

UNDERGRADUATE CATALOG SUPPLEMENT

1980 - 1981

This supplement to the 1977-79 College Catalog was prepared to explain the new programs offered at California State College and to list the new course descriptions.

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School of Arts and Sciences

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THE CURRICULUM IN ARTS AND SCIENCES

The Arts and Sciences curriculum is defined by the requirements of the general education component and the area of concentration component. The general education component consists of 60 semester hours and is the same for each arts and sciences program. The area of concentration component consists of 68 semester hours and varies according to the program selected as a student's major.

GENERAL EDUCATION

The requirements of the general education component are:

- 3 credits English Composition I
3 credits English Composition II
12 credits Humanities Electives - At least three semester hours must be successfully completed from the art, music, or theatre disciplines. The remaining nine semester hours must be completed from at least two different disciplines. With the exception of English Language Skills (ENG 100) courses in the following disciplines can be used as Humanities electives:
- | | |
|--------------------------|-------------------------------|
| Art - ART | Modern Foreign Language - MFL |
| Art and Humanities - XAH | Music - MUS |
| English - ENG | Philosophy - PHI |
| French - FRE | Polish - POL |
| German - GER | Russian - RUS |
| Greek - GRE | Serbo-Croatian - SCR |
| Hungarian - HUN | Spanish - SPN |
| Italian - ITA | Speech - SPE |
| Literature - LIT | Theatre - THE |
- 12 credits Natural Science Electives - Students must complete three semester hours from at least three different disciplines. With the exception of Basic Mathematics (MAT 09B) courses in the following disciplines can be used as natural sciences electives:
- | | |
|------------------------|---------------------------------|
| Biology - BIO | Marine Science Consortium - MSC |
| Chemistry - CHE | Mathematics - MAT |
| Computer Science - CSC | Physical Science - PHS |
| Earth Science - EAS | Physics - PHY |
- 12 credits Social Science Electives - Students must complete three semester hours from at least three different disciplines. Courses in the following disciplines can be used as social sciences electives:
- | | |
|-------------------------|----------------------|
| Anthropology - ANT | Psychology - PSY |
| Economics - ECO | Social Studies - SOS |
| Geography - GEO | Social Work - SOW |
| History - HIS | Sociology - SOC |
| Political Science - POS | |

18 credits Free Electives - Any course taught for credit at California State College can be used as a free elective. In addition, advanced standing credits awarded by way of the college life experience program are used in this area.

AREA OF CONCENTRATION

In addition to completing the sixty semester hour general education requirements, a student majoring in an Arts and Sciences program must complete a sixty-eight semester hour area of concentration. Prospective students should study the following program descriptions carefully in order to identify the program best suited to their intellectual and career goals. Many of these programs have a great deal of flexibility built into them, permitting students to elect courses in both their major field and related fields. In every case, the student must consult with his adviser and secure his adviser's approval for any course that is intended to meet area of concentration requirements.

Since program review is an ongoing process at California State College, the following program descriptions should be read with the understanding that requirements may have been altered by the time prospective students enter the College. Up-to-date information can always be obtained by inquiring at the School Office or writing to Dr. Philip Y. Coleman, Dean of Arts and Sciences, 102 Noss, California State College, California, Pennsylvania 15419.

ADMINISTRATION AND MANAGEMENT

The required courses in the Administration and Management Program were revised as follows:

Required Courses:

Economic Theory

Introductory Micro Economics
Introductory Macro Economics
Money and Banking
Labor Economics

General Management

Principles of Market Management
Collective Bargaining
Accounting I
Accounting II
Intermediate Accounting I or Cost Accounting

Quantitative Management

Computer Science I
Computer Science II or COBOL I
Math of Finance I
Statistics or Business Statistics
Mathematical Economics
Managerial Economics

General Management (Cont'd.)

Principles of Management
Financial Management

Communications

Oral Communication
Advanced Writing
Business Writing

Behavioral Management

Social Psychology or Mental Hygiene
Industrial Psychology

ART

The required courses in Art were revised as follows:

Required Courses:

Survey of Art History	Median & Techniques I
Design I	Median & Techniques II
Drawing I	

Studio Concentration: 12 semester hours

Humanities Electives: 15 semester hours

Additional Electives: 14 semester hours

ARTS IN HUMAN SERVICES

The thrust of the Arts in Human Services Program is to prepare skilled artisans for service as arts specialists in youth and senior citizen centers, summer camps, nursing homes, community recreation centers, and other interaction agencies.

This comprehensive approach to recreation will integrate students in Urban Recreation with those in the Arts and Human Services Program. Undergraduates in both programs will plan, organize, implement, and evaluate leisure time activities and experiences incorporating the arts and physical recreation for special populations.

The program will provide students with alternative careers, respond to the great number of requests which the college receives from social agencies and community organizations for help with arts/recreation related activities, provide agencies with the kinds of arts/recreation expertise they need as well as providing on-site internship experiences for students and give an affirmative response to the 76 percent positive results of a college survey requesting interest in the program from social agencies and organizations.

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AREA OF CONCENTRATION REQUIREMENTS LEADING TO THE BACHELOR OF ARTS DEGREE
IN ARTS AND HUMAN SERVICES

Required Courses:

Media & Techniques I
Media & Techniques II
Games and Improvisations
Music in Human Services I
Music in Human Services II
Creative Dramatics or Children's Theatre or Puppetry or Reader's Theatre
Developmental Psychology or Social Psychology
Mental Hygiene
Exceptional Child I
Introduction to Social Work
Program Planning
Introduction to Field Experience

Field Experience: 12 - 18 semester hours

Five different field experiences with groups at five different age levels.

