ULLETIN SUPPLEMENT

COURSE DESCRIPTIONS

FALL - 1972

This Booklet Suppersedes the Listing
Shown in the March 1972 Bulletin

REVISED ENVIRONMENTAL STUDIES PROGRAM

This insert page will replace the appropriate material in the 1972-73 FTU Bulletin, pages 49 - 50.†

ACADEMIC PROGRAMS

Each college requires work in the Environmental Studies Program in addition to its respective curricula. The corrections on this revised sheet supersede hours and course requirements in Environmental Studies as shown elsewhere in the bulletin.

ENVIRONMENTAL STUDIES PROGRAM

The Environmental Studies Program presents to each student an opportunity to gain an insight into an organized body of knowledge designed to enhance the student's ability to make intelligent decisions in his world. This program provides the student with an acquaintance of many of the major fields of academic inquiry. It permits the student to make a more meaningful choice of a major and provides insights into areas from which he may select courses for elective credit.

ENVIRONMENTAL STUDIES (69)

BASIC PROGRAM (54)

Communications 10

Composition
- ENG 101 Composition I (4)

Speech
- SPE 101 Fundamentals of Oral Communication (3)

Literature
- Current Literature or any other English writing course or Speech course

Cultural and Historical Foundations* 11 - 12
(Select one course from each group)

A
- HUM 201 Western Humanities Survey (4)

B
- PHIL Philosophy (4)
- Any Literature (4)
- REL Religion (4)
- HUM Humanities (4)
- ART Art (3)
- MUS Music
- THA Theatre (4)

C
- HIS History (4)

Mathematical Sciences 7 - 8
(Select any two)
- MATH Mathematics (4)
- STAT Statistics (4)
- COMP Computer Science
- PHI 205 Formal Logic I (4)

Social Sciences* 12 - 13
(Select from both A & B)

A
- ECON 201, 202 or 203 Economics (3, 3)
- PCL 201 or 203 Political Science (4)
- Social Geography

B
- PSY 201, 202 Psychology (3, 3)
- SOC 201, 202 Sociology (3, 3)
- SOC 310, 311 Anthropology (3, 3)
- COM 100 Basic Communications (3)

Scientific Environment 12 - 13
(Select from at least two groups)

A Biological Science (4 - 8)
- BIOL 100, 103, 105
- BOT 100
- MICR 200
- ZOOL 100

B Earth Sciences (4 - 8)
- GEOL 100, 201, 202
- Physical Geography

C Physical Sciences (4 - 8)
- Any Physics courses
- Any Chemistry courses
- ENGR 100, 151, 152

ADVANCED PROGRAM (15)

Business (3) 3
- BADM 301, 302, 371
- ECON 307

Engineering (3) 3
- ENGR 481 to 489

Education (3) 3
- EDEL 482 (3)
- EDTA 480 (3)
- EDTA 481 (3)

Electives (Upper Division) (6) 6
These courses must be selected from a college other than the one in which the student is registered. A General Studies student may select electives from any college.

† This revised program is subject to the regulations concerning course requirements for graduation appearing at the bottom of page 38 in the Bulletin.

* One year of a foreign language may be substituted for any 4 hours of Cultural and Historical Foundations and 4 hours of Social Sciences.

COURSE DESCRIPTIONS

CLASSIFICATION OF COURSES

The University course numbering system is as follows:

100-299 are freshman and sophomore level courses and are designed primarily for these students.

300-499 are junior and senior level courses and are designed primarily for these and other advanced students. When approved for inclusion in an individual program of graduate study by a supervisory committee approved by the Dean of Graduate Studies, selected 300-499 courses may serve the needs of individual graduate students.

500-599 are *beginning graduate and advanced undergraduate* level courses – open to graduate students and those seniors who receive approval of the appropriate Dean(s).

600-699 are *beginning graduate and professional level* courses open only to graduate students.

SPECIAL COURSES

In addition to the regular courses listed in this bulletin, the following special courses may be available. Consult your academic advisor for details.

	Undergraduates	[1]Spec. Grad	Begin. Grad. & Prof.
Special Topics	491	591	691
Seminar	492	592	692
Special Readings	493	593	693
Independent Study	494	594	694
Research Methods	495		695
Research Planning	496		696
Research	497		697
Research Report	498		698
Thesis	499		699

These courses may be assigned variable credit. Some may be repeated upon approval.

1 The Special Graduate Courses are primarily for graduate students, but may be taken by advanced seniors with the consent of their deans.

PR: PREREQUISITE

A requirement which must be satisfied prior to the listed course.

CR: COREQUISITE

A requirement which must be satisfied concurrently with the listed course.

C.I.: CONSENT OF INSTRUCTOR

AVAILABILITY OF COURSES

The University does not offer each year all of the courses listed in the catalog. The Class Schedule should be consulted for those courses offered each quarter.

COLLEGE OF BUSINESS ADMINISTRATION

ACCOUNTANCY

ACCY 111 Qtr. Hrs. - 4
Basic Concepts: Accounting as a device for measurement and control of business activity. An introduction to the basic concepts and principles; the analysis and recording of transactions; preparation of financial statements; accounting systems and procedures.

ACCY 112 Qtr. Hrs. - 4
Basic Concepts: PR: ACCY 111. A continuation of ACCY 111. Accounting for partnerships and corporations; managerial techniques such as cost control and budgeting.

ACCY 307 Qtr. Hrs. - 5
Accounting Concepts: PR: Junior standing. An accelerated course in accounting concepts for the student desiring an understanding of accounting theory and practice. Credit may not be earned in both ACCY 307 and the ACCY 111, 112 sequence.

ACCY 308 Qtr. Hrs. - 5
Accounting for Engineers: PR: Junior standing. Industrial accounting, estimated costs, budget procedures and records useful to the engineer. Use of accounting, and cost control as tools. Enrollment restricted to engineering students.

ACCY 311 Qtr. Hrs. - 4
Intermediate Accounting: PR: ACCY 112. Accounting theory and practice in relation to professional preparation, analysis and interpretation of financial statements and other accounting and financial data. An in-depth study of assets, liabilities, and stockholders' equity. Income determination; tax implications; funds flow; mathematical principles and application; professional pronouncements.

ACCY 312 Qtr. Hrs. - 5
Intermediate Accounting: PR: ACCY 311. A continuation of ACCY 311.

ACCY 321 Qtr. Hrs. - 3
Cost Accounting: PR: ACCY 112 or 307. The elements of cost recording. The basic cost concept. The importance of cost determination and recording.

ACCY 322 Qtr. Hrs. - 3
Cost Accounting: PR: ACCY 321. The development of cost accounting. Its purposes and its shortcomings. Coordination of cost accounting with general accounting records. Methods of cost analysis and cost application.

ACCY 341 Qtr. Hrs. - 3
Governmental Accounting: PR: ACCY 112 or ACCY 307. Budget, accounting and reporting problems of state and national governments. Design and installation of appropriate accounting systems. Improvement of methods and procedures for public bodies.

ACCY 411 Qtr. Hrs. - 3
Advanced Accounting: PR: ACCY 312. Complex cases in partnership formation, operation, expansion, and liquidation. Installation sales; consignments; home and branch relationships; mathematics of compound interest.

ACCY 412 Qtr. Hrs. - 3
Advanced Accounting: PR: ACCY 312 or C.I. Business combinations; acquisition of subsidiaries; investment carried at equity and cost methods. Advanced problems of consolidated statement preparation. Foreign branches.

ACCY 413 Qtr. Hrs. - 3
Advanced Accounting: PR: ACCY 312 or C.I. Cases of enterprises in distress; estates and trusts. Also a study of the general and special funds related to municipal accounting and non-profit organizations.

ACCY 433 Qtr. Hrs. - 3
Auditing: PR: ACCY 312. The audit concept. Understanding evidence as applied to the audit. Fundamental techniques, practices and procedures.

ACCY 434 Qtr. Hrs. - 3
Auditing II: PR: ACCY 433. A continuation of ACCY 331. A further examination of current auditing practices and procedures, including statistical sampling. Preparation of audit reports.

ACCY 451 Qtr. Hrs. - 3
Federal Income Tax Accounting: PR: ACCY 312. History, theory and basic concept of federal income taxation principles.

ACCY 452 Qtr. Hrs. - 3
Federal Income Tax Accounting: PR: ACCY 451. Corporation tax returns. Study of accounting methods acceptable for tax purposes. Study of federal income tax procedures and appeals methods.

ACCY 461 Qtr. Hrs. - 3
Computer Applications to Accounting Problems: PR: COMP 103 and ACCY 312. The purpose of the computer in financial management. Its use as part of the accounting process. Place of the computer in present day accounting, budgeting and auditing matters.

ACCY 501 Qtr. Hrs. - 4
Financial Accounting Concepts: PR: Acceptance into the MBA Program. The conceptual background for financial statements for external pruposes including problems of the accounting period, the accrual concept and changing price, etc.

ACCY 601 Qtr. Hrs. - 3
Accounting Analysis: PR: Graduate standing and ACCY 501 or one year of accounting. (Not open for accounting majors.) Accounting as an information and measurement system for internal planning and control; concepts and analytical techniques for accumulating costs of products and services.

BUSINESS ADMINISTRATION

BADM 101 Qtr. Hrs. - 4
Business: Survey of managerial divisions of finance, production, personnel, and marketing in business. Business terminology and overall structure of business in its environment. Historical and economic prospectives are considered. This course open only to students at freshman or sophomore level.

BADM 301 Qtr. Hrs. - 3
Business Concepts: PR: Junior standing. The role of business and the environment in which it operates are considered. The responses business makes to freedom, ownership, the market economy and government are discussed. This course satisfies the Advanced Environmental Studies requirement for business. Cannot be use for credit for BSBA degree.

BADM 302 Qtr. Hrs. - 3
Personal Investments: PR: Junior standing. Management of personal finance; life insurance and home ownership as investments; owning a business as an investment; income protection; investable funds; vehicles for investment; financial institutions; aids to investment; investment companies. Cannot be used for credit for BSBA degree. This course satisfies the Advanced Environmental Studies requirement for business.

BADM 311, 312 Qtr. Hrs. - 3, 3
Mathematical Applications to Business: PR: MATH 115 or 321. A study of a wide range of quantitative decision procedures as applied to problems in business administration.

BADM 371 Qtr. Hrs. - 3
Business Law: PR: Junior standing. The presentation of law as an expanding social and political institution in the environment of the business enterprise. Consideration given to the development and sources of law, the judicial system, torts, crimes, and contracts.

BADM 372 Qtr. Hrs. - 3
Business Law: PR: BADM 371. Recognized commercial organizations including agencies, partnerships, corporations. An examination of each and their functions in the business world.

BADM 373 Qtr. Hrs. - 3
Business Law: PR: BADM 371; BADM 372 desirable. A study of the legal concepts underlying the transfer and sale of goods and commercial paper, including an examination of the law of sales, commercial paper and secured transactions and their interaction with the commercial environment.

BADM 444 Qtr. Hrs. - 3
International Business Operation: PR: Senior standing or C.I. An integration of economics and the functional areas of business focused upon the problems of managing international business operations. Ecomomic. legal, functional and administrative problems are studied through cases and literature emphasizing financial and marketing problems.

BADM 474 Qtr. Hrs. - 3
Business Law, Interests in Property and Liability: PR: BADM 371 or C.I. Includes bailments, real and personal property, and security interests therein, insurance, suretyship and guaranty.

BADM 484 Qtr. Hrs. - 3
Operations Research: PR: ECON 321. Methods and models of operations research applied to specific business problems. Develops use of mathematical techniques and demonstrates its use in modern decision theory.

BADM 485 Qtr. Hrs. - 4
Business Policies: PR: Senior standing and completion of all other business core course requirements, or C.I. A study of problems confronting businessmen. The student will be expected to utilize the subject matter contained in the business core courses and his major in the analysis of business problems.

BADM 490 Qtr. Hrs. - 2
Senior Seminar: Business in Human Affairs: Business issues and problems as they relate to human affairs. This course primarily intended for the senior student, is offered as one of the Advanced Environmental Studies seminars. Not open to the student majoring in the College of Business Administration.

BADM 501 Qtr. Hrs. - 3
Business Environment and Business Law: PR: Acceptance into the M.B.A. Program. An analysis of the legal and socio-economic environment surrounding business practices as affected by significant State and Federal legislation and regulation.

BADM 601 Qtr. Hrs. - 3
Operations Research Models for Business: PR: Graduate Standing and ECON 521. Quantitative techniques useful for the solution of business

problems. Mathematical model building to aid the decision-making process is stressed.

BADM 611 Qtr. Hrs. - 3
Systems Analysis for Business Problem Solving: PR: Graduate Standing and MGMT 501 or equivalent. A conceptual framework of the systems approach for analysing business problems, related developments in systems theory and applications to business.

BADM 621 Qtr. Hrs. - 3
Business Policy and Responsibility: PR: Graduate Standing. Functions and responsibilities of management, motivation of the businessman and factors governing business decisions.

BADM 637 Qtr. Hrs. - 3
Simulation of Dynamic Systems: PR; Graduate Standing. A survey of techniques for conducting simulation experiments on digital computers. These experiments involve mathematical and logical models of a business or economics system.

ECONOMICS

ECON 201 Qtr. Hrs. - 3
Economics and Man: An introductory course specifically designed to provide both the business and nonbusiness student with a terminal course in the fundamentals of economics, including economic methodology, microeconomics, and macroeconomics.

ECON 202 Qtr. Hrs. - 3
Principles of Microeconomics: PR: ECON 201. The determination of prices in a market economy; their role in allocating consumer and producer goods and in distributing incomes. Efficiency of markets and evaluation of public policies designed to improve efficiency.

ECON 203 Qtr. Hrs. - 3
Introduction to Aggregate Economics: PR: ECON 201. A course providing further study in the area of national income accounting, income and employment theory, business fluctuations, and U.S. economic policy.

ECON 301 Qtr. Hrs. - 4
Intermediate Price Theory: PR: ECON 202, 203. Theoretical analysis of the determination of product and factor prices under different market structures.

ECON 307 Qtr. Hrs. - 3
Economic History of the United States: PR: Junior standing or C.I. An analysis of the historical growth and development of the American economy.

ECON 311 Qtr. Hrs. - 4
Intermediate Money, Income and Employment Theory: PR: ECON 202, 203. Theoretical analysis of the determination of national income and employment, including an examination of the monetary system.

ECON 321 Qtr. Hrs. - 4
Business and Economic Statistics: PR: ECON 202, ECON 203, MATH 115, STAT 301. The use of statistical methods as scientific tools in the analysis of economic and business problems. Emphasis is placed upon the collection, analysis, and interpretation of quantitative economic and business data (same as STAT 321).

ECON 328 Qtr. Hrs. - 4
Transportation Economics: PR: ECON 202 or 203. Study of general economic characteristics and governmental regulation of public carriers. Consideration of competitive relations between modes of transportation. Criteria for public investment in highway, airport, and other transportation facilities.

ECON 331 Qtr. Hrs. - 3
Economics of Labor: PR: ECON 202, 203. A survey of the growth, structure, objectives, and collective bargaining practices of organized labor groups.

ECON 332 Qtr. Hrs. - 3
Manpower and Human Resources: PR: ECON 202, 203. Examines labor as a human resource or human capital. Special emphasis placed upon the changing role of manpower and manpower policies.

ECON 341 Qtr. Hrs. - 3
International Economics: PR: 202, 203. Fundamental principles of international trade and foreign exchange, including the balance of payments and problems of foreign economic policy.

ECON 361 Qtr. Hrs. - 3
Agriculture in the American Economy: PR: ECON 202, 203. Agriculture in a developed economy. The nature of agricultural markets, their structure and national farm policy issues.

ECON 371 Qtr. Hrs. - 3
Mathematical Economics: PR: ECON 203 and MATH 223. An introduction to the mathematical tools of modern economic analysis.

ECON 381 Qtr. Hrs. - 3
Economics of Public Utilities: PR: ACCY 111, 112 or ACCY 307 and ECON 202, 203 or C.I. The nature of public utilities, the economics of rate determination, and regulatory policy.

ECON 401 Qtr. Hrs. - 3
Managerial Economics: PR: ECON 202, 203. The uses of economic analysis in economic decision-making and business policy formulation.

ECON 411 Qtr. Hrs. - 3
Comparative Economic Systems: PR: ECON 202, 203. An analysis of the fundamental institutions of the American economic system and a comparison of the American economic system with other economic systems.

ECON 421 Qtr. Hrs. - 3
Economic Statistical Analysis: PR: ECON 321. Concepts and methods of developing, analyzing, and interpreting measures of economic activity, and business and economic change.

ECON 431 Qtr. Hrs. - 3
Public Finance in the American Economy: PR: ECON 202, 203. Analysis of fiscal institutions and decision-making in the public sector of the American economy; budget planning and execution, taxation, debt, and theory of taxes.

ECON 432 Qtr. Hrs. - 3
Fiscal Economics: PR: ECON 431. The economics of government spending and taxation; analysis of the fiscal role and instruments of government and their affects on the economy. Fiscal policy, intergovernmental fiscal relationships, inflation, debt.

ECON 435 Qtr. Hrs. - 3
Monetary Theory and Policy: PR: FIN 331. A study of the factors that influence the supply of and demand for money and credit, and the effect of changes in these factors on the allocation of resources, levels of national income, employment, and prices.

ECON 441 Qtr. Hrs. - 3
Economic Development: PR: ECON 202, 203. The processes and problems of economic development.

ECON 451 Qtr. Hrs. - 3
Econometrics: PR: ECON 371 and ECON 421. Application of modern statistical methods to economic theory and problems.

ECON 461 Qtr. Hrs. - 3
Business and Government: PR: ECON 202, 203. A survey of the most significant public policies affecting business firms.

ECON 471 Qtr. Hrs. - 3
History of Economic Thought: PR: ECON 202, 203. A study of the leading ideas of the major contributors to the development of economic thought.

ECON 481 Qtr. Hrs. - 3
Economics of Urban Areas: PR: ECON 202, 203. An analysis of the economic problems arising from and associated with the growth of cities and suburban areas within metropolitan districts.

ECON 501 Qtr. Hrs. - 4
Economic Concepts: PR: Acceptance into the M.B.A. Program. Introduction to economic analysis including the theory of the market; supply, demand and price determination; income distribution; aggregate income and employment determination.

ECON 521 Qtr. Hrs. - 4
Statistics of Business and Economics: PR: Acceptance into the M.B.A. Program. Statistical theory and problems relating to business and economics including time series and correlation theory, index number theory and statistical inference.

ECON 601 Qtr. Hrs. - 3
Economic Analysis of the Firm: PR: Graduate Standing and ECON 501 or equivalent. Commodity price and output determination; factor price determination and functional income distribution; analysis of different types of markets.

ECON 611 Qtr. Hrs. - 3
Aggregate Economics-Income, Enmployment and Growth: PR: Graduate Standing and ECON 501 or equivalent. Analysis of the determinants of national output, income and employment levels; theory of economic growth and progressive equilibrium in an economy.

ECON 621 Qtr. Hrs. - 3
Statistical Models for Business: PR: Graduate Standing and ECON 521 or equivalent. The theory of model analysis including the validation of model assumptions through Monte Carol analysis and advanced statistical techniques.

ECON 631 Qtr. Hrs. - 3
Public Finance and Financial Policy: PR: Graduate Standing and ECON 501 or equivalent. Analysis of the fiscal role and instruments of government and their effects on the economy; taxation, debt, and fiscal policy.

ECON 635 Qtr. Hrs. - 3
Seminar in Labor Problems: PR: Graduate Standing and Econ 501 or equivalent. Philosophy of management-labor problems, survey of pertinent labor legislation; analysis of selected labor problems.

ECON 643 Qtr. Hrs. - 3
The Soviet Economy: Decision Making and Rationality: PR: Graduate standing. and ECON 501 or equivlaent. Examination and analysis of the functions, structure, and operation of the economic systems of the Soviet Union and other East European command economies.

FINANCE

FIN 301 Qtr. Hrs. - 5
Finance: PR: ACCY 112 or ACCY 307, ECON 202, 203. Fundamentals of obtaining and administering funds to meet short-term and long-term capital requirements.

FIN 311 Qtr. Hrs. - 4
Risk and Insurance: PR: Junior Standing or C.I. Principles and methods of risk reduction and specialization, with particular emphasis on insurance.

FIN 321 Qtr. Hrs. - 4
Investments: PR: FIN 301 or C.I. Principles and methods of risk reduction and specialization, with particular emphasis on insurance.

FIN 331 Qtr. Hrs. - 4
Money and Banking: PR: ECON 203 or C.I. The nature of money, the functioning of the commercial banking system and its relation to the level of economic activity, and the activities of the Federal Reserve System and Treasury.

FIN 341 Qtr. Hrs. - 4
Real Estate: PR: Junior standing. Basic principles of real estate ownership, its use and transfer, brokerage, management, legislation, and importance to the economy.

FIN 411 Qtr. Hrs. - 4
Financial Institutions: PR: FIN 301. The operation of financial institutions and an analysis of their role in the economy.

FIN 421 Qtr. Hrs. - 4
Security Analysis: PR: FIN 301 and FIN 321. The problems of selecting securities for various investment purposes.

FIN 431 Qtr. Hrs. - 4
Financial Management: PR: FIN 301. Analytical techniques for dealing with financial problems and their application to corporate financial management.

FIN 501 Qtr. Hrs. - 4
Financial Concepts: PR: Acceptance into the MBA Program. Effects of financial decisions upon the firm, interrelationships of these effects, and alternatives available to financial managers in meeting financing needs of the firm.

FIN 601 Qtr. Hrs. - 3
Capital Management and Analysis: PR: Graduate standing and FIN 501 or equivalent. Financial planning, valuation, sources of long-term capital, concepts of cost of capital and capital budgeting.

FIN 611 Qtr. Hrs. - 3
Financial Management of Current Operations: PR: Graduate standing and FIN 501 or equivalent. Management of current assets and current liabilities. Special problems associated with expansion, contraction, merger and failure.

FIN 621 Qtr. Hrs. - 3
Financial Policy: PR: Graduate standing and FIN 601 and FIN 611. Formulation of financial policy in profit-making organizations. Evaluation of objectives, analysis of alternatives, and selection of criteria for decision-making.

FIN 631 Qtr. Hrs. - 3
Analysis of Investment Opportunities: PR: Graduate standing and FIN 501 or equivalent. Techniques for evaluating securities, investment decision making, and portfolio management.

MANAGEMENT

MGMT 301 Qtr. Hrs. - 5
Management: Fundamentals of management underlying the solution of problems relating to the organization and operation of business enterprises.

MGMT 324 Qtr. Hrs. - 3
Production Management: PR: Sophomore standing. Principles and methods of production viewed from a managerial decision-making level. (Same as IEMS 324.)

MGMT 364 Qtr. Hrs. - 4
Personnel Management: PR: MGMT 301. An investigation of personnel practices and interpersonal relationships involved in managing employees. Internal problems of labor control and the utilization of human resources are considered.

MGMT 401 Qtr. Hrs. - 4
Organization Theory: PR: MGMT 301. Elements in organizations and the processes by which they develop and influence behavior are considered.

MGMT 424 Qtr. Hrs. - 4
Production Management Problems: PR: MGMT 324. Problems in the management of industrial enterprise. Management principles and mathematical analysis applied to manufacturing; product development and production; materials and production control; employee relations.

MGMT 464 Qtr. Hrs. - 4
Personnel Problems: PR: MGMT 364. Case studies in personnel problems directed toward the application of personnel management theory and concepts to organization problems.

MGMT 465 Qtr. Hrs. - 4
Industrial Relations: PR: MGMT 301. The impact of trade unionism on industrial relations; current problems, conflicts and trends; the development of managerial approaches to achieve labor-management cooperation.

MGMT 466 Qtr. Hrs. - 4
Human Relations in Management: PR: MGMT 301. The individual, interpersonal and group relations and inter-group and organizational problems in business.

MGMT 501 Qtr. Hrs. - 4
Management and Production Concepts: PR: Acceptance into the M.B.A. Program. Fundamentals of management and production underlying the solution of problems relating to organization and operation of business enterprises.

MGMT 601 Qtr. Hrs. - 3
Planning and Control Analysis: PR: Graduate standing and MGMT 501 or equivalent. Emphasizes elements of the planning and control processes

including objectives, action programs and control procedures. Discusses integration of the two processes.

MGMT 611 Qtr. Hrs. - 3
Analysis of Organizational Behavior: PR: Graduate standing and MGMT 501 or equivalent. The analysis of human behavior in organizations in terms of the individual, small group, intergroup relationships, and the total organization.

MGMT 621 Qtr. Hrs. - 3
Group Decisions and Analysis: PR: Graduate standing and MGMT 501 or equivalent. Experience in company-wide management decision-making by groups using the management game technique. Analysis of the group decision-making process using video tapes.

MGMT 650 Qtr. Hrs. - 3
Evolution of Administrative Management: PR: Graduate standing and MGMT 501 or equivalent. The historical development of managment in modern society with emphasis in the management process as applied within the economic, social, political, and legal environment.

MGMT 656 Qtr. Hrs. - 3
Research and Development Management: Graduate standing and MGMT 501 or equivalent. An examination of the function of Research and Development and the impact of technological innovation on our economic and social systems.

MARKETING

MKTG 301 Qtr. Hrs. - 5
Marketing: Study of functions, institutions and basic problems in marketing of goods and services in our economy.

MKTG 326 Qtr. Hrs. - 4
Consumer Market Behavior: PR: MKTG 301. An analysis of consumer motivation, buying behavior, market adjustment and product innovation. Behavorial aspects of the marketing process from producer to ultimate user or consumer are considered.

MKTG 334 Qtr. Hrs. - 4
Marketing Models and Logistics: PR: MKTG 301, ECON 321. Qualitative and quantitative model building concepts applied to marketing problems with special emphasis on product planning, distribution, promotion strategy, and pricing problems.

MKTG 364 Qtr. Hrs. - 4
Advertising Management: PR: MKTG 301. Analysis of field of advertising; purposes, techniques, media, organization, and role of research; economic and social aspects of advertising.

MKTG 367 Qtr. Hrs. - 4
Sales Management: PR: MKTG 301. Problems confronting sales manager; training in sales techniques; sales objectives and policies; organization; and administration of sales force.

MKTG 384 Qtr. Hrs. - 5
Marketing Research: PR: MKTG 301 and ECON 321. Study of research procedures and techniques applicable to problem solving in marketing. The marketing management process is analyzed; the underlying concepts related to the information needed to serve the processes are explored; and the incorporation of information resources into the management function is demonstrated.

MKTG 469 Qtr. Hrs. - 4
Channels of Distribution Management: PR: MKTG 301. Study of marketing activities and relationship within channels of distribution. Major attention given to decision making and formulation of policies appropriate for wholesalers, retailers, and vertically integrated marketing institutions.

MKTG 485 Qtr. Hrs. - 4
Marketing Policies and Strategies: PR: MKTG 384 and C.I. Marketing problems and policies are explored with emphasis placed on the decision-making process.

MKTG 489 Qtr. Hrs. - 4
Current Marketing Problems: PR: Senior standing, marketing major, and C.I. A course emphasizing the recognition and analysis of marketing problems arising from broad cultural, social, political, legal, economic, and competitive developments.

MKTG 501 Qtr. Hrs. - 4
Marketing Concepts: PR: Acceptance into the M.B.A. Program. Study of functions, institutions and basic problems in marketing of goods in our economy.

MKTG 601 Qtr. Hrs. - 3
Marketing Policy: PR: Graduate standing and MKTG 501 or equivalent. Marketing policy formulation and decision-making with respect to planning, pricing, promoting, and distributing.

MKTG 602 Qtr. Hrs. - 3
Current Marketing Problems: PR: Graduate standing and MKTG 501 or equivalent. Analysis of marketing problems stemming from broad social, economic, and political developments. Topics treated cover broad classes of marketing institutions.

MKTG 604 Qtr. Hrs. - 3
Sales Management and Control: PR: Graduate standing and MKTG 501 or equivalent. Emphasis is placed on the allocation and development of sales territories, and the training, motivation, and supervision of a sales force.

COLLEGE OF EDUCATION

BUSINESS EDUCATION — DEVELOPMENTAL

EDBE 101 Qtr. Hrs. - 3
Introductory Typewriting: For the student with no previous instruction in typewriting. Development of basic elements in using the typewriter as a tool of literacy and communications.

EDBE 102 Qtr. Hrs. - 3
Communications Production - I: PR: EDBE 101 or equivalent. Continuation of development of skills in speed and accuracy and introduction to skill building procedures in communications production.

EDBE 103 Qtr. Hrs. - 3
Communications Production - II: PR: EDBE 102 or equivalent. Expansion of communications production development, speed and accuracy.

EDBE 201 Qtr. Hrs. - 3
Principles of Shorthand - I: PR: Concurrent enrollment in EDBE 101 or equivalent. For students with no previous instruction in shorthand. Introduction to basic theory of Gregg Shorthand, vocabulary development, and speed building.

EDBE 202 Qtr. Hrs. - 3
Principles of Shorthand - II: PR: EDBE 102, and EDBE 201 or equivalents. A continuation in the study of shorthand theory, vocabulary development, and speed building.

EDBE 203 Qtr. Hrs. - 3
Principles of Shorthand - III: PR: EDBE 102, and EDBE 202 or equivalents. Development and refinement of sustained shorthand dictation, speed and vocabulary development.

EDBE 301 Qtr. Hrs. - 3
Shorthand Dictation: PR: EDBE 102, and EDBE 203 or equivalents. Continued development of shorthand dictation and introductory communications production.

EDBE 302 Qtr. Hrs. - 3
Shorthand Transcription: PR: EDBE 102, and EDBE 301. Gregg Shorthand dictation and refinement of communications production.

EDBE 305 Qtr. Hrs. - 3
Office Technology: PR: EDBE 102 or C.I. Basic operation and function of technological media in modern business offices.

EDBE 405 Qtr. Hrs. - 3
Principles of Business - Vocational Education: PR: Senior standing. Study of historical development of business-vocational education with specific emphasis on identification and interpretation of present day trends and problems.

EDBE 406 Qtr. Hrs. - 3
Office Systems and Procedures: PR: EDBE 302. Study of the responsibilities of the executive secretary and office supervisor; records management, travel services, case studies in human relations in executive level job performance.

EDBE 601 Qtr. Hrs. - 3
Curriculum Innovations in Business Education: PR: Rank III Certificate or C.I. A critical analysis of the business curricula in post secondary schools; development of philosophy, objectives, and design of innovative programs in business.

EDBE 602 Qtr. Hrs. - 3
Problems Issues, and Trends in Business Education: PR: Rank III Certificate or C.I. Historical development; fundamentals of business education; its relation to business, vocational and general education, guidance, objectives and contemporary problems.

EDBE 603 Qtr. Hrs. - 3
Analysis, Trends and Research in Typewriting Instruction: PR: Rank III Certificate or C.I. Techniques, materials, and instructional media; psychological principles, evaluation, and special attention to a study of research and new trends of instruction.

EDBE 604 Qtr. Hrs. - 3
Evaluation in Business Education: Rank III Certificate or C.I. A study of standardized and prognostic business education tests; functions, construction, administration, and evaluation of measurement instruments.

EDBE 610 Qtr. Hrs. - 3
Administration and Supervision of Business Education: PR: Rank III Certificate or C.I. Organization, administration, and supervision of Business Education.

EDBE 611 Qtr. Hrs. - 3
Analysis of Instruction in Shorthand and Transcription: PR: Rank III Certificate or C.I. Techniques, materials, and instructional media, psychological principles, evaluation, and special attention to a study of research and new trends of instruction.

EDBE 612 Qtr. Hrs. - 3
Analysis of Instruction in Office Technology: PR: Rank III Certificate or C.I. Techniques, materials and instructional media, psychological principles, evaluation, and special attention to a study of research and new trends of instruction.

EDBE 613 Qtr. Hrs. - 3
Analysis of Instruction in Basic Business and Accounting: PR: Rank III Certificate or C.I. Techniques, materials, and instructional media,

psychological principles, evaluation, and special attention to a study of research and new trends of instruction.

EDBE 614 Qtr. Hrs. - 3
Coordination of Cooperative Office Business Education: PR: Rank III Certificate or C.I. A study of cooperative programs; organization and coordination of cooperative business education programs.

EDBE 615 Qtr. Hrs. - 3
Improvement of Related Instruction in Cooperative Business Education: PR: Rank III Certificate or C.I. Techniques, materials, and instructional media, psychological principles, evaluation, and special attention to the study of research and new trends of instruction in related cooperative education study.

ELEMENTARY EDUCATION DEVELOPMENTAL

EDEL 301 Qtr. Hrs. - 3
Teaching Mathematics in the Elementary School: PR: Admission to Phase II or C.I. Consideration of selected concepts; organizing for instruction, techniques and activities; class and individual diagnosis; remedial procedures.

EDEL 302 Qtr. Hrs. - 3
Mathematics Programs in the Elementary School: PR: EDEL 301. Analysis of teaching arithmetic, geometry and measurement; philosophy and objectives; instructional materials; current research and new curricula.

EDEL 306 Qtr. Hrs. - 3
Music in the Elementary School: Fundamental procedures for teaching elementary school music, stressing appropriate music materials and activities for different age groups; selected experiences in music.

EDEL 307 Qtr. Hrs. - 3
Literature for Children: PR: Admission to Phase II or C.I. General survey of books and materials; criteria for analysis and evaluation; types of books available considered in terms of interests, needs, and abilities of children.

EDEL 311 Qtr. Hrs. - 3
Basic Foundations of Reading: PR: Admission to Phase II or C.I. Introduction to reading; principles, procedures and organization, current practices; analysis of reading materials; correlation with child development; investigation of research.

EDEL 312 Qtr. Hrs. - 3
Reading in the Elementary School: PR: EDEL 311. Study of specific techniques and materials used to develop reading comprehension vocabulary and rate; organizing and directing a reading lesson; individual differences; evaluation procedures.

EDEL 315 Qtr. Hrs. - 3
Teaching Science in the Elementary School: PR: Admission to Phase II or C.I. Consideration of selected themes, problems, and concepts; organizing for instruction; techniques and activities; evaluation procedures.

EDEL 316 Qtr. Hrs. - 3
Elementary School Curriculum: PR: Admission to Phase II. Basic scope and sequence of the elementary school curriculum, philosophical concepts; techniques and materials for instruction; patterns of organization; planning for instruction.

EDEL 317 Qtr. Hrs. - 3
Teaching Social Science in the Elementary School: PR: Admission to Phase II or C.I. Consideration of selected themes, problems, and concepts; organizing for instruction; techniques and activities; evaluation procedures.

EDEL 318 Qtr. Hrs. - 3
Teaching Physical Education in the Elementary School: PR: EDTA 206 and 307. Organization, practice, and conduct of elementary school physical education with emphasis on teaching methods.

EDEL 401 Qtr. Hrs. - 3
Programs in Early Childhood Education: PR: Admission to Phase II or C.I. Overview of the philosophy, content, facilities, instructional materials, and activities appropriate for children ages 3, 4, and 5; current research and new curricula. Concurrent laboratory experiences.

EDEL 402 Qtr. Hrs. 3
Language Arts in Early Childhood Education: PR: Admission to Phase II or C.I. Analysis of content of values and developmental role of language arts programs; application of instructional techniques; curriculum problems relating to reading readiness, perception and cognition.

EDEL 403 Qtr. Hrs. - 3
Language and Cognition of Young Children: PR: Admission to Phase II or C.I. Language in the learning, patterns of thinking, and perceiving of young children. Theories of language and symbolic experience, verbal and non-verbal behavior.

EDEL 404 Qtr. Hrs. - 3
Organization of Instruction in Nursery-Kindergarten Education: PR: EDEL 401 or 402. Organization of instruction and methods in areas relating to social science, science, mathematics, health, creative arts, and physical education; development of creative manipulative devices. Concurrent laboratory experiences.

EDEL 405 Qtr. Hrs. - 5
Language Arts in the Elementary School: PR: Admission to Phase II or C.I. Content, principles, materials and techniques involved in teaching speaking, listening, writing, and spelling in the elementary school; organizing for instruction.

EDEL 406 Qtr. Hrs. - 3
Art in the Elementary School: Basic principles, purposes, scope and sequence; organization for instruction; evaluation of activities; selected art experiences.

