,572 Topology

Registration #1016-571, 572 Metric spaces, topological spaces, separation axioms, compactness, connectedness, product spaces. (SMAM-412 or permission of instructor)

Class 4, Credit 4 (offered upon sufficient request) (571 -F, W; 572-S, SR)

SMAM-599 Independent Study—Math Registration #1016-599

Faculty directed study of appropriate topics on a tutorial basis. This course will generally be used to enable an individual to pursue studies of existing knowledge available in the literature.

Class variable, Credit variable (offered every year)

SMAM-620 The Fourier Transform Registration #1016-620

This course provides an introduction to an important mathematical tool for the analysis of linear systems. Topics covered are: a Fourier integral theorem; the Fourier transform and its inverse; an introduction to generalized functions; the Dirac delta function; evaluating transforms; convolution; serial products; the sampling theorem; Rayleigh, power, convolution, and auto-correlation theorems; the discrete Fourier transform; the fast Fourier transform. (SMAM-420)

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

SMAT-420 Introduction to Solution of Registration #1019-420 Engineering Problems Application of algebra and trigonometry to solution of engineering problems. Development and application of differential calculus to electromechanical problems. Introduction to integration.

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

SMAT-421,422 Solution of Engineering Problems I, II Registration #1019-421, -422

Application of principles of mathematics and physics to the solution of engineering and technical problems. To include the principles of calculus applied to solutions of problems in mechanics, thermodynamics, electric circuits, and vibrations.

Class 4, Credit 4 (offered every year) SMAT-421 (F, W, S); SMAT-422 (W, S, SR)

Physics

SPSP-200

Physics Orientation

Registration #1017-200 Introduction to physics as a profession and opportunities for physicists in inter-disciplinary efforts. Introduction to the literature of physics.

Class 1, Credit 0 (offered every year) (F)

SPSP-201, 202

Physics in the Arts

Registration #1017-201, -202 A study of topics from the world of art in which the underlying physical laws have influenced the art form and its development. A weekly laboratory will allow study of the relation of an art form to basic optical, mechanical, and electrical physics and in addition will provide time for the development of student projects.

Class 2, Lab. 2, Credit 3 (offered upon sufficient request) (W, S)

SPSP-205, 206, 207

General Physics

73

Registration #1017-205, -206, -207 General physics for engineering and computer science majors. Mechanics, heat, sound, electricity and magnetism, making moderate use of calculus. (Co-registration or credit in SMAM-252, or SMAM-253) (See SPSP-275, 276, 277 for laboratory)

Class 3, Credit 3 (offered every year) (205-W; 206-S; 207-F) SPSP-211, 212, 213 College Physics

Registration #1017-211,-212, -213

An elementary course in college physics. Mechanics, heat,sound, light, and electricity and magnetism, with some elements of modern physics. (SMAM-203orSMAM-223) (SeeSPSP-271, 272, 273 for laboratory)

Class 3, Credit 3 (offered every year) (211 -F, 212-W, 213-S)

SPSP-214, 215, 216 Physics for Graphic Arts Registration #1017-214, -215, -216

An introductory course in college physics covering the fundamentals of mechanics, heat, sound, light, electricity and magnetism, and some modern physics, with emphasis on topics having application in the printing industry. (SMAM-203) (See SPSP-217, 218, 219 for laboratory)

Class 3, Credit 3 (offered every year) (214-F, 215-W, 216-S)

SPSP-217, 218, 219 Physics for Graphic Arts Lab Registration #1017-217, -218, -219

The labs for these courses will include experiments related to the principles and theories discussed in the corresponding lectures. (SPSP-214, 215, 216)

Lab. 2, Credit 1 (offered every year) (F, W, S)

SPSP-271, 272, 273 Registration #1017-271, -272, -273 The labs for these courses will include experiments related to the principles and theories discussed in the corresponding lectures. (SPSP-211, 212, 213).

Lab. 2, Credit 1 (offered every year) (F, W, S)

SPSP-275, 276, 277 General Physics Lab Registration #1017-275, -276, -277 The labs for these courses will include experiments related to the

principles and theories discussed in the corresponding lectures (SPSP-205, 206, 207).

Lab. 2, Credit 1 (offered every year) (F, W, S)

SPSP-301 Electronics for Technologists

Registration #1017-301 A laboratory-oriented course to provide the science or technology student with a basic understanding of electronics and instrumentation. Particular emphasis is placed on systems encountered in chemical laboratories. (SPSP-213)

Class 1, Lab. 6, Credit 3 (offered every year) (W, S)

SPSP-311, 312, 313 University Physics Registration # 1017-311, -312, -313

An intensive course in general physics, using calculus, for majors in the sciences. Also open to engineering majors. Mechanics, heat, sound, electricity and magnetism, and light. (Co-registration or credit in SMAM-252 or SMAM-253)

Class 4, Credit 4 (offered every year) (311 -F, W; 312-W, S; 313-S, F)

SPSP-314, 315 Introduction to Modern Physics Registration #1017-314, 315

An introductory survey of modern physics at the sophomore level. Fundamentals of relativity, atomic phenomena, introduction to quantum physics, elementary wave mechanics, nuclear physics, statistical mechanics, and solid state physics. (SMAM-305, SPSP-207, or SPSP-313)

Class 4, Credit 4 (offered every year) (314-W; 315-S)

SPSP-319 Electrical Processes in Solids Registration #1017-319

Electronic properties of conductors and semiconductors, junction characteristics, operating principles of solid state devices. Theory and application. (SPSP-315 or permission of instructor)

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

SPSP-321 Introduction to Laboratory Techniques Registration #1017-321

A C. circuits, the oscilloscope, vacuum systems.

Class 2, Lab. 3, Credit 4 (offered every year)

SPSP-331 Introduction to Electricity and Electronics Registration #1017-331

Fundamentals of electricity; construction and measurements of electrical and electronic circuits encountered in a scientific laboratory.

Class 4, Lab. 3, Credit 5 (offered every year) (S)

SPSP-341 Foundations of Scientific Thinking

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

Class 2, Credit 2 (offered upon sufficient request) (F, W)

SPSP-351, 352, 353 Radiation Physics

Registration #1017-351,-352, -353 The physics of nuclear radiation and the electronics used in its detection and monitoring. Application of radioactivity to nuclear medicine. (SPSP-213, SMAM-223 required; SMAM-309 recommended)

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

SPSP-371, 372, 373 University Physics Lab

Registration #1017-371,-372, -373 The labs for these courses will include experiments related to the principles and theories discussed in the corresponding lectures (SPSP-311, 312, 313)

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

SPSP-380 Theoretical Physics I

Registration #1017-380 Introduction to the theoretical concepts and techniques used in the description of physical phenomena; fields, periodic phenomena, quantization, etc. (SPSP-314, SMAM-306)

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

SPSP-401, 402 Intermediate Mechanics Registration #1017-401, -402

Particle dynamics, systems of particles, motion of a rigid body, gravitational fields and potential, moving coordinate systems, generalized coordinates. Lagrange's equations, mechanics of continuous media. (SMAM-306, SPSP-313)

Class 4, Credit 4 (offered every year) (401-F; 402-S)

SPSP-411,412 Electricity and Magnetism Registration #1017-411,-412

Electric and magnetic fields using vector methods, Gauss's law, theory of dielectrics, Ampere and Faraday laws, vector potential, displacement current, Maxwell's equations. (SMAM-308, SPSP-401)

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

SPSP-415 Thermal Physics

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

SPSP-421,422 Ex

Experimental Physics

Registration #1017-421,-422 Advanced laboratory work in physics, with experiments selected from one or more of the following branches of physics: mechanics, acoustics, heat, electro-magnetism, and physical optics. (SPSP-313 plus co-registration or credit in any one of these: SPSP-401, 411.415, 455)

Class 1, Lab. 3, Credit 2 (offered every year) (421-F, 422-S)

SPSP-431,432 Electronic Measurements Registration #1017-431, -432

Laboratory course in electronic measurements and instrumentation, with theory and applications of discrete and integrated circuits in analog and digital electronics. (SPSP-313, SPSP-321) Class 2, Lab. 3, Credit 3 (431-F, 432-W)

SPSP-455

Optical Physics

Physics Seminar

Nuclear Physics

Special Topics—Physics

Registration #1017-455 Introduction to wave phenomena as applied to the electromagnetic spectrum. Interaction of radiation with matter. (SMAM-305, SPSP-313)

Class 4, Credit 4 (F-alternate years)

SPSP-501 Theoretical Physics II Registration #1017-501

Application of advanced, mathematical methods to physics. (SMAM-308 plus co-registration or credit in SPSP-401 and SPSP-411)

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

SPSP-521 Advanced Experimental Physics Registration #1017-521

Advanced laboratory experiments and projects in atomic physics, nuclear physics, or solid state physics. Special emphasis on experimental research techniques. (SMAM-307, SPSP-421)

Lab. 6, Credit 2 (offered every year) (F)

SPSP-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)

Class 4, Credit 4 (offered upon sufficient request) (531-S, 532)

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, (offered every year)

SPSP-550

Registration #1017-550

Discussions of contemporary developments in physics. Special emphasis on technical literature search, preparation and presentation of technical papers. (Senior physics majors.) Class 1, Credit 1 (offered every year) (F)

SPSP-552 Introduction to 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-501; SPSP-315 or permission of instructor.

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

SPSP-553 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)

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

SPSP-559

Registration #1017-559 Advanced courses which are of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and have specified prerequisites, contact hours, and examination procedures. Topics could include: introductory statistical mechanics; plasma physics; general relativity; linear integrated circuits; cryogenics; radio astronomy; history of physics; astro-physics; astronomy.