Arts Electives: 12 - 18 semester hours

BIOLOGY

The required courses in Biology were revised as follows:

Required Courses:

Principles of Biology	Organic Chemistry I
Botany I	Organic Chemistry II
Botany II	Physics I (Introductory)
Zoology I	Physics II (Introductory)
Zoology II	Calculus I, Statistics or Basic Calculus
General Chemistry I	
General Chemistry II	

Major Electives: 21 semester hours

EARTH SCIENCE

The Earth Science Program provides students with a varied selection of courses and experiences. The program's flexibility permits the student, working with his advisor, to get training in depth in his major field of interest. The earth scientist uses a variety of tools and disciplines concerning the earth and its processes and is knowledgeable in the areas of geology, astronomy, meteorology, oceanography, and physical geography. The tools of the earth scientist include mathematics, chemistry, and physics. Presently, most earth science students continue their education in specialized areas in graduate school.

**AREA OF CONCENTRATION REQUIREMENTS LEADING TO THE BACHELOR OF SCIENCE DEGREE
IN EARTH SCIENCE**

Required Courses: (34 credits)

Intro to Geology	Earth Resources
Historical Geology	General Chemistry I
Meteorology	Physics I
Climatology	Statistics
Intro to Oceanography	
Astronomy	

Electives: (34 credits)

A minimum of 18 credits of electives will be at the 300 level or above.

ECONOMICS

The required courses in Economics were revised as follows:

Required Courses:

Introductory Micro Economics	Intermediate Micro Theory
Introductory Macro Economics	Intermediate Macro Theory
Accounting I	
Accounting II	
Money and Banking	

Major Electives: 14 semester hours

Related Electives:

Advanced Writing	Statistics or Business Statistics
Business Writing I	Mathematical Economics
Business Writing II	Mathematics elective
Math of Finance I	

Psychology - 6 semester hours
Political Science - 6 semester hours
Sociology - 3 semester hours

ENGLISH

The requirements in the area of major electives of the English Program were revised as follows:

Major Electives: 33 semester hours in English at the 300-400 level, including one course each in English Literature Prior to 1800, English Literature After 1800, and American Literature.

ENVIRONMENTAL STUDIES

The three areas of specialization in Environmental Studies are: environmental conservation, environmental resources, and environmental science

The required courses in Environmental Conservation are as follows:

Required Courses:

Man and His Environment	Game Habitat Management
Seminar in Nature Conservation	Wildlife Techniques
Introduction to Geology	Environmental Resource Problems
Statistics	Principles of Biology
General Chemistry I	Zoology I
General Chemistry II	Zoology II
Field Biology	

Major Electives:

Botany I	Biotic Communications or Ecosystems Ecology
Botany II	Biometry

Related Electives: 8 semester hours

The required courses in Environmental Resources are as follows:

Required Courses:

Man and His Environment	Map & Air Photo Interpretation
Seminar in Nature Conservation	Soil Science
Statistics	Environmental Geology
Introduction to Geology	Earth Resources
General Chemistry I	Mineralogy
General Chemistry II	Petrology
Economic Geography	Energy, Power & the Environment

Related Electives: 23 semester hours

The required courses in Environmental Science are as follows:

Required Courses:

Man and His Environment	Biometry
Seminar in Nature Conservation	General Physics - Med Tech.
Statistics	Meteorology
Introduction to Geology	Environmental Resources Problems
General Chemistry I	
General Chemistry II	
Principles of Biology	

Related Chemistry Courses: Two of the following:

Analytical Chemistry I	Organic Chemistry I
Analytical Chemistry II	Organic Chemistry II

Related Electives: 22 semester hours

GEOLOGY

The required courses in Geology were revised as follows:

Required Courses:

Introduction to Geology	Geomorphology
Historical Geology	General Chemistry I
Mineralogy	General Chemistry II
Petrology	General Physics
Structural Geology	College Algebra

Related Electives: 21 semester hours (Must include at least 6 semester hours of mathematics and one biology course.)

MATHEMATICS AND COMPUTER SCIENCE

The required courses in Mathematics and Computer Science were revised as follows:

Required Courses:

Calculus I	Assembler Language Programming
Calculus II	Numerical Analysis
Calculus III	Structures of Program Languages
Calculus IV	Introduction to COBOL
Statistical Analysis I	Information Structures
Linear Algebra I	
Computer Science I	
Computer Science II	

Math Electives from the following: (6 semester hours)

Statistical Analysis II	Math of Finance II
Linear Algebra II	Differential Equations

Computer Science Electives from the following: (8 semester hours)

Systems Analysis	Computer Operations
Special Topics in Computer Science	Computer Aided Instruction
Logic & Switching Theory of the Computer	

Related Electives: 12 semester hours

MODERN LANGUAGES: FRENCH, GERMAN, SPANISH

The required courses in Modern Languages were revised as follows:

Required Courses: FRENCH

Intermediate French I
 Intermediate French II
 French Comp., Conversation & Phonetics I
 French Comp., Conversation & Phonetics II

Studies in French Culture I	History of the English Language or Intro to Linguistics
Studies in French Culture II	European Life & Society to 1815
Survey of French Literature I	European Life & Society Since 1815
Survey of French Literature II	

Related Electives: 47 semester hours

A minimum of three credit hours from each of the following fields for a total of twelve semester hours:

Philosophy	Psychology
Sociology	Speech Communication
Six credits of another language	

GERMAN

The required courses in German have been revised as follows:

Required Courses:

Intermediate German I	Survey of German Literature I
Intermediate German II	Survey of German Literature II
German Conversation & Comp. I	History of the English Language or Intro to Linguistics
German Conversation & Comp. II	European Life & Society Since 1815
Studies in German Culture I	Geography of Europe
Studies in German Culture II	

Related Electives: 47 semester hours

A minimum of three credit hours from each of the following fields for a total of twelve semester hours:

Philosophy	Speech Communication
Sociology	Psychology
Six credits of another language	

SPANISH

The required courses in Spanish were revised as follows:

Required Courses:

Intermediate Spanish I	Survey of Spanish Literature I
Intermediate Spanish II	Survey Spanish-American Literature
Spanish Conversation & Comp. I	Intro to Linguistics
Spanish Conversation & Comp. II	Geography of Latin America
Studies in Hispanic Culture I	History of Latin America
Studies in Hispanic Culture II	

Related Electives: 35 semester hours

A minimum of three credit hours from each of the following fields for a total of twelve semester hours:

Philosophy
Sociology
Six credits of another language

Psychology
Speech Communication

PHYSICS

The required courses in Physics were revised as follows:

Required Courses:

College Physics I
College Physics II
College Physics III
Intermediate Mechanics
Intermediate Electricity & Magnetism
Radiation & Optics
Modern Physics

Advanced Laboratory I
Calculus I
Calculus II
Differential Equations
General Chemistry I
General Chemistry II

Major Electives: 9 semester hours

Related Electives: 12 semester hours

POLITICAL SCIENCE

The required courses in Political Science were revised as follows:

Required Courses:

Introduction to Political Science
American Government
General Psychology
Principles of Anthropology
Principles of Sociology
History of U. S. to 1877
History of U. S. since 1877

European Life & Society to 1815
European Life & Society since 1815
Introductory Micro Economics or
Introductory Macro Economics
Elements of Economics or Current
Economic Issues
Introduction to Geography

Major Electives: 30 semester hours

Related Electives: 2 semester hours

PROFESSIONAL WRITING PROGRAM

The required courses in Professional Writing were revised as follows:

Required Courses:

Advanced Writing
Independent Study in Writing
Seminar in Writing
Creative Writing: Fiction
Creative Writing: Poetry
Adaptation of Literary Materials

Article Writing
Advertising
Publishing the Literary Magazine
Studies in Writing
Playwriting

Related Electives: 35 semester hours

Three semester hours from the following:

Journalism I	Scientific and Technical Writing
Business Writing I	Essay Writing

Related Discipline: 16 semester hours

(In addition to the courses above, 16 hours in an approved academic discipline. Program must be approved by the department involved.)

Internship or additional electives from any area: 16 semester hours

In the Scientific and Technical Writing part of the Professional Writing Program, the related electives were revised as follows:

Related Electives: 38 semester hours

Six semester hours from the following:

Journalism I	Publishing the Literary Magazine
Essay Writing	Any writing course
Creative Writing: Fiction	
Creative Writing: Poetry	
Playwriting (THE)	

Related Discipline: 16 semester hours

(In addition to the courses listed, the student will have 16 hours in a related discipline chosen from the Natural Sciences or Science and Technology programs, to be approved by the department of this related interest.)

Internship or additional electives from any area: 16 semester hours

In the Journalism part of the Professional Writing Program, the related electives were revised as follows:

Related Electives: 41 semester hours

Six semester hours from the following:

- Playwriting (THE)
- Radio and TV Writing: News and Commercial (SPE)
- Radio and TV Writing: Dramatic Script (SPE)
- Adaptation of Literary Materials
- Publishing the Literary Magazine

Three semester hours from the following:

- Business Writing I
- Scientific and Technical Writing I
- Essay Writing
- Creative Writing: Fiction
- Creative Writing: Poetry

Related Discipline: 16 semester hours

(In addition to the courses above, 16 hours in an approved academic discipline. Program must be approved by the department involved.)

Internship or additional electives from any area: 16 semester hours

In the Radio & Television Journalism part of the Professional Writing Program, the related electives were revised as follows:

Related Electives: 44 semester hours

15 semester hours from the following:

Journalism II	Studies in Writing
Journalism III (editing)	Special Problems (SPE)
Advertising	Any writing course
Article Writing	

Three semester hours from the following:

Business Writing I	Playwriting (THE)
Creative Writing: Fiction	Radio and TV Writing: Drama
Creative Writing: Poetry	Scientific and Technical Writing
Essay Writing	

Nine semester hours from the following:

Radio & TV Workshops	Advanced TV Production
Radio & TV Announcing	Special Problems
Appreciation of Television	

Internship and/or additional electives from any area: 20 semester hours

SOCIAL WORK

The required courses in Social Work were revised as follows:

Required Courses:

Minority Group Relations	Principles of Sociology
Contemporary Social Problems	General Psychology
Intro to Social Work	Human Growth & Behavior I
Research Methods in Social Science	Human Growth & Behavior II
Social Work Methods I	Social Psychology
Social Work Methods II: Group Work	Social Institutions
Social Work Methods III: Comm. Org.	History of Social Thought
Social Change	Urban Sociology
Delivery of Services	Abnormal Psychology
Welfare Practicum I	
Welfare Practicum II	

Related Electives: 5 semester hours

SPEECH COMMUNICATION

The required courses in the Radio and TV part of Speech Communication were revised as follows:

Required Courses:

Oral Communication	Intro to Radio Production
Survey of Radio, TV & Film	Radio & Television Announcing
Fundamentals of Discussion or Group Discussion	Radio & TV Writing: News or
Intro to Communication Theory	Radio & TV Writing: Drama
Intro to Oral Interpretation	Appreciation of Film
Three Radio and TV Workshops	
Intro to Television Production	

Major Electives: 3-6 credits from Group A; 3-6 credits from Group B.