EDEL 407 Qtr. Hrs. - 3
Classroom Diagnosis and Treatment of Reading Difficulties: PR: EDEL 311 or 312 or equivalent. Principles and techniques of diagnosis and remedial teaching with the disabled reader; factors related to reading problems — physiological, psychological, cultural; materials for instruction.

EDEL 408 Qtr. Hrs. - 3
Science Programs in the Elementary School: PR: Admission to Phase II or C.I. Overview of the instructional program in natural sciences; philosophy and objectives; special problems; instructional materials; current research and new curricula.

EDEL 409 Qtr. Hrs. - 3
Social Science Programs in the Elementary School: PR: Admission to Phase II or C.I. Overview of the instructional program in the social sciences; philosophy and objectives; special problems; instructional materials; current research and new curricula.

EDEL 415 Qtr. Hrs. - 3
Teaching Elementary School Health and Physical Education: PR: Admission to Phase II or C.I. Observation, organization, practice, and conduct of health and physical education activities in the elementary school.

EDEL 455 Qtr. Hrs. - 4
Elementary School Curriculum: PR: Bachelor's degree or C.I. Advanced study of the elementary school curriculum; patterns of organization; school services; individual subject areas; school related activities; investigation of trends; research and new curricula.

EDEL 456, 457 Qtr. Hrs. - 2-5, 2-5
Directed Study in Elementary Education: Workshop for the improvement of the elementary school curriculum. Open to in-service teachers.

EDEL 482 Qtr. Hrs. - 3
Drug Abuse Education: PR: C.I. Study of developments relating to drug abuse in contemporary society. Objectives, content, resources, and techniques of drug abuse education.

EDEL 530 Qtr. Hrs. - 4
Developmental Reading: PR: Rank III Certificate or C.I. Principles, procedures, organization, and current practices in the elementary reading program.

EDEL 535 Qtr. Hrs. - 3
Classroom Diagnosis and Treatment of Reading Difficulties: PR: EDEL 530 or equivalent. Principles and techniques of classroom diagnosis and corrective teaching in reading. Consideration of instructional materials.

EDEL 604 Qtr. Hrs. - 3
Leadership in Elementary Education: PR: Rank III Certificate or C.I. Current issues with emphasis on the improvement of instruction, analysis of curriculum, and staff development procedures.

EDEL 605 Qtr. Hrs. - 3
Problems in Classroom Teaching in the Elementary School: PR: Rank III Certificate or C.I. Identification and analysis of relevant major instructional problems in the elementary school.

EDEL 606 Qtr. Hrs. - 3
Curriculum Design in Elementary Education: PR: Rank III Certificate or C.I. Design and construction of programs to meet needs of varying levels of student populations. (May be repeated.)

EDEL 607 Qtr. Hrs. - 3
Practicum in Elementary Education: PR: Rank III Certificate or C.I. Supervised laboratory experiences including individual and small group instructional procedures. (May be repeated.)

EDEL 610 Qtr. Hrs. - 3
Trends in Elementary School Science Education: PR: Rank III Certificate or C.I. Analysis of historical development and current trends in mathematics education research.

EDEL 620 Qtr. Hrs. - 3
Trends in Elementary School Mathematics Education: PR: Rank III Certificate or C.I. Analysis of historical development and current trends in mathematics education research.

EDEL 621 Qtr. Hrs. - 3
Diagnosis of Difficulties in Elementary School Mathematics: PR: EDEL 620. Study and uses of tests regarding the symptoms and causes of specific learning skills in mathematics.

EDEL 622 Qtr. Hrs. - 3
Remediation of Difficulties in Elementary School Mathematics: PR: EDEL 621. Selection of materials and techniques for a remedial program based on individual diagnosis.

EDEL 630 Qtr. Hrs. - 3
Trends in Elementary School Reading Education: PR Rank III Certificate or C.I. Analysis of historical development and current trends in reading research.

EDEL 632 Qtr. Hrs. - 3
Corrective Reading for Classroom Teachers I: PR: EDEL 535 or equivalent. A practicum for classroom teachers with emphasis on group diagnostic reading tests and classroom corrective techniques.

EDEL 633 Qtr. Hrs. - 3
Corrective Reading for Classroom Teachers II: PR: EDEL 632 or equivalent. A continuation of EDEL 632.

EDEL 635 Qtr. Hrs. - 3
Diagnosis of Difficulties in Reading: PR: EDEL 535 or equivalent. Administration and interpretation of individual tests. Consideration of physical, psychological and environmental factors contributing to reading difficulties.

EDEL 636 Qtr. Hrs. - 4
Diagnostic Reading Practicum: PR: EDEL 635 or equivalent. Evaluation of reading abilities and difficulties of children in the reading laboratory of the University. Preparation of individual case reports.

EDEL 637 Qtr. Hrs. - 4
Remedial Reading Practicum: PR or CR: EDEL 636. Supervised remedial instruction with individual children. Selection of instructional materials and techniques; preparation of case progress reports; parent interviews.

EDEL 640 Qtr. Hrs. - 3
Trends in Elementary School Language Arts Education: PR: Rank III Certificate or C.I. Analysis of historical development and current trends in language arts research.

EDEL 641 Qtr. Hrs. - 3
Investigation in Children's Literature: PR: Rank III Certificate or C.I. Analysis of the various approaches available for learning through the utilization of children's literature.

EDEL 650 Qtr. Hrs. - 3
Trends in Elementary School Social Science Education: PR: Rank III Certificate or C.I. Analysis of historical development and current trends in social science education research.

EDEL 681 Qtr. Hrs. - 3
Seminar in Early Childhood Education: PR: Rank III Certificate or C.I. Study and evaluation of research applicable to the design and construction of a curriculum for 3, 4 and 5 year old children.

EXCEPTIONAL CHILD EDUCATION

EDEX 511 Qtr. Hrs. - 4
Exceptional Children in the Schools: PR: Senior Standing or C.I. Characteristics, developmental patterns, educational problems, and appropriate educational programs for the exceptional child in Special Education.

EDEX 512 Qtr. Hrs. - 4
Educational Implications for the Speech and Language Disorders of Exceptional Children: PR: Senior Standing or C.I. Identification, evaluation, interpretation. and planning appropriage learning experiences to aid exceptional children with speech, hearing, and language disorders.

EDEX 513 Qtr. Hrs. - 4
Fundamental Concepts of Mental Retardation: PR: Senior Standing or C.I. Characteristics, symptom groupings, diagnostic procedures, learning characteristics, and educational treatment procedures of the mentally retarded.

EDEX 514 Qtr. Hrs. - 4
Psycho-educational Appraisal of Exceptional Children: PR: Senior Standing or C.I. Selection of performance objectives, diagnostic measures, prescriptive teaching programs, and progress evaluation procedures for individualizing instruction.

EDEX 521 Qtr. Hrs. - 3
Classroom Organization for Teaching the Mentally Retarded: PR: Senior Standing, EDEX 514 or C.I. Special class organization, scheduling, utilizing materials, equipment; analysis of instructional procedures for teaching mentally retarded.

EDEX 522 Qtr. Hrs. - 3
Curriculum Planning Procedures for the Educable Mentally Retarded: PR: Senior Standing, EDEX 513 and EDEX 514 or C.I. Appropriate curriculum experiences and adjustments; media use; develop prevocational skills of educable mentally retarded children.

EDEX 523 Qtr. Hrs. - 3
Curriculum Planning Procedures for the Trainable Mentally Retarded: PR: Senior Standing, EDEX 513 and EDEX 514 or C.I. Curriculum experiences, media use, pre-vocational skills development for developmental levels of trainable mentally retarded children.

EDEX 611 Qtr. Hrs. - 3
Homemaking and Social Learning Skills for the Mentally Retarded: PR: Rank III Certificate or C.I. Personal development and management in clothing maintenance, and repair, cooking, the use of hand tools, and homemaking tasks.

EDEX 612 Qtr. Hrs. - 3
Occupational and Educational Information for Exceptional Children: PR: Rank II Certificate or C.I. World-of-work overview, occupational areas, occupational skills required for habilitative and rehabilitative community agencies for exceptional children.

EDEX 621 Qtr. Hrs. - 3
Theories of Learning Disabilities of School Children: PR: Rank III Cerfificate or C.I. An introduction to etiology of learning disorders, with emphasis on environmental deprivation, sensory development, and other impairment.

EDEX 622 Qtr. Hrs. - 3
Instructional Diagnosis of the Learning Disabled Child: PR: Rank II Certificate or C.I. Evaluation techniques for diagnosing learning disabilities related to development in the basic school skills areas.

EDEX 623 Qtr. Hrs. - 3
Individualized and Prescriptive Instruction for the Learning Disabled Child: PR: Study of program innovations and prescriptive programming for pupils with learning disavilities.

EDEX 624 Qtr. Hrs. - 3
Behavior Management Techniques with Exceptional Children: PR: Rank III Certificate or C.I. Study of pupil management techniques, including group and individual procedures, for modifying the learning behavior of exceptional pupils.

LIBRARY SCIENCE

EDLS 301 Qtr. Hrs. - 4
Foundations of Librarianship: PR: C.I. Survey of libraries and librarianship, Origin, services, problems and current library literature. Library services on all levels and related terminology.

EDLS 321 Qtr. Hrs. - 4
Media Center Organization and Operation: PR: C.I. Principles in organizing library collections of books and non-book materials. Ciruclation of materials, statistical records and maintenance of collections in school media centers.

EDLS 421 Qtr. Hrs. - 4
Administration of the Library Media Center: PR: EDLS 301. Principles and practices of administration applied to elementary and secondary school library media centers. Methods of teaching the use of the library.

EDLS 431 Qtr. Hrs. - 4
Cataloging and Classification: PR: EDLS 301. Cataloging and classification of library materials. Practical problems in descriptive cataloging, subject cataloging and the Dewey Decimal Classification as practiced in school media centers.

EDLS 441 Qtr. Hrs. - 4
Reference Materials and Services: PR: C.I. Selection, evaluation and use of basic print and non-print reference materials.

EDLS 451 Qtr. Hrs. - 4
Utilization of Educational Media: PR: C.I. Principles and practices of communication theory and its application in the classroom. Emphasis on utilization and operation of the various classroom media.

EDLS 452 Qtr. Hrs. - 4
Instructional Media Producation: PR: EDLS 451. Selection, evaluation and production of instructional materials with emphasis on projected materials, display and presentation techniques.

EDLS 521 Qtr. Hrs. - 4
Administrative Principles in Media Centers: PR: EDLS 321. Planning, organizing, directing, supervising and budgeting in school media centers. Personnel, public relations and evaluating services. Planning buildings, including equipment and furniture.

EDLS 531 Qtr. Hrs. - 4
Non-Book Materials: PR: EDLS 431. The function, evaluation, selection, preparation for use, cataloging and preservation of non-book materials.

ESLS 532 Qtr. Hrs. - 4
Acquisition of Library Materials: PR: EDLS 321 or C.I. Evaluation, selecting, and acquiring book and non-book materials. Selecting aids, reviewing media, publishers and jobbers. Procedures for budgeting, final records, gifts and exchanges.

EDLS 541 Qtr. Hrs. - 4
Government Publications: PR: EDLS 441. United States government publications, state and international documents. Selection, acquisition and use as sources of information for school media centers.

EDLS 551 Qtr. Hrs. - 4
Instructional Technology and the Curriculm: PR: EDLS 451. Use and selection of instructional materials as they apply to the curriculm in elementary and secondary schools.

EDLS 611 Qtr. Hrs. - 4
Seminar In library Media: PR: EDLS 421, 431, 441. Problems in the development of collections for children and young people, reluctant readers and the non-reader. Controversial aspects of book selection and censorship.

EDLS 641 Qtr. Hrs. - 4
Reference Sources: PR: EDLS 441. Selection, evaluation and use of advanced and specialized reference materials in various subject fields.

MUSIC EDUCATION

EDME 401 Qtr. Hrs. - 3
Elementary School Music Instructional Analysis: PR: EDTA 206 and EDTA 307. Instructional planning; sources of information; instructional techniques; and special evaluation procedures in elementary school music.

EDME 402 Qtr. Hrs. - 3
Secondary School Music Instructional Analysis: PR: EDTA 206 and EDTA 307. Instructional planning; sources of information; instructional techniques; and special evaluation procedures in secondary school music.

PHYSICAL EDUCATION – DEVELOPMENTAL

EDPE 323 Qtr. Hrs. - 2
Instructional Analysis in Team Sports: PR: Sophomore standing. Analysis of neuromuscular performances and optimal approach to specific learning patterns in team sports.

EDPE 324 Qtr. Hrs. - 2
Instructional Analysis in Tennis: Mechanical analysis of neuromuscular performances and optimal approach to specific motor learning patterns.

EDPE 325 Qtr. Hrs. - 2
Instructional Analysis in Aquatics: Mechanical analysis of neuromuscular performances and optimal approach to specific motor learning patterns.

EDPE 326 Qtr. Hrs. - 2
Instructional Analysis in Gymnastics and Tumbling: Mechanical analysis of neuromuscular performances and optimal approach to specific motor learning patterns.

EDPE 327 Qtr. Hrs. - 2
Instructional Analysis in Golf: Mechanical analysis of neuromuscular performances and optimal approach to specific learning patterns.

EDPE 328 Qtr. Hrs. - 2
Instructional Analysis in Wrestling (M): Mechanical analysis of neuromuscular performances and optimal approach to specific learning patterns.

EDPE 329 Qtr. Hrs. - 2
Choreography of Contemporary Dance (W): Dance production as an art form.

EDPE 330 Qtr. Hrs. - 2
Instructional Analysis of Rhythmics: PR: Sophomore standing. Analysis of rhythm and rhythmic activities as they relate to teaching physical education.

EDPE 350 Qtr. Hrs. - 3
Coaching Theory: PR: EDPE 323. Theory and methods of coaching for optimum sports performance.

EDPE 360 Qtr. Hrs. - 3
School and Community Recreation: PR: Admission to Phase II or C.I. Knowledge and skills of after school activity and summer recreational programs.

EDPE 407 Qtr. Hrs. - 5
Family Living Concepts: The ideas and principles of healthy family living.

EDPE 408 Qtr. Hrs. - 5
Contemporary Health Hazards: The effects of drugs and other mood modifiers.

EDPE 410 Qtr. Hrs. - 3
Kinesiomechanics: PR: ZOOL 224. Mechanics of human movement. Anatomical and mechanical analysis of motor tasks and individual performance. Laboratory experience in analytical and evaluative methods.

EDPE 421 Qtr. Hrs. - 4
Exercise Physiology - Cardiovascular: PR: ZOOL 224. A circulatory study of man's homeostatic regulation during environmental stress. (Includes lecture and laboratory.)

EDPE 422 Qtr. Hrs. - 4
Exercise Physiology - Respiratory: PR: ZOOL 224. A study of metabolic costs and respiratory adjustment to exercise.

EDPE 430 Qtr. Hrs. - 4
Human Performance Learning: PR: Admission to Phase II or C.I. Theories of movement and factors influencing the learning of gross and fine motor skills. (Includes lecture and laboratory.)

EDPE 440 Qtr. Hrs. - 3
Rehabilitation Training Techniques: PR: Admission to Phase II or C.I. Recognition and rehabilitation of sports injuries, including first aid.

EDPE 450 Qtr. Hrs. - 3
Organization and Administration of Physical Education: PR: EDSE 380. Administering and organizing for instruction of the physical education class and the total school physical education program.

EDPE 601 Qtr. Hrs. - 3
Philosophical Foundations of Physical Education: PR: Rank III Certificate or C.I. Analysis of the forces and events leading to the development of current concepts in physical education.

EDPE 602 Qtr. Hrs. - 3
Current Trends in Physical Education: PR: Rank III Certificate or C.I. (A Comprehensive review of the literature influencing trends in physical education)

EDPE 603 Qtr. Hrs. - 3
Organization and Design of Physical Education Programs: PR: Rank III Certificate or C.I. Study of physical education and its existing organization. Emphasis on ethics, values, principles and issues.

EDPE 612 Qtr. Hrs. - 5
Primate Gross Anatomy Dissection: PR: Rank III Certificate or C.I. Dissection, identification, and analysis of select vertebrate morphology.

EDPE 621 Qtr. Hrs. - 5
Physiology of Exercise - Environmental: PR: Rank III Certificate or C.I. A study of physiological adaptation resulting from prescribed physical activity programs.

EDPE 624 Qtr. Hrs. - 3
Rhythmics: PR: Rank III Certificate or C.I. Instructional analysis in classical and modern rhythms.

EDPE 631 Qtr. Hrs. - 5
Motor Learning: PR: Rank III Certificate or C.I. A study of optimal human factors controlling performance.

EDPE 632 Qtr. Hrs. - 3
Perceptual Motor Development: PR: EDTA 614 or C.I. Study of the relationship between perceptual motor development and learning. Evaluation of physical activities designed to improve perceptual motor skills.

EDPE 660 Qtr. Hrs. - 3
School Recreation: PR: Rank III Certificate or C.I. A study of recreational programs related to the public schools.

EDPE 680 Qtr. Hrs. - 3
Kinesiologic Analysis of Individual Activities: PR: Rank III Certificate or C.I. Analytical techniques of kinesiology and their methods of application to individual motor activities.

EDPE 681 Qtr. Hrs. - 3
Kinesiologic Analysis of Team Activities: PR: Rank III Certificate or C.I. Analytical techniques of kinesiology and their methods of application to team motor activities.

PROFESSIONAL LABORATORY – APPLICATION

EDPL 320 Qtr. Hrs. - 3
Elementary School Student Teaching - Block A: PR: EDTA 206 and EDTA 307. Junior year student teaching in an elementary school under the supervision of a certified classroom teacher.

EDPL 321 Qtr. Hrs. - 3
Elementary School Student Teaching - Block B: PR: EDPL 320. Junior year student teaching in an elementary school under the supervision of a certified classroom teacher.

EDPL 330 Qtr. Hrs. - 3
Secondary School Student Teaching - Block A: PR: EDTA 206 and EDTA 307. Junior year student teaching in a secondary school under the supervision of a certified classroom teacher.

EDPL 408 Qtr. Hrs. - 3
Teaching Strategies: PR: Admission to Phase III. Seminar taken concurrently with student teaching. Problem study focused on current needs such as: classroom management and control, planning for instruction, and aspects of professionalism.

EDPL 409 Qtr. Hrs. - 4
Teaching Strategies: PR: Bachelor's degree or C.I. A seminar taken concurrently with Teaching Practicum, EDPL 465. Advanced problem study focused on current needs such as: classroom management and control, planning for instruction, and aspects of professionalism.

EDPL 421 Qtr. Hrs. - 9
Elementary School Student Teaching - Block C: PR: EDPL 321. Senior year student teaching in an elementary school under the supervision of a certified classroom teacher.

EDPL 430 Qtr. Hrs. - 9
Secondary School Student Teaching - Block C: PR: EDPL 330. Senior year student teaching in a secondary school under the direction of a certified classroom teacher.

EDPL 465, 466 Qtr. Hrs. - 5, 5
Teaching Practicum: PR: Bachelor's degree and approved application. Directed observation, participation, and teaching in an elementary or secondary school under the direction of a selected teacher.

EDPL 551 Qtr. Hrs. 1-12
Supervised Teaching Practicum with Exceptional Children: PR: Bachelor's degree, approved program, and C.I. Supervised observation and teaching under the direction of a properly certified exceptional child teacher.

EDPL 558 Qtr. Hrs. - 4
Supervision of Professional Laboratory Experiences: PR: C.I. Study of the undergraduate professional laboratory experiences program with emphasis on the role and responsibilities of the Teacher Education Associate or Supervising Teacher.

SECONDARY EDUCATION – DEVELOPMENTAL

EDSE 303 Qtr. Hrs. - 3
School Programs: PR: EDTA 206 and EDTA 307. A study of the public school curriculum, kindergarten through grade twelve.

EDSE 305 Qtr. Hrs. - 3
Secondary School Curriculum: PR: EDTA 206 and EDTA 307. Study of total school patterns with emphasis on new trends, including subject areas, administration, supervision, school services and school related activities.

EDSE 310 Qtr. Hrs. - 4
Speech Instructional Analysis: PR: EDTA 206 and EDTA 307. Study of instructional programs in speech; objectives, materials, techniques, organization for instruction, evaluation procedures, current research.

EDSE 320 Qtr. Hrs. - 3
Foreign Language as Human Behavior: PR or CR: ENG 371 or C.I. Nature of language, objectives of foreign language learning and introduction to teaching basic skills. One hour laboratory required each week.

EDSE 321 Qtr. Hrs. - 4
Foreign Language Instructional Analysis: PR: EDTA 206 and EDTA 307. Study of course objectives for the high school curriculum and survey of methods and materials having special application for teaching foreign language.

EDSE 330 Qtr. Hrs. - 4
Business Instructional Analysis I: PR: EDTA 206 and EDTA 307. Techniques, materials, and instructional media; psychological principles, evaluation, and current trends in typewriting instruction.

EDSE 340 Qtr. Hrs. - 4
English Instructional Analysis: PR: EDTA 206 and EDTA 307. Study of course objectives for the high school curriculum and survey of methods and materials which have special application for teaching English.

EDSE 350 Qtr. Hrs. - 4
Mathematics Instructional Analysis: PR: EDTA 206 and EDTA 307. Study of course objectives for the high school curriculum and survey of methods and materials which have special application for teaching mathematics.

EDSE 360 Qtr. Hrs. - 4
Science Instructional Analysis: PR: EDTA 206 and EDTA 307. Study of course objectives for the high school curriculum and survey of methods and materials which have special application for teaching science.

EDSE 370 Qtr. Hrs. - 4
Social Science Instructional Analysis: PR: EDTA 206 and EDTA 307. Study of instructional programs in Social Sciences; objectives; materials; techniques; organization of instruction; evaluation procedures; current research.

EDSE 380 Qtr. Hrs. - 4
Physical Education Instructional Analysis: PR: EDTA 206 and EDTA 307. Study of course objectives for the high school curriculum and survey of methods and materials having special application for teaching physical education.

EDSE 404 Qtr. Hrs. - 3
Instructional Techniques: PR: EDPL 330, CR: EDPL 408 and EDPL 430. Procedures, applications and evaluation of technical skills a teacher may employ in the classroom.

EDSE 421 Qtr. Hrs. - 3
Oral Teaching of Foreign Languages: PR: EDPL 330 or C.I. Audio-lingually-based demonstration class. Practice in linguistic methods. One hour laboratory required each week.

EDSE 431 Qtr. Hrs. - 3
Business Instruction Analysis II: PR: EDTA 206 and EDTA 307. Techniques, materials, and instructional media; psychological principles, evaluation and current trends in shorthand and related instruction.

EDSE 432 Qtr. Hrs. - 3
Business Instructional Analysis III: PR: EDTA 206 and EDTA 307. Techniques, materials, and instructional media; psychological principles, evaluation, and current trends in accounting and basic business instruction.

EDSE 440 Qtr. Hrs. - 3
Teaching Language and Composition: PR: EDTA 206 and EDTA 307. Techniques and methods in teaching of dialects, semantics, the various grammars. A survey of composition rhetorical methods of selected authors.

EDSE 441 Qtr. Hrs. - 3
Literature for Adolescents: PR: Senior standing or C.I. Selecting and evaluating books for adolescents with emphasis on the uses of literature in the development of young people.

EDSE 442 Qtr. Hrs. - 4
Reading in the Secondary School: PR: Senior standing or C.I. Developmental reading for the junior and senior high school pupil.

EDSE 451 Qtr. Hrs. - 3
Recent Developments in Secondary School Mathematics: PR: Senior standing. Major concepts in SMSG mathematics and other modern secondary programs.

EDSE 461 Qtr. Hrs. - 3
Biology Laboratory Teaching: PR: Senior standing. Participation in introductory level chemistry laboratory. Includes laboratory set-ups, laboratory staff meetings and a weekly seminar.

EDSE 462, 463 Qtr. Hrs. - 2, 2
Chemistry Laboratory Teaching: PR: Senior standing. Participation in introductory level chemistry laboratory. Includes laboratory set-ups, laboratory staff meetings and weekly seminar.

EDSE 464, 465 Qtr. Hrs. - 2, 2
Physics Laboratory Teaching: PR: Senior standing. Participation in introductory level physics laboratory. Includes laboratory set-ups, laboratory staff meetings and a weekly seminar.

EDSE 471 Qtr. Hrs. - 3
Trends in Secondary School Social Science: PR: Senior standing. Identification, development and evaluation of major social science concepts as they relate to contemporary school programs.

EDSE 521 Qtr. Hrs. - 3
Trends in School Foreign Language Programs: PR: Rank III Certificate or C.I. Development, articulation and innovations in foreign language curriculums.

EDSE 541 Qtr. Hrs. - 3
English Programs in the Secondary School: PR: Rank III Certificate or C.I. Concepts, problems, and advanced topics in such programs as Project English and other secondary school English projects.

EDSE 551 Qtr. Hrs. - 3
Topics in Junior High School Mathematics: PR: Rank III Certificate or C.I. Instructional techniques and major problems in junior high mathematics programs.

EDSE 561 Qtr. Hrs. - 3
General Science Programs in the Secondary School: PR: Rank III Certificate or C.I. Basic concepts, philosophies, and formats of experimental secondary school general science programs (may be repeated.)

EDSE 562 Qtr. Hrs. - 3
High School Biology Concepts: PR: Rank III Certificate or C.I. Major concepts in BSCS biology and other modern biology programs.

EDSE 571 Qtr. Hrs. - 3
Contemporary Social Science Education: PR: Rank III Certificate or C.I. A survey of recent developments and contemporary programs in all areas of the social sciences.

EDSE 601 Qtr. Hrs. - 3
Curriculum Planning: PR: Rank III Certificate or C.I. Developing of a theory and formulating a basic instructional plan for the classroom teacher.

EDSE 602 Qtr. Hrs. - 3
Principles of Educational Supervision: PR: Rank III Certificate or C.I. Basic theory and application of supervising principles for instructional improvement.

EDSE 621 Qtr. Hrs. - 3
Media and Research in Foreign Language Teaching: PR: Rank III Certificate or C.I. Rationale and use of technological aides in foreign language teaching, classroom research and evaluation.

EDSE 622 Qtr. Hrs. - 3
Linguistic Analysis in Teaching Foreign Languages: PR: Rank III Certificate or C.I. Linguistic aspects of foreign language learning. Applied linguistics and psycholinguistics in language teaching.

EDSE 641 Qtr. Hrs. - 4
Media and Methods in English Education: PR: Rank III Certificate or C.I. Practicum in the use of various media in the English classroom with emphasis on student film making and production of media.

EDSE 642 Qtr. Hrs. - 3
Reading Guidance for Adolescents: PR: Rank III Certificate or C.I. Review of literary works appropriate for young people to provide insight into psychological problems common to teenagers.

EDSE 651 Qtr. Hrs. - 3
Laboratory Programs in Mathematics: PR: Rank III Certificate or C.I. Design, organization and development of special materials and projects for mathematics independent study.

EDSE 652 Qtr. Hrs. - 3
Seminar in Mathematics Teaching: PR: Rank III Certificate or C.I. A review of prominent research and the writings of selected authors in mathematics education.

EDSE 661 Qtr. Hrs. - 3
Inquiry in the Sciences: PR: Rank III Certificate or C.I. The techniques in teaching science by inquiry in the secondary school with the opportunity to participate in and develop inquiry lessons.

EDSE 662 Qtr. Hrs. - 3
Laboratory Programs in Science Education: PR: Rank III Certificate or C.I. Rank III or C.I. Design, organization and development of special materials and projects for science independent study centers.

EDSE 671 Qtr. Hrs. - 3
Laboratory Programs in the Social Sciences: PR: EDSE 571 or C.I. Design, organization and development of special materials related to selected conceptual specializations.

EDSE 672 Qtr. Hrs. - 3
Inquiry in the Social Studies: PR: Rank III or C.I. An in-depth development of the role of inquiry in the new social studies with opportunity to both participate in and to develop inquiry episodes.

TEACHING ANALYSIS

EDTA 206 Qtr. Hrs. - 3
Human Development: Analysis of basic principles and applications in growth and learning from conception through adolescence. EDTA 307 recommended concurrently.

EDTA 305 Qtr. Hrs. - 3
Principles of Evaluation: PR: Successful completion of Teaching Analysis, (EDTA 307) and Human Development, (EDTA 206). Principles of evaluation applied to advising pupils, diagnosing learning deficiencies, determining effectiveness of instruction and judging pupil progress.

EDTA 306 Qtr. Hrs. - 3
Learning Theory: PR: Successful completion of Teaching Analysis, (EDTA 307) and Human Development, (EDTA 206). Study of applications of learning theory to classroom teaching.

EDTA 307 Qtr. Hrs. - 5
Teaching Analysis: Initial requirement; an opportunity to examine and participate in general and specific dimensions of teaching with socio-economic factors emphasized. EDTA 206 recommended concurrently.

EDTA 480 Qtr. Hrs. - 3
Overview of Education: Study of public education in the United States focusing on the development of structure and process in the educational enterprise.

EDTA 481 Qtr. Hrs. - 3
Trends and the Future of Education: Identification of trends and postulations concerning the future of education and formulation of criteria for appraisal of innovations in education.

EDTA 490 Qtr. Hrs. - 2
Senior Seminar: Education in Human Affairs: Provides an overview of basic objectives, strategies, and techniques in education. This course, primarily intended for the senior student, is offered as one of the advanced Environmental Studies Seminars. Not open to the student enrolled in the College of Education.

EDTA 601 Qtr. Hrs. - 3
Fundamental Research Procedures in Education: PR: Rank III Certificate or C.I. Design rationale and construction, sampling methods, control and limits.

EDTA 611 Qtr. Hrs. - 3
Social Factors in American Education: PR: Rank III Certificate or C.I. Analysis of general and specific aspects of American education as they relate to Social and Behavioral Sciences.

EDTA 612 Qtr. Hrs. - 3
Measurement and Evaluation in Education: PR: Rank III Certificate or C.I. Rationale and construction of evaluative instruments, parametric and non-parametric statistics, interpretation of data.

EDTA 613 Qtr. Hrs. - 3
Behavior Problems in the Public School: PR: Rank III Certificate or C.I. Role of the teacher in identification, strategies for remediation and referral procedures for working with behavioral problem children. Mental hygiene principles stressed.

EDTA 614 Qtr. Hrs. - 3
Studies in Human Development and Childhood: PR: Rank III Certificate or C.I. Recent research in Human Development and childhood relevant to contemporary American education. Emphasis prenatal through age 11.

EDTA 615 Qtr. Hrs. - 3
Studies in Teaching Analysis: PR: Rank III Certificate or C.I. Usage and analysis of micro-teaching, verbal and non-verbal approaches, social and behavioral variables influencing classroom learning.

EDTA 616 Qtr. Hrs. - 3
Techniques of Game Use in Education: PR: Rank III Certificate or C.I. Analysis, development, and use of educational games as an approach to classroom teaching.

EDTA 617 Qtr. Hrs. - 3
Adolescent Development and the Schools: PR: Rank III Certificate or C.I. Recent research in human development in adolescence with special emphasis upon research of interest to secondary school teachers.

EDTA 618 Qtr. Hrs. - 3
Instructional Models and Learning Theories in Education: PR: Rank III Certificate or C.I. Recent research and theoretical analysis of instruction-learning interfaces as they relate to learning in the schools.

VOCATIONAL / TECHNICAL EDUCATION

EDTE 401 Qtr. Hrs. - 4
Philosophy and Principles of Technical/Vocational Education: PR: Rank III Certificate or C.I. Overview of technical/vocational education; study of purposes, organization curriculum, financial supports, trends and history of technical/vocational education.

EDTE 402 Qtr. Hrs. - 5
Methods of Teaching Technical/Vocational Subjects: PR: Rank III Certification or C.I. A study of the techniques, skills and procedures used in teaching technical/vocational education subjects.

EDIE 403 Qtr. Hrs. - 4
Analysis of Vocational Occupations: PR: Rank III Certificate or C.I. Techniques of analyzing components of an occupation to obtain content for instruction.

EDIE 404 Qtr. Hrs. - 4
Curriculum Planning for Vocational Education: PR: Rank III Certificate or C.I. Systematic development of a course of study for use in teaching a subject in an occupational area.

EDIE 405 Qtr. Hrs. - 4
Evaluation of Occupational Instruction: PR: Rank III Certificate or C.I. This course is concerned with the total evaluation process as it relates specifically to vocational instruction.

EDIE 406 Qtr. Hrs. - 4
Analysis of Learning as Applied to Vocational Education: PR: Rank III Certificate or C.I. Course is designed to familiarize the vocational application to the Vocational classroom.

EDUCATION – VISUAL ARTS

EDVA 401 Qtr. Hrs. - 3
Elementary School Art Instructional Analysis: PR: EDTA 206 and EDTA 307 or C.I. Methods and curriculum materials appropriate for teaching Visual Arts in the elementary schools.

EDVA 402 Qtr. Hrs. - 3
Secondary School Art Instructional Analysis: PR: EDTA 206 and EDTA 307 or C.I. Methods and curriculum materials for teaching Visual Arts in the secondary schools.

EDVA 431 Qtr. Hrs. - 3
Two-Dimensional Instructional Materials: PR: EDVA 401 or 402 or C.I. Application of two-dimensional materials to appropriate levels of instruction: chalk, ink, water color, crayon, tempera, acrylics, paper, fiber, and oils.

EDVA 432 Qtr. Hrs. - 3
Three-Dimensional Instructional Materials: PR: EDVA 401 or 402 or C.I. Application of three-dimensional materials to appropriate levels of instruction: wood, paper, plaster, stone, clay, wax, fiber, metal, and synthetics.

EDVA 433 Qtr. Hrs. - 3
Graphic Instructional Materials: PR: EDVA 401 or 402 or C.I. Application of graphic materials to appropriate level of instruction: direct and indirect basic processes of reproduction of mono and multi-printing.

EDVA 501 Qtr. Hrs. - 3
Contemporary Visual Arts Education: PR: EDVA 401 and EDVA 402 or C.I. A study of current programs and innovations in public school Visual Arts Programs.

EDVA 502 Qtr. Hrs. - 3
Found Arts: PR: EDVA 431 and EDVA 432 or C.I. Materials available for instruction in the public schools will be explored in depth in relation to their appropriateness and productive qualities.

EDVA 601 Qtr. Hrs. - 3
Two-Dimensional Instructional Materials: PR: EDVA 401, 402, and 431, or C.I. Application of two-dimensional materials to appropriate levels of instruction: chalk, ink, water color, crayon, tempera, acrylics, paper, fiber, and oils.

EDVA 602 Qtr. Hrs. - 3
Three-Dimensional Instructional Materials: PR: EDVA 401, 402, 432, or C.I. Application of three-dimensional materials to appropriate levels of instruction: wood, paper, plaster, stone, clay, wax, fiber, metal, and synthetics.

EDVA 603 Qtr. Hrs. - 3
Graphic Instructional Materials: PR: EDVA 401, 402, and 433, or C.I. Application of graphic materials to appropriate level of instruction: direct and indirect basic processes of reproduction of mono and multi-printing.

COLLEGE OF ENGINEERING

CIVIL ENGINEERING AND ENVIRONMENTAL SCIENCES

CEES 321 Qtr. Hrs. - 3
Surveying: CR: Junior Standing. Theory and field practice in engineering, measurements, and the reduction and adjustment of data. Two lectures, three hours laboratory.

CEES 322 Qtr. Hrs. - 4
Engineering Geology: PR: ENGR 152. Basic principles of physical geology with emphasis on topics pertinent to analysis and engineering of soil deposition, geologic maps, weathering, groundwater, mass wasting, and earthquakes. Three lectures, three hours laboratory.

CEES 351 Qtr. Hrs. - 4
Structural Mechanics: PR: ENGR 312. Deflections of statically determinate structures by direct and energy methods. Introduction to matrix algebra. Influence coefficients and diagrams. Analysis of statically indeterminate structures by methods of consistent displacements, slope-deflection, and moment distribution.

CEES 355 Qtr. Hrs. - 3
Structural Steel Design: PR: ENGR 312. Design of steel structural members. Selected topics in beam design, column design, plastic design, connections and build-up members.

CEES 357 Qtr. Hrs. - 3
Structural Concrete Design: PR: ENGR 312. Principles of designing reinforced concrete members. Selected topics in concrete mixes, beams, columns, and ultimate analysis.