Class variable, Credit variable (offered upon sufficient request)

SPSP-599

Independent Study-Physics

Registration #1017-599 Faculty directed study of appropriate topics on a tutorial basis. This course will generally be used to enable an individual to pursue studies of existing knowledge available in the literature. Class variable, Credit variable (offered every year)

Clinical Sciences

SHPG-204 **Communication Skills for** Registration #1026-204 **Clinical Sciences** Designed to increase skill in recording, describing, and interpreting biological procedures, observations and concepts. Emphasis will be placed on clarity and precision of expression as well as principles of good English. (GLIC-220) Class 1, Credit 1 (W, S)

SHPG-301

Medical Terminology

Registration #1026-301 Emphasizes etymology, definition, pronounciation and correct utilization of medical terms which enables students to develop a vocabulary essential to the understanding of and communication with the various health areas in which allied health professional will serve. (SBIO-306)

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

SHPM-401

Registration #1024-401

Composition of blood, blood groups and the immunology of blood substances. The genetics of blood groups with reference to practical applications in medical laboratory procedures. The struc-

tures of antigens and antibodies and the mechanics of antigenantibody reactions will be stressed. Lab procedures will demonstrate antigen-antibody reactions and compatibility testing of various blood groups. (SBIO-306)

Class 3, Lab 3, Credit 4 (F)

SHPM-405 **Diagnostic Bacteriology and Mycology** Registration #1024-405

Study of bacteria and fungi that cause human disease. Lecture and laboratory subjects include microorganism growth, isolation, identification, antibiotic sensitivity, and related human immunological and serological responses. (SBIC-404)

Class 3, Laboratory 3, Credit 4 (W)

SHPM-410

Hematology

Immunohematology

Registration #1024-410 Descriptions of normal and abnormal human red and white blood cells. Study of the structure of hemoglobin, chemical and physical properties of blood cells, hemostasis, and coagulation mecha-nism. Laboratory testing procedures used for the diagnosis of anemias, leukemias, and coagulation disorders. (SBIO-306) Class 3, Lab 3, Credit 4 (S)

SHPM-432

Biology Laboratory Techniques I

Registration #1024-432 Principles of clinical laboratory instruments in the analysis of body fluids. This quarter stresses the principles of instrumental methods of analysis including visible and ultraviolet, spectrophotometry, fluorometry, flame photometry, atomic absorption pho-tometry, chromatography, electrophoresis, osmometry, radiation counters, and automated chemical analyzers. (SCHG-217, or equivalent, SBIO-306)

Class 2, Lab 6, Credit 4 (F, W)

SHPM-433

Biology Laboratory Techniques II Registration #1024-433

Principles of clinical chemistry in the analysis of the chemical component of body fluids. This quarter stresses the basic chemistries underlying the classical methodologies and relates them to the disease state. Topics include: liver function tests, renal function tests, carbohydrates, electrolytes, acid base balance, enzymes, lipids, endocrine function tests, drug analysis, and statistical quality control. (SCHG-217, or equivalent, SBIO-306)

Class 2, Lab 6, Credit 4 (S)

SHPN-401 Introduction to Radioimmunoassav^{*} Registration #1025-401

Combination lecture/laboratory in radioimmunoassay. Theory and basic principles; instrumentation; specific assays; quality control and future trends in RIA. (Prerequisite: Fourth year standing in NMT program.

Credit 2 (winter) SHPN-402 Registration #1025-402 Radioimmunoassay Practicum*

Practical experience in operating radioimmunoassay laboratory. Preparation of specific assays, introduction to quality control, data reduction, clinical significance. (Prerequisite: Fourth year standing in NMT program) Credit 4 (winter, spring)

SHPN-501 Introduction to Clinical Nuclear Medicine* Registration #1025-501

combination lecture/laboratory course introducing clinical aspects of Nuclear Medicine. Topics include radionuclide imaging, instrumentation, radio-pharmaceuticals, invitro proce-dures, radiation protection, nursing procedures. (Prerequisite: Fourth year standing in NMT program) Credit 6 (fall)

SHPN-502 Clinical Nuclear Medicine Lecture Series*

Registration #1025-502 Lectures by clinical faculty on specific aspects on nuclear medicine and allied areas. Some of the topics include specific radionuclide imaging procedures including pathology and physiology; ultrasound; radiopharmaceuticals, instrumentation. (Prerequiultrasound; radiopharmaceuticals, ins site: Fourth year standing in NMT program)

Credit 2 (winter, spring)

SHPN-503 **Review in Nuclear Medicine***

Registration #1025-503 Discussion of all aspects of Nuclear Medicine Internship including preparation and presentation of technical papers. (Prerequisite: Fourth year standing in NMT program)

Credit 4 (All year)

SHPN-510 Radionuclide Imaging & External Monitoring* Registration #1025-510

Instruction in the radio nuclide in-vivo procedures currently in use. Devices used in these procedures include the scintillation camera, the rectilinear scanner and single scintillation probes. (Prere-quisite: Fourth year standing in NMT program) Credit 15 (All year)

SHPN-511 Patient Positioning & Nursing Procedures* Registration #1025-511

Practical instruction concerning handling of sick patients in the nuclear medicine laboratory. Basic nursing skills and emergency procedures are covered. (Prerequisite: Fourth year standing in NMT program)

Credit 4 (All year) (F, W, S,)

Nuclear Medicine Pharmacy-In Vitro SHPN-512 Registration # 1025-512 Procedures & Therapy* Practical experience in the radiopharmacy, introduction to in vitro procedures and related techniques and instruments; introduction to the use of radioactive materials in therapy. (Prerequisite: Fourth year standing in NMT program)

Credit 6 (All year)

SHPN-513 **Nuclear Medicine Administrative Procedures** Registration #1025-513 & Radiation Protection* Introduction to record and file keeping in a nuclear medicine department; operation and procedures manual; radiation safety procedures; radiation protection monitoring, radiation safety manual. (Prerequisite: Fourth year standing in NMT program) Credit 4 (All year)

* Offered every year.

SHPN-514 Instrumentation in Nuclear Medicine* Registration #1025-514

Combined laboratory/practicum in instrumentation in a nuclear medicine laboratory. Laboratories include use of scintillation detecting equipment including scintillation camera and use of computers in nuclear medicine. Practicum is used to reinforce laboratories. (Prerequisite: Fourth year standing in NMT program) Credit 3 (All year)

Graduate Courses Master of Science in Clinical Chemistry SHPC-820 Advanced Clinical Chemistry I

Registration #1023-820

Toxicology, therapeutic drug monitoring, electrolytes acid-base, vitamins, oncology, hepatitis, coagulation, and various standard methods. (Permission of instructor)

2 hr lecture, 2 hr seminar, credit 3

On a rotating basis Ad. Clin. Chem I, II, III will be offered two courses per year; one in the fall, another in the spring, and the third the following fall. They are independent courses that may be taken in any sequence.

820 will be offered in S 1981; F 1982

SHPC-810 Advanced Clinical Chemistry Laboratory I Registration #1023-810

Comparison of current methods for analysis of toxicology samples-gas-liquid chromatography, radioimmunoassay, enzyme multiplied immunoassay. (Permission of instructor, class size limited to 12)

Lab 4, Credit 1 (offered concurrently with SHPC-820)

SHPC-821 Advanced Clinical Chemistry II Registration #1023-821

Proteins, enzymes, hemoglobins, iron, renal function, lipids, quality control, automation, and method selection. (Permission of instructor)

2 hr lecture, 2 hr seminar, credit 3 (F 1981; S 1983)

SHPC-811 Advanced Clinical Chemistry Laboratory II Registration #1023-811

Comparison of current methods for separation and determination of isoenzymes. (Permission of instructor, class size limited to 12) Lab. 4, Credit 1 (concurrent with SHPC-821)

SHPC-822 Advanced Clinical Chemistry III Registration #1023-822

Radioimmunoassay, hormones, fetal-placement unit, integration of laboratory data. (Permission of instructor)

2 hr lecture, 2 hr seminar, Credit 3 (fall 1980, spring 1982)

SHPC-812 Advanced Clinical Chemistry Laboratory III Registration #1023-812

Methods for the development, improvement, and trouble shooting of radioimmunoassay analyses. (Permission of instructor, class size limited to 12)

Lab 4, Credit 1 (concurrent with SHPC-822)

SHPC-859 External Clinical Chemistry Research Registration #1023-859

SHPC-879 Clinical Chemistry Research Registration #1023-879 Credit 1-16

SHPC-899 Registration #1023-899 Credit variable

Independent Study

SHPC-741 Clinical Laboratory Management Registration #1023-741 Organization of health care facilities, regulatory agencies, q.c.,

personnel relations, productivity analyses, equipment maintenance, education and safety programs, extra-laboratory interactions, cost-accounting of laboratory tests.

Class 4, Credit 4 (Spring of odd-numbered years) *Offered every year.

SHPC-712 Registration #1023-712

Statistics and Quality Control

Principles of statistics as they apply to biomedical sciences and to clinical laboratory analyses. Illustrative examples will involve clinical laboratory data. Probability, normal distributions, analysis of variance sampling, normal values, quality control, applications in patient care, hypothesis testing.

Class 3, Credit 3 (Spring of even-numbered years)

SHPC-870 Clinical Chemistry Seminar Registration #1023-870

Credit 1

SHPC-872 Special Topics in Clinical Science Registration #1023-872

In response to student and/or faculty interest, special courses which are of current interest and/or logical continuations of regular courses will be presented. These courses will be structured as ordinary courses with specified prerequisites, contact hours and examination.

Class variable, Credit variable

SHPC-722 Clinical Laboratory Computer Applications Registration #1023-722

Data processing overview and terminology, hospital computer utilizations, evaluation of the need for computers in the laboratory, design of laboratory and hospital systems, evaluation-selection-installation of computer systems, legal aspects of biomedical data processing, instrument interfacing.