Group A

Appreciation of TV
Radio & TV Writing (Drama)
Radio & TV Writing (News & Com)
Advanced TV Production
Special Problems in Speech Comm.
Radio & TV in a Free Society

Group B

Fundamentals of Discussion
Voice & Articulation
Persuasion
Group Discussion
Freedom of Speech
Language and Behavior

Related Electives: 26 semester hours

URBAN AFFAIRS

The Urban Affairs Program has been revised into three tracks: Urban Planning Management and Policy Analysis, Urban Recreation, and General Urban Studies.

Urban Planning Management and Policy Analysis

The required courses in Urban Planning Management and Policy Analysis were revised as follows:

Required Courses:

Planning and Public Management	Program Evaluation & Performance Analysis
Organization and Administrative Behavior	Urban Planning: The Historical Perspective
Urban Affairs and Policy Analysis	Workshop in Urban Planning
Urban Geography	Urban Affairs Practicum
Urban Sociology	
Political Economy	
Data Analysis for Public Decisions	

Major Electives: 5 courses

Community Action & Neighborhood Gov't.	Demographic Analysis
Urban Transportation	Regional Economics
Housing and Housing Policy	Modules (any 2)

Related Electives: 9 - 13 semester hours

General Urban Studies

The required courses in General Urban Studies were revised as follows:

Required Courses:

Planning & Public Management
Organizational & Administrative Behavior
Urban Affairs & Policy Analysis
Urban Geography
Urban Sociology
Political Economy

Data Analysis for Public Decisions
Program Evaluation & Performance
Analysis
Urban Planning: The Historical
Perspective
Workshop in Urban Planning
Practicum

Related Electives: 24- 32 semester hours

Urban Recreation

The required courses in Urban Recreation were revised as follows:

Required Courses:

Planning & Public Management
Organizational & Administrative Behavior
Urban Affairs & Policy Analysis
Urban Geography
Urban Sociology
Political Economy
Data Analysis for Public Decisions
Program Planning
Community Action & Neighborhood Gov't.

Program Evaluation & Performance
Analysis
Urban Planning: The Historical
Perspective
Workshop in Urban Planning
Recreation & Park Administration
Planning & Developing Areas &
Facilities
Administration of Private &
Commercial Recreation
Practicum

Related Electives: 7 - 19 semester hours

Description of Courses

14

(Introductory level courses are indicated by a dagger /+/.)

NOTE: Only new courses and revised course descriptions are provided in this catalog supplement. All other courses are indicated in the 1977-79 College Catalog.

(Introductory level courses are indicated by a dagger /+/.)

AMERICAN STUDIES

+ XAS 200 INTRODUCTION TO AMERICAN STUDIES (3 crs.)

ANTHROPOLOGY

ANT 103 BIBLICAL ARCHAEOLOGY. A study of Biblical times, places and events as seen through the archaeological record. Special emphasis is placed upon chronology of Biblical events, upon diverse cultural traditions as well as in-depth studies of selected archaeological excavations. Extra-Biblical written and excavated sources are included when they relate directly to Biblical history. (3 crs.)

ANT 205 CULTURAL RESOURCE MANAGEMENT: HISTORICAL PRESERVATION. Designed to acquaint students with the need for preservation of cultural resource (historical preservation), the legislation supporting such work, and the way the work is performed. Students learn what is meant by historical preservation and cultural resources management, the problems faced by anybody doing cultural resource study, what types of questions preservationists must seek answers to, how significant resources (historic and archaeological) are identified, how it is determined whether a resource is considered significant, how to do architectural descriptions of historic structures, and how to complete the National Register of Historic Places nomination forms. Part of the course will involve some on site study of resources. Prerequisite: ANT 100. (3 crs.)

ANT 226 HISTORIC SITES ARCHAEOLOGY. Classroom and limited experiences in laboratory and field recording in an archaeological study of America's pioneer, industrial and military past. Historic sites archaeology acquaints students with techniques, philosophy, work, and aims of that branch of history and anthropology that studies the American past from a cultural-archaeological point of view. The course includes the study of military and community restorations based on historical archaeology such as Colonial Williamsburg, Plymouth Plantation, Independence Square, Fort Michilimackinac, Fort Ligonier, and Fort Necessity. Prerequisite: ANT 100. (3 crs.)

ART

ART 100 MEDIA AND TECHNIQUES II. Development of a broad knowledge of media and techniques used in creative expression. Emphasis will be placed on exploration and product. Three dimensional media and techniques will be covered. (3 crs.)