CEES 411 Qtr. Hrs. - 4
Environmental Engineering — Water Supply: PR: ENGR 332. Water resources, hydrologic cycle, water quality, chemistry of natural Water, water treatment, transmission, and distribution.

CEES 412 Qtr. Hrs. - 4
Environmental Engineering — Wastewater: PR: ENGR 332. Drainage systems, collection and transmission of wastewater, channel flow, biodegradation of organic wastes, principles of wastewater treatment, effluent and sludge handling and disposal.

CEES 414 Qtr. Hrs. - 4
Water and Wastewater Systems Design: PR: CEES 411 or 412. Planning capacity and design of water distribution systems, sanitary sewerage, storm drainage systems, water and wastewater treatment plants.

CEES 415 Qtr. Hrs. - 3
Atmospheric Pollution Control: PR: Senior standing. Atmospheric composition and dynamics, sources and nature of contaminants, toxicity thresholds and biological significance, engineering methods of measurement and control.

CEES 416 Qtr. Hrs. - 4
Public Health Engineering: PR: Senior standing. Selected topics in the occurrence and transmission of diseases, mathematical theory of epidemics, sanitation of the environment, vector control and public engineering and administration.

CEES 417 Qtr. Hrs. - 4
Environmental Health: PR: Senior standing. Selected topics in industrial hygiene, radiological health, effects of pollution on the natural environment, pollution control concepts and regulatory agencies.

CEES 431 Qtr. Hrs. - 4
Soil Mechanics and Foundation Engineering I: PR: ENGR 312. Study of the fundamental principles of soil behavior, properties, engineering, and characteristics, including bearing capacity and settlement. Basic applications to retaining walls, foundations, slope stability, etc. Project type laboratory exercises with emphasis on application of laboratory testing and results to practical problems. Three lectures, three hours laboratory-demonstrations.

CEES 432 Qtr. Hrs. - 4
Soil Mechanics and Foundation Engineering II: PR: CEES 431 or C.I. Continuation of CEES 431 with emphasis on strength and compressibility characteristics of soils, application to slope stability, earth dams, etc. Continuation of project type laboratory. Three lectures, three hours laboratory-demonstration.

CEES 451 Qtr. Hrs. - 4
Matrix Methods of Structural Analysis - I: PR: CEES 351 or C.I. Structural analysis of beams, frames, and plates by matrix methods. Identical to EMMS 441.

CEES 452 Qtr. Hrs. - 4
Matrix Methods of Structural Analysis - II: PR: CEES 451. Extension of CEES 441 to include selected topics in stability, vibration, and limit analysis of beams, frames and plates.

CEES 461 Qtr. Hrs. - 3
Transportation Engineering: PR: ENGR 342. Investigation of all forms of transport — highway, rail, water, air. Systems approach to planning, design, construction, operation, and administration of transportation networks.

CEES 462 Qtr. Hrs. - 3
Transportation Engineering: PR: CEES 461. Advanced topics in transportation system analysis.

CEES 463 Qtr. Hrs. - 3
Traffic Engineering: PR: CEES 461 and ENGR 371. Study of operator and vehicle characteristics, street capacity, signals, signs and markings. All phases of traffic engineering as applied to urban areas.

CEES 471 Qtr. Hrs. - 3
Urban Planning: PR: ENGR 342. History and principles of planning. Basic economic, land use, population, conservation, and government planning concepts. Quantitative methods for comprehensive studies of urban development.

CEES 472 Qtr. Hrs. - 3
Urban Planning: PR: CEES 471. Municipal organization and administration, public health, public utilities, services, zoning, replanning, critical studies.

CEES 501 Qtr. Hrs. - 3
Environmental Engineering – Chemistry I: Study of fundamental principles of physical and analytical chemistry applicable to treatment of water and wastewater. Chemical thermodynamics, chemical kinetics, chemical equilibria, water analysis. Two hours lecture and three hours laboratory.

CEES 502 Qtr. Hrs. - 3
Environmental Engineering – Chemistry II: PR: CEES 501 or C.I. Continuation of CEES 501 to include study of fundamental principles of organic chemistry and biochemistry as applied to environmental quality control, biodegradation of wastes, and wastewater analysis. Two hours lecture and three hours laboratory.

CEES 518 Qtr. Hrs. - 3
Hydraulic Engineering: Application of principles of fluid mechanics to engineering problems. Topics include open channel flow, flow in conduits under pressure, hydraulic machinery, principles of reservoir planning, water supply systems, dams, spillways, and other hydraulic works.

CEES 521 Qtr. Hrs. - 3
Aerial Photographic Interpretation: PR: C.I. Geometrical principles, optics, photography, survey cameras, stereoscopic vision and measurement, interpretation, theory of image measurement, terrestrial photogrammetry, aerial photogrammetry, thermal imagery, fundamental projective relations, errors.

CEES 525 Qtr. Hrs. - 4
Advanced Topics in Engineering Geology: Geologic aspects of major civil engineering works, including dams, reservoirs, urban development, transportation systems, etc.

CEES 530 Qtr. Hrs. - 3
Foundations Desgin I: Design of fundamental foundation units including spread footings, combined footings, mats, and retaining walls.

CEES 581 Qtr. Hrs. - 3
Water Resources Engineering: PR: C.I. Hydrology, hydraulics, pressure conduits, open channels, and uses of water. The economics and engineering of systems for control and utilization of water resources will be studied using systems analysis and operations research techniques.

CEES 582 Qtr. Hrs. - 3
Water Resources Economics: PR: CEES 581. General micro-economic concepts, benefits and costs from investment alternatives, external diseconomies, effluent charges, interest rates, design life, and case studies of foreign and domestic policies.

CEES 601 Qtr. Hrs. - 4
Unit Operations and Processes of Sanitary Engineering - I: Theory and design of physical, chemical, and biological operations and processes used in sanitary engineering.

CEES 602 Qtr. Hrs. - 4
Unit Operations and Processes of Sanitary Engineering - II: Continuation of CEES 601. Theory and design of physical, chemical, and biological operations and processes.

CEES 603 Qtr. Hrs. - 2
Unit Operations and Processes Laboratory: Laboratory exercises in physical, chemical, and biological processes.

CEES 604 Qtr. Hrs. - 3
Water and Wastewater Treatment Systems: Integration of unit operations and processes into treatment systems. Emphasis will be placed on functional, hydraulic, and economic design using computers.

CEES 611 Qtr. Hrs. - 4
Environmental Engineering – Water Supply: Water resources, hydrologic cycle, water quality, chemistry of natural water, water treatment, transmission, and distribution.

CEES 612 Qtr. Hrs. - 4
Environmental Engineering – Wastewater: Drainage systems, collection and transmission of wastewater, channel flow, biodegradation of organic wastes, principles of wastewater treatment, effluent and sludge handling and disposal.

CEES 614 Qtr. Hrs. - 3
Water and Wastewater Systems Design: Planning capacity and design of water distribution systems, sanitary sewerage, storm drainage systems, water and wastewater treatment plant.

CEES 615 Qtr. Hrs. - 3
Atmospheric Pollution Control: Atmospheric composition and dynamics, sources and nature of

contaminants, toxicity thresholds and biological significance, engineering methods of measurement and control

CEES 616 Qtr. Hrs. - 4
Public Health Engineering: Selected topics in the occurrence and transmission of diseases, mathematical theory of epidemics, sanitation of the environment, vector control, and public engineering and administration.

CEES 617 Qtr. Hrs. - 4
Environmental Health: Selected topics in industrial hygiene, radiological health, effects of pollution on the natural environment, pollution control concepts, and regulatory agencies.

CEES 618 Qtr. Hrs. - 3
Solid Wastes Management: Study of the extent and characteristics of the solid waste problem, collection and disposal systems, and environmental interfaces and effects.

CEES 620 Qtr. Hrs. - 3
Groundwater and Seepage: Theories of groundwater movement geological factors, analysis techniques, etc. Emphasis on practical considerations.

CEES 630 Qtr. Hrs. - 3
Foundations Design II: Continuation of topics in CEES 530 including sheet piles and pile foundations.

CEES 681 Qtr. Hrs. - 4
Water Resources Systems I: PR: CEES 582. A comprehensive approach to planning controlling, and development of water resources systems. Applications of systems analysis and economic theory to water resources problems. Deterministic models are developed and solved. Case studies.

CEES 682 Qtr. Hrs. - 4
Water Resources Systems II: PR: CEES 681. Continuation of CEES 681 to include stochastic models. Case studies.

ELECTRICAL ENGINEERING AND COMMUNICATIONS SCIENCES

EECS 311 Qtr. Hrs. - 4
Introduction to Digital Circuits: PR: COMP 205. Introduction to electrical components used in digital switching circuits and to the properties of magnetic materials; construction of basic logic gates and flip-flops; consideration of various practical problems including reliability, noise and packaging techniques. Intended primarily for computer science majors. Three lectures, three hours laboratory.

EECS 321 Qtr. Hrs. - 4
Electrical Networks: PR: ENGR 321. Analysis of linear circuits. Laplace and Fourier transform techniques. State variable representation. Computer aided analysis techniques. Three lectures, three hours laboratory.

EECS 322 Qtr. Hrs. - 4
Electronic Engineering: PR: ENGR 322. Electronic devices and circuits including small signal amplifiers, power amplifiers, and switching circuits. Three lectures, three hours laboratory.

EECS 331 Qtr. Hrs. - 3
Electromechanics: PR: ENGR 323. Energy conversion by electromechanical methods.

EECS 341 Qtr. Hrs. - 4
Electromagnetic Fields: PR: ENGR 322 and MATH 331. Introduction to electrical fields and waves.

EECS 411 Qtr. Hrs. - 4
Logical Component Design: PR: ENGR 322. Switching theory. Design and application of serial and parallel logical components including counters, registers, adders. Principles of stored program computers. Three lectures, three hours laboratory.

EECS 412 Qtr. Hrs. - 4
Logical Systems Design: PR: EECS 411. Systems investigation, design, and operation of digital computers; study of a basic hardware set and a basic software set.

EECS 413 Qtr. Hrs. - 4
Digital Systems and Circuits: PR: EECS 411. Investigation of integrated circuit digital subsystems and their incorporation into circuits for digital applications. Three lectures, three hours laboratory.

EECS 414 Qtr. Hrs. - 3
Analog Computers: PR: EECS 321. Theory, operation and application of analog computers.

EECS 421 Qtr. Hrs. - 3
Electrical Networks: PR: EECS 321 and 341. Traveling electromagnetic waves with application to distributed parameters. Two lectures, three hours laboratory.

EECS 431 Qtr. Hrs. - 3
Electrical Machinery: PR: EECS 331. Methods and techniques of systems analysis applied to the dynamics of electrical machinery. Two lectures, three hours laboratory.

EECS 442 Qtr. Hrs. - 4
Microwaves: PR: EECS 341. Microwave devices and systems and measurement techniques. Three lectures, three hours laboratory.

EECS 451 Qtr. Hrs. - 4
Communication Systems: PR: EECS 321 and 322. Information transmission, modulation, and noise. Three lectures, three hours laboratory.

EECS 461 Qtr. Hrs. - 3
Semiconductor Devices: PR: EMMS 411. Semiconductors with non-uniform impurity

distribution; impurity diffusion, analysis of drift transistor with constant built-in field. Junction field-effect transistors. Two lectures, three hours laboratory.

EECS 462 Qtr. Hrs. - 3
Solid State Systems: PR: EECS 461. Theory of solid state devices.

EECS 464 Qtr. Hrs. - 3
Solid State Electronics: PR: EECS 461. Theory of solid state devices.

EECS 513 Qtr. Hrs. - 4
Pulse Circuits: PR: Basic electronics course. Wave generating, shaping, and logic circuits. Three lectures, three hours laboratory.

EECS 531 Qtr. Hrs. - 3
Environmental Control Systems: PR: ENGR 421 or equivalent. Modeling, control methods, stability, and optimization applied to environmental systems.

EECS 535 Qtr. Hrs. - 3
Electric Power Generation and Distribution: PR: ENGR 323 or equivalent. Introduction to electric energy sources. Concept of complex power in single and three phase systems. Synchronous machines, power transformer, and transmission lines.

EECS 543 Qtr. Hrs. - 3
Coherent Optics Applications: PR: PHYS 354. Theory and design of coherent optical systems lasers, information, processing, communication, holography.

EECS 553 Qtr. Hrs. - 3
Random Processes: PR: EECS 321 and ENGR 371. Random variables, averaging, sampling, elements of probability theory.

EECS 611 Qtr. Hrs. - 3
Modern Circuit Design: Application of computer aided methods for the analysis and synthesis of passive and active networks.

EECS 613 Qtr. Hrs. - 3
Digital Circuits: Analysis of logic circuits, design of digital systems using contemporary integrated circuits, laboratory project.

EECS 621 Qtr. Hrs. - 3
Digital Computer Systems: PR: EECS 613. Investigation of general purpose computer systems and their components.

EECS 625 Qtr. Hrs. - 3
Computer Simulation of Environmental Systems: PR: EECS 531 or equivalent. Modeling environmental systems using digital, analog, and hybrid computer techniques.

EECS 631 Qtr. Hrs. - 3
Modern Control Theory: State space method of analysis for discrete and continuous control, phase plane, Lyapunov stability.

EECS 632 Qtr. Hrs. - 3
Optimal Control Systems: PR: EECS 631. Cost Function, control restraints, initial and target states. Pontryagin's theorem, time, fuel, and energy optimization.

EECS 633 Qtr. Hrs. - 3
Nonlinear Control Systems: PR: EECS 631. Analysis and synthesis techniques for nonlinear systems, stability classifications, limit cycles, Popov's theorem. State variable description.

EECS 645 Qtr. Hrs. - 3
Remote Sensing Optical Systems: PR: EECS 341 or equivalent. Study of electromagnetic phenomena and systems at optical and near optical wavelengths and the use of such systems in environmental monitoring.

EECS 651 Qtr. Hrs. - 3
Signal and System Analysis: Representation of signals and linear systems in the frequency and time domains, transforms, sampling, random signals.

EECS 653 Qtr. Hrs. - 3
Communication Theory: Theory of communicating in the presence of noise, modulation, optimum filtering, phase-lock loop.

ENGINEERING CORE

ENGR 100 Qtr. Hrs. - 4
Oceanography and Space: Fundamentals of oceanography and space with emphasis on the engineering aspects and uses. May be used to satisfy Scientific Environment requirement of Environmental Studies Program.

ENGR 101 Qtr. Hrs. - 3
Engineering Graphics: Spatial visualization, sketching, and graphical presentation as a form of engineering communication. Engineering drawing, descriptive geometry, manipulation of vectors and graphical solution techniques. Two lectures, one two-hour laboratory.

ENGR 103 Qtr. Hrs. - 3
Creative Design: PR: Approval of instructor. Role of the engineer as a creative design professional. Emphasis on understanding the creative process and factors that influence it. Attitudes and viewpoints of the designer and an investigation of the techniques of analysis, synthesis, and evaluation used. Two lectures, two hours recitation-laboratory.

ENGR 111 Qtr. Hrs. - 4
Engineering Concepts: CR: MATH 321. Introduction to the basic physical phenomena essential to the understanding of engineering structures, machines, processes, and systems. Primary emphasis on mechanics, materials behavior, and thermofluid mechanics phenomena. Lecture, demonstration, and recitation.

ENGR 151, 152 Qtr. Hrs. 3, 3
Chemical Foundations of Engineering: PR: Satisfactory performance in one year of high school chemistry or physics. CR: MATH 211. Engineering applications of basic chemical concepts. Atomic and molecular structure, states of matter and their energies, chemical equilibria and reaction rates, organic compounds, and industrial processes. Lecture, demonstration, recitation.

ENGR 201 Qtr. Hrs. - 1
Engineering Design Case Studies: PR: Sophomore standing and ENGR 103. Discussion of the role of various engineering disciplines in the creative design process. Invited guest speakers will review pertinent case studies covering a broad spectrum of engineering problems.

ENGR 211 Qtr. Hrs. - 4
Engineering Analysis – Statics: PR: ENGR 111 and MATH 322. Fundamental concepts of mechanics including resultants of force systems, free-body diagrams, equilibrium of rigid bodies, and analyses of structures.

ENGR 221 Qtr. Hrs. - 4
Electrical Science: PR: MATH 323 and ENGR 111. General concepts of electricity and magnetism; the development of fundamental laws of electrical engineering; the introduction of the basic circuit elements. Lecture and discussion.

ENGR 311 Qtr. Hrs. - 4
Engineering Analysis – Dynamics: PR: ENGR 211 and MATH 323. Kinematics and kinetics of particles and rigid bodies; mass and acceleration, work and energy, and impulse and momentum.

ENGR 312 Qtr. Hrs. - 5
Mechanics of Materials: PR: ENGR 211; CR: MATH 331. Concepts of stress and strain, Hooke's Law; strength and deflection of axial force members, shafts in torsion and beams in flexure; combined stress; stability of columns. Lecture, demonstration and laboratory.

ENGR 321 Qtr. Hrs. - 4
Principles of Electrical Engineering: PR: ENGR 221; CR: MATH 331. Introduction to fundamental laws of electrical circuits, including transient, steady-state AC, and general network analysis. Lecture, demonstration, and laboratory.

ENGR 322 Qtr. Hrs. - 4
Electronic Engineering: PR: ENGR 321. Electronic circuits. Lecture, demonstration and laboratory.

ENGR 323 Qtr. Hrs. - 4
Electrical Devices Systems: PR: ENGR 322. Electromagnetic energy conversion devices, feedback amplifiers, and instrumentation. Lecture, demonstration, and laboratory.

ENGR 331 Qtr. Hrs. - 3
Thermodynamics: PR: ENGR 311. CR: MATH 324. Work, heat and energy transformations. Relation of properties. Laws, concepts and modes of analysis common to all applications of thermodynamics in engineering.

ENGR 332 Qtr. Hrs. - 4
Fluid Mechanics: PR: ENGR 331. Basic principles of continium fluid mechanics and transport concepts. Lecture, demonstration, and laboratory.

ENGR 341 Qtr. Hrs. - 3
Engineering Economic Analysis: PR: ECON 201 or C.I. Economic evaluation of engineering alternatives. Time value of money and economic impact of taxes, risk, depreciation.

ENGR 342 Qtr. Hrs. - 3
Systems Analysis: PR: MATH 324; CR: MATH 331. Introduction to the mathematical analysis of linear systems. The behavior of linear systems as manifested by their characteristic functions. Introduction to Laplace transforms, matrices, and state variable techniques. System simulation by digital and analog computers.

ENGR 351 Qtr. Hrs. - 3
Structure and Properties of Material: PR: ENGR 152 and MATH 322. Electrons and bonding, crystals, noncrystalline solids, equilibrium diagrams, nonequilibrium phase transformations, and diffusion in solids.

ENGR 352 Qtr. Hrs. - 3
Materials of Engineering: PR: ENGR 351. Chemical, mechanical and electrical properties of materials; structure and properties of engineering alloys; lecture, demonstration, and laboratory.

ENGR 361 Qtr. Hrs. - 3
Man and His Environment: PR: ENGR 152 or equivalent. Man's interaction with the air, water and land environment in which he lives. The role of engineering in control of the physical environment for the benefit of mankind.

ENGR 371 Qtr. Hrs. - 3
Probability and Statistics for Engineers: PR: MATH 323. Axioms of probability; combinatorial and geometrical probability; probability distributions; measures of location and dispersion; sampling and sampling distributions; estimation and tests of hypotheses; engineering applications. (Same as STAT 335.)

ENGR 403 Qtr. Hrs. - 3
Senior Creative Design: PR: Senior standing. Application of the fundamental engineering design algorithm to design synthesis and inventiveness methods culminating in an individual or group engineering design project.

ENGR 421 Qtr. Hrs. - 3
Linear Control Systems: PR: MATH 331, ENGR 332. Theoretical and experimental study of the dynamics of linear, lumped parameter models of mechanical, electrical, fluid, thermal and mixed systems as applied to control systems.

ENGR 431 Qtr. Hrs. - 3
Thermodynamics and Transport Processes: PR: ENGR 331. CR: ENGR 332. Consequences of the second law and combined first and second law analysis of thermodynamic systems. Introduction to heat transfer including conduction, convection, and radiation.

ENGR 441 Qtr. Hrs. - 3
Technical Communications: PR: Junior standing. Composition for technical papers, reports and scientific articles suitable for publication. Oral and written presentation.

ENGR 442 Qtr. Hrs. - 3
Operations Research: PR: ENGR 371. Mathematical methods of operations research; linear programming, techniques of optimizations.

ENGR 443 Qtr. Hrs. - 3
Engineering Administration: PR: ENGR 341 and senior standing. Engineering organization and administration; delegation of authority and responsibility; effective utilization of resources; compensation structure, labor-management relations; selected case studies.

ENGINEERING — INTERDISCIPLINARY COURSES

ENGR 480 Qtr. Hrs. - 3
Systems Modelling: PR: COMP 101 or equivalent. Representation of man/machine systems through analytic and computer-based models. Case studies in the analysis and improvement of systems in industry, education, and government.

ENGR 481 Qtr. Hrs. - 3
Man and Machine: The influence and interrelationship of invention and technical progress on the evolution of social forms and institutions.

ENGR 482 Qtr. Hrs. - 3
Engineering & Technology in History: Important developments in engineering and technology and their effect on society and our socio-economic processes and institutions.

ENGR 483 Qtr. Hrs. - 3
Technology and Social Change: Review of existing theories of social change, analysis of the role of technology as related to social change, and study of contemporary events in technology and their possible impact on society.

ENGR 484 Qtr. Hrs. - 3
Science in History: Examination of the reciprocal relations of science and society from ancient to recent times.

ENGR 485 Qtr. Hrs. - 3
Topics in Urban Development: Production, distribution, and consumption of various commodities and engineering relationships to distribution, internal structure, and function of urban developments. Interrelationship of engineering, social, economic, and cultural phenomena.

ENGR 486 Qtr. Hrs. - 3
Science, Engineering, and Ethical Systems: A study of the contributions of science and engineering to society in light of moral, social, and ethical principles. A systematic and critical consideration of representative ethical problems created by advancing technology.

ENGR 487 Qtr. Hrs. - 3
Historical Architecture: Architecture as the realization of changing aesthetic and cultural ideals and the expression of changing forms of society. Development of understanding of our physical environment through a study of the forms, functions and determinants of architecture.

ENGR 488 Qtr. Hrs. - 3
Man and Environment: PR: Permission of instructor. A discussion of environmental factors of importance to man, man's interaction with the environment, engineering and non-engineering measures to insure improvement and maintenance of environmental quality. Not intended for engineering students.

ENGR 489 Qtr. Hrs. - 3
Computers, Cybernetics and Society: The effects of computers and the cybernetic revolution on the individual and society. Effects of positive and negative feedback on biological, technological, and social systems. Computers and their interactions with human system.

ENGR 490 Qtr. Hrs. - 2
Engineering in Human Affairs: The impact of engineering on modern society. This course, primarily intended for the senior student, is offered as one of the Advanced Environmental Studies Seminars. Not open to students majoring in the College of Engineering.

ENGINEERING MATHEMATICS AND COMPUTER SYSTEMS

EMCS 423 Qtr. Hrs. - 3
Mathematics Review for Engineers: Comprehensive review of college algebra, trigonometry, analytical geometry, vector calculus, and an introduction to differential equations for non-current engineering students wishing to pursue advanced work.

EMCS 430 Qtr. Hrs. - 3
Engineering Software Design: PR: COMP 102 or equivalent, CR: MATH 331. Theory and construction of special purpose computer software for engineering applications. Review of problem oriented languages through selected case studies, including ECAP, CSMP, COGO and SNOBOL 4.

EMCS 431, 432, 433 Qtr. Hrs. - 3, 4, 4
Numerical Methods in Scientific Computation: PR: MATH 321. Methods for the operational solution of problems in engineering, science, and applied mathematics. Synthesis and design of computer processing algorithms, including error analysis, stability analysis, and run time prediction. Review of existing software systems for numerical application.

EMCS 434 Qtr. Hrs. - 3
Computing Methods in Automatic Control: PR: ENGR 421. Design, analysis, and implementation of computer based control systems, including analog, digital, and on-line schemes for process identification and control.

EMCS 471, 572 Qtr. Hrs. - 3, 3
Engineering Mathematical Analysis: PR: MATH 324, MATH 331. The application of mathematical methods to engineering problems including vector and tensor fields, state space techniques, orthogonal curvilinear coordinates and orthogonal functions.

EMCS 530 Qtr. Hrs. - 3
Engineering Data Reduction: PR: ENGR 371. Methods for processing and analysis of scientific test and process data, including computer filtering schemes and data compression and recovery techniques.

EMCS 532 Qtr. Hrs. - 3
Atomata Theory: PR: EECS 411 or equivalent. Structural theory and performance characteristics of finite-state machines.

EMCS 573 Qtr. Hrs. - 3
Analytical Methods in Engineering: PR: EMCS 471 or C.I. The kinematics and dynamics of ideal field theory problems and their mathematical expression. Formulation of boundary conditions. Basic concepts of complex potential and conformal mapping with application to problems influid flow, thermal, and electrical potential.

EMCS 574 Qtr. Hrs. - 3
Analytical Methods in Engineering: PR: EMCS 471 or C.I. Engineering applications of partial differential equations and the concept of the mathematical modeling of physical problems. Development of characteristic properties of equations and methods of solutions, including separation of variables, transform techniques, and method of characteristics.

EMCS 575 Qtr. Hrs. - 3
Numerical Analysis in Engineering: PR: MATH 324, MATH 331. Application of numerical techniques to the solution of complex engineering problems. Analysis and organization of practical programs for numerical solution of initial, boundary and eigenvalue problems.

EMCS 630 Qtr. Hrs. - 3
Discrete System Simulation: PR: ENGR 371 or equivalent. Computer-based modelling and analysis of discrete-space, discrete-time engineering related systems. Use of FORTRAN IV and GPSS/360 for implementing such models. Laboratory assignments.

EMCS 631 Qtr. Hrs. - 3
Continuous System Simulation: PR: ENGR 342 or equivalent. Computer-based modelling and analysis of continuous systems. Use of state-space techniques and the CSMP/360 simulation language. Laboratory assignments.

ENGINEERING MECHANICS AND MATERIALS SCIENCES

EMMS 351 Qtr. Hrs. - 4
Structural Mechanics: PR: ENGR 312. Deflections of statically determinate structures by direct and energy methods. Introduction to matrix algebra. Influence coefficients and diagrams. Analysis of statically indeterminate structures by methods of consistent displacements, slope-deflection and moment distribution. Identical to CEES 351.

EMMS 355 Qtr. Hrs. - 3
Structural Steel Design: PR: ENGR 312. Design of steel structural members. Selected topics in beam design, column design, plastic design, connections and built-up members. Identical to CEES 355.

EMMS 357 Qtr. Hrs. - 3
Structural Concrete Design: PR: ENGR 312. Principles of designing reinforced concrete members. Selected topics in concrete mixes, beams, columns and ultimate analysis. Identical to CEES 357.

EMMS 411 Qtr. Hrs. - 3
Semiconductor Materials and Devices: PR: ENGR 323 and ENGR 351. Electrical conduction in semiconductors; basic concepts of drift, diffusion, carrier generation and recombination. Physical theory and models for the junction diode and transistor. Representation in terms of linear, incremental, and nonlinear charge control models.

EMMS 412 Qtr. Hrs. - 3
Electronic Properties of Materials: PR: ENGR 351. Electronic processes in solids. Electrical, magnetic and optical properties of solids. Electron energies in solids. Superconducting materials.

EMMS 413 Qtr. Hrs. - 3
Thermodynamic Properties of Materials: PR: ENGR 351. Fundamental concepts of thermodynamics and kinetics are applied to the study of solid state phase transformations, equilibrium in multicomponent systems and diffusion in solids.

EMMS 414 Qtr. Hrs. - 3
Mechanical Properties of Materials: PR: ENGR 351. Fundamentals of mechanical behavior of engineering materials. Selected topics include fracture, creep, fatigue, and microscopic interpretation of results of mechanical testing.

EMMS 421 Qtr. Hrs. - 3
Theory of Crystalline Solids: PR: ENGR 351. Modern theory of crystalline materials. Topics treated include crystal structure, mechanical, thermal and transport properties.

EMMS 430 Qtr. Hrs. - 3
Structure and Properties of Alloys: PR: ENGR 351. Application of kinetic factors and phase equilibria to the study of the structure and properties of ferrous and non-ferrous alloys; correlation of properties with structure, chemical composition, and environmental factors.

EMMS 433 Qtr. Hrs. - 3
Physical Metallurgy: PR: ENGR 351. Principles underlying the study of diffusion, recovery and recrystallization, and solidification processes in metal systems.

EMMS 434 Qtr. Hrs. - 3
Experimental Techniques for Materials: PR: ENGR 351. Theoretical and experimental study of the application of optical microscopy, X-ray diffraction and electron microscopy for materials analysis. Two lectures and two hours laboratory.

EMMS 435 Qtr. Hrs. - 3
Structure and Properties of Ceramics and Polymers: PR: ENGR 351. Structure of vitreous and crystalline non-metals; mechanical, thermal, and electrical properties of organic polymers and composite materials.

EMMS 441 Qtr. Hrs. - 4
Matrix Methods of Structural Analysis I: PR: EMMS 351 or C.I. Structural analysis of beams frames, and plates by matrix methods. Same as CEES 451.

EMMS 442 Qtr. Hrs. - 4
Matrix Methods of Structural Analysis II: PR: EMMS 441. Extension of EMMS 441 to include selected topics in stability, vibration, and limit analysis of beams, frames and plates. Same as CEES 452.

EMMS 501 Qtr. Hrs. - 3
Electron Microscopy of Crystalline Materials: PR: ENGR 351, or C.I. Introduction to the optics of the electron microscope, electron and electron diffraction contrast mechanisms in foils containing lattice defects and second phases, evaluation of methods of specimen preparation including thin foils and replicas; emphasis on the interpretation of images and diffraction effects.

EMMS 511 Qtr. Hrs. - 3
Phase Transformation in Solids: PR: ENGR 351 or C.I. Principles of phase transformations, including precipitation, recrystallization, eutectoids, and martensite; emphasis on the understanding of the thermodynamic and kinetic processes underlying these phenomena.

EMMS 541 Qtr. Hrs. - 4
Intermediate Mechanics of Materials: PR: ENGR 312 and MATH 331. Stress and strain at a point; failure theories; elements of plane elasticity; curved beams; bending and torsion of thin-walled structures; theory of thin plates.

EMMS 600 Qtr. Hrs. - 3
Physical Metallurgy: PR: EMMS 433 or C.I. Theoretical examination of the basic metallurgical processes; diffusion, nucleation and growth, recovery and recrystallization; phase transformation; survey of recent advances in the field.

EMMS 610 Qtr. Hrs. - 3
Mechanical Metallurgy: PR: EMMS 414. Theoretical treatment of solid solution hardening, strain hardening, and precipitation hardening; survey of recent advances in the field.

EMMS 621 Qtr. Hrs. - 3
Advanced Dynamics: PR: EMCS 471 or equivalent. The study of the dynamics of particles and rigid bodies from an advanced viewpoint. Virtual work principle, Lagrange's and Euler's equations of motion and Hamilton's principle applied to engineering problems.

EMMS 643 Qtr. Hrs. - 3
Mechanics of Continuous Media: PR: EMMS 541 or C.I. Vectors and cartesian tensors. Stress in a continuous medium. Deformation and flow. Material properties. Behavior of elastic solids; behavior of fluids.

ENGINEERING TECHNOLOGY

ENT 304 Qtr. Hrs. - 3
Technical Economic Analysis: PR: Junior standing. Analysis of cost elements in technical projects. Basis for comparison of alternatives. Economic analysis of technical operations.

ENT 331 Qtr. Hrs. - 3
Hydraulics and Hydrology: PR: Junior standing. Applied hydraulics and hydrology including topics in closed and open channel flow, rainfall, runoff, seepage, ground water, storage and impoundments, wells, etc.

ENT 351 Qtr. Hrs. - 3
Work Analysis: PR: Junior standing. Analysis of work elements in technical projects. Work simplification and methods improvements in technical operations.

INDUSTRIAL ENGINEERING AND MANAGEMENT SYSTEMS

IEMS 301 Qtr. Hrs. - 3
Management Standards: PR: ENGR 341, CR: ENGR 371. Management standards for evaluation and control of the performance of men and man-machine systems. Flow sequences, work design principles, measurement and evaluation of work with respect to time and wages. Laboratory assignments.

IEMS 311 Qtr. Hrs. - 4
Engineering Law: PR: Junior standing. Influence of contract, property and tort law upon engineering activities; contracts, agency, partnerships, corporations, liens and expert testimony. Inception and development of inventions. Patents and licensing.

IEMS 324 Qtr. Hrs. - 3
Production Management: PR: Sophomore Standing. Principles and methods of production viewed from a managerial decision-making level. (Same as MGMT 324)

IEMS 332 Qtr. Hrs. - 3
Statistical Quality Control: Statistical concepts and methods applied to the control of quality of manufactured products. (Same as STAT 332.)

IEMS 411 Qtr. Hrs. - 3
Industrial Administration: PR: ENGR 443. Role of the engineer in manufacturing management. Basic functions, departmentation, authority relationships, and methods of control.

IEMS 412 Qtr. Hrs. - 4
Safety Engineering: PR: Junior standing. Basic principles of accident prevention in relation to the factors involved in the accident prevention. Hazards within the workplace environment – plant layout and materials handling, machinery, electrical hazards, flammable materials and pressure vessels.

IEMS 414 Qtr. Hrs. - 3
Industrial Facilities Planning Design: PR: IEMS 301. Comprehensive design of an industrial production system. Problems involved in and the inter-relationships of plant location, product analysis, process design, equipment selection, materials handling, plant arrangement and supplementary services. Laboratory assignments.

IEMS 415 Qtr. Hrs. - 3
Job Evaluation and Wage Incentives: PR: IEMS 301 or IEMS 324. Work measurement as a basis for industrial wage systems; consideration of work factor and task analysis in job classification and wage determination.

IEMS 418 Qtr. Hrs. - 3
Project Engineering: PR: Senior standing. Role of the project engineer in research and development, emphasizing the complete sequence of steps from project proposal to project completion. Analytical techniques such as CPM, PERT/COST will be considered.

IEMS 422 Qtr. Hrs. - 3
Network Analysis: PR: ENGR 442. Development, application and computerized analysis of networks for systems analysis and control. Applications of CPM, PERT, GERT and maximal flow concepts. Laboratory Assignments.

IEMS 423 Qtr. Hrs. - 3
Analysis of Industrial Operations: PR: Minimum of 12 credits of IEMS course work. An extensive and intensive analysis of industrial operations for optimum utilization of resources. Laboratory Assignments.

IEMS 424 Qtr. Hrs. - 3
Management Control Systems: PR: ENGR 371 or equivalent. Management decision rules, and mathematical and economic models of production, forecasting, scheduling, order control and inventory control. Application of the computer as a management tool to automate control of the production and inventory process.

IEMS 431 Qtr. Hrs. - 3
Engineering Applications of Computer Methods: PR: MATH 323, COMP 102 or approval of instructor. Methods of structuring engineering problems for computers; general characteristics and performance measures of computers and auxiliary equipment. Introduction to computer-aided design and time-sharing systems, case studies. Two hours lecture, two hours laboratory.

IEMS 432 Qtr. Hrs. - 3
System Simulation with Digital Computers: PR: COMP 102 or equivalent. Methods and procedures for simulating large scale systems with digital computers, FORTRAN, CSMP and GPSS programming languages are used. Laboratory assignments.

IEMS 433 Qtr. Hrs. - 3
Information Acquisition: PR: ENGR 371. The design of systems to collect data for use in managerial decision models, job evaluation, wage payment, production standards, queueing studies, engineering evaluation, and reliability predictions.

IEMS 441 Qtr. Hrs. - 4
Mathematical Systems Theory I: PR: MATH 331, senior standing. Concepts of linear systems analysis. Introduction to state and space techniques. Stable and unstable behavior of linear systems.

IEMS 443 Qtr. Hrs. - 3
Analysis of Decision Processes: PR: ENGR 371 and ENGR 341. Methods of making economic decisions; effects of risk, uncertainty, and strategy on managerial economic decision.

IEMS 447 Qtr. Hrs. - 3
Numerical Methods in Systems Analysis: PR: ENGR 371. Application of vector space and matrix concepts to systems problems. Analysis of linear transformations and simultaneous linear equations. Introduction finite Markov processes.