Class 3, Credit 3 (Winter of even-number years, e.g., 80-81)

Institute College

Department of Instructional Technology

All courses in the Department of Instructional Technology are offered at least once every three years and/or upon sufficient demand

Audiovisual Communications

ICIC-401 Message Design

Registration #0612-401 Reviews perception and media formats as they may be applied to

the design of instructional communications. Examines social psy-chological principles as they relate to attitude change and motivation in learners. Students use design principles and structure messages for different media forms. Required for all students. Credit 4

ICIC-405

Audiovisual Seminar

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

Credit 2

ICIC-421 **Producing Audiovisual Presentations I** Registration #0612-421

Students develop slide/tape presentations in order to communicate an idea or change the attitudes or behavior of the viewer. The development process includes: analyzing the needs of clients and preparing communications objectives; audiences; preparing treatment, storyboard and script; producing audio track and visual materials; synchronization and presentation preparation. Project required. (Photographic skills required) For nonmajors. Credit 4

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

Basic slide/tape planning and production similar to ICIC-421 but with increased emphasis on scripting and production planning and the unique characteristics of slide/tape as a delivery medium; increased emphasis on synchronization methods and sophisticated presentation hardware. (ICIC-421) For nonmajors. more Credit 4

Producing Audiovisual Presentations III ICIC-423 Registration #0612-423 Similar to ICIC-421 and 422 but with production of presentations

using other media in addition to slide/tape. Characteristics of various presentation media are emphasized along with the hard-ware and software available for various media. (ICIC-421,422) For nonmajors. Credit 2

ICIC-440

Audiovisual Program Design I

Registration #0612-440 Students learn how to develop audiovisual materials by using sys-tematic development procedures. The design model for the de-velopment of instructional/training materials and the media elements that comprise them focuses on process and analytic skills such as the writing of behavioral objectives and developmental testing. Mastery of skills and techniques rather than theory is emphasized. Required for all students.

Credit 4

ICIC-450

Audiovisual Program Design II

Registration #0612-450 The systems approach to audiovisual program design is further developed and used as a basis for a systematic, four-stage process of program identification, design, development, and dissem-ination. Students design, produce and validate an instructional product by utilizing this systems model. Required for all students.

Credit 4

Selection, Storage, and Dissemination of ICIC-460 Registration #0612-460 **Media Resources** Reviews methods of searching for, selecting and evaluating visual information and nonprint materials such as films, filmstrips, videotapes and audiotapes. Covers location of pictorial material in primary and secondary sources and current copyright restrictions governing its use. Also covers proper storage and distribution methods for these materials. Credit 3

Audio for Audiovisual Presentations ICIC-489 Registration #0612-489

Students record, transfer, edit, and mix sound tracks-with music, narration and sound effects-for audiovisual programs. Course stresses practical approach with hands-on experience. (Enrollment for 4 credits requires production of the audio portion of a presentation.) For nonmajors. Credit 3-4

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

related to audio recording. (ICIC-489 or equivalent)

Credit 4 ICIC-500 Practicum in a Special Registration #0612-500 Interest Area Allows a student to explore or develop a special competence in an area of special interest and to work with "clients" in real or simu-lated work environments. A proposal (guidelines available from

the department) must be submitted prior to registration. For audiovisual communications majors only. Credit variable (1-4) ICIC-501 **Practicum in Audiovisual** Registration #0612-501 **Program Design**

Allows a student to explore or develop a special competence in audiovisual program design and to work with "clients" in real or simulated work environments. A proposal (guidelines available from the department) must be submitted prior to registration. For audiovisual communications majors only. Credit variable (1-4)

ICIC-502 **Practicum in Audiovisual** Registration #0612-502 Management Allows a student to explore or develop a special competence in audiovisual management and to work with "clients" in real or simulated work environments. A proposal (guidelines available from

the department) must be submitted prior to registration. For audiovisual communications majors only.

Credit variable (1 - 4)

ICIC-503 Practicum in Audiovisual Production Registration #0612-503

Allows a student to explore or develop a special competence in advanced production and work with "clients" in real or simulated work environments. A proposal (guidelines available from the department) must be submitted prior to registration. For audiovisual communications majors only.

Credit variable (1-4)

ICIC-510 Writing for Audiovisual Programs Registration #0612-510

Emphasizes the principles of script writing for verbal and visual continuity, clarity, and impact. Considers the audience and purpose for which the script is being written, the intended medium and styles of writing. Required for all students.

Credit 4

Management of Audiovisual Programs ICIC-550 Registration #0612-550

Covers organizational strategies, management practices, budgeting and fiscal control, personnel recruitment, selection, training and supervision, resource center operation and organization. Credit 4

Media Facilities Design

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

Credit 4

ICIC-570 Survey of Audiovisual Equipment Registration #0612-570

Permits the student to both survey the wide spectrum of AV equipment available and to do an in-depth analysis of one type of equipment. Different groups of students will then report to the class the results of their in-depth study, using demonstrations, media presentations, visits by dealers or manufacturers and other methods. Credit 2

ICIC-580 **Producing Multimedia Presentations**

Registration #0612-580 Students design, produce, and present multimedia productions. Covers both theory and practice of aspects such as media synchronization, presentation planning and equipment selection, and the presentation development process. (Multimedia refers to the simultaneous and/or sequential use of a variety of media formats in the same presentation.) Projects required. (ICIC-489, ICIC-401 orICIC-421 or equivalent)

Credit 4

ICIC-581 **Producing Multi-image Presentations** Registration #0612-581

Students design and produce multi-image presentations (6-15 projectors) controlled by microprocessor-based programmers using leisure time programming. Basic research and theory of multi-image covered. Two presentations required. (ICIC-489, ICIC-580, and ICIC-401 or ICIC-421 or equivalent)

Credit 4

ICIC-583 Advanced Multi-image Project Registration #0612-583

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

Credit 1-4 ICIC-585

Producing Special Effects Slides

Registration #0612-585 Building on basic black and white and color photography, the student designs, produces and evaluates optically produced graphic and pictorial slides for use in audiovisual presentations. Includes techniques to produce effects such as multiple exposures, streaks, zooms, neons, registration techniques to produce slide animation and seamless masking. Emphasis is on design and planning as well as production and use of slides in presentations. (Enrollment for 4 credits requires the prior approval of special effects sequence for multi-image.) Credit 3-4

ICIC-595. 596

Senior Project

Registration #0612-595, -596 Focus is on the design and production of an interview presentation package based on each senior's own job aspirations, professional skills, personal qualities and portfolio materials. These courses are to be taken in the senior year. Both are required for graduation. For audiovisual communications majors only. Credit 2/Qtr.

School of Computer Science and Technology

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

Undergraduate Courses

Service Courses

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

Computer Techniques

ICSP-205 Registration #0601-205

Students will be introduced to computer systems, problem solving techniques, and the FORTRAN programming language. Programming projects will be required.

Class 3, Credit 3

ICSP-216 **Program Design and Validation/FORTRAN** Registration #0601-216

Program Design, including specification, structured development, advanced data types, procedures and functions, program validation and verification and FORTRAN and its use in graphics programming. Programming projects will be required. (ICSP-208) Class 4. Credit 4

ICSP-220 **FORTRAN Programming for Engineers** Registration #0601 -220

Topics include an introduction to computer systems, problemsolving techniques and the FORTRAN programming language. Scientific and engineering applications will be emphasized. Pro-gramming projects will be required. (EEEE-201)

Class 4, Credit 4

ICSP-300 Principles of COBOL Programming Registration #0601 -300

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

Class 4, Credit 4

ICSP-302 Computer Applications in Registration #0601-302 Engineering Problems Introduction to programming using the FORTRAN programming language. Class 1, Credit 1

ICSS-200 Registration #0603-200

Survey of Computer Science

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

Class 4, Credit 4

78

ICIC-560

ICSS-370, 371 Computer Graphics in Filmmaking Registration #0603-370, 371

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

Class 4, Credit 4 (Offered upon sufficient demand)

Computer Science Courses

Computer Science and Technology courses may be taken as Computer Science electives except as noted.

ICSP-208 Introduction to Programming Registration #0601-208

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

Class 4, Credit 4

ICSP-210 Program Design and Validation Registration #0601-210

Program design, including specification, structured development, advanced data types, procedures and functions, program validation and verification; programming paradigms, including basic internal sorting and searching algorithms. Programming projects will be required. (ICSP-208) Class 4, Credit 4

ICSP-215 Programming Language—FORTRAN Registration #0601 -215

A study of FORTRAN programming techniques and applications. Topics include data representation and expression evaluation, logical operations, storage allocation, I/O manipulation, program structures, subprograms and plotting. Programming projects will be required. (ICSS-202) Class 4, Credit 4

ICSP-301

COBOL Programming

Registration #0601-301 Topics include COBOL coding methods, data processing and sequential file manipulation, table look-up, SORT and SEARCH verbs, modular and structured programming, COBOL debugging and editing facilities and establishment of documentation standards. Programming projects will be required. (ICSS-202) (Not open to students in the Computer Systems Option) Class 4, Credit 4

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ICSP-305 Assembly Language Programming Registration #0601 -305 A study of assembly language concepts and programming methods, including computer organization, assembly process, addressing, binary arithmetic, repeatability, storage allocation, subroutine linkage, looping and address modification, character manipulation, bit manipulation, floating point arithmetic, decimal instructions, some system I/O, macros and debugging techniques. Programming projects will be required. (A high-level programming language)