- ART 193-293-393-493 CERAMICS STUDIO. An art studio course which expects each student to select a particular direction for personal exploration. Students work in depth in such areas as Ceramic design, glaze problems, kiln construction, ceramics history, etc. At each successive level, they will be expected to illustrate additional competencies and experience. Prerequisite: Ceramics I. (3 crs.)
- ART 194-294-394-494 WEAVING STUDIO. A successive level studio course in weaving and fiber art, designed to enable the student who is seriously interested in fibers to experiment with and explore multiple techniques and to investigate specific problems in one or several areas, e.g. sculptural weaving, surface treatment of fabric, etc. Prerequisite: Weaving I (3 crs.)
- ART 196-296-396-496 PAINTING STUDIO. An art studio course which allows students to select a painting medium and to practice skills and explore in depth problems of form, content, and technique. The course enables the student to progress through degrees of competencies and abilities, with opportunities for maximum growth in an area or areas. Prerequisite: Painting I. (3 crs.)
- ART 197-297-397-497 PRINTMAKING STUDIO. A successive level art studio course which expects each student to select a particular direction for personal exploration. Students work in depth in such areas as relief printing, intaglio, screen printing processes, composition and registration problems in multiple printing, printmaking history, etc. Prerequisite: Printmaking I. (3 crs.)
- ART 198-298-398-498 SCULPTURE STUDIO. A successive level studio course in sculpture is designed to enable the student who is seriously interested in sculpture the opportunity to experiment with many types of media and to investigate others. He will be expected to undertake problems which demonstrate critical thinking and analysis of materials. Prerequisite: Sculpture I. (3 crs.)
- + ART 208 CALLIGRAPHY AND ADVERTISING. Designed to acquaint the student with contemporary ideas in advertising and to make him/her knowledgeable in the art of calligraphy. (3 crs.)
- ART 210 DRAWING II. Further development of the knowledge and skills covered in Drawing I, with increased emphasis upon individual forms of expression. Prerequisite: Drawing I. (3 crs.)
- + ART 220 SCULPTURE I. Introduction to the basic language, components, elements, and principles of organization of sculpture. The basic techniques of manipulation, subtraction, substitution, and addition will be covered, involving a limited range of materials. (3 crs.)
- ART 242 FIBERS AND THREADS. Designed primarily to give the student an opportunity to manipulate varying fibers in such techniques as macrame, tapestry, and free weaving, basketry, sprang, rug construction, braiding, twining, combinations of techniques. Imaginative treatments of all techniques is stressed, unusual uses and combinations of materials are encouraged, and emphasis is on quality pieces. (3 crs.)

- ART 275 FABRICS: SURFACE TREATMENT. (The course number was changed from 250 to 275. The course description was not changed.)
- ART 355 JEWELRY II. A means of providing further opportunity for study and experience in the craft of jewelry making. For the undergraduate student who having completed Jewelry I, wishes to continue his work, increase his skill, and acquire further knowledge of metal techniques. (3 crs.)
- ART 360 WATERCOLOR PAINTING II. A course designed to further the study of transparent watercolor and includes techniques in gouache, egg tempera and fresco painting. (3 crs.)

ARTS AND HUMANITIES

- + XAII 400 INTRODUCTION TO CULTURE AND TECHNOLOGY. (3 crs.)

BIOLOGY

- + BIO 101 CONTEMPORARY ISSUES IN BIOLOGY. Basic biological principles are applied to the understanding of current social-biological problems and how they relate to an individual's personal life. Topics included are: human sexuality, nutrition, health and disease, evolution, behavior, and the diversity of life. The course is intended for students not majoring in biology. Prerequisites: None. Three lecture hours weekly. (3 crs.)
- + BIO 104 BASIC CARE OF PLANTS. A general introduction to the basic care of plants. Students will be introduced to techniques that will make the growing and caring of plants, indoors and out, less complicated and more fun. (3 crs.)
- + BIO 105 ENVIRONMENTAL BIOLOGY. The interrelationships of various plants and animals are stressed, particularly as these factors relate to the living and non-living components of land and water habitats. Environmental processes which control life on earth are discussed with reference to human populations, world food and energy production, and pollution problems. Especially suitable for non-science students; requires only basic understanding of biology. Prerequisites: BIO 101. Three lecture hours weekly. (3 crs.)
- + BIO 107 HEREDITY AND HUMAN AFFAIRS. A study of the basic principles of classical and molecular genetics and how these are applied to contemporary biological problems. Prerequisites: BIO 101. Three lecture hours weekly. (3 crs.)
- + BIO 108 BIOLOGICAL CONCEPTS. A one semester preparative course in biology for students who must take BIO 115 as part of their curriculum and who require additional training in the biological sciences. Topic areas are selected to deal with those fundamental concepts which are requisite to entrance into BIO 115. Three lecture hours weekly. (3 crs.)
- + BIO 111 BOTANY I: NONVASCULAR PLANTS. An analysis of the biology of lower plants encompassing the origin of plant life on earth, modes of increasing structural complexity, the nature and meaning of sexuality, the nature of motility, the evolutionary processes and ecology, especially as manifest in the algae and fungi. Prerequisites: BIO 115. Three hours lecture and three hours laboratory weekly. (4 crs.)