IEMS 450 Qtr. Hrs. - 3
Biomedical Engineering: PR: ENGR 342 or C.I. An

IEMS 450 Qtr. Hrs. - 3
Biomedical Engineering: PR: ENGR 342 or C.I. An introduction to the engineering description and analysis of living systems. Application of modern technology to medicine and biology. Systems analysis and its application to biomedical and ecological systems.

IEMS 461 Qtr. Hrs. - 3
Human Engineering: PR: Senior standing. Man-machine systems; design and conduct of human engineering studies. Laboratory assignments.

IEMS 462 Qtr. Hrs. - 3
Human Factors in Space Travel: PR: IEMS 461. Artificial environments and environmental control of upper atmosphere and space.

IEMS 464 Qtr. Hrs. - 3
Design of Industrial Operations: Planning, analyzing, controlling and evaluating production systems. Laboratory assignments.

IEMS 470 Qtr. Hrs. - 3
Introduction to Public Systems Analysis: PR: ENGR 371 or equivalent. Application of probability and statistics to the analysis of public systems data. Operations research models and applications; economic decision-models; cost/benefit analysis.

IEMS 502 Qtr. Hrs. - 3
Probability for Engineers: PR: ENGR 371. Engineering application of probability, combinatorial analysis, sample space, events, probability, discrete and continuous random variables, and probability distributions. (Same as STAT 535).

IEMS 503 Qtr. Hrs. - 3
Statistics for Engineers: PR: ENGR 371. Engineering application of statistics, significance tests and confidence intervals, tests of hypotheses, simple and multiple regression and correlation. (Same as STAT 536)

IEMS 510 Qtr. Hrs. - 4
Hospital Systems Analysis: PR: IEMS 301 or equivalent. The application of industrial engineering and systems analysis concepts and techniques to hospital management and operational systems. Hospital systems organization, effectiveness measures and improvement methods.

IEMS 521 Qtr. Hrs. - 3
Engineering Reliability and Quality Assurance: PR: IEMS 332 or C.I. Design and management of reliability programs and quality assurance systems; mathematics of reliability.

IEMS 524 Qtr. Hrs. - 3
Operations Research I: PR: ENGR 442 or equivalent. The methods of operations research including formulation of models and derivation of solutions by various optimization techniques; introduction to deterministic models and techniques, sequencing and replacement, linear programming, geometric and dynamic programming.

IEMS 525 Qtr. Hrs. - 4
Operations Research II: PR: IEMS 524. Introduction to stochastic models and techniques including queueing theory. Simulation, non-linear programming, calculus of variations, and forecasting.

IEMS 532 Qtr. Hrs. - 4
Management Information Systems I: PR: COMP 102 or equivalent. Computer-based management information systems. Analysis of the management and control functions from the context of information processing requirements. Presentation of alternative system designs, including real-time, on-line computing systems.

IEMS 540 Qtr. Hrs. - 4
Systems Dynamics: PR: COMP 102 or equivalent. Industrial dynamics and the information feedback characteristics of industrial systems. Construction, verification, and use of computer-based simulation models for the design, analysis, and improvement of organizational structures and management control policies. Introduction to the use of DYNAMO II computer simulation language.

IEMS 541 Qtr. Hrs. - 4
Mathematical Systems Theory II: PR: IEMS 441 or equivalent. Introduction to non-linear analysis. Approximation methods and numerical solutions. Stability of non-linear systems. Systems examples to be taken from engineering, environmental science, and economics.

IEMS 550 Qtr. Hrs. - 4
Biomedical Instrumentation: PR: ENGR 342 or consent of instructor. Theory and techniques of biological instrumentation systems including transducers and computers applications. The nature of biological signals, their detection, analysis and display.

IEMS 561 Qtr. Hrs. - 3
Human Performance: PR: IEMS 461 or C.I. A study of the factors affecting human acquisition of skills and level of performance attained. Includes a critical review of background research. Laboratory assignments.

IEMS 602 Qtr. Hrs. - 3
Engineering Economic Analysis: PR: ENGR 341. The engineering economic audit, breakeven point analysis, variable budget control of manufacturing costs, cost analysis and product pricing.

IEMS 610 Qtr. Hrs. - 3
Project Engineering: PR: Graduate standing. Role of the project engineer in research and development, emphasizing the complete sequence of steps from project proposal to project completion. Analytical techniques such as CPM, PERT/COST will be considered.

IEMS 620 Qtr. Hrs. - 3
Queueing Systems: PR: IEMS 502. Analysis of queueing systems and waiting line problems using analytical and Monte Carlo methods. Laboratory assignments.

IEMS 626 Qtr. Hrs. - 4
Linear Programming: PR: ENGR 442 or equivalent. Theoretical and computational aspects of linear programming and related topics including simplex algorithms, duality theory, integer programming and stochastic linear programming. Applications to operational problems and computer solutions are emphasized.

IEMS 627 Qtr. Hrs. - 4
Non-linear Programming: PR: IEMS 524. Study of non-linear models and their solution. Topics in non-linear programming, separable programming, and geometric programming.

IEMS 628 Qtr. Hrs. - 4
Dynamic Programming: PR: IEMS 524. A study of the optimization of multistage decision processes based on the application of the principle of optimality. Stochastic and deterministic models are developed.

IEMS 641 Qtr. Hrs. - 4
Mathematical Systems Theory III: PR: IEMS 541. Adaptive systems and trainable machines. Introduction to cybernetics and artificial intelligence.

IEMS 671 Qtr. Hrs. - 3
Public Works Economics: PR: ENGR 341 or equivalent. Economic considerations in public works planning. The nature and objective functions of public works projects; cost estimating, cost allocation and pricing. Cost/benefit analysis on primary and secondary benefits from public works projects.

IEMS 672 Qtr. Hrs. - 4
Urban Dynamics: PR: IEMS 540. Development of dynamic and community systems models. Use of computer simulation to analyze governmental and private sector policies in selected areas such as housing programs, industrial growth, worker training programs, environmental quality control, urban planning and land use planning.

IEMS 678 Qtr. Hrs. - 3
Public Operating Systems Analysis: PR: ENGR 371 or equivalent. Establishment of data base for public operating systems, including identification of data requirements. Development of service demand and workload relationships, resource and manpower requirements.

IEMS 679 Qtr. Hrs. - 3
Public System Planning and Resource Allocation: PR: IEMS 678. Forecasting work load, demand rates, public services by correlation with census factors in geographical grid network. Application of basic operations research techniques, computer simulation models and analytical operating models to optimize resource allocation and work assignment planning.

MECHANICAL ENGINEERING AND AEROSPACE SCIENCES

MEAS 341 Qtr. Hrs. - 3
Kinematics and Kinetics of Machines: PR: ENGR 311. Graphical, mathematical, and computer aided kinematic analysis and synthesis of basic mechanisms. Kinetic analysis of machines. Two two-hour lecture-recitations.

MEAS 342 Qtr. Hrs. - 3
Machine Design and Analysis: PR: MEAS 341. Application of concepts and principles of stress, deflection, strength, and fatigue analysis to machines design. Design Project. Two two-hour lecture-recitations.

MEAS 351 Qtr. Hrs. - 3
Measurement Systems: PR: ENGR 312 and 322. Application of system design concepts to measurements. Fundamental theory of static and dynamic measurements. Behavior of transducers individually and in open-loop systems. Validation of experimental data. Measurements are considered as information transfer accompanied by energy transfer. Two lectures, one laboratory lecture, two hours laboratory bi-weekly.

MEAS 371 Qtr. Hrs. - 4
Fluid Mechanics: PR: ENGR 332. Continuation of ENGR 332. Topics in gas dynamics, including shock waves, viscous flow analysis and solutions in boundary layer theory. Lecture, demonstration, and laboratory.

MEAS 382 Qtr. Hrs. - 3
Thermodynamics of Mechanical Systems: PR: ENGR 431. Applied thermodynamics, availability analysis, thermodynamics of reactive and non-reactive mixtures, thermodynamic relations of properties. Thermodynamic design analysis of complete mechanical systems.

MEAS 411 Qtr. Hrs. - 3
Aerodynamics: PR: ENGR 332. Principles of subsonic and supersonic flight; airfoils in compressible and incompressible flow; flow about a body; thin airfoil and finite airfoil theory. Lecture, demonstration, and laboratory.

MEAS 413 Qtr. Hrs. - 3
Stability and Control: PR: MEAS 411. Application of elementary aerodynamic principles to static and dynamic stability and control surface theory.

MEAS 415 Qtr. Hrs. - 4
Space Mechanics: PR: ENGR 311. Dynamics with applications to aeronautical and astronautical problems, orbits and trajectories, motion in a resisting medium, performance and optimization of multistage rockets.

MEAS 423 Qtr. Hrs. - 4
Vibration Analysis: PR: ENGR 312. Undamped and damped vibrations of single degree of freedom systems. Forced vibrations, transient response. Many degrees of freedom systems, normal modes, vibration of elastic bodies.

MEAS 424 Qtr. Hrs. - 3
Flight Vehicle Structures: PR: ENGR 312. Space structures; thin-walled structures; load factors; nonsymmetrical bending and transverse shear; shear center and shear flow; semimonocoque construction, fuselage rings; multicelled structures; sandwich panels, fatigue.

MEAS 432 Qtr. Hrs. - 3
Propulsion Systems: PR: MEAS 372. Analysis of jet propulsion systems including turbojets, ramjets, and rockets.

MEAS 436 Qtr. Hrs. - 3
Mechanical Power Systems: PR: MEAS 372. Analysis and design of large power generating systems and components thereof with emphasis on steam plants utilizing both chemical and nuclear fuels. Boiler, turbine, condenser, and auxiliary equipment design and performance analysis.

MEAS 441 Qtr. Hrs. - 3
Engineering Design and Analysis: PR: MEAS 341, Senior standing. Problem formulations and definition, inventiveness enhancement, generalized physical principles, numerical and computer methods and optimization techniques. Three lectures.

MEAS 451 Qtr. Hrs. - 3
Measurement Systems: PR: MEAS 351. Extension of fundamental measurement principles; discussion of DC, sine wave and pulse carrier systems and of unbalance and reference-balance measuring methods; simple computing-type transducer. Two lectures, two hours lecture-laboratory.

MEAS 482 Qtr. Hrs. - 4
Heat Transfer: PR ENGR 431, CR: MEAS 371. Steady state and transient conduction in one and two dimensions. Application of boundary layer theory to convective heat transfer analysis. Radiation heat transfer, analysis and design of heat exchangers. Lecture, demonstration and laboratory.

MEAS 523 Qtr. Hrs. - 3
Acoustics: PR: C.I. Elements of vibration theory and wave motion; radiation, reflection, absorption, and transmission of acoustic waves; architectural acoustics; control and abatement of environmental noise pollution.

MEAS 537 Qtr. Hrs. - 3
Energy Conversion: PR: MEAS 372 and PHYS 344. Unconventional methods of energy conversion; particular emphasis on fuel cells, thermoelectrics, thermionics, solar energy, photovoltaics, nuclear, and magnetohydrodynamics.

MEAS 538 Qtr. Hrs. - 3
Environmental Thermodynamics: PR: ENGR 431 or equivalent. Thermodynamics of the environment, computation of energy requirements; physiological reactions to the environment, air and gas distributions, control systems and cleaning of air and the atmosphere.

MEAS 542 Qtr. Hrs. - 3
Principles of Design: PR: MEAS 342. Design procedures; force and motion analysis; failure modes; stress and deflection analysis; stress concentration; fatigue; selected components.

MEAS 581 Qtr. Hrs. - 3
Statistical Thermodynamics: PR: ENGR 331. Statistical approach to thermodynamic concepts, laws, and methods of analysis. Generalized p-v-T data. Special systems.

MEAS 611 Qtr. Hrs. - 3
Aerodynamics: PR: MEAS 411 or equivalent. Theoretical methods useful for predicting performance and stability of thin lifting surfaces and slender vehicles at subsonic, supersonic and hypersonic speeds.

MEAS 613 Qtr. Hrs. - 3
Aeromechanics: PR: MEAS 413 or equivalent. Advanced applied aerodynamics including stability and control of aerospace vehicles. Generalized vehicle performance. Small disturbance dynamic stability and control response.

MEAS 641 Qtr. Hrs. - 3
System Control: PR: ENGR 421 or equivalent. Theoretical, experimental and computer methods involved in the design of control systems. Emphasis on non-linear systems and advanced methods for control system analysis and optimization.

MEAS 643 Qtr. Hrs. - 3
Mechanical Design: PR: MEAS 542 or equivalent. Consideration of shock, impact, fatigue, and energy methods in design. Thermal stress, creep, and stress rupture analysis of composite, honeycomb, and reinforced materials.

MEAS 653 Qtr. Hrs. - 3
Experimental Measurements: PR: Approval of instructor. Principles of operation, analysis and design of measurement systems for engineering applications with emphasis upon the measurement of environmental parameters.

MEAS 671 Qtr. Hrs. - 3
Gas Dynamics: PR: MEAS 674. Survey of gas dynamics from an advanced viewpoint. Fundamentals of wave phenomena. Shock waves and the analysis of subsonic, supersonic and hypersonic flows.

MEAS 673 Qtr. Hrs. - 3
Transport Processes: PR: ENGR 431 or equivalent. Principles of the transport of mass, momentum and energy in fluids with applications to atmospheric and other environmental processes as well as equipment design.

MEAS 674 Qtr. Hrs. - 3
Continuum Fluid Mechanics: CR: EMCS 471. Principal concepts and methods of fluid dynamics. Continuity, momentum, energy and constitutive relations for continuous fluids. Kinematics of fluid motion. Governing equations for motion of viscous and non viscous fluids. Navier Stokes equations and boundary layer theory.

MEAS 686 Qtr. Hrs. - 3
Advanced Heat Transfer: CR: EMCS 574. Steady-state and transient-state conduction and convection problems in heat and mass transfer solved for various constant and fluctuating boundary conditions. Applications to heat exchangers.

COLLEGE OF HUMANITIES AND FINE ARTS

ART

ART 201 Qtr. Hrs. - 3
Design Fundamentals I: Materials, processes, form. Application to product design, communication design, environmental design, and the visual arts. Stresses the value of planning and design in the development of a more humane civilization. Emphasis on two-dimensional design problems.

ART 202 Qtr. Hrs. - 3
Design Fundamentals II: Continuation of ART 201. Emphasis on color theory.

ART 203 Qtr. Hrs. - 3
Design Fundamentals III: Continuation of ART 202. Emphasis on three-dimensional design in the various sculptural media.

ART 204 Qtr. Hrs. - 3
Film Design: A series of exercises in craft technique, and design for the film, including animation.

ART 211 Qtr. Hrs. - 3
Drawing Fundamentals I: Drawing as a means of formal organization. Introduction to problems in drawing methods and media. Emphasis on descriptive techniques.

ART 212 Qtr. Hrs. - 3
Drawing Fundamentals II Continuation of ART 211. Emphasis on traditions of spatial organization.

ART 221 Qtr. Hrs - 3
The History of Art I: Painting, sculpture, and architecture from the Prehistoric Era through the Medieval Period.

ART 222 Qtr. Hrs. - 3
The History of Art II: Painting, sculpture, and architecture from the Renaissance to the 19th Century.

ART 223 Qtr. Hrs. - 3
The History of Art III: Painting, sculpture and architecture of the 19th and 20th Centuries.

ART 231 Qtr. Hrs. - 4
Visual Arts Overview: An analysis of the characteristics and scope of visual arts. Recommended for credit toward the cultural and historical foundations section of the Environmental Studies Program.

ART 301 Qtr. Hrs. - 3
Lettering: PR: Six hours of Design Fundamentals or C. I. Workshop study of the classical and historic types and styles.

ART 302 Qtr. Hrs. - 3
Graphic Design I: PR: Six hours Design Fundamentals and ART 301, or C.I. Principles of visual communication, methods, materials, and processes. Relationship of perceptual studies to graphic design.

ART 303 Qtr. Hrs. - 3
Graphic Design II: PR: ART 302 or C.I. Development of studio techniques and problems stressing balance between articulation and succinct presentation of information.

ART 304 Qtr. Hrs. - 3
Design In Advertising: PR: ART 201 Principles and techniques relating to field of advertising. Not open to art majors. Intended for visual arts education majors and general university elective.

ART 305 Qtr. Hrs. - 3
Three-Dimensional Design: PR: ART 203 or C.I. Intermediate problems in three-dimensional materials, processes, forms.

ART 308 Qtr. Hrs. - 3
Jewelry Design: PR: Consent of the instructor.

ART 311 Qtr. Hrs. - 3
Intermediate Drawing: PR: Six quarter hours of Drawing Fundamentals or C.I. Intermediate problems in drawing. Emphasis on the human form.

ART 321 Qtr. Hrs. - 3
Arts of Pre-Literate Societies: The visual arts in recent and contemporary primitive societies with emphasis on the cultures of Africa and Oceania.

ART 322 Qtr. Hrs. - 3
Asian Art: An introduction to the history of visual arts of China, Japan, India and other Eastern cultures.

ART 324 Qtr. Hrs. - 3
History of Photography: The development of still photography in terms of its historical, aesthetic, and social impact on Western Culture from 1839 to the present.

ART 341 Qtr. Hrs. - 3
Photography: Consideration of basic technical and aesthetic factors in using still photography as a vehicle for visual, artistic expression.

ART 351 Qtr. Hrs. - 3
Painting: PR: Three quarter hours in Design Fundamentals and three quarter hours in Drawing Fundamentals or C.I.

ART 361 Qtr. Hrs. - 3
Printmaking: PR: Three quarter hours of Drawing Fundamentals or C.I. Basic procedure and processes in printmaking. Formal and expressive characteristics of the print media.

ART 371 Qtr. Hrs. - 3
Sculpture: PR: Six quarters in Design Fundamentals, to include three quarter hours in three-dimensional work, or C.I.

ART 381 Qtr. Hrs. - 3
Ceramics: PR: ART 203 or C.I. Basic concepts of ceramic design, experience in processes of forming, decorating, glazing, and firing pottery.

ART 391 Qtr. Hrs. - 3
Experiments in Art and Technology: PR: Consent of Instructor.

ART 402 Qtr. Hrs. - 3
Advanced Graphic Design I: PR: ART 301, ART 302, ART 303. Advanced study in typographic organization, paper, and light-sensitive materials related to design and production of a book.

ART 403 Qtr. Hrs. - 3
Advanced Graphic Design II: PR: ART 402. Relatively large scale problems in existing media of graphic application. Pictorial and symbolic expression in creation of poster design, symbols, magazine and book cover design.

ART 404 Qtr. Hrs. - 3
Advanced Graphic Design III: PR: ART 403. Workshop in Graphic Design: Individual problems providing students with an opportunity to initiate search for an independent formula of graphic design principles.

ART 405 Qtr. Hrs. - 3
Advanced Three-Dimensional Design: PR: ART 305. May be repeated for credit. Advanced problems in three-dimensional materials processes, form.

ART 408 Qtr. Hrs. - 3
Advanced Jewelry Design: PR: ART 308. May be repeated for credit.

ART 409 Qtr. Hrs. - 3
Fibers, Fabrics, Textiles and Synthetics: Textile design and production, including non-loom and loom weaving processes.

ART 410 Qtr. Hrs. - 3
Metals, Woods, Leathers and Stones: Processes and techniques of production in these traditional craft materials.

ART 411 Qtr. Hrs. - 3
Advanced Drawing: PR: ART 311. May be repeated for credit.

ART 425 Qtr. Hrs. - 4
Religious Symbolism in the Visual Arts: A study of the origin, migration, and transmutation of religious signs, symbols and images in the history of art. (Same as HUM 425.)

ART 433 Qtr. Hrs. - 3
Theory and Criticism of the Visual Arts: Criteria of criticism; analysis of works of art; elements of psychology and sociology of art; semantics of critical terminology; relation of aesthetic meaning to reality and truth; emphasis on developments in the arts of the 20th Century.

ART 434 Qtr. Hrs. - 3
Art and Technology: The impact of technological developments in the visual arts of the 20th Century.

ART 441 Qtr. Hrs. - 3
Advanced Photography: PR: ART 341. May be repeated for credit.

ART 451 Qtr. Hrs. - 3
Advanced Painting: PR: ART 351. May be repeated for credit.

ART 461 Qtr. Hrs. - 3
Advanced Printmaking: PR: ART 361. May be repeated for credit.

ART 471 Qtr. Hrs. - 3
Advanced Sculpture: PR: ART 371. May be repeated for credit.

ART 481 Qtr. Hrs. - 3
Advanced Ceramics: PR: ART 381. May be repeated for credit.

ART 482 Qtr. Hrs. - 3
Advanced Experiments in Art and Technology: PR: ART 391. May be repeated for credit.

ART 484 Qtr. Hrs. - 3
Senior Studio and Exhibition: PR: Senior standing and consent of the studio areas faculty. Required of all art majors with a studio concentration.

ENGLISH

ENG 100 Qtr. Hrs. - 1
Vocabulary Study: A word skills course for students wishing to improve their vocabulary.

ENG 101 Qtr. Hrs. - 4
Composition I: Expository writing, with emphasis on effective communication. Grammar and mechanics will not form a major part of this course; if the student is deficient, he will achieve proficiency through independent study. Writing topics to be based on selected readings.

ENG 103 Qtr. Hrs. - 3
Current Literature: PR: ENG 101 or equivalent. Writing practice based on readings in contemporary prose and poetry selected to invite the interest of students in literature.

Note on Freshman English Program:
ENG 101, and 103 may be taken to satisfy the State Department requirement for certification in secondary school teaching or for transfer to colleges that require one full year of Freshman English. Students who intend to major in English, English Education, or Library Science must take ENG 103, and must complete ENG 201 before enrolling in any English courses numbered above 201 with the exception of ENG 301.

ENG 201 Qtr. Hrs. - 4
Literature of Modern Man: Reading and discussion of types and forms of modern literature. Satisfies section B of the cultural and historical foundation in the Environmental Studies Program.

ENG 208 Qtr. Hrs. - 3
Principles of Creative Writing: For freshman and sophomore students. An exploratory course in the several types of creative writing; group analysis of original writing; critical reading of established authors. May be repeated for credit.

ENG 211 Qtr. Hrs. - 3
Survey of English Literature to 1625

ENG 212 Qtr. Hrs. - 3
Survey of English Literature, 1626-1798

ENG 213 Qtr. Hrs. - 3
Survey of English Literature, 1798-1914

ENG 301 Qtr. Hrs. - 3
Professional Report Writing I: Emphasis on clear expository writing of memoranda, reports and articles in the student's particular field.

ENG 302 Qtr. Hrs. - 3
Creative Writing Workshop I: PR: C.I. Practice in established forms: essay, short story, and poetry.

ENG 303 Qtr. Hrs. - 3
Creative Writing Workshop II: PR: ENG 302 or C.I. Individualized practice in writing in one of the established forms; analytic study of the work of pertinent authors.

ENG 304 Qtr. Hrs. - 3
Creative Writing Workshop III: PR: ENG 302 or C.I. Individualized practice in writing in one of the established forms; students who have completed ENG 303 will be expected to do intensive work in a different form from that practiced in the course; analytic study of the work of pertinent authors.

ENG 305 Qtr. Hrs. - 3
English Versification: Intensive study of the structural characteristics of English poetry, metrical systems, rhyme, scansion, and poetic rhetorical devices.

ENG 306 Qtr. Hrs. - 3
Writing for Children: Practice in writing publishable literature for pre-school and elementary level children.

ENG 307 Qtr. Hrs. - 3
Writing Skills: Intensive practice in description, narration, exposition and argumentation; control of tone, mood, viewpoint, and level of diction. Applicable to article, essay, and short-story writing.

ENG 308, 309 Qtr. Hrs., - 3, 3
Magazine Writing: PR: ENG 307. Structure and organization of articles, essays, profiles, and reviews; market analysis; data gathering.

ENG 310 Qtr. Hrs. - 3
Professional Report Writing II: Instruction and practice in scientific writing including preparation of scientific reports in the student's particular field.

ENG 311 Qtr. Hrs. - 3
Survey of American Literature, 1588-1865

ENG 312 Qtr. Hrs. - 3
Survey of American Literature, 1865-1914

ENG 313 Qtr. Hrs. - 3
Survey of American Literature Since 1914

ENG 314 Qtr. Hrs. - 3
Survey of British Literature Since 1914

ENG 316 Qtr. Hrs. - 3
Continental European Fiction Since 1900: A selection of significant works of fiction written in various languages during the present century, read in translation.

ENG 317 Qtr. Hrs. - 4
World Literature I: Poetry, prose, and drama selected from ancient Hebrew, Greek, and Oriental literature and from that of Renaissance Europe.

ENG 318 Qtr. Hrs. - 4
World Literature II: Readings from Moliere, Voltaire, Goethe, Pushkin, Balzac, Tolstoy, Ibsen, Mann, Kafka, Camus, and others. Open to students who have not taken World Literature I.

ENG 320 Qtr. Hrs. - 4
Women in Literature: An investigation of attitudes toward women in literature. Selections from Shakespeare, Eliot, Flaubert, Ibsen, Freud, Lawrence, Hemingway, Albee, Freidan, Millett, Greer, and Steinem.

ENG 321 Qtr. Hrs. - 3
Exploring Poetry: A broad, cultural approach to poetry, with emphasis upon the major themes and preoccupations of poets of all ages. Students from all disciplines are welcome.

ENG 361 Qtr. Hrs. - 3
Practical Criticism: Student evaluation of selected fiction, poetry, and drama through practical exercises in literary criticism.

ENG 371 Qtr. Hrs. - 3
Principles of Linguistics: An overview of the modern linguist's approach to language. The nature of communication systems. Structure and function of the organs of articulation; language acquisition. Theory and analytic methods of phonology, morphology, syntax. Brief systematic survey of Idiolectology, Dialectology, Linguistic Prehistory.

ENG 400 Qtr. Hrs. - 3
Writing About Literature: Supplies background for recognizing literary allusions and technical terms, assures acquaintance with professional literary journals, and provides supervision of student critical writing.

ENG 401, 402, 403 Qtr. Hrs. - 3, 3, 3
Senior Writing Workshop I (Non-fiction): PR: Evidence of writing skill satisfactory to the instructor. Analysis of significant non-fiction; market research; intensive writing practice leading to a completed body of non-fiction writing suitable for publication.

ENG 404, 405, 406 Qtr. Hrs. - 3, 3, 3
Senior Writing Workshop II (Fiction): PR: Evidence of writing skill satisfactory to the instructor. Analysis of significant fiction; market research; intensive writing practice leading to a completed body of fiction writing suitable for publication.

ENG 407, 408, 409 Qtr. Hrs. - 3, 3, 3
Senior Writing Workshop III (Verse): PR: Evidence of writing skill satisfactory to the instructor. Analysis of significant poetry; market analysis; intensive writing practice leading to a completed body of verse suitable for publicaation.

ENG 410 Qtr. Hrs. - 3
Ethnic Literature in America: Contributions of linguistic and ethnic groups of non-English origin to the literature of the United States.

ENG 415 Qtr. Hrs. - 3
Readings in Shakespeare: Reading and analysis of a selected group of comedies, histories, and tragedies for English Education majors.

ENG 421 Qtr. Hrs. - 3
English Renaissance Literature I: Elizabethan poetry and prose, 1588-1603.

ENG 422 Qtr. Hrs. - 3
English Renaissance Literature II: Jacobean and Caroline Poetry and prose, 1603-1642.

ENG 423 Qtr. Hrs. - 3
English Renaissance Literature III: Commonwealth poetry and prose, 1642-1660, including Milton.

ENG 424 Qtr. Hrs. - 3
Studies in Restoration English Literature: Literature of the Restoration.

ENG 425 Qtr. Hrs. - 3
English Literature, 1700-1745: Prose and poetry of the first half of the 18th Century.

ENG 426 Qtr. Hrs. - 3
English Literature, 1745-1798: Prose and poetry of the last half of the 18th Century.

ENG 427 Qtr. Hrs. - 3
Studies in 19th Century English Literature I: English literature from 1798-1832: the Romantic Triumph in poetry and prose.

ENG 428 Qtr. Hrs. - 3
Studies in 19th Century English Literature II: English literature from 1832 to 1870: the early Victorians.

ENG 429 Qtr. Hrs. - 3
Studies in 19th Century English Literature III: English literature from 1870 to 1914: later Victorians and transitional writers.

ENG 430 Qtr. Hrs. - 3
Chaucer: *The Canterbury Tales, Troilus and Criseyde,* and other works.

ENG 431 Qtr. Hrs. - 3
Shakespeare's Comedies

ENG 432 Qtr. Hrs. - 3
Shakespeare's Histories

ENG 433 Qtr. Hrs. - 3
Shakespeare's Tragedies

ENG 434 Qtr. Hrs. - 3
Milton: *Paradise Lost, Paradise Regained, Samson Agonistes,* shorter poems, and selected prose.

ENG 441 Qtr. Hrs. - 3
English Drama to 1642 (exclusive of Shakespeare)

ENG 442 Qtr. Hrs. - 3
Restoration and 18th Century English Drama

ENG 444 Qtr. Hrs. - 3
The British Novel in the 18th Century

ENG 445 Qtr. Hrs. - 3
The British Novel in the 19th Century

ENG 446 Qtr. Hrs. - 3
The American Novel in the 19th Century

ENG 451 Qtr. Hrs. - 3
British and American Fiction Since 1900

ENG 452 Qtr. Hrs. - 3
British and American Poetry Since 1900

ENG 453 Qtr. Hrs. - 3
British and American Drama Since 1900

ENG 460 Qtr. Hrs. - 3
Historical Survey of Literary Criticism: Study of the major critics from classical antiquity through the modern era.

ENG 461 Qtr. Hrs. - 3
Literary Criticism from Plato to Johnson: PR: 12 Hours of courses in literature numbered above 300.

ENG 462 Qtr. Hrs. - 3
Literary Criticism Since 1800: PR: 12 hours of courses in literature numbered above 300.

ENG 471 Qtr. Hrs. - 3
Modern English Grammar: PR: ENG 371. Methods in the study of modern English grammar. Emphasis upon the analysis and comparison of traditional, structural, and transformational grammar.

ENG 472 Qtr. Hrs. - 3
History of the English Language: PR: ENG 371. Study of the English language and its development from Anglo-Saxon to Modern English. Attention given to Old, Middle, and Early Modern English grammar and syntax.

ENG 473 Qtr. Hrs. - 3
Transformational Grammar: PR:ENG 371, 471. Introduction to philosophical basis of Transformational Grammar. Students will develop grammar for modern English.

ENG 520 Qtr. Hrs. - 4
Studies in Contemporary Fiction: Fiction of the last 20 years in the United States and Britain.

FOREIGN LANGUAGES

FL 323 Qtr. Hrs. - 4
Comparative World Literature I: Masterworks of world literature in translation from the Book of Job to Cervantes. Authors represented include Homer, Sophocles, Cicero, Virgil, St. Augustine, Dante, Chaucer, Montaigne, and Shakespeare.

FL 324 Qtr. Hrs. - 4
Comparative World Literature II: Continuation of FL 323, from the Renaissance to the 20th Century, including works by Pascal, Milton, Rousseau, Goethe, Wordsworth, Poe, Balzac, Chekov, Baudelaire, Yeats, Mann, and Camus. Need not be taken in sequence with FL 323.

FRENCH

FRE 101 Qtr. Hrs. - 3
Elementary French Language and Civilization: Designed to initiate the student to the major language skills; listening, speaking, reading, and writing, in addition to an introduction to French culture.

FRE 102 Qtr. Hrs. - 3
Elementary French Language and Civilization: PR: FRE 101 or equivalent. Continuation of FRE 101.

FRE 103 Qtr. Hrs. - 3
Elementary French Language and Civilization: PR: FRE 102 or equivalent. Continuation of FRE 102.

FRE 201 Qtr. Hrs. - 3
Intermediate French Language and Civilization: PR: FRE 103 or equivalent. Designed to continue development of language skills at the intermediate level, together with a review of grammar, study of syntax, idiomatic expressions, extensive readings and further study of French culture.

FRE 202 Qtr. Hrs. - 3
Intermediate French Language and Civilization: PR: FRE 201 or equivalent. Continuation to FRE 201.

FRE 203 Qtr. Hrs. - 3
Intermediate French Language and Civilization: PR: FRE 202 or equivalent. Continuation of FRE 202 with greater emphasis on French civilization from the Middle Ages to the present.

FRE 301 Qtr. Hrs. - 4
French Composition: PR: FRE 203 or equivalent. Development of skills in composition through systematic review of grammar, syntax, and development of style. Free and controlled written compositions required.

FRE 303 Qtr. Hrs. - 4
French Conversation: PR: FRE 203 or equivalent. Development of skills in conversation and comprehension through practice and systematic review of phonology and grammatical structure.

FRE 311 Qtr. Hrs. - 3
Survey of French Literature: PR: FRE 203 or equivalent. Main literary currents and works from the Middle Ages through the Renaissance.

FRE 312 Qtr. Hrs. - 3
Survey of French Literature: PR: FRE 203 or equivalent. Main literary currents and works of the seventeenth and eighteenth centuries.

FRE 313 Qtr. Hrs. - 3
Survey of French Literature: PR: FRE 203 or equivalent. Main literary currents and works of the nineteenth and twentieth centuries.

FRE 321 Qtr. Hrs. - 3
Short Stories of 18th, 19th and 20th Centuries: PR: FRE 203 or equivalent. Selected readings designed to increase reading speed and develop analytical abilities. Authors include: Voltaire, Maupassant. Flaubert, Camus and others.

FRE 401 Qtr. Hrs. - 2
French Phonetics and Diction: PR: FRE 303 or equivalent. French phonology with emphasis on phonic groupings.

FRE 422 Qtr. Hrs. - 3
Seventeenth Century French Theater: PR: FRE 312. Corneille, Racine, and Moliere. A study of the life and principal works of the authors.

FRE 425 Qtr. Hrs. - 3
Seventeenth Century French Literature: PR: FRE 312. Philosophers and Novelists of the Seventeenth Century and their writings.

FRE 431 Qtr. Hrs. - 3
French Literature of the Eighteenth Century: PR: FRE 312. The philosophical movement: Montesquieu, Vauvenargues, Voltaire, Diderot, Buffon.

FRE 441 Qtr. Hrs. - 3
Nineteenth Century French Literature: PR: FRE 313. Romanticism.

FRE 442 Qtr. Hrs. - 3
Nineteenth Century French Literature: PR: FRE 313. Realism and naturalism.

FRE 443 Qtr. Hrs. - 3
Nineteenth Century French Literature: PR: FRE 313. Parnassianism and symbolism.

FRE 451 Qtr. Hrs. - 3
Twentieth Century French Literature: Contemporary French drama and poetry.

FRE 453 Qtr. Hrs. - 3
Twentieth Century French Literature: PR: FRE 313. Contemporary French novel.

FRE 481 Qtr. Hrs. - 3
Stylistics: PR: FRE 301 or equivalent. An intense study of textual criticism. An examination of the relationship between language and literature; explications and linguistic analysis of literary texts.

GERMAN

GER 101 Qtr. Hrs. - 3
Elementary German Language and Civilization: Designed to initiate the student to the major language skills; listening, speaking, reading, and writing, in addition to an introduction to German culture.

GER 102 Qtr. Hrs. - 3
Elementary German Language and Civilization: PR: GER 101 or equivalent. Continuation of GER 101.

GER 103 Qtr. Hrs. - 3
Elementary German Language and Civilization: PR: GER 102 or equivalent. Continuation of GER 102.

GER 201 Qtr. Hrs. - 3
Intermediate German Language and Civilization: PR: GER 103 or equivalent. Designed to continue development of language skills at the intermediate level, together with a review of grammar, study of syntax, idiomatic expressions, extensive reading, and further study of German culture.

GER 202 Qtr. Hrs. - 3
Intermediate German Language and Civilization: PR: GER 201 or equivalent. Continuation of GER 201.

GER 203 Qtr. Hrs. - 3
Intermediate German Language and Civilization: PR: GER 202 or equivalent. Continuation of GER 202 with greater emphasis on German civilization from the Middle Ages to the present.

GER 301 Qtr. Hrs. - 4
German Composition: PR: GER 203 or equivalent. Development of skills in composition through systematic review of grammar, syntax, and development of style. Free and controlled compositions required.