Class 4, Credit 4

ICSP-306 Advanced Assembly Techniques Registration #0601 -306

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

Class 4, Credit 4

ICSP-307 Business Applications Programming Registration #0601 -307

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

Class 4, Credit 4

ICSP-318 APL Programming Techniques Registration #0601-318 and Applications Topics include APL programming and style, function definition and recursive programming, APL report formatting features, file I/O subsystem, graphic I/O and scientific and business systems applications. Programming projects will be required. (A high-level programming language) Class 4, Credit 4

ICSP-330

PL/I Programming

Registration #0601-330 Topics include elementary data types and control structures, data structuring capabilities (arrays and records), run-time error handling, standard built-in functions, text processing and user-written functions and subroutines. Emphasis is on developing well-structured and modular programs. Programming projects will be required. (A high-level programming language) Class 4, Credit 4

ICSP-350 Programming Language Concepts Registration #0601-350

A study of the syntax and semantics of a diverse set of high-level programming languages. The similarities and differences of the languages chosen are discussed in order to demonstrate general principles of programming language design. Programming projects will be required. (ICSS-320) Class 4, Credit 4

ICSP-488 Programming Systems Workshop Registration #0601-488

A workshop for the mastery of the techniques and concepts of programming systems specification, design and implementation. Students will work with data modeling, both with and without a data-base management system product. Students will gain experience with system specification and design charting techniques, project scheduling and management, and programming team experience. Programming projects will be required. (ICSS-307, ICSS-335, ICSS-485)

Class 4, Credit 4

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

An introduction to the computer: information representation, instruction execution, and the software interface to the user. Topics include integer (binary and decimal) and floating point arithmetic, logical operations; introduction to machine language and assembly language, input/output operations and operating systems and editors.

Class 4, Credit 4

ICSS-315

Digital Computer Organization

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

Class 4, Credit 4

ICSS-320 Registration #0603-320

Data Structure Analysis

Information structures: sequential lists, stacks, queues, sequential allocation; linked lists, circular lists, doubly linked lists, linked allocation; trees, tree traversal; lists, orthogonal lists, multilinked structures; dynamic storage allocation and garbage collection. Programming projects will be required. (Either ICSP-210 or ICSP-216 and ICSP-305) Class 4, Credit 4

80

Data Organization and Management ICSS-325 Registration #0603-325

This course combines the content associated with file organization (sequential, indexed and direct access physical organization); space optimization and directory organization; an introduction to external sorting and searching, and the basics of data modeling, database organization and management. Program-ming projects will be required. (ICSS-320)

Class 4, Credit 4

Systems Specification, Design ICSS-335 Registration #0603-335 and Implementation Students are introduced to basic concepts of system specification, design, system implementation and project management. Tools used include PERT/CPM (scheduling tools), structured English, structured flowcharts, and decision trees (description tools), dataflow diagramming (description and design tool), and hierarchical design of programming systems (design tool). Students are also introduced to other tools (e.g., HIPO charts, N-S charts, etc.). An introduction to the structured design methods of Yourdon is included. (ICSS-325) Class 4, Credit 4

I CSS-340 **Finite State Machines and Automata** Registration #0603-340

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

Class 4, Credit 4

ICSS-355 Registration #0603-355

The Human Side of Computers

The impact of computer systems on society is studied using class discussion, lectures and films. Current topics such as the following are covered: the impact of computers on employment; automation and the labor force; overview of computer applications in government; innovative medical applications; computers in edu-cation and computer assisted instruction; social issues-ethics, information banks, privacy and the Freedom of Information Act, computer abuses and crime-the impact on law enforcement, and the future-a cashless society, universal identifiers and compu-ters in the home. Participants will develop several short discussion papers and a major study in one of the course topics. (ICSS-200 or ICSS-202)

Class 4, Credit 4

ICSS-360 Registration #0603-360

Essentials of Computer Science

Selected topics from ICSS-202, ICSP-208, ICSP-210and ICSP-305 are presented. This course is required for students transferring into the School of Computer Science and Technology with previous programming experience. Open only to transfer students; not to be taken as a Computer Science elective.

Class 4, Credit 4

I CSS-400

Registration #0603-400

Logical Design

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

Class 4, Credit 4

ICSS-420 Registration #0603-420

Data Communication Systems

Numerical Methods

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

Class 4, Credit 4

ICSS-430

Registration #0603-430 Topics include introductory error analysis, roots of an equation, solution of systems of linear and non-linear equations, interpolapower series calculation of functions, numerical integration first-order ordinary differential equations. The computational tion. and aspects rather than mathematical development will be emphasized. Programming projects will be required. (Either SMAM-252 or SMAM-215 and a high-level scientific programming language) Class 4, Credit 4

ICSS-440

Operating Systems

Registration #0603-440 A general survey of operating system concepts. Topics include process synchronization, interprocess communication, dead-locks, multiprogramming and multiprocessing, processor scheduling and resource management, memory management, overlays, static and dynamic relocation, virtual memory, file systems, logical and physical I/O, device allocation, I/O processor scheduling, process and resource protection. (ICSS-315, ICSS-320) Class 4, Credit 4

ICSS-480 Registration #0603-480

Formal Languages

Formal language theory and principles. Topics include context free, context sensitive grammars, regular expressions; Turing ma-chines; introduction to unsolvability and computability. (ICSS-(ICSS-340)

Class 4, Credit 4

ICSS-485 Registration #0603-485

Topics include data organization and structure; relational, hierarchical, and network approach; data security and recovery. Comparison of the data-base approach with traditional file organization and access methods, performance and management issues. Existing data-base systems will be studied. (ICSS-325)

ICSS-515

Class 4. Credit 4

Analysis of Algorithms

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

Class 4. Credit 4

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

Class 4, Credit 4 I CSS-540

Operating Systems Laboratory

Registration #0603-540 Application of operating system concepts. Laboratory work in-cludes development of a small multi-tasking operating system and a study of its functional characteristics; special topics include I/O programming, interrupt handling, resource allocation and scheduling methods. Laboratory emphasis. (ICSS-440) Class 4. Credit 4

Data Base Concepts

ICSS-545 Registration #0603-545

A survey of processor design and implementation techniques. Topics include microprogramming and emulation, comparisons of microcode and hardwired logic, I/O processors and subsystems, high-level language and operating system support, and processor speedup techniques. Lectures will be supplemented with outside reading and/or programming assignments. (ICSS-315orICSS-720)

Class 4, Credit 4

I CSS-550 **Review of Computer Science** Registration #0603-550

Review of recent advances in computer science-designed to give graduating or upperclass students an introduction to recent technological and theoretical advances through readings in the current literature. (Fifth-year standing in Computer Science and Technology)

Class 4, Credit 4

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

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

Class 4, Credit 4

I CSS-565 **Computer Systems Selection** Registration #0603-565

A study of computer systems design, evaluation, and selection methodology. The design aspect deals with the problem of specifying physical systems on the basis of logical design specifications and performance analysis of existing and proposed computer systems. The selection aspect covers vendor proposal requests, evaluation and validation of proposals and procurement methods. (ICSS-315, ICSS-320)

Class 4, Credit 4

Minicomputer Systems and Applications LCSS-575 Registration #0603-575

A study of minicomputer hardware architectures; software organization, operating systems; input/output programming, interrupt handling; debugging techniques, device interfacing and custom applications. Hands-on experimentation with a minicomputer is emphasized. (Proficiency in assembly language programming is required)

Class 4, Credit 4

ICSS-580 Language Processors Registration #0603-580

To give students exposure to issues in the design of a variety of language processors and translators. The basic concepts will be presented as part of the design of several such programs (e.g., assemblers, compilers, linkage editors and Programming projects will be required. (ICSP-350) macroprocessors. Class 4, Credit 4

I CSS-585 Systems Programming Laboratory Registration #0603-585

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

ICSS-590

Seminar in Computer Science Registration #0603-590 Current advances in computer science.

Class 2-4, Credit 2-4

ICSS-599

Independent Study Registration #0603-599

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

Class 2-4, Credit 2-4

Graduate Courses

Undergraduate Computer Science and Technology students may take ICSS-700 level courses as undergraduate computer science electives. They must be fourth- or fifth-year students and have already completed any stated prerequisites or have the consent of the instructor.

Undergraduate students may not take ICSS-800 level courses, ICSM courses, or ICSI courses.

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

Computer Science

EDP Auditing

Registration #0603-710 A study of the techniques and approaches used to audit computer data centers and systems. Topics include the methodology and controls, input/output controls, data security, physical security, computer hardware controls and data communication control.