- BIO 304 A PROCESS APPROACH TO ENVIRONMENTAL EDUCATION. An intensive one week workshop taught only at the Ivan McKeever Environmental Center, Sandy Lake, PA. The course is taught using college personnel as well as staff members from the McKeever Center. The workshop emphasizes the development of skills and techniques for strengthening environmental programs, identifying methods of implementing new programs, field work and designing methods for involving "the public". Prerequisites: XES 100 or Advisor's consent. (2 crs.)
- BIO 314 PLANT ECOLOGY. A consideration of the plant communities which are influenced by both biotic and physical factors. The emphasis is on the vegetation of Pennsylvania, especially in the area of the Appalachian Mts. Laboratory work provides the student with the opportunity to become familiar with modern methods of vegetational analysis and community sampling. Prerequisites: BIO 111, 115, and 212. Three hours lecture and three hours laboratory weekly. (4 crs.)
- BIO 321 BIOTIC INDICATORS OF WATER QUALITY. (The course title was changed. There are no changes in the course description.)
- BIO 328 HUMAN PHYSIOLOGY. The functions of the human body. Basic physiological phenomena are studied, with considerable emphasis upon clinical and practical application. Prerequisites: BIO 115, 121, 222. Three hours lecture and three laboratory hours weekly. (4 crs.)
- BIO 334 SOIL SCIENCE. An edaphological approach is taken in the study of the soil, i.e., the soil as a natural habitat for plants. The various properties of the soil will be considered as they relate to plant production. Since the clay and humus fractions are of tremendous importance, the course will incorporate a colloidal-biological basis. Prerequisites: General Chemistry I and II. Three hours lecture and three hours lab per week. (4 crs.)
- BIO 335 PLANT PHYSIOLOGY. The physio-chemical foundations of plant functions will be investigated, including such topics as water and salt absorption, photosynthesis, respiration, plant growth substances, photoperiodic responses, mineral metabolism, germination, and the effects of air pollution on plants. Recent advances in the field of plant physiology will also be included. Prerequisites: BIO 111, 115 and 212; General Chemistry I and II. Three hours lecture and three hours lab per week. (4 crs.)
- BIO 342 SCIENTIFIC PHOTOGRAPHY. A basic course in the life and environmental sciences which stresses the myriad of ways in which photography can be applied to enhance the effectiveness of teaching and research endeavors of biologists and environmentalists. Special attention is given to photomicroscopy, macrophotography, and field photography. Various other illustrative materials are also prepared utilizing selective photographic equipment and/or procedures. Prerequisites: Three biology or environmental courses with a minimum of one field-oriented course. (2-4 crs.)
- BIO 400 MAMMALOLOGY. A study of the classification, distribution, and natural history of mammals, with emphasis on eastern North American species. Field studies and preparation of study specimens. Prerequisites: BIO 115, 121, 222; BIO 308 or BIO 316 or XES 300. (4 crs.)

- BIO 418 BIOLOGICAL RESEARCH INVESTIGATIONS.** A research study program for advanced undergraduate students who wish to pursue careers in biological or medical areas. Emphasis is placed upon the student learning to use various scientific instruments and biological procedures necessary for research investigations. The student works closely with one or more faculty members on a research project which is departmentally approved. Each research project is unique and the data should ultimately be published in a professional biological journal. The student normally participates in one aspect of an ongoing research study and he/she may pursue the work for one or more semesters. Prerequisites: BIO 111, 115 and 212 (or 121 and 222), one biology elective course, junior or senior standing, and a 3.0 QPA. (1-)
- BIO 427 CELLULAR PHYSIOLOGY.** The physiology of the cell with emphasis on the relationship of cell structure and function. Includes physical and chemical aspects of cells, the relation of cells to their environment, energy conversions in cells, membrane permeability, photosynthesis, and enzyme action. Prerequisites: BIO 111, 115, 121, 212 and 222; General Chemistry I and II recommended. (4 crs.)
- BIO 435 ICHTHYOLOGY.** An introduction to the morphology, taxonomy, ecology, and distribution of the major groups of freshwater fishes, with emphasis on the northeastern U. S. fauna. Prerequisites: BIO 115, 121, 222. Three hours lecture and three hours laboratory weekly. (4 crs.)
- BIO 441 ETHOLOGY.** Four principal approaches to ethology-ecology; physiology, genetics, and development are interpreted within the frame work of evolutionary biology with emphasis on the patterns of behavioral similarities and differences among different kinds of animals. Prerequisites: BIO 115, 121, 222; BIO 308 or BIO 316 or XES 300. Three hours lecture and three hours laboratory weekly. (4 crs.)
- BIO 449 BIO. MEDICAL TECH. CLINICAL PRACTICUM I.** Upon acceptance to a hospital school of Medical Technology, the student undertakes the clinical training experience required by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). Programs of instruction will vary from one hospital to another but usually include hematology, microbiology, parasitology, immunology, urinalysis, and biochemistry. This course covers the first term of two required terms. (15 crs.)
- BIO 459 BIO. MEDICAL TECH. CLINICAL PRACTICUM II.** A continuation of BIO 449. The second of two terms. (14 credits)
- BIO 466 BIOMETRY.** The fundamental concepts underlying the application of statistical methods and experimental designs to environmental problems. Practical experience in the development and analysis of laboratory and field projects will be included. Prerequisites: MAT 215, a field biology course, and consent of instructor. Three hours lecture and three hours laboratory weekly. (4 crs.)
- BIO 470 EVOLUTION.** An advanced course pertaining to the mechanisms which are operative in the process of biological evolution. Life origins and development will be investigated with special emphasis placed upon the importance of genetic and metabolic systems diversity. The recurring and universal themes of mutation and natural selection will be thoroughly discussed as the concept of evolution at the population level is developed. A detailed account of human origins and species diversity is also studied. Prerequisites: BIO 318 and General Chemistry I and II. Three hours lecture weekly. (3 crs.)

CHEMISTRY

- + CHE 100 INTRODUCTION TO CHEMISTRY. A preparatory course emphasizing the mathematical and reasoning skills needed to be successful in general chemistry. There are no prerequisites and the course will satisfy requirements in the Natural Science area. This course is not an elective for chemistry majors. (3 crs.)
- CHE 340 ORGANIC SPECTROSCOPIC INTERPRETATION. Structure elucidation of organic molecules based on infrared determination of major functional groups and differentiation of functional group isomers; nuclear magnetic resonance determination of chemical shifts, coupling constants and splitting patterns; mass spectroscopic determination of molecular weight, fission and re-arrangement processes, isotope ratios; ultraviolet determination of λ_{max} for conjugated dienes and α, β -unsaturated ketones, chromophore types, extinction of coefficients and Lambert-Beer relationships. Prerequisites: Organic Chemistry 332. (3 crs.)
- CHE 411 BIOCHEMISTRY I. A comprehensive survey of the properties of amino acids, elucidation of protein structure, protein biosynthesis, the Genetic Code, and carbohydrate metabolism. Prerequisite: Organic Chemistry I and/or instructor's permission. (4 crs.)
- CHE 412 BIOCHEMISTRY II. A continuation of Biochemistry I and including fatty acid biosynthesis, fatty acid metabolism, photosynthesis, protein metabolism, vitamins, hormones and immuno-chemistry. Prerequisite: Biochemistry I and/or instructor's permission. (4 crs.)