GER 303 Qtr. Hrs. - 4
German Conversation: PR: GER 203 or equivalent. Development of skills in conversation and comprehension through practice and systematic review of phonology and grammatical structure.

GER 311 Qtr. Hrs. - 3
Survey of German Literature I: PR: GER 203 or equivalent. Main literary currents and works from the Middle Ages through the Renaissance and Baroque.

GER 312 Qtr. Hrs. - 3
Survey of German Literature II: PR: GER 203 or equivalent. Main literary currents and works of the 17th and 18th centuries.

GER 313 Qtr. Hrs. - 3
Survey of German Literature III: PR: GER 203 or equivalent. Main literary currents and works of the 19th and 20th centuries.

GER 321 Qtr. Hrs. - 3
Short Story: PR: GER 203 or equivalent. German short prose works of the XIXth and XXth centuries.

MUS 113 Qtr. Hrs. - 1
String: PR: C.I. by audition. Class and private instruction. May be be repeated for credit.

MUS 114 Qtr. Hrs. - 1
Woodwind: PR: C.I. by audition. Class and private instruction. May be be repeated for credit.

MUS 115 Qtr. Hrs. - 1
Brass: PR: C.I. by audition. Class and private instruction. May be repeated for credit.

MUS 116 Qtr. Hrs. - 1
Percussion: PR: C.I. by audition. Class and private instruction. May be repeated for credit.

MUS 117 Qtr. Hrs. - 1
Organ: PR: C.I. by audition. One half-hour private instruction per week. May be repeated for credit.

MUS 118 Qtr. Hrs. - 1
Piano: PR: C.I. by audition. One half-hour private instruction per week. May be repeated for credit.

MUS 201, 202 Qtr. Hrs. - 4, 4
Materials of Music III, IV: PR: MUS 103 or C.I. Study of harmonic practice to the beginning of the 20th Century. Aural comprehension and sight singing.

MUS 204 Qtr. Hrs. - 1
Voice Class: Fundamental principles of the three areas of activity in singing, breathing, phonation, and resonation.

MUS 205 Qtr. Hrs. - 1
String Class: Fundamental principles of string instrument technique. May be repeated for credit.

MUS 206 Qtr. Hrs. - 1
Woodwind Class: Fundamental principles of woodwind instrument technique. May be repeated for credit.

MUS 207 Qtr. Hrs. - 1
Brass Class: Fundamental principles of brass instrument technique. May be repeated for credit.

MUS 208 Qtr. Hrs. - 1
Percussion Class: Fundamental of percussion instrument technique. May be repeated for credit.

MUS 211 Qtr. Hrs. - 2
Piano: PR: C.I. by audition. May be repeated for credit.

MUS 212 Qtr. Hrs. - 2
Voice: PR: C.I. by audition. May be repeated for credit.

MUS 213 Qtr. Hrs. - 2
String: PR: C.I. by audition. May be repeated for credit.

MUS 214 Qtr. Hrs. - 2
Woodwind: PR: C.I. by audition. May be repeated for credit.

MUS 215 Qtr. Hrs. - 2
Brass: PR: C.I. by audition. May be repeated for credit.

MUS 216 Qtr. Hrs. - 2
Percussion: PR: C.I. by audition. May be repeated for credit.

MUS 217 Qtr. Hrs. - 2
Organ: PR: C.I. by audition. May be repeated for credit.

MUS 218, 219, 220 Qtr. Hrs. - 2, 2, 2
Piano Literature: PR: Proficiency in an applied instrument or voice (200 level or above) or C.I. by audition. Survey of stringed keyboard literature from the sixteenth century to the present with emphasis on technical, formal and performance problems.

MUS 221, 222, 223 Qtr. Hrs. - 2, 2, 2
Song Literature: PR: Proficiency in an applied instrument or voice (200 level or above) or C.I. by audition. Survey of the development of the art song from the Middle Ages to the present with emphasis on technical, formal and performance problems.

MUS 300 Qtr. Hrs. - 4
Materials of Twentieth Century Music: PR: MUS 202 or C.I. An investigation of techniques used by composers during the 20th Century. Aural comprehension and sight singing of appropriate materials.

MUS 301 Qtr. Hrs. - 3
Introduction to Contrapuntal Techniques: PR: MUS 202 or C.I. Visual, written and aural analysis of polyphonic music from all periods.

MUS 302 Qtr. Hrs. - 3
Creative Counterpoint: PR: MUS 301 or C.I. Guided composition in the Renaissance through Contemporary idioms. Required of all music majors.

MUS 304 Qtr. Hrs. - 1
Madrigal Singers: PR: C.I. by audition. Participation in a select vocal ensemble for the study and performance of madrigals and similar works from the fourteenth century to the present. May be repeated for credit.

MUS 307 Qtr. Hrs. - 1
Concert Choir: PR: C.I. by audition. Study, rehearsal and performance of choral works of all styles and periods. Open to all students. May be repeated for credit.

MUS 308 Qtr. Hrs. - 1
Concert Band: PR: C.I. by audition. Participation in a chamber or large ensemble for purposes of studying and performing band literature. Open to all students. May be repeated for credit.

MUS 309 Qtr. Hrs. - 1
Philharmonic Orchestra: PR: C.I. by audition. Participation in a chamber or large ensemble for purposes of studying and performing symphonic

orchestral literature. Open to all students. May be repeated for credit.

MUS 310 Qtr. Hrs. - 1
Chamber Music: PR: C.I. by audition. Participation in small ensemble for purposes of studying and performing chamber music literature. May be repeated for credit.

MUS 311 Qtr. Hrs. - 2
Piano: PR: C.I. by audition. May be repeated for credit.

MUS 312 Qtr. Hrs. - 2
Voice: PR: C.I. by audition. May be repeated for credit.

MUS 313 Qtr. Hrs. - 2
String: PR: C.I. by audition. May be repeated for credit.

MUS 314 Qtr. Hrs. - 2
Woodwind: PR: C.I. by audition. May be repeated for credit.

MUS 315 Qtr. Hrs. - 2
Brass: PR: C.I. by audition. May be repeated for credit.

MUS 316 Qtr. Hrs. - 2
Percussion: PR: C.I. by audition. May be repeated for credit.

MUS 317 Qtr. Hrs. - 2
Organ: PR: C.I. by audition. May be repeated for credit.

MUS 320, 321, Qtr. Hrs. - 3, 3
Orchestration and Score Reading: PR: Proficiency in an applied instrument or voice, and MUS 202 or C.I. Preliminary study of instruments through score reading. Scoring for band combinations.

MUS 340, 341, 342 Qtr. Hrs. - 4, 4, 4
Music History: PR: MUS 202 or C.I. Music in Western Civilization traced from its primitive sources to the present; emphasis on composers' styles in relation to cultural backgrounds.

MUS 350 Qtr. Hrs. - 2-5
Composition: PR: MUS 303 or C.I. by audition. May be repeated for credit. Creative work in large and small forms in the area of choral, instrumental and keyboard media.

MUS 351 Qtr. Hrs. - 2
Choral Conducting: PR: Junior standing. CR: MUS 320 or 321 or 322. Fundamental principles of choral conducting and rehearsal techniques.

MUS 352 Qtr. Hrs. - 2
Instrumental Conducting: PR: Junior standing. CR: MUS 320 or 321 or 322. Fundamental principles of instrumental conducting and rehearsal techniques.

MUS 390 Qtr. Hrs. - 3
Fundamental Music Skills: An introduction to the basic music skills — notation, rhythm, sight-singing, basic piano skills, dictation and fundamentals of conducting.

MUS 401, 402 Qtr. Hrs. - 4, 4
Form and Analysis of Music: PR: MUS 202 or C.I. A study of the structure of music from small forms through multi-movement works. Required of all music majors.

MUS 411 Qtr. Hrs. - 2
Piano: PR: C.I. by audition. May be repeated for credit.

MUS 412 Qtr. Hrs. - 2
Voice: PR: C.I. by audition. May be repeated for credit.

MUS 413 Qtr. Hrs. - 2
String: PR: C.I. by audition. May be repeated for credit.

MUS 414 Qtr. Hrs. - 2
Woodwind: PR: C.I. by audition. May be repeated for credit.

MUS 415 Qtr. Hrs. - 2
Brass: PR: C.I. by audition. May be repeated for credit.

MUS 416 Qtr. Hrs. - 2
Percussion: PR: C.I. by audition. May be repeated for credit.

MUS 417 Qtr. Hrs. - 2
Organ: PR: C.I. by audition. May be repeated for credit.

MUS 421 Qtr. Hrs. - 2-5
Piano: PR: C.I. by audition. Hours of instruction are variable. May be repeated for credit.

MUS 422 Qtr. Hrs. - 2-5
Voice: PR: C.I. by audition. Hours of instruction are variable. May be repeated for credit.

MUS 423 Qtr. Hrs. - 2-5
String: PR: C.I. by audition. Hours of instruction are variable. May be repeated for credit.

MUS 424 Qtr. Hrs. - 2-5
Woodwind: PR: C.I. by audition. Hours of instruction are variable. May be repeated for credit.

MUS 425 Qtr. Hrs. - 2-5
Brass: PR: C.I. by audition. Hours of instruction are variable. May be repeated for credit.

MUS 426 Qtr. Hrs. - 2-5
Percussion: PR: C.I. by audition. Hours of instruction are variable. May be repeated for credit.

MUS 427 Qtr. Hrs. - 2-5
Organ: PR: C.I. by audition. Hours of instruction are variable. May be repeated for credit.

MUS 450, 451 Qtr. Hrs. - 3, 3
Music in the Twentieth Century: PR: MUS 300 or C.I. Problems of contemporary style and aesthetics; analysis of solutions to those problems: atonal, twelve-tone, chance, neoclassic, electronic, others.

PHILOSOPHY

PHI 105 Qtr. Hrs. - 4
Non-Formal Logic: An examination of fallacies and other logical abuses in conjunction with an analysis of traditional modes in an attempt to encourage meaningful thought and usage.

PHI 205 Qtr. Hrs. - 4
Formal Logic I: Analysis of logical form and of procedures used in deductive inference, of the kind underlying mathematical reasoning.

PHI 221 Qtr. Hrs. - 4
Introduction to Philosophy: Inquiry into the meaning and justification of fundamental ideas and beliefs concerning reality, knowledge, and values; application to relevant topics in ethics, religion, and politics.

PHI 305 Qtr. Hrs. - 4
Formal Logic II: PR: PHI 205. Systematic study of propositional and first-order predicate logic; logistic systems and axiomatic methods; problems of metatheory, including consistency, completeness and decidability.

PHI 312 Qtr. Hrs. - 4
Existentialism: Study of existentialist analysis and criticism of the human situation as found in the writings of such philosophers as Kierkegaard, Nietzsche, Heidegger, Sartre, and Camus.

PHI 314 Qtr. Hrs. - 4
Problems in Contemporary Philosophy: Prominent issues in philosophies of the 20th century, apart from existentialism: logical positivism, linguistic analysis, phenomenology, and pragmatism.

PHI 331 Qtr. Hrs. - 4
Ethics: An examination of the nature of moral problems, judgments and principles with an emphasis on recent formulations in ethical theory.

PHI 341 Qtr. Hrs. - 4
Aesthetics: An investigation into the nature of human artistic experience with special reference to the problems of creativity.

PHI 405 Qtr. Hrs. - 4
Philosophy of Religion: Examination of basic ideas, beliefs, attitudes and functions of religion. The significance of religion in human experience.

PHI 407 Qtr. Hrs. - 4
Philosophy of Literature: An examination of fictional and non-fictional prose as it determines and reflects social, political, economic, and religious institutions. Includes works by Sartre, Feuchtwanger, and Zola.

PHI 409 Qtr. Hrs. - 4
Philosophy of Science: An examination of the conceptual foundations and methodology of modern science.

PHI 461 Qtr. Hrs. - 4
The Secular View: Examination of the philosophical foundations of secularism and of literary and political humanism, based on the work of Erasmus, Montaigne, Voltaire, Hobbes, Locke, and Rousseau. (Same as HUM 461.)

RELIGION

REL 300 Qtr. Hrs. - 4
The Hebrew and Christian Heritage: Same as HUM 300.

REL 315 Qtr. Hrs. - 4
The Religious Heritage of China & Japan: Same as HUM 315.

REL 317 Qtr. Hrs. - 4
The Religious Heritage of India: Same as HUM 317.

REL 318 Qtr. Hrs. - 4
The Religious Heritage of Islam: Same as HUM 318.

REL 321 Qtr. Hrs. - 4
Religion in America: The effect of Puritan, Quaker, Anglican, and Catholic traditions on various regions; the phenomenon of evangelism; the rise of new sects such as Mormonism.

REL 441 Qtr. Hrs. - 4
Modern Theology: An exploration of the revolution in religious thought based on the work of Kierkegaard, Jaspers, Heidegger, Tillich, Barth, Niebuhr, Bonhoeffer, Bultmann, Altizer, and Teilhard de Chardin.

REL 471 Qtr. Hrs. - 4
Mythology: An examination and interpretation of myths dealing with gods, divine heroes, and sacred events. (Same as HUM 471.)

REL 473 Qtr. Hrs. - 4
The Religious Quest: A study of major religious statements from the desert Fathers to Kafka and Kazantazkis, and of the human and cultural circumstances from which they emerged. (Same as HUM 473.)

REL 477 Qtr. Hrs. - 4
Mysticism: The modes and aims of the mystic, both Eastern and Western, as seen in art, music, and literature. (Same as HUM 477).

RUSSIAN

RUS 101 Qtr. Hrs. - 3
Elementary Russian Language and Civilization: Designed to initiate the student to the major language skills; listening, speaking, reading, and writing, in addition to an introduction to Russian culture.

RUS 102 Qtr. Hrs. - 3
Elementary Russian Language and Civilization: PR: RUS 101 or equivalent. Continuation of RUS 101.

RUS 103 Qtr. Hrs. - 3
Elementary Russian Language and Civilization: PR: RUS 102 or equivalent. Continuation of RUS 102.

RUS 201 Qtr. Hrs. - 3
Intermediate Russian Language and Civilization: PR: RUS 103 or equivalent. Designed to continue development of language skills at the intermediate level, together with a review of grammar, study of syntax, idiomatic expressions, extensive reading, and further study of Russian culture.

RUS 202 Qtr. Hrs. - 3
Intermediate Russian Language and Civilization: PR: RUS 201 or equivalent. Continuation of RUS 201.

RUS 203 Qtr. Hrs. - 3
Intermediate Russian Language and Civilization: PR: RUS 202 or equivalent. Continuation of RUS 202 with greater emphasis on Russian civilization from the Middle Ages to the present.

RUS 301 Qtr. Hrs. - 4
Russian Composition: PR: RUS 203 or equivalent. Development of skills in composition through systematic review of grammar, syntax, and development of style. Free and controlled written compositions required.

RUS 303 Qtr. Hrs. - 4
Russian Conversation: PR: RUS 203 or equivalent. Development of skills in conversation and comprehension through practice and systematic review of phonology and grammatical structure.

SPANISH

SPA 101 Qtr. Hrs. - 3
Elementary Spanish Language and Civilization: Designed to initiate the student to the major language skills; listening, speaking, reading, and writing, in addition to an introduction to Spanish culture.

SPA 102 Qtr. Hrs. - 3
Elementary Spanish Language and Civilization: PR: SPA 101 or equivalent. Continuation of SPA 101.

SPA 103 Qtr. Hrs. - 3
Elementary Spanish Language and Civilization: PR: SPA 102 or equivalent. Continuation of SPA 102.

SPA 201 Qtr. Hrs. - 3
Intermediate Spanish Language and Civilization: PR: SPA 103 or equivalent. Designed to continue development of language skills at the intermediate level, together with a review of grammar, study of syntax, idiomatic expressions, extensive reading, and further study of Spanish culture.

SPA 202 Qtr. Hrs. - 3
Intermediate Spanish Language and Civilization: PR: SPA 201 or equivalent. Continuation of SPA 201.

SPA 203 Qtr. Hrs. - 3
Intermediate Spanish Language and Civilization: PR: SPA 202 or equivalent. Continuation of SPA 202 with greater emphasis on Spanish civilization from the Middle Ages to the present.

SPA 301 Qtr. Hrs. - 4
Spanish Composition: PR: SPA 203 or equivalent. Development of skills in composition through systematic review of grammar, syntax and development of style. Free and controlled written composition required.

SPA 303 Qtr. Hrs. - 4
Spanish Conversation: PR: SPA 203 or equivalent. Development of skills in conversation and comprehension through practice and systematic review of phonology and grammatical structure.

SPA 311 Qtr. Hrs. - 3
Survey of Spanish Literature: PR: SPA 203 or equivalent. Main literary currents and works from the Middle Ages through the Renaissance and Baroque.

SPA 312 Qtr. Hrs. - 3
Survey of Spanish Literature: PR: SPA 203 or equivalent. Main literary currents and works of the eighteenth and nineteenth centuries.

SPA 313 Qtr. Hrs. - 3
Survey of Spanish Literature: PR: SPA 203 or equivalent. Main literary currents and works from the Generation of 1898 to the present.

SPA 316 Qtr. Hrs. - 3
Survey of Latin-American Literature I: PR: SPA 203 or equivalent. Main literary currents and works from the colonial period to the nineteenth century.

SPA 317 Qtr. Hrs. - 3
Survey of Latin-American Literature II: PR: SPA 203 or equivalent. Main literary currents and works of the nineteenth century.

SPA 318 Qtr. Hrs. - 3
Survey of Latin-American Literature III: PR: SPA 203 or equivalent. Main literary currents and works of the twentieth century.

SPA 401 Qtr. Hrs. - 2
Spanish Phonetics and Diction: PR: SPA 303 or equivalent. Spanish phonology with emphasis on phonic groupings.

SPA 421 Qtr. Hrs. - 3
Golden Age Drama: PR: SPA 311. A study of the drama of the Golden Age with special emphasis on Lope, Tirso, Alarcon, and Calderon. The controversies on the Spanish theatre and its influence abroad.

SPA 423 Qtr. Hrs. - 3
Cervantes I: PR: SPA 311. *Don Quixote.* (Part I).

SPA 424 Qtr. Hrs. - 3
Cervantes II: PR: SPA 311. *Don Quixote.* (Part II).

SPA 441 Qtr. Hrs. - 3
Nineteenth Century Spanish Literature: PR: SPA 312. Romanticism in Spanish literature.

SPA 442 Qtr. Hrs. - 3
Nineteenth Century Spanish Literature: PR: SPA 312. The realistic and naturalistic novel in Spain.

SPA 443 Qtr. Hrs. - 3
The Generation of 1898: PR: SPA 313. A study of the Generation's main authors and their works.

SPA 451 Qtr. Hrs. - 3
Twentieth Century Spanish Literature: PR: SPA 313. The contemporary Spanish novel.

SPA 452 Qtr. Hrs. - 3
Twentieth Century Spanish Literature: PR: SPA 313. Contemporary Spanish drama and poetry.

THEATRE

THA 180 Qtr. Hrs. - 3
Study of Drama and Theatre: Nature of drama and the theatre, and basic principles of play analysis.

THA 210 Qtr. Hrs. - 4
Cinema Survey: A broad cultural approach to cinema as theatre. Emphasis on theme and expression in major current films. Satisfies Section B, Cultural and Historical Foundations.

THA 230 Qtr. Hrs. - 3
Interpretation I: Analysis of thought; development of imagination; oral presentation of literary forms; individual problems in interpretive reading. (Recommended for students majoring in English and preparing to teach literature.)

THA 240 Qtr. Hrs. - 4
Technical Theatre Production: History, theory, and practice of technical theatre production.

THA 241 Qtr. Hrs. - 4
Stage Carpentry: Special approaches to construction, painting, rigging, and operation of stage scenery. 2 hours lecture; 4 hours lab.

THA 242 Qtr. Hrs. - 4
Stage Properties: Design, construction, operation, and management of stage properties. History, style, and decoration of practical, scenic, and hand properties. 2 hours lecture; 4 hours lab.

THA 280 Qtr. Hrs. - 4
Introduction to Acting: Prepares the beginning actor for University Theatre productions. Emphasis on movement, motivation, voice, characterizational techniques, makeup, and other basic requirements for acting.

THA 290 Qtr. Hrs. - 2
Theatre Practicum: PR: C.I. Open to all students interested in participating in productions of University Theatre. Student will have the opportunity for supervised work in all phases of theatrical production. May be repeated for credit.

THA 310 Qtr. Hrs. - 4
History of the Motion Picture: Development of the film industry; its social and economic impact. (Same as COM 310.)

THA 330 Qtr. Hrs. - 3
Interpretation II: PR: THA 230 or the equivalent and junior standing. Selecting and abridging literary material for platform use; preparation and presentation of program for special and general occasions.

THA 331 Qtr. Hrs. - 3
History of the Theatre: Classic and Renaissance: Development of theatre art from the earliest times through the sixteenth century.

THA 332 Qtr. Hrs. - 3
History of the Theatre XVII and XVIII Centuries: Development of theatre art from the Renaissance through the neo-classic period to the beginning of the Romantic Period.

THA 333 Qtr. Hrs. - 3
History of the Theatre: XIX and XX Centuries: Development of theatre art from the Romantic Period to the modern theatre.

THA 341 Qtr. Hrs. - 4
Drama Development I: A study of dramatic works in translation of the Greeks, Romans, and the Medieval Theatre. Extensive readings in the plays of these periods should be expected.

THA 342 Qtr. Hrs. - 4
Drama Development II: A study of dramatic works in translation of the French, German, Spanish, and Itlaian theatres in the 16th and 17th centuries. Extensive readings in the plays of these periods should be expected. Continuation of THA 341.

THA 343 Qtr. Hrs. - 4
Drama Development III: Continuation of THA 341-342 tracing the development of dramatic works in translation of the 18th and 19th centuries. Extensive readings of plays from the French, German, English, Spanish, Italian, and Russian theatres.

THA 350 Qtr. Hrs. - 4
Theatrical Costume: History and Theory: Historical costume for theatre purposes; period costume in relation to social and cultural development. Fabric, silhouette, color and decoration as related to theatrical characterizations.

THA 351 Qtr. Hrs. - 4
Costume and Makeup Techniques: Analysis, design, construction, and management of costume and makeup in the theatre. Two hours lecture, two hours laboratory.

THA 375 Qtr. Hrs. - 4
Modern Stage Movement: Modern movement patterns, analysis, improvisation, and exercise to improve the flexibility and control of the actor's physical means of expression. 3 hours class; 2 hours lab.

THA 380 Qtr. Hrs. - 3
Directing I: Fundamental principles of play-directing; demonstrations of theory in group exercises. Each student is required to direct two short scenes for laboratory presentation and criticism. (Laboratory hours to be arranged, and work in departmental productions.)

THA 381 Qtr. Hrs. - 4
Scene Design I: Study and practice of scene design; perspective drawing, fundamentals of design, and techniques of scene painting. (Service on crew as required.)

THA 382 Qtr. Hrs. - 4
Stage Lighting: PR: Junior standing. Study of stage lighting techniques, practices, and equipment. (Service on light crew is required.)

THA 390 Qtr. Hrs. - 2
Theatre Practicum II: PR: THA 290 or C.I. Primarily an activity course. Student will serve as crew head or in some position of responsibility in production. May be repeated for credit.

THA 421 Qtr. Hrs. - 3
Dramatic Theory: ,PR: C.I. The theory and philosophy of the theatre; analysis of various types of plays, both modern and historical, from the point of view of their production on a stage.

THA 422 Qtr. Hrs. - 4
High School Play Directing: Introduction to the theory and practice of directing and producing, with particular emphasis upon methods practicable in high school and junior college play production.

THA 423 Qtr. Hrs. - 3
Contemporary Theatre and Drama: Trends in theatrical production and dramatic literature in Italy, France, Germany, Russia, and the Scandinavian countries.

THA 424 Qtr. Hrs. - 4
Principles of Motion Picture Art: PR: THA 310 or C.I. Aesthetic consideration of the motion picture as art; critical criteria and stylistic comparisons are established through the viewing of films, reading assignments, and discussion.

THA 425 Qtr. Hrs. - 3
Dramatic Criticism: PR: C.I. Analysis of the nature of past and present day criticism of the drama; practical work in such criticism.

THA 431 Qtr. Hrs. - 3
Modern Theatre Forms: Modern and historical aesthetic analysis of theatre forms; theatrical experience related to playwriting, interpretation, performance, audience response. Theorists studies: Appia, Craig, Artaud, Grotowsky and Knott.

THA 434 Qtr. Hrs. - 4
Modern Motion Picture Technique: PR: THA 310 or C.I. An examination of the techniques of motion picture as art; directing, acting, editing, writing, cinematography.

THA 441 Qtr. Hrs. - 4
Modern Currents in the Theatre: Recent trends in the development of theatre: constructs, production, and design. Study of new theatres: "Happenings," "environments," "guerrilla," "street" theatres, other departures from conventional modes.

THA 480 Qtr. Hrs. - 3
Directing II: PR: THA 380. Further theories and techniques of play direction, study of dramatic values, plot structure, style, mood, composition, and directing approach. Each student will direct scenes in class and laboratory and serve as assistant director or stage manager on a major production.

THA 481 Qtr. Hrs. - 3

Acting II: PR: THA 280. Study and practical experience in creating roles in plays of different types, style, and period, with emphasis on developing flexibility of actor's equipment. (Laboratory hours to be arranged and work in departmental productions.)

THA 483 Qtr. Hrs. - 4

Advanced Scene Design: A continuation of THA 381 in which the emphasis is placed on independent planning and execution of a scene design. The student will be expected to work with the production group on a selected production.

THA 486 Qtr. Hrs. - 3

American Theatre and Drama: XVIII & XIX Centuries: An examination of the social, cultural and economic influences on the American drama and theatre. Trends in theatrical production and dramatic types, Revolutionary Drama, Social Comedy, Romantic Verse Drama, ethnic characters, and Naturalism.

THA 487 Qtr. Hrs. - 3

American Theatre: XX Century: A continuation of THA 486, with emphasis placed upon the aesthetic and literary development of the theatre in this century. The New Stagecraft, Agitprop Theatre, Federal Theatre, Antiwar Drama, the Absurdist and the avant-garde theatres will be dealt with in detail.

THA 488 Qtr. Hrs. - 3

Creative Dramatics and Children's Theatre: An introduction to the aesthetical and psychological bases of theatre production for and by young people. The production of children's theatre, play selection, scenery, costumes, management, and touring.

THA 489 Qtr. Hrs. - 3

Studies in Oral Interpretation: PR: THA 230. Individual oral reading projects; an intensive study of the literature for interpretation.

COLLEGE OF NATURAL SCIENCES

ALLIED HEALTH SCIENCES

AHS 100 Qtr. Hrs. - 1
Allied Health Sciences Orientation: A survey of the allied health sciences; opportunities and scope of the field.

AHS 320, 321 Qtr. Hrs. - 3, 3
Hospital Organization and Administration: PR: Junior standing. Organization patterns in hospitals, clinics, and community health agencies, medical staff organization; principles and practices of administration.

AHS 340, 341 Qtr. Hrs. - 3, 3
Introduction to Disease: Nature and cause of disease, treatment and management of patients in major clinical areas of medicine.

AHS 350 Qtr. Hrs. - 3
Medical Legal Jurisprudence: Principles of law as applied to the health field with special reference to health practices.

AHS 375 Qtr. Hrs. - 3
Recent Advances in Medicine: A review of new discoveries and treatments in the medical field.

BIOLOGY

BIOL 100 Qtr. Hrs. - 4
General Biology: Basic principles emphasizing the unifying concepts of biology and their relationships to diversity in living organisms. Recommended for majors and preprofessional students. Not open to students with credit in BIOL 103.

BIOL 103 Qtr. Hrs. - 4
Biological Principles: An integrated approach to life processes and their relationships among diverse organisms, including man. Recommended for non-majors. Not open to students with credit in BIOL 100.

BIOL 105 Qtr. Hrs. - 4
Biology and Environment: PR: BIOL 100 or BIOL 103. Biological implications of the interaction among human society, population, and technology in relation to the environment and natural systems.

BIOL 303 Qtr. Hrs. - 3
Biology and Society: PR: Junior standing. Biological concepts applied to current human problems - food production, pollution, desease, extinction, and disrupted ecosystems. Designed for non-majors.

BIOL 305 Qtr. Hrs. - 3
Biological Nature of Man: PR: Junior standing. Man's behaviour, reproduction, development, diversity, heredity, evolution, population control, aggression, and biological needs in contemporary society.

BIOL 330 Qtr. Hrs. - 3
Immunology: PR: MICR 300. Basic principles of the immune reaction; antigens, antibody formation, hypersensitivity and autoimmunity.

BIOL 331 Qtr. Hrs. - 2
Serology: PR: BIOL 330. Laboratory exercises in the production of antibodies, agglutination and precipitin reactions; quantitative techniques and isohemoagglutination.

BIOL 332 Qtr. Hrs. - 5
Cell Physiology: PR: 11 hours in biological sciences and CHEM 123. Basic physiological processes, cellular organization, exchange of materials, conversion of energy, irritability and contractibility.

BIOL 350 Qtr. Hrs. - 4
Principles of Ecology: PR: 12 hours in biological sciences. Elements of ecosystems, biogeochemical cycling, environmental factor interactions, population dynamics and evolution, communities, and succession.

BIOL 360 Qtr. Hrs. - 4
Genetics: PR: BIOL 100. Basic principles of heredity as applied to plants and animals. Laboratory will emphasize work with *Drosophila.*

BIOL 420 Qtr. Hrs. - 4
Cytology: PR: 11 hours in biological sciences and CHEM 123. Structure of vegetative and reproductive cells; cytoplasmic differentiation, mitosis, meiosis and chromosomal aberrations.

BIOL 450 Qtr. Hrs. - 5
Limnology: PR: BIOL 350 or C.I. Introduction to principles of limnology and methods for freshwater ecology with respect to physical, chemical and biological parameters.

BIOL 451 Qtr. Hrs. - 5
Freshwater Systems: PR: BIOL 450 or C.I. Primary and secondary productivity and interaction among factors such as nutrients, pollutants, temperature radiation, turbidity, and seasons.

BIOL 460 Qtr. Hrs. - 3
Organic Evolution: PR: 11 hours in biological sciences including BIOL 360. An outline of evolutionary principles, natural selection and

phylogeny; origin of variation and origin of species.

BIOL 470 Qtr. Hrs. - 3
History of Biology: PR: Junior standing. People and events from Aristotelian times to the present; development of the science of biology.

BOTANY

BOT 100 Qtr. Hrs. - 4
General Botany: PR: BIOL 100 or BIOL 103. Introduction to botany; plant structure and function, including a survey of the plant kingdom giving special emphasis to forms important to man.

BOT 310 Qtr. Hrs. - 4
Botanical Microtechnique: PR: BOT 100. Methods for preparation and staining of plant materials for microscopic study.

BOT 320 Qtr. Hrs. - 5
Comparative Morphology of Plants: PR: BOT 100. A sequential survey of the algae, fungi, bryophytes, ferns, fern allies, gymnosperms and flowering plants, with emphasis on evolutionary relationships, structure and function.

BOT 325 Qtr. Hrs. - 4
Plant Anatomy: PR: BOT 100. A study of the development, structure and function of the principle organs and tissues of vascular plants.

BOT 330 Qtr. Hrs. - 5
Plant Physiology: PR: BIOL 332 or C.I. Chemical and physical activities of plants; absorption, transpiration, mineral nutrition, photosynthesis and growth.

BOT 340 Qtr. Hrs. - 4
Phycology: PR: BOT 320 or C.I. A lecture-laboratory course to survey the diversity and classification of marine, terrestrial and freshwater algae.

BOT 345 Qtr. Hrs. - 5
Plant Taxonomy: PR: BOT 100. An introduction to systematics, classification and identification of vascular plants with emphasis on the flora of peninsular Florida.

BOT 371 Qtr. Hrs. - 3
Plants and Man: PR: BOT 100. Provides a broad understanding of the various plant groups and their ecomomic importance to man; designed primarily for non-majors.

BOT 372 Qtr. Hrs. - 3
Plants and the Urban Environment: The selection, placement, propagation and care of ornamental plants in residential, commerical and industrial areas.

BOT 442 Qtr. Hrs. - 4
Bryology: PR: BOT 320 or C.I. A lecture-laboratory survey course on the diversity and classification of mosses, liverworts and hornworts with special emphasis on those found in Florida.

BOT 443 Qtr. Hrs. - 4
Mycology: PR: BOT 320, MICR 200 or C.I. A lecture-laboratory course to cover the major groups of fungi, treating their morphology and classification and emphasizing those of special importance to man.

BOT 451 Qtr. Hrs. - 4
Plant Ecology: PR: BOT 345 or C.I. Role of soils and climate in relation to succession and composition of diverse plant communities.

BOT 453 Qtr. Hrs. - 3
Plant Geography: PR: BIOL 350 or BOT 350. The major climatic plant formations of the world and historical plant geography.

BOT 470 Qtr. Hrs. - 4
Plant Pathology: PR: BOT 443 and MICR 200. A survey of the microorganisms causing plant diseases, emphasizing fungi, especially those forms which are important to Florida.

BOT 472 Qtr. Hrs. - 2
Botanical Nomenclature: PR: BOT 345. The development of the International Code of Botanical Nomenclature and its application to special problems.

BOT 547 Qtr. Hrs. - 4
Field Botany: PR: 12 hours in biological sciences or science teaching experience; or C.I. Classification and identification among lower and higher plant groups with emphasis on field experience. Major reference sources reviewed.

CHEMISTRY

CHEM 101, 102 Qtr. Hrs. - 4, 4
Chemistry and Society: Lecture-Laboratory: Descriptive approach to the understanding of the role of chemistry in human affairs.

CHEM 111 Qtr. Hrs. 5
General Chemistry (Fundamentals): An introductory study of the fundamental concepts of chemistry, oriented toward AHS and Biology Education majors.

CHEM 112 Qtr. Hrs. - 3
General Chemistry (Organic): PR: CHEM 111. A survey of organic chemistry stressing its applications to our society. The chemistry of functional groups will be related to industrial and natural processes.

CHEM 113 Qtr. Hrs. - 3
General Chemistry (Biochemistry): PR: CHEM 112. A survey of the chemistry of living systems. A conceptual approach will be used in an effort to provide a rationale for the uniqueness of the chemical reactions associated with life.

CHEM 114 Qtr. Hrs. - 1
General Chemistry Laboratory I: PR: CHEM 111 or CHEM 161. Illustrations of some of the principles and techniques of inorganic and analytical chemistry.

CHEM 115 Qtr. Hrs. - 1
General Chemistry Laboratory (Organic-Biochemistry): PR: CHEM 112. An Introduction to organic and biochemical laboratory operations.

CHEM 122, 123 Qtr. Hrs. - 4, 3, 3
Organic Chemistry: Following an introduction of atomic structure, chemical periodicity, and stoichiometry, a study of spectroscopy and bonding in organic molecules is used to provide a bridge from the usual high school chemistry course to the study of organic chemistry. Fundamentals of organic chemistry including nomenclature, structure, reactions, and reaction mechanisms are covered.

CHEM 251 Qtr. Hrs. - 2
Analytical Fundamentals: PR; CHEM 264. Development of basic analytical skills and problem practice in stoichiometry, solution chemistry, and oxidation-reducation.

CHEM 261, 262, 263 Qtr. Hrs. 4, 3, 3
Chemistry Fundamentals: PR: High School Chemistry of CHEM 111. Basic physical theory of chemical reactivity, atomic structure, chemical bonding, periodicity, stoichiometry, equilibria, thermodyamics, and kinetics.

CHEM 264 Qtr. Hrs. - 1
Chemistry Fundamentals Laboratory: PR: CHEM 111 or CHEM 261. Illustration of chemical principles and introduction to the techniques of inorganic and physical chemistry.

CHEM 321, 322, 323 Qtr. Hrs. - 4, 3, 3
Organic Chemistry: PR: CHEM 263. Theory and applications of organic chemistry, structure, bonding, kinetics, thermodynamics and reaction mechanisms. Structure elucidation via spectrometric techniques.

CHEM 324 Qtr. Hrs. - 2
Organic Laboratory Techniques: PR; CHEM 321. An introducation to the laboratory techniques of organic chemistry including the preparation, reaction, and analysis of organic compounds.