Credit 4 **ICSS-720**

ICSS-710

Computer Architecture Registration #0603-720

Brief review of a classical computer architecture. Analysis of internal and external bus structures. Architectural features required to support virtual storage and various replacement poli-cies are discussed. Various types of parallel computers are pre-sented along with analyses of the problems preventing them from achieving an ideal n-fold speedup. (ICSS-440 or equivalent)

Credit 4

Microprocessors and Microcomputers ICSS-721 Registration #0603-721

A study of microprocessors, microcomputers, and their applications. Topics include microprocessor hardware, microcomputer programming, Case studies organization, software, microcomputer interface techniques and development trends. will be provided. (ICSS-315)

Credit 4 **ICSS-730**

Discrete Simulation Registration #0603-730

Computer simulation techniques are examined. Topics include abstract properties of simulations modeling, analysis of a simulation run, and statistics. One or more general-purpose simulation languages will be taught. Programming projects will be required. (SMAM-309 or equivalent)

Credit 4

I CSS-7 35 **On-Line Information Systems Design** Registration #0603-735

Topics include basic on-line system characteristics, design guidelines, hardware requirements, comparison of systems and languages, file organization concepts, the simultaneous access problem, file security and recovery, error recovery, system evalu-ation and case studies. (Background in systems analysis is recommended) Credit 4

I CSS-7 36 **Data Base System Implementation** Registration #0603-736

Requirements and characterization of generalized data-base systems, the role of the data-base administrator, creation of a general data base, elements of data-base management systems. data-base management in a multi-access environment, survey of data-base management systems, selecting a data-base management system. Projects in data-base systems implementation will be emphasized. (ICSS-485) Credit 4

ICSS-740 Computer Communication Networks Registration #0603-740

A study of hardware and software principles of computer communication networks. Topics include network configuration and vocabulary, network hardware components, network software components, network technologies, examples of existing networks, network utilization, measurement and evaluation. (ICSS-420)

Credit 4

ICSS-755 Real-Time Computation Registration #0603-755

Principles and applied problems in real-time computation using microprocessors as laboratory equipment. Topics include interrupt handlers, multi-tasking concepts, process synchronization, response time considerations for interrupt-driven and polled I/O and elements of computer communications. (ICSS-440 is required; ICSS-720 is recommended) Credit 4

ICSS-770

Computer Graphics

Registration #0603-770 Topics include basic concepts, 2-D transformations, windowing, clipping, interactive and raster graphics, 3-D transformations and perspective, hidden line and hidden surface techniques, graphical software packages and graphics systems. Programming projects will be required. (A scientific high-level programming language) Credit 4

Cieult 4

ICSS-805 Fundamentals of Computing Registration #0603-805

Computer systems, number representations, arithmetic operations and error analysis, structured programming, recursive programming, program correctness, systems software and computer architecture. Credit 4

ICSS-806 Foundations of Computing Theory Registration #0603-806

Principles of computing theory; mathematical logic, set theory, relations, functions, algebraic structures; grammars and languages, lattices and Boolean algebra and graph theory. (SMAM-204 or equivalent)

Credit 4

I CSS-825 Assemblers, Interpreters, and Compilers Registration #0603-825

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

Credit 4

ICSS-826 Deterministic and Probability Models Registration #0603-826 of Operating Systems Concurrent process control, processor scheduling models, computer sequencing problems, auxiliary and buffer storage models, storage allocation in paging systems, memory management of multiprogramming computers. (ICSS-440 or SMAM-352) Credit 4

ICSS-836 Data Base Systems Registration #0603-836

Topics include data organization and structure; relational, hierarchical and network approach; data security and recovery. Comparison of the data-base approach with traditional file organization and access methods, performance and management issues. Existing data-base systems will be studied. (ICSS-320) Credit 4

ICSS-846 Information Storage and Retrieval Registration #0603-846

Topics include an overview of history, development and traditional approaches of information storage and retrieval, automatic text analysis, automatic classification, file structures, search strategies, probabilistic retrieval and system evaluation. Credit 4

ICSS-850 Registration #0603-850

Computability

The theory of computation as it relates to computable functions is examined. Topics include finite state machines, Turing machines, recursive function theory, Post's symbol manipulation systems and the limitations of the concept of effective computability. (ICSS-806)

Credit 4 ICSS-851

Computational Complexity

Registration #0603-851 This course is concerned with the mathematical analysis of computer algorithms. Topics include matrix operations, combinatorial algorithms, integer and polynomial arithmetic, NP-complete problems and lower bounds on algorithms involving arithmetic operations. (ICSS-850 or equivalent) Credit 4

ICSS-852

Coding Theory

Registration #0603-852 Study of error-correcting codes and their applications. Topics include algebraic structure of group codes, linear switching circuits, cyclic codes and the decoding problem. (ICSS-806) Credit 4

ICSS-856

Theory of Parsing

Registration #0603-856 Application of theoretical concepts developed in formal language and automata theory to the design of programming languages and their processors, syntactic and semantic notation for specifying programming languages, theoretical properties of some grammars, general parsing, non-backtrack parsing and limited backtrack parsing algorithms. (ICSS-480)

Credit 4 ICSS-860

Compiler Construction

Registration #0603-860 Language definition, lexical analysis, syntactic analysis, storage allocation and management, code generation, code optimization, diagnostic generation and bootstrapping. (ICSS-480, ICSS-825) Credit 4

orount 4

I CSS-875 Minicomputer Systems and Applications Registration #0603-875

A study of minicomputer hardware architectures; software organization, operating systems; input/output programming, interrupt handling; debugging techniques, device interfacing and custom applications. Hands-on experimentation with a minicomputer is emphasized. (Proficiency in assembly language programming is required)

Credit 4

ICSS-880 Systems Programming Registration #0603-880

A study of systems program organization and systems programming techniques. Topics include systems programming languages, assemblers, macroprocessors, linkage editors and loaders, compilers and text processors. Programming projects will be required.

Credit 4

I CSS-885 Systems Programming Laboratory Registration #0603-885

Systems programming techniques applied to the design and implementation of a large systems program or module. Past projects have included floating point simulators, a small data-base system, system utilities and a command language interpreter. (ICSS-880)

Credit 4

I CSS-890 Registration #0603-890 Current advances in computer science. Credit 2-4

I CSS-895

Registration #0603-895 Credit 4-8

Seminar

MS Thesis

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

Information Science

Library Automation and Management **ICSI-722** Registration #0616-722

This course summarizes the computer techniques applied to library automation and the study of management techniques and problems in a modern automated library. Case studies in current library systems will be included. Management models in selected libraries will be discussed

Credit 4 (offered upon sufficient demand)

ICSI-733 Information Media and Design

Registration #0616-733 A study of current information media and their design. Topics include microfilm systems, video systems, computer input and output devices, computer interface with media devices, and system design concepts and techniques for applications in libraries and information centers.

Credit 4 (offered upon sufficient demand)

School of Engineering Technology

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

Upper-Division Civil Engineering Technology ITEC-420 Hydraulics Registration #0608-420

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

ITEC-428

ICSS-899

Report Writing

Registration #0608-428 The principles of organizing data and information into clear and concise engineering memos, letters, and reports. The techniques of library research, and oral reports using video tapes of student presentations are also stressed.

Class 3, Credit 2

ITEC-432 Water & Wastewater Transport Systems Registration #0608-432

Discussion of surface and groundwater sources. Introduction to well hydraulics. The hydraulic design of sanitary and storm sewer systems, and water distribution systems.

Class 2, Recitation 3, Credit 3

ITEC-434 Registration #0608-434

The study of various forms of pollution including air, thermal, noise, erosion, pesticides, radiation, and visual pollution, with the investigation of the sources, measurement, methods of control, legislation, codes, and enforcing agencies, Several expert guest speakers will also lecture.

Class 3, Credit 3

ITEC-438 Principles of the Treatment of Water Registration #0608-438 and Sewage An introduction to water and wastewater treatment interpretation

of analyzed physical, chemical, and biological parameters of water quality with regard to the design and operation of treatment processes and to the control of the quality of natural water; fundamental principles and applications of physical, chemical and biological processes employed in water and wastewater treatment; analysis of waste assimilative capacity of streams.

Class 3, Lab. 2, Credit 4

ITEC-510 Design of Water Treatment Facilities Registration #0608-510

Principles of water treatment plant design; conceptual and hydraulic design of water purification and conditioning facility. The topics discussed include the design of a rapid sand filtration plant with water softening treatment. Class 3, Lab. 2, Credit 3

ITEC-513 Computer Techniques in Civil Engineering Registration #0608-513 Technology Designed to complement Computer Techniques, ICSP-205, as an introduction to problem oriented languages such as COGO, STRESS, and other proprietory systems. Lab. 2, Credit 1

ITEC-514

Land Planning

Registration #0608-514 The environmental and social aspects of land planning are covered, as well as the engineering and economic considerations. Topics included are zoning concepts, the Master Plan, subdivision planning and regulations, flood-plain controls, conservation of open space, protection of wetlands, transfer of development rights and agricultural districts. Local development issues will be studied, and either class attendance at a planning board hearing or a field trip is scheduled?* Class 2, Credit 2

ITEC-516 Analysis and Design of Registration #0608-516 Reinforced Concrete Structures

Introduction to the analysis of indeterminate flexural members and frames, emphasizing the method of moment distribution. Design of continuous reinforced concrete elements and frames. The accent is on building structures and the use of the ACI Code. The working stress method is briefly covered, but primary emphasis is given to the strength method. Class 5, Credit 4

ITEC-520

Design of Wastewater

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

Class 3, Lab. 2, Credit 4

ITEC-527 Soil Mechanics and Foundations Registration #0608-527 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, Lab. 2, Credit 4

ITEC-544 **Contracts and Specifications** Registration #0608-544

A study of the contract documents; the relationship between the owner, engineer, and contractor; various types of contracts and specifications are studied as well as an introduction to engineering law.

Class 3, Credit 3 **Environmental Pollution**

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

Construction Safety

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

Class 3 Credit

ITEC-505

Independent Study

ITEC-549 Environmental Engineering Project Registration #0608-549

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

Class 2, Lab 3, Credit 4

ITEC-550

Construction Practices

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

ITEC-552 Analysis and Design of Steel Structures Registration #0608-552

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

Class 5, Credit 4

ITEC-556, 557 Wastewater Treatment Plants Registration #0608-556, -557 Operation and Control I & II

A self-paced audio-visual course. Emphasis on the functional aspects of wastewater treatment plants' operation. Discussion of the significance of the results of laboratory analysis and their interpretation and application to the control of treatment processes. (ITEC-438 and consent of instructor)

Credit 1-4

ITEC-599 Independent Study Registration #0608-599

A supervised investigation within a civil technology area of student interest. Consent of the instructor is required.

Credit 1-8

Construction

ITEC-422 Elements of Building Construction Registration #0608-422

Elements and details of building construction; study of building codes from a design concept; foundations; wood, steel and concrete construction methods; floor and wall systems; and introduction to construction specifications and management.