COMPUTER SCIENCE

- + CSC 105 BASIC PROGRAMMING LANGUAGE. Elementary computer concepts in such areas as the nature and structure of computers, the history and development of computers, flow charting and elements of the basic language involved in reading and printing, transfer statements, looping, subroutines, conversational programming, etc. The computer language taught is basic. Prerequisite: One year of algebra. (3 crs.)
- + CSC 108 COBOL I. Introductory concepts of data processing through the basic components of COBOL programming. Prerequisite: CSC 121. (3 crs.)
- + CSC 121. COMPUTER SCIENCE I. Introduction to computer programming through the Fortran IV language. Prerequisite: MAT 101. (3 crs.)
- CSC 208 COBOL II. Files, various mass storage devices, table handling, declarative and linkage sections, use of source program library facilities, operations of calling and called programs and important features of COBOL for business applications, e.g., report writer feature and sort feature. Prerequisite: COBOL I. (3 crs.)
- CSC 216 LOGIC AND SWITCHING THEORY OF THE COMPUTER. A lecture laboratory course providing an in-depth study of digital computers, including the circuits and logic involved in the computer. Prerequisites: CSC 121, MAT 101, MAT 102. (3 crs.)

- CSC 222 COMPUTER SCIENCE II. Three class hours each week with outside assignments requiring advanced Fortran programming a digital computer to assist in the solution of problems assigned. Considerable time in computer lab is required. Prerequisite: CSC 121. (3 crs.)
- CSC 256 COMPUTER AIDED INSTRUCTION (CAI). The course is taught on a lecture-laboratory basis. Students are expected to be able to use time sharing terminals and be familiar with at least one conversational computer language, preferably BASIC. In the laboratory session, students will be exposed to various types of CAI programming materials and be instructed in the development of their own CAI package. Prerequisites: CSC 105 or CSC 121. (3 crs.)
- CSC 275 COMPUTER OPERATIONS. To introduce the student to the hardware of the computer and to acquaint him with the usage and operation of the Central Processing Unit and its peripheral equipment. Prerequisites: CSC 121 and CSC 222. (3 crs.)
- CSC 308 SURVEY OF OPERATIONS RESEARCH. Lecture and laboratory sessions utilizing the computer in the performance of quantitative methods of decision making. Survey of present operations research tools available to the administrator and manager is an integral part of the course. Working knowledge of FORTRAN and statistics is necessary. Prerequisites: CSC 121, MAT 215, MAT 225. (3 crs.)
- CSC 323 ASSEMBLER LANGUAGE PROGRAMMING. Computer organization, representation of numbers and characters, instruction codes, machine language, macros, and subroutines. Prerequisites: CSC 222. (3 crs.)
- CSC 324 COMPUTER GRAPHICS. Lecture and laboratory sessions utilizing the computer via inter-active graphics terminals and study of the theory and hardware of graphics devices is stressed. Development and utilization of graphics soft-ware is the major goal of this course. Prerequisites: CSC 121, CSC 222. (3 crs.)
- CSC 328 DATA STRUCTURES. Concepts and algorithms used in the solution of non-numerical problems. Applications to data management systems, file organization, information retrieval, list processing and programming languages. Prerequisites: CSC 222. (3 crs.)
- CSC 375 SYSTEMS ANALYSIS. An introduction to the basic concepts and tools of systems analysis within the context of real life problem situations. Prerequisites: CSC 222. (3 crs.)
- CSC 377 INFORMATION STRUCTURES. Data structures, concepts and algorithms used in solution of non-numerical problems. Applications to data management systems, information retrieval and list processing. Prerequisites: CSC 222. (3 crs.)
- CSC 378 COMPUTER ARCHITECTURE. Central processor organization, instruction formats, addressing schemes, hierarchies of storage, executive, and priority processing, as well as input and output. Prerequisites: CSC 222. (3 crs.)

- CSC 419 **MATHEMATICS INTERNSHIP AND COMPUTER SCIENCE.** Mathematical Programming Work Experience. Prerequisite: Approval of Mathematics and Computer Science Department. (3 to 15 crs.)
- CSC 424 **NUMERICAL ANALYSIS.** Modern methods of numerical analysis methods as they apply to the digital computer. Prerequisites: CSC 222, MAT 214. (3 crs.)
- CSC 455 **STRUCTURE OF PROGRAMMING LANGUAGES.** The power and limitations of algebraic languages, string manipulation languages and interactive languages will be studied together with compiler structure and techniques. Prerequisites: CSC 222. (3 crs.)
- CSC 456 **DATA BASE MANAGEMENT SYSTEMS.** Design, implementation and application of data base management systems. Prerequisites: CSC 108. (3 crs.)
- CSC 485 **SPECIAL TOPICS IN COMPUTER SCIENCE.** Individual study or research on topics and materials not ordinarily covered by other courses. Prerequisites: Permission of instructor. (3 crs.)
- CSC 496 **SEMINAR IN COMPUTER SCIENCE.** Topics to be chosen jointly by the instructor and the student or students involved. Prerequisite: Approval of the instructor. (1 to 3 crs.)