CHEM 325 Qtr. Hrs. - 2
Organic Laboratory Techniques: PR: CHEM 322 and CHEM 324. Open-end laboratory to develop synthesis, techniques and structure elucidation skills.

CHEM 351, 352 Qtr. Hrs. - 3,3
Analytical Chemistry: PR: CHEM 251. Lecture-Labortary. Laboratory practice of classical and instrumental methods. Emphasis on problem solutions and choice of analytical procedure.

CHEM 355 Qtr. Hrs. - 4
Clinical Chemistry: PR: CHEM 113 and CHEM 352. A lecture-laboratory course designed to develop a working knowledge of the analytical instrumental techniques in the modern medical laboratory.

CHEM 361, 362, 363 Qtr. Hrs. - 5, 3, 3
Physical Chemistry: PR: CHEM 263, PHYS 212, and MATH 322. Rigorous treatment of atomic and molecular structure, thermodynamics, kinetics, and chemical bonding.

CHEM 364, 365 Qtr. Hrs. 2, 2
Physical Chemistry Laboratory: PR: CHEM 351 and CHEM 361. Classical as well as modern instrumental techniques coupled with computer data processing to measure physical properties and determine atomic and molecular parameters.

CHEM 421, 422 Qtr. Hrs. 3, 3
Advanced Organic Chemistry: PR: CHEM 323 and CHEM 363. A consideration of organic reaction mechanisms in the light of bonding theories, thermodynamics and kinetics.

CHEM 431 Qtr. Hrs. - 4
Inorganic Chemistry: PR; CHEM 363. A discussion of descriptive inorganic chemistry based on various bonding theories, thermodynamics and kinetics.

CHEM 441, 442, 443 Qtr. Hrs. - 3, 3, 3
Biochemistry: PR: CHEM 323. A study of the composition, structure, and reactions which occur in living systems.

CHEM 444, 445 Qtr. Hrs. - 2, 2
Biochemical Methods: PR: CHEM 113 or CHEM 441, and CHEM 352. A laboratory course stressing the application of the chemical arts to the separation, identification, and quantitation of materials of biological significance.

CHEM 451 Qtr. Hrs. - 5
Analytical Laboratory Technique: PR: CHEM 323, CHEM 352, and CHEM 363. A lecture-laboratory course designed to give in-depth coverage to modern methods of analysis including electrochemistry, spectroscopy, and separation techniques.

CHEM 452 Qtr. Hrs. - 4
Analytical Laboratory Technique: PR: CHEM 451. A lecture-laboratory course in which students will be encouraged to propose qualitative and quantitative methods of analysis for various inorganic and organic materials. Specific instrumental techniques will also be covered.

CHEM 461 Qtr. Hrs. - 3
Advanced Physical Chemistry: PR: CHEM 363, and MATH 324. A rigorous treatment of selected topics of thermodynamics, kinetics, quantum mechanics, and structure.

CHEM 471 Qtr. Hrs. - 3
Introduction of Nuclear Chemistry: PR: CHEM 362. Discussion of fundamental particles, nuclear reactions, radioactivity, radiation chemistry, and isotope chemistry.

CHEM 474 Qtr. Hrs. - 3
Radiochemical Techniques: PR: CHEM 352. A lecture-laboratory course stressing radiochemical handling techniques, radiation safety, and the detection and measurement of nuclear radiation.

CHEM 481 Qtr. Hrs. - 3
Our Chemical Environment: PR: Basic ESP. An examination of the role of modern chemical technology in our society — its beneficial and detrimental effects.

CHEM 482 Qtr. Hrs. - 3
The Development of Modern Chemistry: PR: Basic ESP. A look at man's changing theories of matter, energy, the universe, and himself with emphasis on the scientific accomplishments of the past two centuries.

COMPUTER SCIENCE

COMP 101 Qtr. Hrs. - 4
Introduction to Computer Science: History; typical computer; elements and symbology; number systems; arithmetic operations; control and data flow; peripheral components; memory devices; case study of an application of computers.

COMP 102 Qtr. Hrs. - 3
Computer Programming: PR: MATH 110 or the equivalent. Problem definitions, algorithms, flow charts, digital computer programming using a higher level language (FORTRAN).

COMP 205 Qtr. Hrs. - 4
Algorithmic Processes: PR: MATH 110 or equivalent. Algorithms and computers, flow chart language, branching and subscripted variables, looping, approximations, selected projects using a suitable procedure-oriented language.

COMP 207 Qtr. Hrs. - 4
Non-numeric Processes: PR: COMP 205. Trees, compiling, text-editing, other non-numeric applications.

COMP 302 Qtr. Hrs. - 4
Programing and Numerical Methods: CR: MATH 324. Flowcharts, FORTRAN, approximations, numerical applications.

COMP 303 Qtr. Hrs. - 3
Computer Fundamentals for Business Applications: History of computers; processing information; manual information processing systems; introduction to electronic computer systems; storage of information; solving problems; preparation of common business reports.

COMP 305 Qtr. Hrs. - 4
Assembly Language Programming Laboratory: PR: COMP 205 or COMP 302. Computer structure and machine language; addressing techniques; digital representation of data; symbolic coding and assembly systems; selected programming techniques.

COMP 306 Qtr. Hrs. - 3
Computers and Programming: PR: COMP 207 and COMP 302. Macros, program segmentation and linkage, systems and utility programs.

COMP 331 Qtr. Hrs. - 4
Introduction to Combinatorics and Graph Theory: PR: COMP 205 and a course in statistics. Recursion, permutations, combinations, generating functions, inclusion and exclusion, elements of the theory of directed and undirected graphs. Applications to computer science.

COMP 387 Qtr. Hrs. - 3
Computer Programming With Business Applications: PR: Any COMP Course. A study of computer languages of particular use in business and applications to business activities.

COMP 401, 402 Qtr. Hrs. - 3, 3
System Design: PR: COMP 305, EECS 311. Processor characteristics; peripheral equipment characteristics; information representation; introduction to data communications.

COMP 405 Qtr. Hrs. - 4
Data Structures: PR: COMP 207 and COMP 305. Basic concepts of data; linear lists, strings, arrays, and orthogonal lists; ordering or sorting techniques; recursion; string and list processing languages.

COMP 408 Qtr. Hrs. - 3
Programming Languages I: PR: COMP 207. Formal definitions of programming languages; global properties of algorithmic languages.

COMP 409 Qtr. Hrs. — 3
Programming Languages II: PR: COMP 207. List processing, string manipulation, data description, and simulation languages.

COMP 411, 412 Qtr. Hrs. - 3, 3
Operating Systems: PR: COMP 306 and COMP 405. Task scheduling; file management; file security; multiprogramming; communication between system components, system logs, and accounting and status reporting.

COMP 421, 422 Qtr. Hrs. - 3, 3
Compiler Structure: PR: COMP 405. Syntax analysis; bootstrapping and metacompilers; languages for compiler writing, storage allocation, mapping, dynamic allocation; scanners; symbol tables; code emitters; one-pass and multi-pass systems; code optimization.

COMP 461, 462, 463 Qtr. Hrs. - 3 3, 3
Numerical Analysis: PR: COMP 302. CR: MATH 317 or MATH 318. Numerical solution of algebraic/transcendental equations, systems of equations, ordinary and partial differential equations, integral equations; interpolation; finite differences; eigen-value problems; relaxation techniques; error analysis.

COMP 471, 472, 473 Qtr. Hrs. - 3, 3, 3
Mathematical Programming: PR: COMP 302, MATH 317 or MATH 318; or C.I. Linear, nonlinear, and dynamic programming; applications in business, science and engineering.

COMP 481, 482 Qtr. Hrs. - 3, 3
Computer Processing of Statistical Data: PR: COMP 102 and STAT 402, or C.I. The use of high-speed electronic computers in statistical analysis; approximation methods; error analysis; Monte Carlo calculations; simulation; combination problems, matrix calculations; least squares analysis; multiple regression; stepwise regression; nonlinear estimation; characteristic value problems; principal component analysis, factor analysis; analysis of variance and covariance computations.

COMP 484 Qtr. Hrs. - 3
Health Information Systems: PR: COMP 103. A critical survey of the current status of health information systems, application of automated data processing techniques to the health field, and the manual systems needed to support them.

COMP 487, 488, 489 Qtr. Hrs. - 3, 3, 3
Computer Processing of Business Data: PR: Junior standing and COMP 101 or COMP 102 or COMP 303. The use of high-speed electronic computers for business data processing; applications in accounting, payroll inventory control, and production control file organization, development, and control; on-line systems and controls.

COMP 501 Qtr. Hrs. - 3
Digital Computing: PR: MATH 323. Digital computer programming; internal operation of the computer; current developments in programming languages and computers. Intended for secondary school mathematics teachers.

GEOLOGY

GEOL 100 Qtr. Hrs. - 4
Introductory Geology: Survey of geology including current topics such as earthquakes, drifting continents, and lunar history. Appropriate for the Environmental Studies Program.

GEOL 201 Qtr. Hrs. - 4
Physical Geology: PR: GEOL 100. Geologic principles and recent theories developed in some depth with the aid of rock and mineral samples and geologic maps.

GEOL 202 Qtr. Hrs. - 4
Historical Geology: PR: GEOL 201. Evolution of continents and of life as reconstructured from geologic evidence and fossil remains. North America emphasized, but other continents considered.

INHALATION THERAPY

IT 301 Qtr. Hrs. - 2
Clinical Practice I: PR: C.I. Basic equipment and patient care. IPPB Therapy. Cleaning, sterilization and maintenance procedures. Suction techniques.

IT 302 Qtr. Hrs. - 2
Clinical Practice II: PR: C.I. Patient care with advanced respiratory equipment. Tracheostomy care. Advanced suction techniques and introduction to cardiopulmonary resuscitation.

IT 330 Qtr. Hrs. - 3
Cardiopulmonary Resuscitation: PR: C.I. Resuscitative procedures in respiratory and cardiac emergencies. Airway maintenance. Defibrillation and post-resuscitative care. Drowning, underwater, aviation, and space physiology.

IT 331 Qtr. Hrs. - 1
Cardiopulmonary Resuscitation Laboratory: Adult intubation and available airways. Defibrillation practice. Taken concurrently with IT 330.

IT 340 Qtr. Hrs. - 3
Introduction to Pharmacology: Regulatory agencies and the regulations concerning the use of drugs. Review of pharmacological mathematics. Drug absorption and distribution in the human body.

IT 350 Qtr. Hrs. - 3
Introduction to Respiratory Equipment: Fundamental functions of basic inhalation therapy equipment. Systems of oxygen storage. Safety precautions. Preparation for clinical practice.

IT 351 Qtr. Hrs. - 1
Respiratory Equipment Laboratory: Procedures in cleaning, sterilizing, maintenance, and repair of equipment. Taken concurrently with IT 350.

IT 352 Qtr. Hrs. - 3
Respiratory Equipment Function: PR: IT 350. Function of advanced respiratory equipment. Arterial blood gas equipment. Prolonged mechanical ventilation. Bedside respiratory volumetric monitoring. Evaluation prior to and during weaning from respirator.

IT 353 Qtr. Hrs. - 1
Respiratory Equipment Function Laboratory: Care and sterilization of respirators. Calibration of blood gas analyzers. Care and standardization of bedside volumetric equipment. Taken concurrently with IT 352.

IT 370 Qtr. Hrs. - 3
Pulmonary Physiology: PR: CHEM 113 and PHYS 281. Normal ventilation of respiration. Response to gases and ions. Lung reflexes. Ventilatory and mechanical factors. Pulmonary circulation. Gas diffusion and transport. Manual respiratory adjustments. Manifestations of disease.

IT 371 Qtr. Hrs. - 1
Pulmonary Physiology Laboratory: Experiments in ventilation mechanics, diffusion, circulation, and gas transport. Taken concurrently with IT 370.

IT 380 Qtr. Hrs. - 3
Respiratory Pathology: PR: ZOOL 224. Cellular pathology with emphasis on pathology of respiratory and cardiovascular systems.

IT 381 Qtr. Hrs. - 1
Respiratory Pathology Laboratory: Macro and microscopic identification of respiratory diseases. Gross pathology. Taken concurrently with IT 380.

IT 401 Qtr. Hrs. - 2
Clinical Practice III: PR: C.I. Advanced cardiopulmonary resuscitation. Patient care with advanced cardiopulmonary equipment.

IT 402 Qtr. Hrs. - 2
Clinical Practice IV: PR: C.I. Pulmonary functions studies. Care of patients with medically treated diseases. Exposure to the functional role of the department administrator.

IT 403 Qtr. Hrs. - 2
Clinical Practice V: PR: C.I. Pediatrics. Pulmonary rehabilitation. Therapeutic applications of cardiopulmonary medications. Advanced pulmonary function testing. Application of diagnostic techniques in cardiopulmonary diseases and surgical techniques in open-heart, thoracic and general surgery.

IT 410 Qtr. Hrs. - 2
Pulmonary Rehabilitation: PR: C.I. The motor unit, exercise and fatigue. Therapeutic exercise, exercise in cardiopulmonary disease. Postural drainage, and vibration techniques.

IT 420 Qtr. Hrs. - 3
Respiratory Pediatrics PR: C.I. Fetal lung development and circulation. Fetal and newborn regulation of respiration. Pulmonary function in congenital anomalies, infant infections, and hyaline membrane disease. Resuscitation at birth. Respiratory diseases of childhood.

IT 430 Qtr. Hrs. - 3
Cardiopulmonary Therapy: PR: IT 370. Introduction of diagnostic and surgical techniques in thoracic and general surgery.

IT 431 Qtr. Hrs. - 2
Cardiopulmonary Therapy Laboratory: PR: C.I. Student participation in cardio-catheterization and extra-corporeal circulation. Operating theatre observation. Extensive patient round and clinical observation. Taken concurrently with IT 430.

IT 440, 442 Qtr. Hrs. - 3, 3
Medical Pharmacology: PR: IT 340. Use of drugs in cardiovascular diseases. Effects on the nervous system, gastrointestinal tract, and neuroeffectors. Depressants and stimulants. Influence on metabolism and endocrine functions. Anesthetics. Chemotherapy. Poisons and antidotes.

IT 460 Qtr. Hrs. - 3
Medicine: PR: IT 370. Disease states treated medically in conjunction with one or more modalities of respiratory therapy.

IT 461 Qtr. Hrs. - 2
Selected Topics in Inhalation Therapy: PR: C.I. Lecture-laboratory course. Includes patient rounds and discussion regarding current trends and techniques in respiratory care. Taken concurrently with IT 460.

IT 462 Qtr. Hrs. - 3
Pulmonary Function Studies: PR: C.I. Detailed procedures and tests to provide objective information for diagnosis of respiratory diseases.

IT 463 Qtr. Hrs. - 1
Pulmonary Function Laboratory: Testing procedures and experiments in normal and abnormal respiratory functions. Taken concurrently with IT 462.

MATHEMATICS

MATH 100 Qtr. Hrs. - 4
Principles of Mathematics: PR: Two years of high school mathematics. Selected topics in mathematics with primary emphasis on developing conceptual understanding and broadening insight into mathematics. Not intended for students in the Colleges of Business Administration, Engineering, or Natural Sciences.

MATH 101 Qtr. Hrs. - 4
Elementary School Mathematics I: PR: Two years of high school mathematics. Logic, sets, the system of whole numbers, numeration systems, the system of integers, the system of rational numbers. Open only to majors in elementary education.

MATH 104 Qtr. Hrs. - 4
Fundamental Algebra: Elementary algebra including factoring, plane coordinates, systems of linear equations, exponents and radicals, quadratic equations and inequalities, ratio, proportion, and logarithms. For those students whose preparation in mathematics is noncurrent or insufficient for MATH 106, 110, 111, and 115.

MATH 106 Qtr. Hrs. - 4
College Algebra: PR: MATH 104 or 2 years of high school algebra. Sets; exponential and polynomial functions; formula manipulation; graphs; linear equations; vectors; and matrices. Not open to students with credit in MATH 110.

MATH 110 Qtr. Hrs. - 4
Precalculus Mathematics I: PR: MATH 104, or two years of high school algebra and one year of high school plane geometry. This course is intended to cover most of the topics usually found in college algebra emphasizing the notion of function.

MATH 111 Qtr. Hrs - 4
Precalculus Mathematics II: PR: MATH 110 or equivalent (e.g., a course in college algebra which required the mastery of the function concept). Exponential and logarithmic functions; circular and

trigonometric functions; inverses of circular functions; complex numbers.

MATH 115 Qtr. Hrs. - 4
Finite Mathematics: PR: MATH 104 or one and one half years of high school algebra and one year of plane geometry or two years of high school algebra. Mathematical logic, set theory, counting and the binomial theorem, probability.

MATH 201 Qtr. Hrs. - 4
Elementary School Mathematics II: PR: MATH 101. The system of real numbers, polynomials, linear equations and inequalities, systems of equations and inequalities, quadratic equations and inequalities, the complex numbers. Open only to majors in elementary education.

MATH 211 Qtr. Hrs. - 3
Analytic Geometry: CR: MATH 111 or equivalent. Plane and three-dimensional analytic geometry developed with the aid of vectors. Topics include coordinate systems; vectors; lines in the plane; lines and planes in space; conic sections; polar coordinates; transformation of coordinates.

MATH 271 Qtr. Hrs. - 3
Logic and Proof in Mathematics: PR: Four years of high school mathematics or equivalent. The course begins with basic mathematical logic and works up to methods of proof in mathematics using simple mathematical theorems as examples. Primarily for mathematics majors.

MATH 272 Qtr. Hrs. - 3
Mathematical Structures: CR: MATH 271. An introduction to mathematical systems: number theory, group theory, the number system.

MATH 301 Qtr. Hrs. - 4
Elementary School Mathematics III: PR: MATH 201 or C.I. Algebraic structures, selected topics from number theory, experimental and formal geometry, points, lines, planes, angles, curves, regions, parallel and intersecting lines and planes, area, congruence, measurement, and space figures. Open only to majors in elementary education.

MATH 311, 312 Qtr. Hrs. - 4, 4
Applied Calculus: PR: College algebra and trigonometry. Differential and integral calculus applied to problems in engineering technology fields. Not open to students with credit in MATH 320 or MATH 321.

MATH 314 Qtr. Hrs. - 4
Boolean Algebra: PR: MATH 323 or C.I. Axiomatic development of Boolean algebra; the algebras of sets, logic and circuits as Boolean algebras.

MATH 315, 316 Qtr. Hrs. - 3, 3
Introduction to Number Theory: PR: C.I. Divisibility; primes and composites; divisors; multiples; Euclid's algorithm; Diophantine equations; modulo arithmetic; simple continued fractions. Intended for prospective teachers of mathematics.

MATH 317 Qtr. Hrs. - 3
Matrices: PR: MATH 323 Elementary properties of matrices; special, real and complex matrices; determinants and inverses; rank and systems of equations; transformations; eigenvectors; diagonalization; quadratic forms.

MATH 318, 319 Qtr. Hrs. - 3, 3
Linear Algebra: CR: MATH 272. A detailed analysis of finite dimensional linear spaces including bases, subspaces, dual spaces, quadratic forms, and applications to geometry.

MATH 320 Qtr. Hrs. - 4
Concepts of Calculus: PR: MATH 106 or equivalent. Differential and integral calculus of exponential and polynomial functions; optimization of multivariate functions; mathematical models. Not open to students with credit in MATH 321.

IMATH 321, 322, 323 Qtr. Hrs. - 4, 4, 4
Calculus: PR: MATH 110 and MATH 111, or equivalent. CR: MATH 211. The differential and integral calculus of elementary functions of one variable with attention to a variety of geometric and physical applications.

MATH 324 Qtr. Hrs. - 4
Intermediate Calculus: PR: MATH 323. Differential and integral calculus of functions of several variables with applications. Topics include vector differential calculus, partial derivatives; multiple integrals; line and surface integrals.

MATH 331 Qtr. Hrs. - 4
Differential Equations: PR: MATH 321. First order ordinary differential equations; equations with constant coefficients; the method of variation of parameters; step-by-step integration; reduction of order; Picard's method, the method of Frobenius; introduction to input-output analysis and transform methods.

MATH 341 Qtr. Hrs. - 3
Vector Analysis: PR: MATH 321. Scalar and vector products; limits; derivatives and integrals of vector valued functions of real vectors; the directional derivative and vector operators; the theorems of Green, Gauss, and Stokes; generalized curvilinear coordinates; applications in engineering and physical sciences.

MATH 351 Qtr. Hrs. - 4
Foundations of Geometry: PR: C.I. Modern Euclidean geometry; logical defects in Euclid's geometry; simple axiomatic systems; introduction to finite and affine geometries. This course is intended for prospective teachers of mathematics.

MATH 411, 412, 413 Qtr. Hrs. - 3, 3, 3
Algebraic Structures: PR: MATH 272. An introduction to the properties of groups, rings, polynomial rings, integral domains and fields.

MATH 414 Qtr. Hrs. - 3
Semi-Groups and Groups: PR: C.I. An axiomatic development of basic properties of semi-groups and groups.

MATH 420 Qtr. Hrs. - 3
Sequences and Series: PR: C.I. Convergence of infinite sequences and series; double series; infinite products. Intended for prospective teachers of mathematics.

MATH 421, 422, 423 Qtr. Hrs. - 3, 3, 3
Introduction to Analysis: PR: MATH 272 and MATH 324. Limits, sequences and continuity; differentiation and integration; derivatives of integrals; infinite series and convergence; the Bolzano-Weierstrass theorem and the Heine-Borel theorem; extensions in Euclidean n-space.

MATH 424 Qtr. Hrs. - 3
Lebesgue Theory: PR: MATH 423. Inner and outer measure; measurable sets and functions; the Lebesgue integral.

MATH 425 Qtr. Hrs. - 3
Techniques of Complex Variables: PR: MATH 321. Analytic functions; integration in the complex plane; Laurent series and residue calculus, inversion of Laplace transforms; conformal mappings; applications in engineering and the physical sciences.

MATH 426, 427 Qtr. Hrs. - 3, 3
Theory of Complex Variables: PR: MATH 425. Analytic and harmonic functions; Cauchy's theorem and its implications; the maximum modulus principle; series expansions; decomposition of meromorphic functions into partial fractions; analytic continuation; asymptotic expansions; the Mittag-Leffler Theorem; integral functions of finite order; Riemann surfaces.

MATH 428 Qtr. Hrs. - 3
The Number System: PR: C.I. An axiomatic development of the natural numbers followed by a constructive development of the real and complex numbers. Intended for prospective teachers of mathematics.

MATH 429 Qtr. Hrs. - 3
Foundations of Calculus: PR: C.I. Functions; limits; continuity; differentiation and integration. This course is a study of the basic structure of the calculus and is recommended for prospective teachers of mathematics.

MATH 431 Qtr. Hrs. - 3
Ordinary Differential Equations: PR: MATH 331. Systems of equations; the Wronskian; Abel's identity; integrating factors and adjoint equations.

MATH 432 Qtr. Hrs. - 3
Theory of Differential Equations: PR: MATH 331. The existence and uniqueness of solutions; oscillation theory; asymptotic solutions; stability.

MATH 434 Qtr. Hrs. - 3
Partial Differential Equations: PR: MATH 331. Separation of variables; orthogonality and Fourier series; classification of equations; solutions in different coordinate systems; methods of characteristics; the Fourier integral transform and Dirac's delta function.

MATH 435 Qtr. Hrs. - 3
Boundary Value Problems: PR: MATH 434. Adjoint forms and Green's functions; applications in engineering and the physical sciences.

MATH 436 Qtr. Hrs. - 3
Special Functions: PR: MATH 331. Special functions represented as series, products and integrals; generating functions and recursion formulas; orthogonal expansions and interrelations between special functions. Emphasis will be on the Bessel, Legendre, gamma and hypergeometric functions with an introduction to other polynomial sets.

MATH 437 Qtr. Hrs. - 3
Laplace Transforms: PR: MATH 331. The Laplace and Z transforms; solutions of ordinary and partial differential equations; application to circuit analysis and difference equations.

MATH 438 Qtr. Hrs. - 3
Transform Calculus: PR: MATH 331. Fourier, Hankel and other transforms with applications to physical problems; the transformations of distributions.

MATH 451, 452 Qtr. Hrs. - 3, 3
Non-Euclidean and Projective Geometry: PR: MATH 351 or C.I. Non-Euclidean geometry; projective plane, perspectivities, projectivities; projective theory of conics; analytic projective geometry; vector theory; and linear theory; and linear transformations in projective geometry.

MATH 461, 462, 463 Qtr. Hrs. - 3, 3, 3
Topology: PR: MATH 272. Metric spaces; topological spaces, limit points, connectedness; compactness; topology of surfaces; spheres with handles and crosscaps; Euler characteristics; topological invariants.

MATH 490 Qtr. Hrs. - 3
History of Mathematics: PR: Five hours of mathematics. A chronolgical study of the evolution of mathematical though from primitive counting through modern ideas of the twentieth century. Recommended for prospective teachers of mathematics.

MEDICAL RECORD ADMINISTRATION

MRA 300 Qtr. Hrs. - 3
Medical Record Science I: Two hour lecture, two hour laboratory. An introduction to the field of Medical Record Administration with emphasis on evaluation and application of identification, storage and retrieval systems, preservation and retention of records.

MRA 301 Qtr. Hrs. - 5
Medical Record Science II: PR: MRA 300 and MRA 305; or C.I. Three hour lecture, four hour laboratory. A study in depth of the medical record, its components, development and use, including health statistics and legal concepts in Medical Record Administration.

MRA 302 Qtr. Hrs. - 5
Medical Record Science III: PR: MRA 301 or C.I. Three hour lecture, four hour laboratory. Principles of coding and indexing procedures, special registries, research and statistical techniques.

MRA 305 Qtr. Hrs. - 5
Medical Terminology: A study of the language of medicine and allied health specialties, including word construction, definitions and application of terms.

MRA 370, 371 Qtr. Hrs. - 1, 1
Directed Experience: PR: MRA 300. Four hours per week in a selected health care facility. Application of the principles discussed in MRA 300, 301, and 302.

MRA 403 Qtr. Hrs. - 5
Medical Record Science IV: PR: MRA 301 or C.I. Three hour lecture, four hour laboratory. Principles of related health information systems of hospitals, nursing homes, extended health care facilities, psychiatric and other specialized institutions. Methods of establishing a medical reference library.

MRA 404 Qtr. Hrs. - 3
Medical Record Seminar: CR: MRA 421 or C.I. Discussion and problem-solving by use of case-method approach for the purpose of coordinating the students' knowledge, skills and experience in medical record practice.

MRA 420, 421 Qtr. Hrs. 3, 3
Medical Record Organization and Administration: PR: MRA 403 or C.I. Two hour lecture, two hour laboratory. A study of the principles of control and management of departmental functions.

MRA 472 Qtr. Hrs. - 2
Directed Experience: PR: MRA 371. Eight hours per week in a selected health care facility. A supervised experience enabling the students to handle problems of medical record personnel. Provides the students with administrative experience in the usual activities and responsibilities of the department.

MRA 473 Qtr. Hrs. - 2
Directed Experience: PR: MRA 472. Eight hours per week in a selected health care facility. A supervised experience enabling the students to handle problems of medical record personnel. Provides the students with administrative experience in the usual activities and responsibilities of the department.

MRA 474 Qtr. Hrs. - 2
Directed Experience: PR: MRA 473. Two weeks of affiliation (80 hours) at a selected health care facility serving in an administrative capacity under the direction of a qualified Medical Record Administrator.

MICROBIOLOGY

MICR 200 Qtr. Hrs. - 4
General Microbiology: PR: 8 hours of biological science. Fundamentals of microbiology, microbial morphology, metabolism and laboratory techniques.

MICR 210 Qtr. Hrs. - 2
Culture Media and Reagents: PR: MICR 200. Preparation of differential, selective and enrichment media; reagents used in microbiology.

MICR 300 Qtr. Hrs. - 4
Advanced General Microbiology: PR: MICR 200; CR: CHEM 121 or CHEM 113. Advanced fundamental theory and technique.

MICR 320 Qtr. Hrs. - 4
Pathogenic Microbiology: PR: MICR 300 or C.I. Microorganisms producing disease in man and other animals; means of transmission; protection against disease.

MICR 322 Qtr. Hrs. - 4
Microbiology of Water and Waste: PR: MICR 300. Organisms in water and their relationship to production and distribution of potable water; disposal of sewage.

MICR 410 Qtr. Hrs. - 5
Diagnostic Microbiology: PR: MICR 320. Techniques used in identifying bacteria which are pathogenic to man.

MICR 430 Qtr. Hrs. - 4
Microbial Physiology: PR: MICR 300 and CHEM 442, 444. Relationship between structure and function in microorganisms.

MICR 440 Qtr. Hrs. - 4
Determinative Microbiology: PR: MICR 300. Microbial classification, rules of nomenclature, bacterial code and identification of species.

MICR 451 Qtr. Hrs. - 4
Microbial Ecology: PR: BIOL 350 and MICR 300. Study of the roles of microbes in the environment.

MICR 470 Qtr. Hrs. - 4
Virology: PR: MICR 300 and CHEM 442. Nature of viruses and Rickettsiae, including their structure, propagation, isolation and identification.

MICR 520 Qtr. Hrs. - 3
Sanitation and Public Health Microbiology: PR: Graduate standing or C.I. Principles of sanitation and public health. Includes theories of diseases, sanitary procedures on water purification, sewage disposal, refuse collection, food processing, swimming pools and air and water contamination.

PHYSICS

PHYS 100, 101 Qtr. Hrs. - 4, 4
Physical Science: Introduction to the basic principles of physical science. A study of selected topics emphasizing general concepts of the field. Familiarization with the basic laws governing our universe and man's environment. Recommended for satisfying the science requirements of the Environmental Studies Program.

PHYS 103 Qtr. Hrs. - 4
Astronomy: A descriptive survey of the properties of the solar system, the galaxies and the universe including the physical properties of stars as deduced from their radiation. Night observation sessions are included.

PHYS 201 Qtr. Hrs. - 3
College Physics I: PR: Two years of high school mathematics. Principles of physics with special application to the life sciences.

PHYS 202 Qtr. Hrs. - 3
College Physics II: PR: PHYS 201 or C.I. Lectures and laboratory experiments with special application to the life sciences.

PHYS 211 Qtr. Hrs. - 4
General Physics I: CR: MATH 321. The first course in a sequence covering the basic principles of classical mechanics, thermodynamics, electricity, magnetism, optics and modern physics.

PHYS 212 Qtr. Hrs. - 4
General Physics II: PR: PHYS 211; CR: MATH 322. Continuation of the General Physics sequence.

PHYS 213 Qtr. Hrs. - 4
General Physics III: PR: PHYS 212; CR: MATH 323. Continuation of the General Physics sequence.

PHYS 282, 283 Qtr. Hrs. - 1, 1
General Physics Laboratory: PR: PHYS 211. Laboratory experimentation and instruction covering selected topics in physics. Three hours per week.

PHYS 301, 302, 303 Qtr. Hrs. - 3, 3, 3
Project Physics: A "hands-on" lecture-laboratory course, particularly for Elementary Education majors and prospective Junior High science teachers. Topics range from naked-eye astronomy to radioactive dating.

PHYS 304 Qtr. Hrs. - 4
Astronomy: PR: PHYS 103 or equivalent. A continuation of PHYS 103 with emphasis on stellar and galactic evolution, and recent discoveries in astronomy. Appropriate for the Environmental Studies Program.

PHYS 307 Qtr. Hrs. - 3
Biophysics: PR: One year of college physics, or C.I. Physics of Biosystems, viewed as optimal control systems with constraints imposed by energy transfer mechanisms, and examined by considering energy, information, and cybernetics.

PHYS 311 Qtr. Hrs. - 4
Intermediate Physics I: PR: PHYS 213; or C.I.; CR: MATH 323. First course in a sequence covering mechanics, vectors, coordinate transformations, rigid-body dynamics, electrostatics, electrodynamics, Maxwell's equations, special relativity, radiation, atomic, nuclear and solid state physics, wave guides, physical optics, wavemotion, quantum statistics in thermodynamics, and kinetic theory.

PHYS 312 Qtr. Hrs. - 4
Intermediate Physics II: PR: PHYS 311 or C.I.; CR: MATH 324. Continuation of the Intermediate Physics sequence.

PHYS 313 Qtr. Hrs. - 4
Intermediate Physics III: PR: PHYS 312 or C.I.; CR: MATH 331. Continuation of the Intermediate Physics sequence.

PHYS 314 Qtr. Hrs. - 4
Intermediate Physics IV: PR: PHYS 313 or C.I. Continuation of the Intermediate Physics sequence.

PHYS 315 Qtr. Hrs. - 4
Intermediate Physics V: PR: PHYS 314 or C.I. Continuation of the Intermediate Physics sequence.

PHYS 343 Qtr. Hrs. - 4
Computer Methods in Physics I: PR: PHYS 211 and COMP 102 or C.I. Non-analytical problems in physics and astronomy, supplementary to the Physics 211, 212, 213 sequence, solved by approximation methods with computer assistance.

PHYS 344 Qtr. Hrs. - 3
Modern Physics for Engineers: PR: ENGR 221 and MATH 331. Selected topics in atomic, nuclear, molecular, and solid state physics. A study of spectroscopy, X-rays, nuclear radiation, and cosmic rays.

PHYS 345 Qtr. Hrs. - 3
Astrophysics: PR: PHYS 213 or equivalent. Elementary physics of stellar systems, including the theories of evolution of stars and planets, models of stellar interiors, properties of stellar atmospheres and stellar spectra of all wavelengths. Includes night sessions for photography and spectroscopy of celestial objects.

PHYS 354 Qtr. Hrs. - 3
Optics and Wave Motion for Engineers: PR: ENGR 211 and MATH 324. Selected topics in optics, acoustics, and related wave phenomena. A study of reflection, refraction, interference, and diffraction.

PHYS 380 Qtr. Hrs. - 3
Scientific Instruments Laboratory: PR: PHYS 202 or C.I. A lecture-laboratory course in fundamentals of physics related particularly to the application, operation and limitations of various scientific instruments.

PHYS 381 Qtr. Hrs. - 3
Physics Laboratory – Electronics: PR: PHYS 212; CR: MATH 323; or C.I. Lecture and laboratory work stressing electronic principles through the study of test equipment, power supplies, amplifiers, oscillators, and pulse circuits.

PHYS 382, 383 Qtr. Hrs. - 4, 4
Physics Laboratory – Intermediate: PR: PHYS 213 or C.I. Laboratory work in basic measurements of physical constants; intermediate level experiments in electronics, modern physics, nuclear physics, optics and solid state physics.

PHYS 401 Qtr. Hrs. - 3
Physical Limitations of Mankind: Physical processes of primary importance to environmental stability described for nonscientists. Explanation of physical mechanisms, limitations imposed, and requirements for survival.

PHYS 443 Qtr. Hrs. - 3
Computer Methods in Physics II: PR: PHYS 311 and COMP 102 or C.I. Examples and problems in physics from classical mechanics, electromagnetic theory and wave mechanics are solved using numerical techniques with computer assistance.

PHYS 451 Qtr. Hrs. - 3
Optics: PR: MATH and PHYS 331 or PHYS 354; or C.I. A study of modern approaches to refraction, interference, diffraction, polarization, scattering absorption and stimulated emission, spectroscopy and lasers.

PHYS 461 Qtr. Hrs. - 3
Solid State Physics: PR: PHYS 341 or C.I. Properties of solids, crystal binding, free electron model, band theory of solids, Fermi surface, and solid state applications.

PHYS 471 Qtr. Hrs. - 3
Quantum Mechanics: PR: PHYS 341 or C.I. A study of the postulates of quantum mechanics, the Schrodinger equation, and an introduction to the statistics of many particle systems.

PHYS 477 Qtr. Hrs. - 3
Nuclear Physics: PR: PHYS 341 and MATH 331; or C.I. Nuclear force, structure moments and models. Alpha decay, beta decay, gama-ray emission, nuclear reactions and applications of nuclear physics.

PHYS 481, 482 Qtr. Hrs. - 4, 4
Physics Laboratory – Advanced: PR: PHYS 382 or C.I. Advanced laboratory experiments in electronics, atomic and molecular physics, nuclear physics, optics, solid state physics, and astrophysics. Major emphasis placed on experimental design, data, and scientific writing.

SCIENCE

SCI 490 Qtr. Hrs. - 2
Senior Seminar: Science in Human Affairs: The impact of science on modern society. This course, primarily intended for the senior student, is offered as one of the Advanced Environmental Studies seminars.