Class 4, Credit 4

ITEC-444 Mechanical Equipment for Buildings Registration #0608-444

Presentation of mechanical and electrical equipment used in building construction; the pertinent codes will be studied; emphasis will be given to energy aspects of equipment design and selection.

Class 3, Credit 3

Class 4, Credit 4

ITEC-450 Construction Management Registration #0608-450

Construction company organization, time and resource scheduling for construction operations (CPM); role of the construction manager; project finance; cash flow; bonding and insurance. (ITEC-500, -508, -460)

ITEC-460 Construction Equipment Registration #0608-460

Fundamentals of equipment selection; determining equipment requirements based upon the design and capabilities of currently available construction equipment. Emphasis is given to equipment management, earthmoving and mechanical design. Class 3, Credit 3 ITEC-470 Ti Registration #0608-470

Timber Design and Construction

 $App\bar{l}ication$ of structural design methods to timber; concrete forms, temporary bracing, shoring, ground support, framing and scaffolding.

Class 3, Credit 3

ITEC-500 Registration #0608-500

Introduction to labor law, negotiations, arbitration, trade unions and jurisdictions; various aspects of labor management are studied, with and without organized labor. Several guest speakers representing government, private industry and organized labor also lecture.

Class 3, Credit 3

ITEC-508

Registration #0608-508 An introduction to the fundamentals of cost estimating and bidding construction projects; labor and material takeoffs, equipment costs, overhead and profit. (ITEC-422)

Class 3, Credit 3

Upper-Division Electrical Engineering Technology

ITEE-310 Registration #0609-310

An introduction to electricity for photo management majors. Topics covered are basic circuit analysis and the D.C. operation of diodes, transistors, vacuum and gas tubes. Some electronic circuit analysis is covered.

Class 3, Lab. 3, Credit 4

ITEE-311 Registration #0609-311

Continuation of ITEE-310. Analysis of A.C. circuits is covered. Power supplies and circuits used in the 5s printer are analyzed. Additional circuits relating to photography are covered. (ITEE-310)

Class 3, Lab. 3, Credit 4

ITEE-312 Registration #0609-312

Electronics II

Circuit Theory I

Circuit Theory II

Continuation of ITEE-311. Digital circuits and transistors are covered. Circuits used in the 2610 and 2620 printers are analyzed. Electro-optic devices are discussed. (ITEE-311)

Class 3, Lab. 3, Credit 4

ITEE-401

Registration #0609-401 An introductory course in the use of LaPlace transforms to determine the complete response of circuits containing independent and dependent sources, resistance, inductance, and capacitance. Application of basic circuit theorems to the solution

of transformed networks. (SMAT-420 concurrently) Class 3, Lab. 2, Credit 4

ITEE-402 Registration #0609-402

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Frequency response of network functions as solved by use of pole-zero diagrams and Bode diagrams. Mutual inductance. The Fourier series solution of circuits with non-sinusoidal inputs. (ITEE-401)

Class 3, Lab. 2, Credit 4

ITEE-404 Registration #0609-404

Control Systems I

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

Class 3, Lab. 2, Credit 4

Cost Estimates

Electricity

Electronics I

Labor Relations

ITEE-411 Registration #0609-411

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

ITEE-414

Electrical Principles for Design II

Registration #0609-412 A review of A.C. resonance in series and parallel circuits, threephase circuits, rotating machines and their application; transformers, semiconductor theory, bridges, power supplies, and phase shifting circuits. (ITEE-411) Class 3, Lab. 3, Credit 4

Basic Electrical Principles Registration #0609-414

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. (SMAT-421) Class 3, Lab. 3, Credit 4

ITEE-428

ITEE-424

Registration #0609-424 The analysis and simplification of logic equations using Boolean algebra with applications to semiconductor integrated circuits. Truth tables and Karnaugh map reduction techniques, multiple output circuits, multiplexers and demultiplexers, synchronous sequential circuits, state diagrams and counter circuits are also studied.

Class 3, Lab. 2, Credit 4

Linear Amplifier Design

Logic and Digital Devices

Registration #0609-428 Bipolar and I-ET transistor biasing are reviewed. Design and analysis of class A amplifiers using small signal h-parameters is presented. Low and high frequency, and mid-band, response of single- and multi-stage amplifiers is included. Also covered are multiple device circuits such as cascade, cascode, differential amplifiers and integrated circuit operational amplifiers. Class 3, Lab. 3, Credit 4

ITEE-499 Co-operative Education Registration #0609-499

One quarter of appropriate work experience in industry.

Credit 0

ITEE-520 Electrostatic and Magnetic Fields Registration #0609-520

Basic principles of electrostatic and magnetic fields including vector analysis, Coulomb's law, field intensity, Gauss's law, energy and potential gradient, conductors, dielectrics, capacitance, Biot-Savart law, Ampere's circuital law, Stokes' theorem, magnetic flux density, force on current element and magnetic boundary conditions. (SMAT-422)

Class 3, Lab. 2, Credit 4

Electromagnetic Fields and Antennas ITEE-521 Registration #0609-521*

The time varying fields, Maxwell's equations, characteristic impedance and radiation patters of the dipole antenna are explored. Design of antenna arrays for UHF-VHF and microwave application are also discussed; microwave antenna design. (ITEE-520)

Class 3, Lab. 2, Credit 4

ITEE-524

Microwave Systems

Registration #0609-524 Microwave power sources, waveguide transmission systems, measurement of standing waves, impedance, power flow in waveguides, solid state microwave devices, and microwave communication system design are discussed. (ITEE-520)

Class 3, Lab. 3, Credit 4

ITEE-526 Registration #0609-526*

Theoretical description of p-n junctions and semi-conductor phenomena; transistor and FET models are developed to obtain parameters; solid state device characteristics are derived. (ITEE-428)

Class 4, Credit 4

Application of Discrete and Integrated **ITEE-530** Registration #0609-530 **Circuit Elements** Selected topics in the application of discrete circuit components to linear and non-linear circuit design. Theory and application of integrated circuit op-amps in the design of active filters, analog computers, feedback control systems and function generators. Class 3, Lab 2, Credit 4

ITEE-532

Power Amplifier Design

Registration #0609-532 The design of Class A and B low-frequency power amplifiers is studied, including the use of feedback and heat sinking requirements. Principles of design for Class C RF amplifiers and Class D voltage regulators are also covered. (ITEE 428) Class 3, Lab 2, Credit 4

ITEE-534

Communication Systems I

Registration #0609-534 An introduction to AM, DSB, SSB and FM modulation systems and their spectrums. Circuitry for their generation and demodulation; frequency division multiplexing and the analysis of mixing circuits; the sampling theorem and its application to time division multiplexing. (ITEE-428) Class 3, Lab. 2, Credit 4

ITEE-535 Registration #0609-535

Communication Systems II

Pulse modulation systems including pulse amplitude modulation, pulse width modulation and pulse position modulation; pulse code modulation as applied to voice and to digital data trans-mission; introduction to noise and its effect on communication system performance; introductory information theory; analysis and design of communication systems. (ITEE-534) Class 4, Credit 4

ITEE-536 Registration #0609-536*

Control Systems II

Design of control systems for specific application and performance criteria; a study of control motors and components for D.C./A.C. control systems; application of control theory to the solution of practical system problems. (ITEE-404) Class 3, Lab. 2, Credit 4

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

Design of logic circuits using 7400 series TTL gates; a study of TTL flip-flops, one shots and oscillator circuits; design of arithmetic circuits, shift registers and counters. (ITEE-424, 540) Class 3, Lab. 2, Credit 4

ITEE-539 Registration #0609-539

Digital Computer Design II

A continuation of ITEE-538 with application of logic circuits to computer design. Multiplexers, semiconductor memories, ALUs their applications to computers and microprocessors are considered. The basic operation of computers, and computer systems are examined. Machine language programming, indexing and indirect addressing and interrupt programming are introduced. Peripheral devices and interfaces are discussed if time permits. (ITEE-538)

Class 3, Lab. 2, Credit 4

*Courses which are offered at least once every three years and/or upon sufficient demand.

Semiconductor Physics

ITEE-542 Registration #0609-542

Microprocessors

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

Class 2, Lab. 4, Credit 4

ITEE-543 Minicomputers, Controllers and Registration #0609-543* Peripherals A study of popular minicomputers and most common peripherals that they use. The course includes the PDP-8, PDP-11, and NOVA

minicomputers. Peripherals include TTYs, MODEMS, tape drives, disc drives, cassettes, card readers, line printers, and D/A and A/D converters. Methods of interfacing these peripherals to minicomputers and microprocessors are emphasized. (ITEE-539)

Class 2, Lab. 4, Credit 4

ITEE-546 Industrial Electronics Registration #0609-546

Design of SCR/Triac control circuits for D.C. and A.C. motors; control of lights and heating elements with D.C. power supplies and polyphase rectifier circuits; speed control of D.C. and A.C. motors; process control systems utilizing solid state electronic circuits. (ITEE-532) Class 3, Lab. 2, Credit 4

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

Analog signal processing including the use of microprocessors. Topics include transducers, AD/DA converters, microprocessor programming and I/O devices. Applications include bio-medical, automotive controls and communication signals. Class 4, Credit 4

ITEE-548 D.C. and A.C. Machine Design Registration #0609-548

The theory, principles of operation and application of A.C. and D.C. rotating machines; the characteristics of shunt, series and compound D.C. motors and generators are explored with torque-speed characteristics, power efficiency and applications of single phase and three phase motors. (ITEE-402) Class 3, Lab. 3, Credit 4

ITEE-550 Registration #0609-550

Power Systems I

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

Class 3, Lab. 3, Credit 4

ITEE-551 Protective Relaying Registration #0609-551

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

Class 3, Lab. 3, Credit 4

Power System Stability

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

Class 4, Credit 4

ITEE-522

ITEE-554 Registration #0609-554*

Electronic Optic Devices

Basic photometry is discussed. Light emitting and light receiving devices are covered with circuits and applications. Optics is introduced with laser theory and fiber-optics. Class 3, Lab. 2, Credit 4

ITEE-556 Registration #0609-556

Transmission Lines and Filters

General transmission line equation and approximations; lossless transmission line and analysis using the Smith chart; matching stub design for transmission lines; Butterworth filter design principles and applications. (ITEE-402)

Class 3, Lab. 2, Credit 4

ITEE-580 Registration #0609-580*

ITEM-301

Senior Project

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

Class/Lab. as required. Credit 4

Upper-Division Mechanical Engineering Technology

Engineering Graphics

Registration #0610-301 A basic course in engineering drawing. Topics include lettering, line quality, use of instruments, free-hand sketching, orthographic projections, pictorials, sections, auxiliary views and dimensioning.