STATISTICS

STAT 201 Qtr. Hrs. - 4
Principles of Statistics: A lecture-laboratory course designed to introduce the student to statistical concepts in modern society. An introduction to basic principles, frequency distributions, measures of location and dispersion, probability, probability distributions, statistical inference.

STAT 301 Qtr. Hrs. - 4
Fundamentals of Probability and Statistics: PR: Four years of high school mathematics or MATH 106 or 110 or equivalent. A lecture-laboratory course introducing probability and statistical inference including: estimation, hypothesis testing, binomial and normal distributions, small samples, regression and correlation.

STAT 321 Qtr. Hrs. - 4
Business and Economic Statistics: PR: ECON 203, MATH 115, and STAT 301. The use of statistical methods as scientific tools in the analysis of economic and business problems. Emphasis is placed upon the collection, analysis, and interpretation of quantitative economic and business data. (Same as ECON 321.)

STAT 332 Qtr. Hrs. - 3
Statistical Quality Control: Statistical concepts and methods applied to the control of quality of manufactured products. (Same as IEMS 332.)

STAT 335 Qtr. Hrs. - 3
Probability and Statistics for Engineers: PR: MATH 323. Axioms of probability; combinatorial and geometrical probability; probability distributions; measures of location and dispersion; sampling and sampling distributions; estimation and tests of hypotheses; engineering applications. (Same as ENGR 371.)

STAT 341, 342, 343 Qtr. Hrs. - 3, 3, 3
Mathematical Statistics: PR: MATH 323 and a course in statistics. Sample space, probability axioms, distribution functions, sampling distributions, point and interval estimation, hypothesis testing, multivariate normal, regression and correlation, linear models, analysis of variance, distribution-free methods, an introduction to stochastic processes.

STAT 401, 402 Qtr. Hrs. - 4, 4
Statistical Methods: PR: One course in statistics or graduate standing. A lecture-laboratory course designed to introduce the student to the role of statistics in research; methods of analysing data from experiments and surveys; statistical concepts and models; estimation; tests of hypotheses; regression and correlation; analysis of variance and covariance; an introduction to the principles of the statistical design of experiments and surveys.

STAT 411 Qtr. Hrs. - 3
Experimental Design: PR: STAT 402. Methods of constructing and analyzing designs for experimental investigations; concepts of blocking, randomization, and replication; experimental unit technique; complete block designs; confounding in factorial experiments; incomplete block designs; response surface methodology.

STAT 415 Qtr. Hrs. - 4
Regression Analysis: PR: MATH 317 and STAT 401. Least squares techniques in multiple regression; matrix methods; general linear model; residual analysis; transformations; orthogonal polynomials; stepwise and stagewise procedures; non-linear estimation.

STAT 421 Qtr. Hrs. - 3
Survey Design: PR: STAT 402. Methods of constructing and analyzing designs for survey investigations; simple random, stratified, multistage, and multiphase sampling designs; questionnaire construction; methods of estimation; techniques of survey investigation.

STAT 447, 448 Qtr. Hrs. - 3, 3
Probability Theory and Applications: PR: MATH 324. Axioms of probability, discrete and continuous random variables, characteristic functions, Markov chains, recurrent events, sequences of random variables, random walk, simple stochastic processes.

STAT 535 Qtr. Hrs. - 3
Probability for Engineers: PR: STAT 335. Engineering application of probability, combinatorial analysis, sample space, events, probability, discrete and continuous random variables, and probability distributions. (Same as IEMS 502.)

STAT 536 Qtr. Hrs. - 3
Statistics for Engineers: PR: STAT 335. Engineering application of statistics, significance tests and confidence intervals, tests of hypotheses, simple and multiple regression and correlation. (Same as IEMS 503.)

ZOOLOGY

ZOOL 100 Qtr. Hrs. - 4
General Zoology: PR: BIOL 100 or 103. Introduction to zoology; structure, function and representative groups; current concepts in zoological sciences.

ZOOL 310 Qtr. Hrs. - 4
Histological Technique: PR: ZOOL 100 or C.I. Preparation of tissues for miscroscopic study; paraffin and cryostat methods; use of microtome; staining procedures; whole mounts.

ZOOL 322 Qtr. Hrs. - 4
Vertebrate Histology: PR: ZOOL 100. Anatomy, structure and function of major cell types and tissues.

ZOOL 324 Qtr. Hrs. - 5
Human Anatomy: PR: BIOL 100 or equivalent. Structure of the human body. Not open to students in ZOOL 326, 327 or equivalent.

ZOOL 326, 327 Qtr. Hrs. - 4, 4
Comparative Vertebrate Anatomy: PR: ZOOL 100. The vertebrate animals; relationship of organs and systems; and their phylogentic significance.

ZOOL 330 Qtr. Hrs. - 5
Animal Physiology: PR: BIOL 332 or C.I. Function and interrelationships of nervous, endocrine, muscle, reticulo-endothelial, reproductive, excretory, respiratory and digestive systems.

ZOOL 334 Qtr. Hrs. - 3
Human Physiology: PR: BIOL 100 or equivalent. The physiology and interrelationships of organ systems of the body.

ZOOL 335 Qtr. Hrs. - 2
Human Physiology Laboratory: PR: BIOL 100 or equivalent. Laboratory exercises illustrating the physiological principles included in ZOOL 334. Must be taken concurrently with ZOOL 334 when required by curriculum.

ZOOL 340 Qtr. Hrs. - 4
Vertebrate Zoology: PR: 8 hours of zoology or C.I. Emphasis on evolution and classification followed by an introduction to vertebrate ecology, natural history and behavior.

ZOOL 345 Qtr. Hrs. - 4
General Entomology: PR: ZOOL 100. Introduction to insects; their identification, biology and ecology.

ZOOL 355 Qtr. Hrs. - 3
Game Conservation and Management: PR: ZOOL 100. Principles of conservation and management; habitat improvement; wildlife techniques; public relations.

ZOOL 370 Qtr. Hrs. - 5
Animal Parasitology: PR: ZOOL 100. Identification and life histories of representative parasitic protozoa and helminths emphasizing host-parasite relationships; techniques of animal examination; emphasis on human parasites.

ZOOL 375 Qtr. Hrs. - 3
Vertebrate Ethology: PR: ZOOL 100. Classical ethology, modern experimental ethology and behavioral ecology are considered.

ZOOL 423 Qtr. Hrs. - 5
Comparative Vertebrate Embryology: PR: ZOOL 326, 327. Embryology of the vertebrates; fertilization of egg; stages of cleavage; development of organs and systems.

ZOOL 440 Qtr. Hrs. - 3
Principles of Zoological Systematics: PR: BIOL 460 and 15 hours of zoology courses of 300 level or above. Theory and practice of taxonomy and classification of animals; introduction to the International Code of Zoological Nomenclature.

ZOOL 442 Qtr. Hrs. - 5
Invertebrate Zoology: PR: 12 hours of biology or C.I. Taxonomy, anatomy and ecology of the invertebrate animals.

ZOOL 445 Qtr. Hrs. - 4
Ichthyology: PR: 8 hours of zoology or C.I. Introduction to the biology of the fishes, their classification, evolution and life histories.

ZOOL 446 Qtr. Hrs. - 4
Herpetology: PR: 8 hours of zoology or C.I. Introduction to the biology of the amphibians and reptiles, their classification, evolution and life histories.

ZOOL 447 Qtr. Hrs. - 4
Ornithology: PR: 8 hours of zoology or C.I. Introduction to the biology of birds, their classification, evolution and life histories.

ZOOL 448 Qtr. Hrs. - 4
Mammalogy: PR: 8 hours of zoology or C.I. Introduction to the biology of mammals, their classification, evolution and life histories.

ZOOL 450 Qtr. Hrs. - 4
Fishery Biology: PR: BIOL 450 and ZOOL 445. Life histories, distribution and identification of fresh water game fishes of North America with particular emphasis on the southeastern United States; interrelationship of biology and management.

ZOOL 452 Qtr. Hrs. - 4
Lake and Stream Management: PR: ZOOL 450. The ecology of freshwater fishes; techniques of aquatic research.

ZOOL 453 Qtr. Hrs. - 3
Zoogeography: PR: BIOL 350. Principles and concepts concerning regional patterns of distribution of the animals of the world, both past and present.

ZOOL 473 Qtr. Hrs. - 4
Medical Entomology: PR: ZOOL 345. A consideration of the recognition characteristics, biology and control of insects and other arthropods of importance to the health of man, livestock and wildlife.

ZOOL 547 Qtr. Hrs. - 4
Field Zoology: PR: 12 hours in biological sciences; or science teaching experience; or C.I. Classification and identification among major animal groups with emphasis on field experience. Major reference sources reviewed.

COLLEGE OF SOCIAL SCIENCES

AIR FORCE ROTC

AFR 101 Qtr. Hrs. - 1
The United States Air Force and Strategic Offensive Forces: PR: Qualification for Air Force ROTC or permission of Professor of Aerospace Studies. History, mission, organization and doctrine of the United States Air Force and a study of U.S. Strategic Offensive Forces.

AFR 102 Qtr. Hrs. - 1
Strategic Defense Forces: PR: AFR 101 or permission of Professor of Aerospace Studies. Concepts of aerospace defense. A study of the various systems and functions associated with defense against manned bombers and missiles.

AFR 103 Qtr. Hrs. - 1
Strategic Defense Forces: PR: AFR 102 or permission of Professor of Aerospace Studies. A brief review of Army, Navy, and Marine Forces. An introduction to special operations and countersurgency.

AFR 201 Qtr. Hrs. - 1
The Department of Defense: PR: AFR 103 or permission of Professor of Aerospace Studies. Organization of the Department of Defense and role of the military in national policies.

AFR 202 Qtr. Hrs. - 1
Military Policies and Strategies: PR: AFR 201 or permission of Professor of Aerospace Studies. Current Military strategy choices, and the military policies of the U.S., its allies and its antagonists which have resulted.

AFR 203 Qtr. Hrs. - 1
The Making of Defense Policy: PR: AFR 202 or permission of Professor of Aerospace Studies. Roles played by various U.S. governmental agencies within and without the Department of Defense in the formulation of defense policies.

AFR 301 Qtr. Hrs. - 3
The Development of Airpower: PR: Completion of the General Military Course, selection for two-year AFROTC Program and approval of Professor of Aerospace Studies. Review and survey of communicative skills. Development of airpower from the beginning of manned flight through 1961.

AFR 302 Qtr. Hrs. - 3
Contemporary Aerospace Power: PR: AFR 301 or approval of Professor of Aerospace Studies. A study of concepts doctrine, and the employment of aerospace power in the 1960's. The future of manned aircraft.

AFR 303 Qtr. Hrs. - 3
Astronautics and Space Operations: PR: AFR 302 or approval of Professor of Aerospace Studies. Air Force astronautics and space operations, emphasis on space vehicle systems, ground support, man in space, and future developments in space.

AFR 401 Qtr. Hrs. - 3
Leadership and Discipline in the Air Force: PR: AFR 303 or approval of Professor of Aerospace Studies. The need for Air Force leadership, professional responsibilities of the officer, need for discipline in the military, and the military justice system.

AFR 402 Qtr. Hrs. - 3
Principles of Military Leadership and Management: PR: AFR 401 or approval of Professor of Aerospace Studies. Variables affecting military leadership, traits and interactional approaches to leadership, introduction to military managment, and systems approach to Air Force managment.

AFR 403 Qtr. Hrs. - 3
Air Force Managment and the Junior Officer: PR: AFR 402 or approval of Professor of Aerospace Studies. Pertinent Air Force publications and personnel management policies, as they affect the junior officer. Preparation of each cadet for active duty.

COMMUNICATION

COM 100 Qtr. Hrs. - 3
Basic Communication: Survey of basic factors affecting human interaction through communication; theories and models of communication; contributions of behavorial sciences and related arts; mass media in society.

COM 301 Qtr. Hrs. - 4
Communication as a Behavorial Science: Basic principles of the behavorial science approach to the study of contemporary communication.

COM 310 Qtr. Hrs. - 4
History of the Motion Picture: Development of the film industry, its social and economic impact. Same as THA 310.

COM 311 Qtr. Hrs. - 4
Business and Professional Communication: Investigation of the basic principles of communication as applied to business with emphasis on the written and oral communicative acts.

COM 312 Qtr. Hrs. - 4
Leadership Through Oral Communication: A theoretical and practical investigation of leadership in oral communication situations, principles of parliamentary law, and approaches to problem solving.

COM 313 Qtr. Hrs. - 4
Interpersonal Communication: Nature of the communication process; variables affecting the process and the individuals involved. Analysis of communication models, sender-receiver behavior, situational cues, verbal and nonverbal messages.

COM 319 Qtr. Hrs. - 5
Basic Reporting: PR: Consent of instructor and student must have a minimum ability to type. Development of skills in gathering and writing for the mass media.

COM 320 Qtr. Hrs. -4
Introduction to Communicative Disorders: Etiology, symptoms, and methods of diagnosing and treating communicative disorders. For beginning and prospective majors in Communicative Disorders. Clinical observations required.

COM 350 Qtr. Hrs. - 4
Oral Communication For Television: PR: SPE 101. Practice and performance in speech preparation and delivery for television. Types of speeches include the television demonstrative, television stimulative and the television persuasive. All speeches are televised in the television laboratory.

COM 363 Qtr. Hrs. - 4
Group Interaction and Decision-Making: A study of small-group interaction employing both general communication theory and small group theory. Attention is given to such group activities as development of discussion, leadership emergence, development of norms, etc.

COM 400 Qtr. Hrs. - 4
Opinion and the Mass Media: Role of the mass media in influencing public opinion, with specific case studies. Also the techniques of opinion measurement and impact of opinion polls on voters.

COM 401 Qtr. Hrs. 4
Communicative Disorders: Articulation: PR: SPE 261, 364, COM 320, and PSY 301. Diagnoistic methods and therapeutic procedures for treatment of articulation disorders. Observations required.

COM 402 Qtr. Hrs. - 4
Communicative Disorders: Language: PR: SPE 261, 364, COM 320, and PSY 333. Diagnoistic techniques and therapeutic procedures for treatment of language disorders. Observations required.

COM 403 Qtr. Hrs. - 4
Communicative Disorders: Voice: PR: SPE 261, 364, COM 320 and PSY 301. Diagnostic techniques and therapeutic procedures for the treatment of voice disorders (Cerebral Palsy, Cleft Palate, Deaf & Hard of Hearing, etc.) Observations required.

COM 404 Qtr. Hrs. - 4
Communicative Disorders: Stuttering: PR: SPE 261, 364, COM 320 and PSY 301. Etiology, diagnosis and therapeutic procedures for stuttering and related disorders. Observations required.

COM 410 Qtr. Hrs. - 4
Social Responsibilities of the Mass Media: Relationships between the mass media and society; examination of social and ethical responsibilities of the media.

COM 411 Qtr. Hrs. - 4
Legal Responsibilities of the Mass Media: Legal rights and restrictions, including Constitutional guarantees; libel, invasion of privacy, and contempt of court.

COM 414 Qtr. Hrs. - 4
Mass Communication and Government: Role, responsibilities, and non-legal problems of both the government and press in the process of conveying governmental news to the public.

COM 415 Qtr. Hrs. - 4
Informational Communication: An examination of available communication systems (non-technical) and their utilization within business, educational, entertainment, industrial, medical, and military organization.

COM 420 Qtr. Hrs. - 1
Practicum in Communication: PR: C.I. May be repeated three times for credit.

COM 421 Qtr. Hrs. - 2
Current Affairs Analysis: An analytical approach to the handling of the major news events through mass communications, with emphasis on their social, economic, political, cultural and historical impact.

COM 426 Qtr. Hrs. - 4
Public Relations: Principles and practice of public relations, the means of gaining publicity and influencing people.

COM 427 Qtr. Hrs. - 4
Public Relations Campaigns: PR: COM 426. Planning and execution of a public relations campaign; use of research and coordination of elements of the campaign.

COM 428 Qtr. Hrs. - 4
Institutional Public Relations: PR: COM 426 or C.I. Principles and methods of public relations as practiced by educational, medical and corporate-related institutions.

COM 429 Qtr. Hrs. - 4
Mass Media and Popular Culture: An impact study of mass media upon American culture past to present.

COM 432 Qtr. Hrs. - 3
The Mass Media in Developing Countries: Role of media in the world's developing areas, how the nations and media help shape the direction of one another.

COM 434 Qtr. Hrs. - 4
Principles of Advertising: Fundamentals of advertising theory and practice, including social and economic aspects.

COM 435 Qtr. Hrs. - 4
Advertising Media: PR: COM 434 or C.I. Evaluations of advertising media, their ability to serve the advertiser's communication needs and analysis used in determining media success.

COM 440 Qtr. Hrs. 1-12
Clinical Observation and Introduction to Clinical Procedures in Speech Pathology and Audiology. (Practicum): PR: Consent of Instructor. Observation and supervised participation in speech pathology and audiology in the university clinic and local clinics.

COM 445 Qtr. Hrs. - 4
Basic Audiology: PR: SPE 261, 364, and COM 320. Introduction to physics of sound, anatomy of hearing mechanism, pure tone audiometry, hearing aids, problems of the hearing handicapped. Observation and practice required.

COM 450 Qtr. Hrs. - 4
Aural Habilitation: PR: COM 345. Principles and procedures in the utilization of residual hearing, auditory training, speech reading and the use of hearing aids for the hard-of-hearing and the deaf.

COM 451 Qtr. Hrs. - 5
Speech and Language for the Deaf and Hard of Hearing: PR: C.I. Principles, theories of developing speech and language in pre-school and school age hard-of-hearing and deaf children. Emphasis on development of vocabulary and language.

COM 457 Qtr. Hrs. 12-15
Communication Internship: PR: C.I. Internship in radio, television, film, journalism, public relations, advertising and speech involving practicum at selected professional communications organizations for one quarter. In addition to a regular prescribed work schedule, the intern must submit a weekly log of his activities and produce a significant research paper.

COM 460 Qtr. Hrs. - 4
Group Dynamics: A study of human behavior in group situations.

COM 463 Qtr. Hrs. - 4
Studies in Listening: Analysis of current trends, professional literature, and resource materials bearing upon the teaching of listening. Practice in listening; preparing listening experiences; oral and written reports.

COM 501 Qtr. Hrs. - 4
Speech Communication Instruction: PR: C.I. Communication models as teaching devices, design of communication curricula, instructional media with speech practicum and classroom criticism and evaluation.

COM 507 Qtr. Hrs. - 4
Freelance Writing: PR: Evidence of satisfactory writing skills. A study of the techniques and procedures of freelance writing, including the preparation of several manuscripts.

COM 510 Qtr. Hrs. - 4
Survey of Communicative Disorders: A survey of speech, language and hearing disorders for habilitative personnel and other interested professionals not directly working or majoring in the area of communicative disorders.

COM 511 Qtr. Hrs. - 5
Communicative Disorders Programs for the Public Schools: PR: C.I. Methods and techniques for the public school clinician; including organization of public school programs. Observations required.

COM 512 Qtr. Hrs. - 4
Audiology II: Advanced techniques in pure-tone speech audiometry and automatic audiometry, with emphasis on interpretation of audiograms and differential diagnosis.

COM 513 Qtr. Hrs. - 4
Auditory Problems of Infants and Children: PR: C.I. Development of sensory perception, auditory deprivation, tests, and testing techniques with the neonate, infant, and young child.

COM 562 Qtr. Hrs. - 4
Persuasion: Attitude Formation and Change: A survey of the immediate and direct ways in which persuasive communications and social groups come to influence attitudes.

COM 568 Qtr. Hrs. - 5
Evolution of Communication Theory: General Survey: Major communication trends from classical era to the present. Comparison of Aristotelian and non-Aristotelian rhetorics. Contributions of principal figures will be discussed.

COM 572 Qtr. Hrs. - 4
Rhetoric of Social and Political Action: PR: Junior Standing. A critical investigation of social and political speaking within contemporary American

society including agitative rhetoric of social and political dissent.

COM 602 Qtr. Hrs. - 4
Modern Communication Theory: Comparative analysis of theories and models of human communication: behavior systems, encoding and decoding processes, interaction variables, and social context.

COM 603 Qtr. Hrs. - 4
Information and Educational Systems: PR: C.I. Sources, processing, and transmittal of educational and informational materials (software) used in educational broadcast systems, information retrieval systems, learning machines, etc.

COM 605 Qtr. Hrs. 2 - 8
Clinical Practice in Speech Pathology and Audiology: PR: C.I. Advanced clinical practice in diagnosis and treatment of communicative disorders.

COM 610 Qtr. Hrs. - 4
Communication and National Development: An examination of the means by which communication has been used to aid in modernizing developing societies.

COM 612 Qtr. Hrs. - 4
Comparative International Communication Organizations: A study of the principle mass communication organizations of the world.

COM 613 Qtr. Hrs. - 4
Communication and Society: The importance of communications in societal stress situations, with emphasis on current problems.

COM 617 Qtr. Hrs. - 4
Governmental Public Relations: PR: Consent of instructor. Emphasis study of campaign planning, image and public affairs activities of political aspirants and executive governmental offices at the city, county, state and federal levels.

COM 620 Qtr. Hrs. - 4
Studies in Persuasion: Survey and evaluation of experimental research in persuasion.

COM 621 Qtr. Hrs. - 4
Persuasion in the Media: Study of persuasive campaign with focus upon ethics, methodology, and strategies toward accomplishing the communication end.

COM 622 Qtr. Hrs. - 4
Small Group Communication: PR: C.I. A study of communication and its effect on small group behavior.

COM 625 Qtr. Hrs. - 4
Problems in Broadcast Journalism: PR: C.I. Analysis of electronic journalistic policies, sources and control of information.

COM 628 Qtr. Hrs. - 4
Audience Measurement: PR: C.I. Examination and review of audience measurement techniques. Individual assignments for compilation and analysis of measurement data.

COM 630 Qtr. Hrs. - 4
Communications Management: PR: C.I. Analysis and developments, with reference to particular media. Organizational theory, structure and behavior. Management principles and operations.

COM 635 Qtr. Hrs. - 4
Legal Aspects of Mass Communication Law: PR: C.I. Further study into the legal rights and restrictions affecting the mass media.

COM 636 Qtr. Hrs. - 3
Organization and Methods in Communicative Disorders Programs: PR: C.I. Techniques for establishing and conducting a program in communicative disorders.

COM 640 Qtr. Hrs. - 4
Effects of Advertising on Society: An in-depth study of advertising's effects on consumer behavior, societal mores and media economics.

COM 645 Qtr. Hrs. - 3
Speech of the Laryngecomee: PR: C.I. Basic principles and practice for developing and improving the speech of the laryngectomee.

COM 646 Qtr. Hrs. 3 - 4
Aphaisa: PR: C.I. Etiology, diagnostic techniques and management of the adult aphasic patient.

COM 647 Qtr. Hrs. 3 - 4
Aural Habilitations II: Physical characteristics and clinical aspects of auditory amplifiers for the hearing handicapped. Clinical observations requried.

COM 660 Qtr. Hrs. - 4
Studies in Communicative Disorders: Advanced study and research in disorders involving: Neuromuscular Disorders, Voice, Language, Stuttering, Articulation, Cleft Palate, Audiology. See class schedule. May be repeated for credit.

JOURNALISM

JRN 321 Qtr. Hrs. - 4
Copy Editing: PR: COM 319. Fundamentals of copy editing for printed media, including selection, processing and display of news.

JRN 322 Qtr. Hrs. - 4
Information Processing: PR: JRN 321 or equivalent. Planning content and format of newspaper and other periodicals; layout; dummying, departmental editing, copy desk management.

JRN 323 Qtr. Hrs. - 4
Press Photography I: Learning the use of the still camera, darkroom procedures, role of the photographer.

JRN 324 Qtr. Hrs. - 4
Press Photography II: PR: JRN 323 or equivalent. Further study in the use of the still camera and darkroom procedures plus color photography.

JRN 330 Qtr. Hrs. - 4
History of American Journalism: Development of newspapers and magazines, the press associations and the growth of the electronic media.

JRN 331 Qtr. Hrs. - 3
Film Criticism: PR: C.I. The practice of writing movie reviews: students will review at least one film a week during the course.

JRN 420 Qtr. Hrs. - 4
Technical and Scientific Writing: PR: C.I. The practice in the gathering of materials for technical and scientific articles; digesting of technical information into more readable forms.

JRN 421 Qtr. Hrs. - 4
Editorial and Column Writing: PR: C.I. Building the editorial page, backgrounding and interpreting the news.

JRN 422 Qtr. Hrs. - 4
Public Affairs Reporting: PR: COM 319 or C.I. Study of community news sources, reporting courts, city and county government.

JRN 423 Qtr. Hrs. - 4
Writing for the Mass Media: PR: C.I. Students write for a certain segment of the mass media of their own choosing. Will include creative writing, article writing, etc. May be repeated for credit.

JRN 424 Qtr. Hrs. - 4
Critical Writing: PR: C.I. Practice in writing reviews of plays, concerts, and books.

JRN 425 Qtr. Hrs. - 4
Feature Writing: PR: C.I. Writing of feature articles for newspapers and magazines.

JRN 430 Qtr. Hrs. - 4
The Newspaper in the Classroom: Study of the use of the newspaper as a teaching aid in the classroom. Designed for persons currently teaching or majoring in education.

JRN 431 Qtr. Hrs. - 4
International Communication and the Foreign Press: ,A study of the news communicating systems of the world, the role of foreign correspondents, the foreign press.

JRN 433 Qtr. Hrs. - 4
Propoganda and Psychological Warfare: Propaganda and psychological warfare principles with a study of the activities engaged in by nations.

JRN 436 Qtr. Hrs. - 4
Advertising Copy: PR:COM 434. The writing and preparation of advertising copy.

JRN 437 Qtr. Hrs. - 4
Advertising Campaigns: PR: JRN 436 or C.I. The planning and execution of an advertising campaign; use of research and coordination of elements of the campaign.

JRN 438 Qtr. Hrs. - 4
Newspaper and Magazine Advertising: PR: C.I. A study of the mechanical requirements and limitations in print advertising.

LAW ENFORCEMENT

LENF 201 Qtr. Hrs. - 4
Law Enforcement: A comprehensive survey of the history and philosophy of law enforcement. The role of the police as a functional component in the broad system of criminal justice will be emphasized.

LENF 205 Qtr. Hrs. - 4
Police Science and Technology: PR: LENF 201. Study of operational concepts of investigative and scientific professions as affecting discovery, preservation, and examination of physical tracings from negligent or criminal events. The specific advantages and limitations of scientific interpretations.

LENF 207 Qtr. Hrs. - 4
Criminal Investigation: A comprehensive survey of the modern methods and procedures used in the investigation and solution of criminal offenses.

LENF 300 Qtr. Hrs. - 4
Crime in America: Social factors and processes in criminal and delinquent behavior. Perspectives on criminal behavior and its varied patterns. Socialized criminals, the sociopathic offender, organized crime, white-collar crime, drug use and abuse, the sexual offender, and protest, politics and crime.

LENF 301 Qtr. Hrs. - 4
Criminal Law in Action: PR: C.I. Basic concepts of the criminal law, their origin and development in Anglo-American jurisdiction; constitutional and procedural restraints on law enforcement, their purpose and implementation; modern criminal procedures; Federal and State relationships in the administration of justice.

LENF 302 Qtr. Hrs. - 4
Administration of Justice: The broad system of criminal justice process in America, an examination of various goals and conflicts present within law enforcement, court and corrections sub-systems.

LENF 303 Qtr. Hrs. - 5
Municipal Police Administration: PR: LENF 201. Advanced study of contemporary operational concepts of administration with an emphasis on function, rather than structure. An examination of emerging ideas such as lateral entry, team policing, central staff control, and professionalization.

LENF 304 Qtr. Hrs. - 5
The Police Managers: PR: LENF 201. Elements of first-line supervision and executive development. Administrative leadership; its situational nature; methods and traits; recent theories and research on leadership.

LENF 310 Qtr. Hrs. - 4
The Correctional and Penal Systems: Organization and function of institutions and noninstitutional services in the correctional rehabilitation of criminal and juvenile offenders, contemporary philosophies and methods in the treatment of adult criminals and juvenile delinquents.

LENF 311 Qtr. Hrs. - 4
Probation and Parole: Analysis of probation and parole services and systems: the organization, administration and management of treatment and field services for various types of public offenders.

LENF 400 Qtr. Hrs. - 4
Police and the Community: Police relationships with the citizenry. Ethnic tension and conflict in relation to law enforcement. The police role in dealing with groups, crowds, gangs and nonconformist cultures.

LENF 407 Qtr. Hrs. - 4
Comparative Justice Systems: A survey of contemporary foreign law enforcement systems, operational and philosophical differences emerging from various cultural and legal systems in Europe and Asia.

LENF 410 Qtr. Hrs. - 4
Financial Administration and Budgeting: PR: LENF 303 or 304. Police budgets as instruments of policy making and management. Financial, fiscal, administrative and legal aspects of budgeting.

LENF 411 Qtr. Hrs. - 4
Justice Policy and Social Conflict: Social conflict and contemporary justice policy, the effect of differential policy and decision making upon the administration of law enforcement bureaucracies and justice service agencies.

LENF 422 Qtr. Hrs. - 4
Delinquency Control: Examination of operational programs and institutions including juvenile court process, intake services, juvenile bureau administration youth authority programs, and drug abuse control.

LENF 423 Qtr. Hrs. - 4
Corrections Administration: Organization administration and operation of short and long term detention facilities or institutions including classification, treatment, security, supervision and prison sub-culture problems.

POLITICAL SCIENCE

PCL 201 Qtr. Hrs. - 4
American National Government: A study of the dynamics of American national government, including its structure, organization, powers, and procedures.

PCL 300 Qtr. Hrs. - 4
State Government: PR: PCL 201 203 or C.I. A comparative study of American state governments and political processes, with emphasis on Florida. Structures and functions of state governments will be considered as well as federal-state and state-local relations.

PCL 302 Qtr. Hrs. - 4
Scope and Methods of Political Science: Introduction to the Scope and Methodology of contemporary political analysis. Topics include scope of the discipline, research design, and methods.

PCL 303 Qtr. Hrs. - 4
Principles of Political Science: Basic concepts of political science and its development as a field with emphasis on areas of concern; analysis of major approaches to the study of politics; familiarization with recent developments in the discipline.

PCL 305 Qtr. Hrs. - 4
Political Parties and Processes: PR: PCL 201, 303, or C.I. Study of American politics with major emphasis upon the role, organization, functions, and future processes of parties in the American political system.

PCL 306 Qtr. Hrs. - 4
Interest Groups and Political Movements: PR: PCL 201 or C.I. A study of the role of interest groups in the American political process and a comparison of varying political objectives and strategies used by the groups.

PCL 308 Qtr. Hrs. - 4
The American Presidency: PR: PCL 201, 303 or C.I. Examination of the presidency as an institution and of the evolution in status, powers, administrative responsibilities, leadership and decision-making roles of the chief executive in the American political system.

PCL 310 Qtr. Hrs. - 4
Congress and the Legislative Process: PR: PCL 201, 303 or C.I. The nature, role, and functions of the legislative process; the dynamics of executive-legislative relations and resultant problems.

PCL 312 Qtr. Hrs. - 4
Minorities in American Politics: PR: PCL 201, 303, or C.I. The past and contemporary roles of minority groups in the American political system; their impact upon the legislative, executive, and judicial processes.

PCL 315 Qtr. Hrs. - 4
Public Opinion: A substantive and theoretical study of public opinion: patterns of distribution, opinion formation, opinion measurement, policy linkages.

PCL 316 Qtr. Hrs. - 4
Electoral behavior: Theoretical and substantive inquiry into U.S. electoral behavior: a study of the factors influencing participation and voting behavior.

PCL 321 Qtr. Hrs. - 4
International Relations: PR: PCL 201, 303 or C.I. Analysis of the fundamental principles and factors affecting interstate relations; the foreign policy decision-making processes of states; the role and problems of power; conflict and methods of resolution.

PCL 323 Qtr. Hrs. - 4
Contemporary International Politics: PR: PCL 201, 303 or C.I. Application of the theory and fundamentals of international politics to contemporary world affairs with attention to the impact of twentieth century developments upon the international system and its actors.

PCL 341 Qtr. Hrs. - 4
Comparative European Politics: PR: PCL 201, 303 or C.I. An analytical and comparative study of the major governments of Europe and their impact upon the development of types of political systems.

PCL 342 Qtr. Hrs. - 4
Nationalism: A Systematic Analysis: Theories of modern nationalism as a world-wide political phenomenon including problems of: nationalistic wars and rebellions, multi-nation states, trans-national organizations.

PCL 343 Qtr. Hrs. - 4
Politics of Developing Areas: PR: PCL 201, 303 or C.I. An analysis of non-Western political systems with emphasis upon the problems of political, socio-economic, and cultural development as they affect attempts to achieve the transformation to modernization.

PCL 344 Qtr. Hrs. - 4
Comparative Asian Politics: PR: PCL 201 and 303, or C.I. Selected Asian political systems will be examined in terms of the interaction between political institutions and processes and social, cultural and economic structures.

PCL 350 Qtr. Hrs. - 4
Introduction to Public Administration: PR: PCL 201, 303 or C.I. Analysis of administrative theories and the process of implementing public policies in a democratic society.

PCL 360 Qtr. Hrs. - 4
American Political Philosophy: PR: PCL 201, 303 or C.I. A survey of the chief contributions of American political thought, their sources and background as focused within the context of American historical and institutional development.

PCL 403 Qtr. Hrs. - 4
Political Behavior: PR: PCL 201, 303 or C.I. A substantive and theoretical study of individual and group political behavior in the American political system.

PCL 405 Qtr. Hrs. - 4
Political Theory: PR: PCL 201, 303 or C.I. Examination of various normative and empirical approaches to the study of political science, stressing contemporary developments in the field.

PCL 413 Qtr. Hrs. - 4
Metropolitan Politics: PR: PCL 303, 203 or C.I. Analysis of political patterns, processes and issues in American communities.

PCL 414 Qtr. Hrs. - 4
Metropolitan Administration I: PR: PCL 350 or 413 or C.I. Study of the formal and informal socio-political structures that govern urban areas; emerging patterns of government, and management practices in urban and suburban settings.

PCL 416 Qtr. Hrs. - 12-15
Public Administration Internship: PR: C.I. Internship in municipal, county, state or federal government, including generalistic assignments or concentrations in such fields as personnel, planning, budget and fiscal, procurement, public safety, or housing and urban development for one quarter.

PCL 417 Qtr. Hrs. - 4
Policy Problems of Metropolitan Areas: PR: 4 hours of political science or C.I. A course designed to provide an in-depth analysis of two or three basic policy areas; for example, transportation, education, welfare, crime, etc.

PCL 418 Qtr. Hrs. - 4
The Politics of Planning for Urban Communities: PR: PCL 413 or C.I. An examination of social, political, and economic factors influencing the urban planning process at local, state, and national levels.

PCL 420 Qtr. Hrs. - 4
Contemporary International Politics of Asia: Examination of the role of Asia in international politics and the foreign policies of major and secondary powers as they related to trends in Asia.

PCL 421 Qtr. Hrs. - 4
International Politics of the Middle East: The external politics of the Middle East from a regional-global perspective with particular attention to the region's impact upon the relations of major powers.

PCL 427 Qtr. Hrs. - 4
American Foreign Policy: PR: PCL 201, 303 or C.I. An analysis of the traditions and development of American foreign policy with major emphasis on the role and policies of the United States in the contemporary world.

PCL 428 Qtr. Hrs. - 4
American Defense Policy: Study of policy evolution since World War II. Including consideration of the social and political costs involved and means of control.

PCL 430 Qtr. Hrs. - 4
International Organizations: PR: PCL 201, 303 or C.I. The nature and growth of international agencies of cooperation. Attention focused on the problems and development of functional, regional, and universal organizations.

PCL 433 Qtr. Hrs. - 4
International Law: PR: PCL 201, 303 or C.I. An introduction to the nature of evolution, and sources of international law and its role in interstate relations.

PCL 435 Qtr. Hrs. - 4
Coercion in International Politics: PR: PCL 201, 303 or C.I. An inclusive examination of the role and utility of coercive techniques of interaction among states in a nuclear age ranging from low-tension producing techniques of diplomatic intervention through theories of nuclear strategy and deterrence.

PCL 440 Qtr. Hrs. - 4
Comparative Public Administration I: PR: PCL 303, 203 or C.I. An analysis of administrative structures and processes of selected countries, including an evaluation of the influence of economic, social and political environment on bureaucratic functions and the role of the executive.

PCL 441 Qtr. Hrs. - 4
Comparative Public Administration II: PR: PCL 201, 303 or C.I. A case study approach to the problems of administration in diverse political environments stressing such functional aspects of bureaucratic and administrative behavior and process as patterns of organization, personnel systems, field services, administrative style and the political power position of the bureaucracy.

PCL 442 Qtr. Hrs. - 4
Government and Politics of Great Britain: PR: PCL 341 or C.I. A survey of British government, society, and institutions, with emphasis on the growth and development of parliamentary democracy.

PCL 443 Qtr. Hrs. - 4
Government and Politics of the Soviet Union: PR: PCL 341 or C.I. Examination of the origins, institutions, and functioning of the Soviet political system, including the role and characteristics of the communist party of the Soviet Union.

PCL 444 Qtr. Hrs. - 4
Government and Politics of China: Examination of the origins, institutions, and functioning of the Chinese political system, including the role and characteristics of the communist party of China.

PCL 447 Qtr. Hrs. - 4
Comparative Political Culture and Socialization: PR: PCL 201 and 303, or C.I. Comparative analysis of the quality and function of political cultures and of recruitment and socialization processes. Analysis and comparison of developed and developing political systems.

PCL 450 Qtr. Hrs. - 4
American Public Policy: PR: PCL 201, 303 or C.I. The American policy-making process with a focus upon contemporary problems including the political impact of the "New Economics," government and business relations, wealth and income inequality, the malapportionment of societal power and social conflict.

PCL 461 Qtr. Hrs. - 4
Political Philosophy: PR: PCL 201, 303 or C.I. Study of the development of political and social ideas in Western thought from early Greece to the Renaissance.

PCL 462 Qtr. Hrs. - 4
Political Philosophy: PR: PCL 201, 303 or C.I. Renaissance to the 19th Century.

PCL 463 Qtr. Hrs. - 4
Political Philosophy: PR: PCL 201, 303 or C.I. Study of contemporary Western political and social thought in the 19th and 20th Centuries.

PCL 471 Qtr. Hrs. - 5
American Constitutional Law: PR: PCL 201, 303 or C.I. The impact of judicial decision-making upon the growth of American political institutions and processes.

PCL 473 Qtr. Hrs. - 5
American Constitutional Law: PR: PCL 201, 303 or C.I. The role of the judiciary in the focusing and refinement of individual rights and civil liberties in American society.

PCL 475 Qtr. Hrs. - 4
Judicial Behavior: Study of Judicial Behavior emphasizing the role of courts as a bureaucratic structure. Consideration will be given to comparative judicial systems.

PSYCHOLOGY

PSY 201, 202 Qtr. Hrs. - 3, 3
General Psychology: The basic principles, theories, and methods of contemporary psychology.

PSY 300 Qtr. Hrs. - 3
Applied Psychology: Applications of principles of psychology to personal adjustment, industry, and education.

PSY 301 Qtr. Hrs. - 4
Basic Learning Processes: PR: PSY 201, 202. A survey of theories and research findings from basic laboratory investigation of learning phenomena. Lec.-Lab.

PSY 302 Qtr. Hrs. - 4
Complex Human Learning: PR: PSY 201, 202. Selected topics from theories and research on complex human learning and problem solving. Lec-Lab.

PSY 303 Qtr. Hrs. - 4
Physiological Psychology: PR: PSY 201, 202. Physiological bases of behavior.

PSY 304 Qtr. Hrs. - 4
Perception: PR: PSY 201, 202. Consideration of physical and psychological variables in perceptual phenomena. Lec-Lab.

PSY 305 Qtr. Hrs. - 4
Psychological Measurement: PR: PSY 201, 202, STAT 201. Theory of test construction and consideration of selected measures of psychological characteristics.

PSY 306 Qtr. Hrs. - 4
Psychology of Adjustment: Psychological principles of adjustment, application of psychology to problems in living.

PSY 307 Qtr. Hrs. - 4
Motivation: PR: PSY 201, 202. Psychological and physiological aspects of human motivation.

PSY 308 Qtr. Hrs. - 4
Social Psychology: PR: PSY 201, 202. Effects of social situations and social variables on the behavior of individuals.

PSY 309 Qtr. Hrs. - 4
Personality Theory: PR: PSY 201, 202. A survey of theory and research on the development of personality characteristics. Lec-Lab.

PSY 310 Qtr. Hrs. - 4
Abnormal Psychology: PR: PSY 201, 202. Classification, causation, and treatment of deviant patterns of behavior.

PSY 312 Qtr. Hrs. - 4
Clinical Psychology: PR: PSY 309, 310. Consideration of psychodiagnostics, behavorial modification techniques and clinical research. Lec-Lab.

PSY 313 Qtr. Hrs. - 4
Developmental Psychology: PR: PSY 201, 202. The effects of genetic, psychological, maturational and social factors on behavior at various stages of development.

PSY 314 Qtr. Hrs. - 4
Industrial Psychology: PR: PSY 201, 202, STAT 201. Psychological principles of employee selection, training, and morale.

PSY 315 Qtr. Hrs. - 4
Drugs and Behavior: PR: PSY 201. Effects of certain drugs upon the nervous system, behavior, and society. Causes of drug abuse and the impasct on mental health.

PSY 321 Qtr. Hrs. - 4
Principles of Behavior Modification: PR: PSY 301. An examination of the control of behavior through applications of principles and theories of learning. Examples are drawn from clinical and social psychology, and from child rearing.

PSY 322 Qtr. Hrs. - 4
Clinical Psychology Research Practicum: PR: PSY 301, 310, 311. Research and practicum experience in mental health related facilities located in the immediately surrounding area.

PSY 323 Qtr. Hrs. - 4
Comparative Psychology: PR: PSY 201, 202. A study of comparative behaviors of lower animals.

PSY 333 Qtr. Hrs. - 4
Development of Language and Conceptual Behavior: PR: PSY 301. Normal ontogeny of language and conceptual behavior from infancy to adulthood; disorders of linguistic and conceptual development and their remediation; key theoretical interpretations.

PSY 340 Qtr. Hrs. - 3
Environmental Psychology: PR: PSY 201, 202, STAT 201. An investigation of theory and research relevant to the relationship between the physical environment and the behavior of man.

PSY 343 Qtr. Hrs. - 4
Educational Psychology: PR: PSY 201, 202. Application of psychological principles and research methods to classroom behavior and learning.

PSY 390 Qtr. Hrs. - 1-3
Undergraduate Field Work: Placement in a community agency for supervised experience in applications of psychology to community problems.

PSY 401 Qtr. Hrs. - 2
Senior Research Proposal: PR: STAT 401 and senior standing. Study in depth of bibliography and methods of psychological research. Each student will write, and have approved, a proposal for an original piece of research.

PSY 403 Qtr. Hrs. - 4
Introduction to Neuropsychology: PR: PSY 303. Study of brain function with particular emphasis on human behavior. Lec-Lab.

PSY 405 Qtr. Hrs. - 4
History and Systems of Psychology: PR: PSY 301, 309. Historical development of psychology with emphasis on classical theoretical positions.

PSY 408 Qtr. Hrs. - 4
Experimental Social Psychology: PR: PSY 201, 202, STAT 201. Study of experimental

investigations of the social behavior of animal and man. Lec-Lab.

PSY 411 Qtr. Hrs. - 3
Statistical Methods in Psychology: PR: One course in statistics. Standard scores, confidence intervals, sampling distributions, hypothesis testing, correlation and regression as applied to research in psychology.

PSY 415 Qtr. Hrs. - 5
Individual Intelligence Testing: PR: PSY 305. A consideration of the nature of intelligence and its measurement. Supervised training in Stanford-Binet and Wechsler testing. Lec-Lab.

PSY 606 Qtr. Hrs. - 4
Psychological Testing II: PR: Graduate admission and C.I. An examination of the most commonly used instruments in psychological testing and a critical evaluation of their potential utility.

PSY 610 Qtr. Hrs. - 4
Psychology of Individual Differences: PR: Graduate admission and C.I. A survey of the problems or measurement and areas of difference between individuals.

PSY 615 Qtr. Hrs. - 4
Counseling Practicum: PR: Graduate admission and C.I. Application of counseling techniques in a supervised setting.

PSY 620 Qtr. Hrs. - 4
Information Processing and Decision Making: PR: Graduate admission and C.I. Application of statistical principles and decision theories to the decision making process. Application of computers to managerial decisions.

PSY 640 Qtr. Hrs. - 4
Consumer Psychology: PR: Graduate admission and C.I. Application of psychology to consumer behavior. Survey of research in product selection, markets, and advertising.

PSY 641 Qtr. Hrs. - 4
Organizational Psychology: PR: Graduate admission and C.I. Survey of present theories in Organizational Psychology. Application of psychological research to organizational functioning.

PSY 650 Qtr. Hrs. - 4
Job Analysis and Personnel Selection: PR: Graduate admission and C.I. Research in and application of job evaluation methods and selection models.

PSY 651 Qtr. Hrs. - 4
Training and Performance Appraisal: PR: Graduate admission and C.I. Survey of problems of industrial training and performance appraisal. Analysis of relevant research in problems of evaluation of training effectiveness.

PSY 660 Qtr. Hrs. - 3
Industrial Psychology Practicum I: PR: Graduate admission and C.I. Supervised research in industry.

PSY 661 Qtr. Hrs. - 3
Industrial Psychology Practicum II: PR: Graduate admission and C.I. Supervised research in industry.

PSY 662 Qtr. Hrs. - 3
Industrial Psychology Practicum III: PR: Graduate admission and C.I. Supervised research in industry.

PSY 664, 665, 666 Qtr. Hrs. 3, 3, 3
Community Psychology Practicum I, II, III: PR: Graduate admission and C.I. Supervised experience in a community agency.

PSY 667 Qtr. Hrs. - 3
Problems in Correctional Psychology: PR: Graduate admission and C.I. An investigation of some of the major problems facing psychologists working in correctional settings. May be repeated for credit.

PSY 668 Qtr. Hrs. - 3
Problems in Mental Health: PR: Graduate admission and C.I. An investigation of some of the major problems facing psychologists working in Mental Health clinics. May be repeated for credit.

PSY 669 Qtr. Hrs. - 3
Problems in School Psychology: PR: Graduate admission and C.I. An investigation of some of the major problems facing psychologists working in school systems. May be repeated for credit.

PSY 670 Qtr. Hrs. - 3
Teaching and Training Evaluation: PR: Graduate admission and C.I. Evaluation of effective teaching methods and practicum experience.

PSY 671 Qtr. Hrs. - 4
Individual Testing: PR: Graduate admission, C.I., and PSY 683. A survey of individual tests commonly used to measure personality and intelligence of both children and adults.

PSY 672 Qtr. Hrs. - 4
Group Testing: PR: Graduate admission, C.I., and PSY 683. A survey of group tests commonly used to measure personality, achievement, and perceptual-motor skills in both children and adults.

PSY 673 Qtr. Hrs. - 4
Mental Retardation: PR: Graduate admission, C.I., and PSY 683, PSY 684. Theory, research and remedial techniques dealing with mental retardation.

PSY 675 Qtr. Hrs. - 4
Implementation and Evaluation: PR: Graduate admission and C.I. Practical problems of consultation with teachers, parents, community mental agencies, etc. Role of the psychologist in solution of social problems and evaluation of programs.

PSY 676 Qtr. Hrs. - 4
Clinical Psychophysiology: PR: Graduate admission, C.I. and PSY 673. Psysiological and clinical effects of various psychotomimetic and psychoactive drugs. Current techniques in diagnosing brain damage.

PSY 677 Qtr. Hrs. - 4
Learning Disabilities: PR: Graduate admission and C.I. Theory, research and remedial techniques dealing with learning disabilities and other factors interfering with learning such as motivation, language disorders and perceptual-motor deficits.

PSY 678 Qtr. Hrs. - 4
Classification of Behavior Disorders: PR: Graduate admission and C.I. Common diagnostic means of classifying behavior plus factor analytic studies of behavior classification.

PSY 683 Qtr. Hrs. - 4
Foundations of Psychology I: PR: Graduate admission and C.I. An intensive survey in the areas of Testing, Learning, and Motivation stressing recent research.

PSY 684 Qtr. Hrs. - 4
Foundations of Psychology II: PR: Graduate admission and C.I. An intensive survey in the areas of Developmental, Personality, and Social Psychology stressing recent research.

PSY 686 Qtr. Hrs. - 4
Clinical Intervention I: PR: Graduate admission and C.I. Various theories of counseling and their evaluated efficiency, including the problems of research in counseling techniques.

PSY 687 Qtr. Hrs. - 4
Clinical Intervention II: PR: Graduate admission, C.I., and PSY 683. Introduction to the principles and procedures of Behavior Modification as a clinical intervention technique.

PSY 688 Qtr. Hrs. - 4
Clinical Intervention III: PR: Graduate admission, C.I., and PSY 684. Principles and procedures of the various therapeutic techniques excluding client-centered and behavior modification models.

RADIO/TELEVISION

RTV 140 Qtr. Hrs. - 4
Foundations of Broadcasting: Nature of the media, the mechanics of operation, history, economics, programming, and internal and external control.

RTV 242 Qtr. Hrs. - 4
Broadcast Techniques: Introduction to the radio and television studio. Utilization of studio operating techniques and equipment (consoles, recorders, cameras, etc.) for use in educational and commercial broadcasting.

RTV 340 Qtr. Hrs. - 4
Audio Production: PR: RTV 242 or C.I. The production of music (live and recorded), talk, interview, discussion, sports, and documentary including performance (talent and announcing) and direction.

RTV 341 Qtr. Hrs. - 4
Television Production: PR: RTV 242 or C.I. Emphasis on the coordination of talent, cameras, visuals, audio and lighting with the dramatic values of the presentation.

RTV 342 Qtr. Hrs. - 4
Broadcast Journalism I: PR: COM 319 or C.I. Historical, legal, and quasi-legal influences on broadcast news; introduction to news sources, writing and interviewing techniques for radio-television news.

RTV 343 Qtr. Hrs. - 4
Television Talent Techniques: A study of communication problems on camera and microphone. Development of performance skills in announcing, interviewing, narrating, and reporting.

RTV 344 Qtr. Hrs. - 4
Broadcast Continuity and Programming I: Practice in the preparation of written materials for all kinds of radio and television programs except news, documentary, and drama. Examination of program practices, development, and traffic systems.

RTV 345 Qtr. Hrs. - 4
Film for Television: Principles and practices of 8mm and 16mm film usage within the television industry.

RTV 441 Qtr. Hrs. - 4
Television Directing: PR: RTV 341. The planning, preparation and directing of programs with emphasis on dramatic values of composition, movement, position, action, timing, pacing, climax, ascendant and descendant values; intergration of the parts to the whole.

RTV 444 Qtr. Hrs. - 4
Broadcast Continuity and Programming II: PR: RTV 344 or C.I. Preparation of documentaries and dramatic writing for television and radio.

RTV 445 Qtr. Hrs. - 4
Television Film Production: PR: C.I. Planning and preparation of filmed documentaries, public service and commercial productions. (Laboratory hours to be arranged.)

RTV 446 Qtr. Hrs. - 4
Radio, Television and Society: A study of the impact of electronic media upon the habits, customs and thinking of our times. Considerations of internal media problems.

RTV 447 Qtr. Hrs. - 4
Television Film Documentary: PR: C.I. Historical developments, styles, and production techniques of the television film documentary.

RTV 448 Qtr. Hrs. - 4
Broadcast Regulations: PR: RTV 140 or RTV 342. Federal, state, local and self-regulator agencies and practices which govern electronic media.

RTV 450 Qtr. Hrs. - 4
Broadcast Journalism II: PR: RTV 342. Principles and practice of news preparation for electronic media.

RTV 451 Qtr. Hrs. - 3
Radio-Television Advertising: PR: COM 434 or C.I. Radio and television as advertising media; advertisers' demands and budget; appropriate programs for the sponsors' needs; writing of commercial continuity.

RTV 452 Qtr. Hrs. - 4
Broadcast Criticism: Evaluation and criticism of past and present radio and television programs, policies, and critics. Concentration on the problem of criteria development.

RTV 453 Qtr. Hrs. - 4
Educational Broadcasting: Values and potentials of radio and television in education, with particular emphasis on current use of the media in elementary and secondary schools, colleges and universities, and adult education.

RTV 454 Qtr. Hrs. - 4
Instructional Broadcasting: Learning theory applied to the creation, production, and dissemination of lessons via electronic media. Introduction to and practicum in radio and television studios as well as lesson presentation.

RTV 455 Qtr. Hrs. - 4
International Broadcasting: Comparative analysis of national broadcast systems. World broadcasting as a social, political and economic force.

RTV 458 Qtr. Hrs. - 4
Broadcast Management: PR: RTV 448. Consideration of broadcast management problems in station operations at the local, regional, and national levels.

SOCIAL SCIENCE

SSC 490 Qtr. Hrs. - 2
Senior Seminar: Social Sciences in Human Affairs: An overview of the development, purposes, and functioning of the social sciences in modern society. Primarily intended for senior students. Offered as one of the Advanced Environmental Studies seminars. Not open to the students in the College of Social Sciences.

SOCIOLOGY

Introductory Sequence: SOC 201, 202.

Theory and Research Sequence: SOC 304, 306, 307, 499.

Social Psychology Area: SOC 352, 353, 354, 451.

Anthropology Concentration: SOC 310, 311, 314, 315, 316, 402.

Social Welfare Concentration: SOC 340, 341, 342, 343, 412, 498.

Social Organization: SOC 325, 326, 333, 335, 407, 411, 416.

Social Deviance: SOC 331, 345, 346, 348, 350.

SOC 201, 202 Qtr. Hrs. - 3, 3
General Sociology: An introduction to the principles of sociology. Primary emphasis is given to the understanding and application of such concepts as human interaction, the nature of the group and group interrelationships, social and cultural systems, the individual as a reflection of his group associations.

SOC 304 Qtr. Hrs. - 4
The Development of Social Thought: PR: SOC 201. An overview of theories concerning the nature of man as a "social being." The nature of society, from the beginnings of the scientific study of man's social life to World War II.

SOC 306 Qtr. Hrs. - 4
Modern Sociological Thought: PR: SOC 201, 304. A study of major European and American contributors to, and schools of, modern sociology from World War II to the present.

SOC 307 Qtr. Hrs. - 4
The Sociology of Religion: Patterns in religious behavior in various societies with primary emphasis on myth, rite, taboo and festival as social phenomena.

SOC 310 Qtr. Hrs. - 4
Physical Anthropology and Archeology: An introduction to the principles of anthropology. Inquiry into the natural history of mankind, man's place among the primates, and evolution. Review of evidence of earlier sociocultural framework, prehistory, and archeological background bearing on man's past achievements.

SOC 311 Qtr. Hrs. - 4
Social Anthropology: Framework and principles of sociocultural organization as exemplified among various cultures and ethnic groups around the world. Deals with kinship subsistence techniques, political structure language, culture and personality, and other topics which combine to form the "holistic approach" of anthropology.

SOC 312 Qtr. Hrs. - 4
Old World Prehistory: PR: SOC 310, 311. An introduction to the emergence of prehistoric archaeology as a discipline, review of fundamental theoretical approaches to prehistory, and survey of the archaelogical evidence for prehistoric cultural manifestations in the Old World from earliest times to the emergence of certain civilizations.

SOC 313 Qtr. Hrs. - 4
New World Prehistory: PR: SOC 310, 311. An introductory to the development of archaeological methods and theories in the New World, development of certain space-time frameworks and surveys of some findings concerning Pre-Columbian peoples.

SOC 314 Qtr. Hrs. - 4
Cultural Anthropology: PR: SOC 310, 311. Emergence and history of man's cultures, their evolution and development, and the structure and functioning of human cultures in every time and place.

SOC 315 Qtr. Hrs. - 4
Physical Anthropology: PR: SOC 310, 311. The study of man as a product of the evolutionary process. Study and analysis of diversity among present human populations.

SOC 316 Qtr. Hrs. - 4
Comparative Social Organization: PR: SOC 310, 311. Introduction to anthropological viewpoints on role of marriage, family, kin groups, and descent as focal points for the study of economic, political and ideological aspects of social organization.

SOC 317 Qtr. Hrs. - 4
Comparative Cultures: People and Societies of Africa: PR: 310, 311. A survey of past native African cultures, and an ethnographic inquiry into cultural diversity in African tribal societies. A consideration of cultural changes, the impact of colonialism, and the emergence of new African states.

SOC 320 Qtr. Hrs. - 4
Collective Behavior: PR: SOC 201. An analysis of the way in which new social groupings arise from unstructured situations. Standard topics include behavior of mobs, riots, crowds and spatially dispersed collectives.

SOC 325 Qtr. Hrs. - 4
Urban Sociology: PR: SOC 201. Historical roots of urbanization. Impact of city life on social actions, social relationships, social institutions and the types of civilizations derived from and based on urban modes of living.

SOC 326 Qtr. Hrs. - 4
Rural Sociology: PR: SOC 201. Rural American life, its resources, and the problems of changing patterns of rural social structure.

SOC 331 Qtr. Hrs. - 4
Social Problems: PR: SOC 201. Major social problems created by the complex social situations of modern life. Sociological analysis of such problem areas as crime and delinquency, poverty, racial tensions, over-population, and drug addiction.

SOC 333 Qtr. Hrs. - 4
Industrial Sociology: PR: SOC 201. Application or development of principles of sociology relevant to the industrial mode of production and the industrial way of life.

SOC 335 Qtr. Hrs. - 4
Social Institutions: PR: SOC 201. Social institutions, social differentation, and social control, with emphasis on American and other modern societies.

SOC 336 Qtr. Hrs. - 4
Social Stratification: PR: SOC 201. Study of class, status and power; cultural variations in stratification system; patterns of mobility and change.

SOC 340 Qtr. Hrs. - 4
Social Welfare: A social Institution: PR: SOC 201. An introduction to social welfare as an institution. The historical and philosophical development of social welfare as related to current social welfare objectives and programs.

SOC 341 Qtr. Hrs. - 4
Social Work: Principles and Methods: PR: SOC 340. A theoretical consideration of the concepts and methods of social work practice and the values, activities and roles of social workers in various practice settings.

SOC 342 Qtr. Hrs. - 4
Government and Social Welfare: PR: SOC 340. The role of federal, state, and local government in social welfare. Laws, policy formulation, administration, and current issues will be examined.

SOC 343 Qtr. Hrs. - 4
The Community and Social Welfare: PR: SOC 340. The community as a social system in meeting human needs. Emphasis on private agencies, including their organization, functions, interrelationships and coordination with governmental agencies.

SOC 344 Qtr. Hrs. - 4
Sociology of Deviant Behavior: PR: SOC 201. An examination of the nature, types and societal reactions to deviant behavior; special emphasis on the process of stigmatization and the emergence of deviant subcultures.

SOC 345 Qtr. Hrs. - 4
Juvenile Delinquency: PR: SOC 201. Types of delinquent behavior found among juveniles, possible causes and ways society attempts to treat the various forms of delinquency.

SOC 346 Qtr. Hrs. - 4
Criminology: PR: SOC 201. Chief causes of antisocial behavior and current methods of

prevention and reform. Effects of heredity and environment, prevalence of delinquency and crime, penal institutions.

SOC 347 Qtr. Hrs. - 4
Sociology of Mental Illness: A sociological examination of mental illness as a social problem; legal aspects of mental illness, and the mental health professions.

SOC 348 Qtr. Hrs. - 4
Sociology of Alcoholism: PR: SOC 201. Introduction to the nature of alcoholism and review of its impact on society.

SOC 349 Qtr. Hrs. - 4
Human Growth and Development: PR: SOC 340. Development of an understanding of individual physical, mental and emotional growth from birth to death, recognizing social and cultural influences on the development.

SOC 350 Qtr. Hrs. - 4
Interviewing in Social Work Practice: PR: SOC 340. Examination of interviewing as the primary medium through which social work is practiced with emphasis on the development of methods, skills and techniques.

SOC 352 Qtr. Hrs. - 4
Race and Ethnic Minorities in the United States: PR: SOC 201. Causes and consequences of group conflict, with emphasis upon majority-minority relations, prejudice and discrimination, alternative theories of prejudice, the effects of minority status on individuals and possibilities for attitude and behavior change.

SOC 353 Qtr. Hrs. - 4
Culture and Personality: PR: SOC 201. Theories of the variations in personality in relation to culture and group life in tribal and modern societies.

SOC 354 Qtr. Hrs. - 4
Sociology of Adolescence: PR: SOC 201. An examination of the transition to adulthood in various societies with primary emphasis on initiation and the contemporary American Problems centering around the "adolescent crisis."

SOC 360 Qtr. Hrs. - 4
Social Change: A Historical and Theoretical Approach: PR: SOC 201. Concerned with the context and essential sources of social development and change.

SOC 362 Qtr. Hrs. - 4
Contemporary Woman and Society: PR: SOC 201. An introduction to the changing system of the American Woman in contemporary society with emphasis on the political, historical, economic, and cultural forces influencing her role.

SOC 380 Qtr. Hrs. - 4
Afro-American Social Problems: PR: SOC 201. A study of contemporary Afro-American social problems in the United States.

SOC 401 Qtr. Hrs. - 4
Individual in Sociology: PR: 201. Inquiry into social dimensions of small group behavior, emphasizing interactive process involved in group behavior including socialization and involvement of the self-concept from the Meadian perspective.

SOC 402 Qtr. Hrs. - 4
Method and Theory in Anthropology: PR: SOC 310, 311. Central methodological and theoretical concerns of anthropology in its emergence as a separate discipline and field of study. Cultural evolutionism, diffusionism, historical particularism, functionalism and their role in the development of anthropology.

SOC 403 Qtr. Hrs. - 4
Anthropological Linguistics: PR: SOC 310, 311, ENG 371. Survey of anthropological linguistic field techniques in non-native cultures and application of linguistic theories to study of socio-cultural systems.

SOC 405 Qtr. Hrs. - 4
Medical Sociology: Social organization of medical care: patterns of morbidity and mortality, social epidemiology and effects of disease, utilization of medical services, medical practice, programs and organizations.

SOC 406 Qtr. Hrs. - 4
Social Gerontology: PR: SOC 201. An examination of the sociological aspects of aging in the contemporary United States. Special needs of the aged in housing, leisure, employment income maintenance, recreation and health, will be considered as well as programs and services designed to meet their needs.

SOC 407 Qtr. Hrs. - 4
The Family: PR: SOC 201. The study of the family as a social institution. The family through history, and the family cross-culturally. The modern American family as a distant social and cultural complex. Changes in the family system. Courtship and marriage.

SOC 408 Qtr. Hrs. - 4
Social Change in Developing Areas: PR: SOC 201 and one course in statistics. A study of growth problems in the emerging nations of Africa and Latin America.

SOC 411 Qtr. Hrs. - 4
Population: PR: SOC 201. Concerned with the study of human population, its distribution, composition and change.

SOC 412 Qtr. Hrs. - 5
Field Experience and Seminar: PR: SOC 340, 341, 342, 343 and Senior standing. Supervised learning experiences in local social agencies relating theory and academic preparation with practice. Eight hours per week plus two hour weekly seminar.

SOC 416 Qtr. Hrs. - 4
Human Ecology: PR: SOC 201. Principles governing the spatial distribution of human populations and activities within an area.

SOC 420 Qtr. Hrs. - 4
Political Sociology: Sociological analysis of political and para-political groups; socio-economic variables of voting behavior; power elites; societies and systems of government.

SOC 433 Qtr. Hrs. - 4
Sociology of Occupations and Professions: PR: 201. An examination of occupations and professions from the sociological perspective. Emphasized are professional and occupational socialization, marginality and choice as well as women and work.

SOC 435 Qtr. Hrs. - 4
Sociology of Education: PR: 201. This course examines the sociological dimensions of the educational institutions including the impact of social structure on learning and the role of education in social change.

SOC 451 Qtr. Hrs. - 4
Contemporary Social Movements: PR: SOC 201. Causes and effects of various social movements in American society compared to large-scale upheavals throughout the West. Considers various theories of explanation.

SOC 452 Qtr. Hrs. - 4
Sociology of Drug Abuse: PR: SOC 201 or C.I. The analysis of the socio-cultural elements of the drug culture. This course will survey problems, impact on society, and possible solutions.

SOC 501 Qtr. Hrs. - 3
Proseminar in Sociology: PR: Six hours of Sociology and graduate level status or C.I. Study of culture, groups, demography, stratification, and culture and personality.

SOC 502 Qtr. Hrs. - 3
Proseminar in Sociology: PR: Six hours of Sociology and graduate level status or C.I. Study of social change, institutions, large organizations, and internal behavior.

SPEECH

SPE 101 Qtr. Hrs. - 3
Fundamentals of Oral Communication: Use of the body and voice; participation in various speaking situations; planning, organizing, and delivering public speeches.

SPE 102 Qtr. Hrs. - 1
Speech Improvement Laboratory: Individual and group practice for students with speech fright and delivery problems. Recommended for all students who want to improve their speaking skills.

SPE 261 Qtr. Hrs. - 5
English Phonetics and American Dialects: Physiological description and visual notation of speech sounds; regional dialects of American English.

SPE 262 Qtr. Hrs. - 3
Psychology of Oral Communication: Psychological principles involved in the communicative process with application to individuals and groups.

SPE 265 Qtr. Hrs. - 4
Voice and Articulation: PR: SPE 101. Introduction to the anatomy of voice and speech production. Analysis of voice and articulation of each student. Exercises for individual improvement.

SPE 360 Qtr. Hrs. - 4
Argumentation and Debate: PR: SPE 101 or C.I. Study and practice in the preparation and delivery of argumentative speeches emphasizing argument, evidence and organization.

SPE 361 Qtr. Hrs. - 4
Persuasion: Motivation: PR: SPE 101 or C.I. A study of motivational factors involved in persuasive speaking to secure belief and action.

SPE 362 Qtr. Hrs. - 4
Platform Speaking: PR: SPE 101 or C.I. Theory and method; training in selecting and organizing materials for various types of speeches; practice in thinking and speaking before an audience; contemporary speeches as examples.

SPE 364 Qtr. Hrs. - 5
Physical Bases of Speech and Hearing: An introduction to the anatomical, physiological, and physical elements underlying the communication process.

SPE 365 Qtr. Hrs. - 2
Parliamentary Procedure: Principles and rules governing participation and leadership in the conduct of formal business meetings.

SPE 366 Qtr. Hrs. - 4
Speech Composition: PR: SPE 101 or C.I. Study and practice in the preparation and delivery of speeches from manuscripts with emphasis on the development of oral style.

SPE 371 Qtr. Hrs. - 3
Speech and Human Relations: Introduction to semantics; symbols and meaning and the relationship with human behavior.

SPE 470 Qtr. Hrs. - 4
History and Criticism of American Public Address: Rhetorical criticism of speaking and writing of American statesmen who have had an influence on political, social, and economic millieu of their times.

SPE 471 Qtr. Hrs. - 4
History and Criticism of British Public Address: Rhetorical criticism of speaking and writing of British statesmen who have had an influence on political, social, and economic millieu of their times.

SPE 473 Qtr. Hrs. - 3
Directing Extracurricular Speech Activities: Debate, extemporaneous speech and other speech events; selection and training of contestants; interschool and intramural speech activities.

CAMPUS ATHLETICS

ENVIRONMENTAL STUDIES PHYSICAL EDUCATION

The Environmental Studies Physical Education Program is designed to enhance the physical and mental development of the student. A student may receive three quarter hours credit toward graduation by enrolling and satisfactorily completing any one of the following courses:

ESPE 301 Qtr. Hrs. - 3
Aquatics: A study and application of the physiological benefits of basic aquatic developmental skills – elementary and advanced strokes, water safety, springboard diving, and interval training. (2 hours lecture; 2 hours activity.)

ESPE 302 Qtr. Hrs. - 3
Body Development (M)

ESPE 303 Qtr. Hrs. - 3
Body Development (W): A study and application of the metabolic, neuromuscular, and cardiovascular changes resulting from select physical activities. (2 hours lecture, 2 hours activity.)

ESPE 304 Qtr. Hrs. - 3
Golf: A study of performance and application in basic and advanced skills, rules, and etiquette. Physiological and social values accruing from this carry-over activity. (2 hours lecture; 2 hours activity.)

ESPE 305 Qtr. Hrs. - 3
Tennis: A study of performance and application in basic and advanced skills, rules, and ettiquette. Physiological and social values accruing from this carry-over activity. (2 hours lecture; 2 hours activity.)

ESPE 306 Qtr. Hrs. - 3
Life Saving: Instruction, training and certification in basic life saving swimming skills. (2 hours lecture; 2 hours activity.)

ESPE 307 Qtr. Hrs. - 3
Scuba Diving: Instruction, training and certification in basic diving skills with self-contained underwater breathing apparatus. Students may be required to supply their own equipment. (2 hours lecture; 2 hours activity.)

ESPE 308 Qtr. Hrs. - 3
Interpretive Dance: Instruction and analysis of creative dance performance as an art form. (2 hours lecture; 2 hours activity.)

CONTINUING EDUCATION

COED 100 Qtr. Hrs. - 0*
Cooperative Education, Freshman Year

COED 200 Qtr. Hrs. - 0*
Cooperative Education, Sophomore Year

COED 300 Qtr. Hrs. - 0*
Cooperative Education, Junior Year

COED 400 Qtr. Hrs. - 0*
Cooperative Education, Senior Year

* May be repeated.

INDEX

Accountancy ..... ACCY 3
Air Force ROTC ..... AFR 63
Allied Health Sciences ..... AHS 50
Art ..... ART 33
Biology ..... BIOL 50
Botany ..... BOT 51
Business Administration ..... BADM 4
Campus Athletics ..... ESPE 78
Chemistry ..... CHEM 51
Civil Engineering ..... CEES 20
Environmental Sciences
Communication ..... COM 63
Computer Sciences ..... COMP 53
Cooperative Education ..... COED 78
Economics ..... ECON 5
Education, Business ..... EDBE 9
Developmental
Education, Elementary ..... EDEL 10
Developmental
Education, Exceptional Child ..... EDEX 12
Education, Library Science ..... EDLS 13
Education, Music ..... EDME 13
Education, Physical ..... EDPE 14
Developmental
Education, Professional ..... EDPL 15
Laboratory Application
Education, Secondary ..... EDSE 15
Development
Education, Teaching Analysis ..... EDTA 17
Education, Vocational/Technical .. EDTE 18
Education, Vocational/Technical .. EDIE 18
Education, Visual Arts ..... EDVA 19
Electrical Engineering and ..... EECS 22
Communications Sciences
Engineering Core ..... ENGR 23
Engineering - Interdisciplinary ... ENGR 25
Engineering Mathematics
and Computer Systems ..... EMCS 25
Engineering Mechanics and ..... EMMS 26
Materials Sciences
Engineering Technology ..... ENT 26
English ..... ENG 34
Environmental Studies ..... ESPE 78
Physical Education
Finance ..... FIN 6
Foreign Languages ..... FL 37
Geology ..... GEOL 54
German ..... GER 38
History ..... HIST 39
Humanities ..... HUM 40
Humanities and Fine Arts ..... HFA 42
Industrial Engineering and ..... IEMS 28
Management Systems
Inhalation Therapy ..... IT 54
Italian ..... ITA 42
Journalism ..... JRN 66
Law Enforcement ..... LENF 67
Management ..... MGMT 7
Marketing ..... MKTG 8
Mathematics ..... MATH 55
Mechanical Engineering ..... MEAS 30
and Aerospace Sciences
Medical Record Administration ... MRA 57
Microbiology ..... MICR 58
Music ..... MUS 42
Philosophy ..... PHI 45
Physics ..... PHYS 59
Political Science ..... PCL 68
Psychology ..... PSY 70
Radio/Television ..... RTV 73
Religion ..... REL 45
Russian ..... RUS 46
Science ..... SCI 60
Social Science ..... SSC 74
Sociology ..... SOC 74
Spanish ..... SPA 46
Speech ..... SPE 77
Statistics ..... STAT 60
Theatre ..... THA 47
Zoology ..... ZOOL 61