Recitation 6, Credit 2 or 3

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

The basic concepts of strength of materials as applied to mechanical design are reviewed in depth. The course includes the study of the concepts of stress and strain, the stress-strain relationship and combined stress. Applications of these concepts to beams, shafts, and columns are covered. (ITEM-408 or equivalent)

Class 3, Credit 3

ITEM-405 Registration #0610-405

Applied Dynamics

Examines the principles of kinematics and the basic laws of motion as applied to the design and analysis of mechanical compo-nents and systems. (ITEM-404, SMAT-421 or concurrent) Class 3, Recitation 2, Credit 4

ITEM-406 Registration #0610-406

Dynamics of Machinery

Engineering Materials

A study of the kinematics of machine elements such as gears, cams and linkages with emphasis on graphical methods. (ITEM-405)

Class 3, Recitation 2, Credit 4

ITEM-407 Mechanical Engineering Technology Laboratory Registration #0610-407

A course in mechanical laboratory techniques and the preparation of laboratory reports; experimental work in materials testing, strength of materials, experimental stress analysis, metallurgy, and metalography; instruction in the preparation of laboratory reports. (It is intended that students enroll concurrently in ITEM-404 and ITEM-414.)

Class 2, Lab. 4, Credit 4

ITEM-408

Introduction to Strength of Materials Registration #0610-408

Elements of statics and strength of materials. Topics include plane equilibrium, friction, stress, strain, torsion, and the bending of beams.

Class 3, Recitation 2, Credit 4

ITEM-411 Registration #0610-411

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

*Courses which are offered at least once every three years and/or upon sufficient demand

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, diffusion in metals, recovery, recrystallization and grain growth, age hardening and heat treatment of metals, corrosion and corrosion controls. The effect of process in terms of property changes of material will be discussed. Plastics, glasses, ceramic materials and their characteristics, processes and manufacturing will also be studied. Prerequisite for ITEM-415 is ITEM-414.

I. Class 3, Credit 3 II. Class 3, Lab. 2, Credit 4

ITEM-425

ITEM-426

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

Quality Assurance

Registration #0610-426 A study of those factors involved in quality planning, the practicality of tolerances and specifications; planning, organizing and installing quality controls; training and supervision of quality control personnel; effective administration of the quality assurance function.

Class 4, Credit 4

ITEM-431

Production Management

Registration #0610-431 A study of modern industrial organization and how it is managed. Techniques of decision-making process will be studied in problem areas related to manufacturing.

ITEM-436

Class 4, Credit 4

Engineering Economics

Cost and Value Analysis

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 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-205)

Class 3, Credit 3

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 are studied. Thermodynamic processes, cycles and the basic concepts of heat transfer are included.

Class 4, Credit 4

ITEM-442 Heat Transfer Registration #0610-442 A first couse in heat transfer. The theory and application of the

A first couse in heat transfer. The theory and application of the fundamentals of heat conduction, convection, and radiation. The design and applications of heat transfer apparatus.

Class 3, Lab. 2, Credit 4

ITEM-445 Registration #0610-445

Thermofluid Apparatus

A study of the application, specification, and operation of steam generators, prime movers, heat exchangers, compressors and pumps. Also, performance evaluation of such apparatus and thermal systems; strategies of energy conservation.

Lecture 3, Lab. 2, Credit 4

ITEM-451

ITEM-461

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 vibration and noise analysis will be demonstrated. (SMAT-422) Class 4. Credit 4

Mechanics of Fluids

Registration #0610-461 A study of the fundamentals of fluid statics and dynamics. Applications of the principles of pumps, turbines, flow measurement, pipe flow, and fluid power. (ITEM-441, time permitting) Class 3, Credit 3

ITEM-465

Thermofluid Laboratory

Registration #0610-465 Laboratory experiments in thermodynamics, fluid mechanics and heat transfer, including computer-aided data reduction. (ITEM-441, 461)

Class 1, Lab 2, Credit 2

ITEM-470 Numerical Control Applications I

Registration #0610-470 The philosophy and use of numerical control in manufacturing. The course will review manual programming, examine different format applications of numerical control, and introduce computer assisted programming techniques available. Numerical control machine tools will be demonstrated.

Class 4, Credit 4

ITEM-472

ITEM-471 Numerical Control Applications II Registration #0610-471

An advanced course in applications of numerical control. Emphasis will be placed on computer-assisted part programming for contouring in two and three axes. (470) Application of advanced technologies such as CNC and DNC.

Class 3, Lab. 2, Credit 4

Tool Engineering

Registration #0610-472 Machining and machine tools will be reviewed: the selection of tools for production; the specification of tools, jigs, and fixtures; production gauges; selection of tooling for automatic machines; determination of assembly tooling. Emphasis is placed on economic justification for tooling.

Class 3, Recitation 2, Credit 4

ITEM-475 Computer-Aided Design & Manufacturing Registration #0610-475

A study of the hierarchical structure of computers applied to manage, monitor and control manufacturing facilities. Four major manufacturing areas are examined: production management; engineering analysis and design; finance and marketing; and production planning, routing and scheduling. Class 3, Lab. 2, Credit 4

ITEM-480 Registration #0610-480

Methods Analysis

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

Class 3, Recitation 2, Credit 4

ITEM-490 Registration #0610-490

Production Planning

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 the system of control material. Class 4, Credit 4

ITEM-492 Registration #0610-492

Plant Layout

The study of the arrangement and functional layout of processes and equipment to maximize production efficiency. Also covered are the principles of material handling.

Class 3, Recitation 2, Credit 4

ITEM-499 Mechanical T echnology Co-op Registration #0610-499

Class 0, Credit 0

ITEM-500,501 Systems Design Project I, II Registration #0610-500, -501

An individual student project in systems design. The student integrates his program, co-op experiences, and independent studies in the solution of a system design project and presents his findings in written and oral presentations. Class 2, Lab. 4, Credit 4

ITEM-506

Registration #0610-506

Machine Design

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

ITEM-508 Special Topics in Machine Design Registration #0610-508 The study of selected topics such as clutches, brakes, couplings,

belts, chains, lubrication and computer-aided design. Class 3. Lab. 2. Credit 4

ITEM-510, 511 Process Design I, II Registration #0610-510, -511

The student is placed in a realistic manufacturing situation in which he selects, creates, or is assigned a product to manufacture. Use of his total program in the solution of the problem and its presentation. Oral and written report presentations.

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 Registration #0610-521

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

Class 3, Lab 2, Credit 4

HVAC Control Systems

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

Class 4, Credit 4

ITEM-530

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

Class 4, Credit 4

ITEM-535

Analog Control Systems

Instrumentation

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. Actual system performance and system tuning procedures will be demonstrated.

Class 4, Credit 4

ITEM-540

Thermal Technology

Independent Study

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

Class 3, Lab. 2, Credit 4

ITEM-541 Registration #0610-541

Alternative Energy Applications

The major emphasis of this course is in the area of solar energy. System design of solar hot water and space heating systems, solar-assisted heat pumps. Other alternative sources of energy are also discussed; wind energy, and solid waste.

Class 4, Credit 4

ITEM-550 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 Registration #0610-599

A supervised investigation within a mechanical technology area of student interest. Student must submit written proposal and have it approved prior to registering.

Credit variable (1-4)

*Courses which are offered at least once every three years and/or upon sufficient demand.

Logic Control Systems

Packaging Science

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

IPKG-201 Principles of Packaging Registration #0607-201

An overview of packaging: the historical development of packaging, the functions of packaging, and the materials, processes, and technology employed to protect goods during handling, shipment and storage. A brief review of container types, package design and development, and research and testing will be pre-sented, along with information about economic importance, social implications, and packaging as a profession. Class 4, Credit 4

IPKG-310

Methods of Evaluation

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

Lab 4, Credit 2

IPKG-311

Packaging Materials I

Registration #0607-311 The manufacture, physical and chemical properties, and uses of commonly used packaging materials, components, and primary packages for consumer and institutional use, will be presented. Emphasis is on metals and plastics used in packaging, and adhesives, propellants, and other component materials. (IPKG-201) Class 3, Credit 3

IPKG-312

Packaging Materials II

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

Class 3. Credit 3

IPKG-315 Registration #0607-315

Container Systems

A study of packages which are in direct contact with the product. Structural design and physical and chemical compatibility of product and container will be analyzed and discussed for basic container types. Students will gain practice in the structural design and construction of prototype packages. (IPKG-311, 312)

Class 2, Lab 4, Credit 4

IPKG-401 The Packaging Industry

Registration #0607-401 An analysis of positioning of the packaging function in the contemporary American corporation. The role of the packaging pro-fessional in the corporate enterprise, and the interrelationship of packaging and other business functions will be considered in de-tail. (Packaging Science juniors only)

Class 2, Credit 2

IPKG-431

Packaging Production Systems

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

Class 2, Lab. 4, Credit 4

IPKG-432 Registration #0607-432

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

Class 2, Lab. 4, Credit 4

IPKG-433

IPKG-520

IPKG-524

Packaging for Marketing

Packaging for Distribution

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

Class 2, Lab. 4, Credit 4

Packaging Management

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

Class 3, Recitation 1, Credit 4

Packaging Economics Registration #0607-524

A study of the costs involved in the development, manufacture, and distribution of packages, in order to develop a working know-ledge of packaging costs. Cost elements associated with devel-opment, tooling, materials, machinery, processing, and distribution will be discussed. The usefulness and validity of various value theories will be considered. (This course is intended for seniors) Class 3, Credit 3

Packaging and the Environment IPKG-530 Registration #0607-530

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

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

IPKG-585 Principles of Shock and Vibration Registration #0607-585

A study of the factors involved in analyzing potential damage to packaged items resulting from impact or vibration forces. Students will be expected to master basic mathematical and physical concepts in addition to the use of various pieces of testing equipment.

Credit variable 3-4

IPKG-590

Senior Thesis

Registration #0607-590 An in-depth study of some phase of packaging which will enable the student to make use of the knowledge and skills acquired during the course of the program. Arranged, Credit 4

IPKG-598, 599 Independent Study Registration #0607-598, -599

Independent study, in consultation with the instructor, on any packaging-related topic. Arranged, Credit variable 1-4

Community /Junior **College Relations**

All courses taught through CCJCR are offered on demand with sufficient enrollment.

Note: Graduate courses applicable to the MS in business technology are listed under the College of Business.

IJCG-701 The Two-Year Colleges Registration #0604-701

The study of the philosophies, organizations, developments, fi-nance, goals, curricula, and spirit of the two-year college. Credit variable (I-3 credits)

IJCG-702

Teaching, Learning, Content, & Environment Registration #0604-702 Advising/counseling relationships, learning styles, student activ-ities, motivations, developmental education, and the implications of the "open door" policy are investigated.

Credit variable (1-3 credits) IJCG-703

Management of Learning

Instructional Techniques

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 (1-6 credits)

IJCG-704

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 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 educational planning, leading to a better understanding of the total learning by the two-year college students.

Credit 2

IJCG-840

Internship

Registration #0604-840 An individual arrangement with an appropriate community or junior college will be made for those persons not having sufficient experience. This will provide definite teaching assignments and responsibilities, together with participation in other faculty func-tions, including advising, committee work, planning, and student evaluation on a full semester or term basis at a two year college. Supervision, assistance, and evaluation will be provided by a mentor in the participating college and by the CCJCR. Credit variable (3-6 credits)

IJCG-850 Registration #0604-850

Special Projects

This course provides for independent study, investigation, or research activity in subject matter areas not formalized by the Center's program, but having specialized value. Proposals require approval by the director. Credit variable (1-6)

Career Information

The Nature of Work

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

Credit 3

IJCC-741

IJCC-742 Registration #0615-742

Career Decision Making Concepts

Based upon prior knowledge of basic sociological and psychological constructs, this course concentrates on the processes and influences involved in choices regarding careers. The relative and collective impacts of peers, teachers, friends and relatives, immediate family, and professional advisors are analyzed. Additional course goals include applications of processes such as socialization, acculturation, assimilation; status and role playing; and perception to related activities such as career education-orientation-advising. Current psychological research relating personal-ity/self concepts/motivation to career decision making will be studied. A special topic involves the problems of communicating information on emerging careers to individuals to effect real and valid perceptions. Two credits relate to the ability to apply career development processes. Three credits relate to an understanding of constructs, theory, and research.

Credit variable (2-5)

IJCC-743 Education/Business/Industry Registration #0615-743 Interrelationships A study of the interrelationship of the world of formal education to the business, industrial, and labor communities. Constraints, problems, and values of cooperative effort will be studied in relation to organizations of varying size. Elementary, secondary and post-secondary education and differing size business organiza-tions and industrial groups that involve differing levels of technical specialization are studied.

Credit 2 LICC-745

Registration #0615-745 Credit 3

LICC-746 Registration #0615-746 Credit 3

IJCC-747 Registration #0615-747 Credit 3

Career Concepts: Services

Career Concepts: Production

Career Concepts: Commerce

These three courses form a single set and are separated only to facilitate registration and scheduling flexibility.

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

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

IJCC-748 Information Retrieval Systems in Career Planning Registration #0615-748

The primary goal is the ability to use several data based computer systems for the storage and retrieval of career information. This includes a sufficient understanding of the computer systems, languages and dictionaries for efficient utilization.

Additional goals are an awareness of other systems based upon media and print materials, and the ability to evaluate various systems.

Credit 3

30

Seminar

Manpower Forecasting Fundamentals IJCC-749 Registration #0615-749

Two different purposes that depend on a common base are goals for this course. The common base is an understanding of the techniques, theories and limitations of manpower forecasting as it applies to numbers in current occupations and to the probabilities of emerging careers.

The two purposes are: (1) the ability to provide, as a generalist having a broad knowledge of different careers, assistance to discipline specialists in feasibility studies for new educational programs, and (2) to assist people in making decisions in those careers for which insufficient information exists. The ability to assist people in making decisions about the pursuit of a career that is projected to be available several years later will be studied in order to develop a uniform and responsible judgement in those areas where probability statements are extremely important. (Satisfaction of all foundation studies)

Credit 4

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

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

Credit 3

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

This course concentrates on the abilities needed to plan, conduct, and evaluate various group counseling and peer assistance processes as used in assisting individuals to formulate career plans. Each participant will understand the appropriate functions, advantages and disadvantages of different group dynamic procedures; and will demonstrate the required "attending", listening, guidance, problem solving, and decision making skills needed to plan and moderate such sessions. Credit 3

Occupational Environments

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

Credit variable (1-6)

IJCC-755 Career Internship-Registration #0615-755 Project/Experience This is a variable credit (1 to 5) course that is required of all students unless they have had sufficient approvable experience as a Career Information Specialist. It would be an opportunity to practice one or more of the defined functions of a Career Information Specialist under RIT supervision. Credit variable (1-5 credits)

IJCC-756

Career Internship— Registration #0615-756 Business/Industry This is a variable (1 to 5) credit course, and is an elective that is available only when satisfactory arrangements can be made to function as a specialist in business/industry. It is possible this would only be available for full-time students. Credit variable (1-5 credits)

IJCC-757 Career Internship-Registration #0615-757 Services/Education This is identical to the 756 internship except that it applies to practice in educational and service occupation fields Credit variable (1 -5 credits)

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

Students are introduced to selected counseling skills including attending, listening, questioning, paraphrasing and reflection of feelings through demonstration and role playing. The application of these skills to a select population (women, handicapped, minorities, etc.) is demonstrated through an independent project. Credit 3

LICC-762 Career Education SeminarH/Vomen Registration #0615-762

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

Credit 3

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

An elective course for students in Career Information concentrating on the ability to provide effective counseling for handicapped persons who wish to plan and succeed in desired careers. Credit 3

Reserve Officers' Training Corps

All courses are offered annually

First Year

MMSM-201 The Military and American Society I Registration #0701 -201 Introduction to the organization of the United States Army and the ROTC program; warfare; its nature, origin, conduct and future; voluntary leadership laboratory.

Class 1, Credit 1

MMSM-202 The National Security Structure Registration #0701 -202

U.S. Army and National Security Organization of the federal government with emphasis on the Congress, Executive Office of the President, and the Department of Defense. Public opinion and national security; an introduction to small unit organization and military rank; voluntary leadership laboratory.

Class 1, Credit 1

MMSM-203 The Military and American Society II Registration #0701 -203

The impact of the military upon American political, economic and social institutions; significance of military customs, courtesies and traditions; introduction to U.S. Army weapons; voluntary leadership laboratory.

Class 1, Credit 1

Second Year

MMSM-301 Introduction to Basic Operations and Tactics Registration #0701-301

Provides a knowledge of small unit leadership with emphasis on map reading and land navigation; leadership laboratory.

Class 2, Credit 2

MMSM-304*

Basic Operations and Tactics Registration #0701 -304

Fundamentals and techniques of squad level tactics with emphasis on leadership, command and control, and tactical employment; leadership laboratory.

Class 2, Credit 2

MMSM-305* **Junior Officer Development** Registration #0701 -305

The functions, duties and responsibilities of a junior officer with an introduction to career planning; leadership laboratory to include field training exercise and military installation orientation visit. Class 2, Credit 2

Third Year

Fundamentals of Instruction

Registration #0701-401 Examination of principles and techniques that are utilized in the preparation and presentation of a complete period of instruction; leadership laboratory.

Class 3, Credit 3

MMSM-401

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 sequen-tial timing and economy of forces and resources; leadership labor-atory to include field training exercise and military installation orientation visit. Class 3, Credit 3

during which begin with his/her class.

MMSM-403

Leadership and Management

Registration #0701-403 Provides future officers with the basic principles of leadership and management of human resources; motivation, morale, communication, individual and group behavior are discussed; leadership laboratory.

Class 3, Credit 3

Fourth Year

MMSM-503 World Change and Military Implications Registration #0701-503

A study of the Army's contribution to the total military structure; an introduction to military implications in the international system; readings in military history; leadership laboratory to include field training exercise and military installation orientation trip.

Class 3, Credit 3

MMSM-504 Administration and Staff Operations Registration #0701 -504

Staff organization, functions and responsibilities at battalion level and company administration; readings in military history, leadership laboratory.

Class 3, Credit 3

MMSM-505 Advanced Leadership and Management Registration #0701 -505 Further studies in leadership and management with emphasis on

contemporary human problems and military justice; readings in military history; leadership laboratory.

Class 3, Credit 3