EARTH SCIENCE

- + EAS 163 **INTRODUCTION TO OCEANOGRAPHY.** An introductory course in the study of the four main branches of Oceanography: (1) Geology of the oceanic basins (origin of the oceans, structure and geomorphology of the ocean's floor, methods of investigation); (2) Chemistry of the oceanic waters; (3) Physics of the oceans (currents, waves, tides, etc.); (4) Biology of the oceans (marine plants and animals). (3 crs.)
- EAS 200 **HISTORICAL GEOLOGY.** A survey course in earth history that assumes some knowledge of geologic principles and terminology. Topics considered include geologic time, the use of fossil material, the origin of life, and physical evolution of planet earth (with special emphasis on North America), and environmental interpretation. Laboratory work includes selected problem sets, geologic maps, and fossils. (4 crs.)
- EAS 202 **HYDROLOGY.** A basic survey course in the area of water and its utilization by humans. The course deals with the identification of water resources and the geographic and geologic aspects of these resources. (3 crs.)
- EAS 210 **SOILS.** Designed to introduce the study of soils and agronomy to the student. It covers the geologic origins of soils and their geographic distribution and classifications. (3 crs.)
- EAS 231 **ENVIRONMENTAL GEOLOGY;** The interaction between man and his geologic environment. The student needs only a limited background in geology (e.g. Introduction to Geology), as the course has been designed as much for the environmental studies major (and general education student) as for the geology major. Erosion, floods, sediments and pollutants, health hazards, soils, earthquakes (prediction and control), mass movements, volcanoes, and urban environmental problems. (3 crs.)

- EAS 232 EARTH RESOURCES. The first half of this course covers the identification and description of rocks and minerals, the origin and classification of soils, and water as a resource. The second half is concerned with the distribution and geologic origin of the economically important metals, non-metals, and fossil fuels. (3 crs.)
- EAS 263 COASTAL GEOMORPHOLOGY AND MARINE RESOURCES. Physical processes that are changing the coastal land-forms such as wave action; long shore currents and transport; wind and tectonic forces. Also includes a study of the resources of the sea and the problems of ocean pollution. (3 crs.)
- EAS 271 CARTOGRAPHY. A laboratory course designed to acquaint the student with the history of maps and mapping; the interpretation of globes, cartograms, and geographic diagrams; the nature and function of maps, including concepts of scales and cartographic symbols; and the use of cartographic tools and equipment in map construction. (3 crs.)
- EAS 272 MAP AND AERIAL PHOTOGRAPHY INTERPRETATION. A utilization of maps and aerial photographs as a source of information to aid in landscape analysis. The principles of data collection and acquisition of information from map and aerial photographs are done in a manner that does not require previous background. (3 crs.)
- EAS 302 FIELD WORK IN HYDROLOGY. The course is designed as a follow-up course in hydrology. It allows the student to do practical work concerning water and water budgets. Students will work with problems concerning storage of water, stream measurements, and evaporation problems. (3 crs.)
- EAS 310 FIELD WORK IN SOILS. This is a field-oriented course designed as a follow-up course to those introducing soils. It is concerned with field measurement of profiles, acidity, moisture, and erosion. Students work closely with data gathered by government agencies on local soil conditions. (3 crs.)
- EAS 321 PETROLEUM GEOLOGY. This course is the first of a two-semester sequence intended primarily for petroleum technology majors. Topics considered include petroleum reservoir properties, petroleum traps, the origin and migration of oil and natural gas, exploration prospect development, and well drilling and completion technology. (3 crs.)
- EAS 322 PETROLEUM GEOLOGY II. The second half of the petroleum sequence, this course considers such topics as geological, geochemical, and geophysical exploration techniques; lithofacies analysis; computer applications; well log analysis; secondary and tertiary recovery techniques; and major oil-fields of the U. S. and selected areas of the world. (3 crs.)
- EAS 331 MINERALOGY. An introduction to the morphology and internal structure of crystals and an examination of the chemical and physical nature of minerals. Laboratory time is devoted to the study of crystal models and the identification of selected mineral specimens. This course presupposes a basic knowledge of Physical Geology and General Chemistry. (3 crs.)

- EAS 332 **PETROLOGY.** A detailed examination of the three major rock groups. Particular emphasis placed on the origin of individual rock types and the several bases of classification. Laboratory work includes hand specimen and thin section identification. Recommended: Physical Geology, Mineralogy, and General Chemistry prior to taking this course. (3 crs.)
- EAS 341 **FIELD WORK IN METEOROLOGY.** This is a field oriented course designed as a follow up course to meteorology. It is concerned with the measurement of weather conditions, plotting these conditions, and predicting the weather. Other weather problems and library research are part of the course. (3 crs.)
- EAS 343 **GEOMORPHOLOGY.** The origin, description, and classification of surface features (landforms). Particular emphasis on the evolution of landscapes as related to underlying geologic factors and the climatic regime. Time is devoted to the examination of landforms as displayed on topographic maps. (3 crs.)
- EAS 350 **MICROPALAEONTOLOGY.** Micropaleontology deals with the essential biological and geological principles which are basic to all paleontological studies. Most of the course is devoted to the study and identification of various microfossil groups: particularly the foraminifera and the ostracodes. The use of microfossils by the petroleum industry for stratigraphic and paleoenvironmental interpretation is also considered. (3 crs.)
- EAS 351 **INVERTEBRATE PALEONTOLOGY.** Invertebrate Paleontology consists of a detailed analysis of each of the invertebrate phyla as well as consideration of the more important of these as stratigraphic index fossils. Some consideration is also given to vertebrates and important local plant fossils. It is hoped that this course will be of interest to biology as well as geology students. (3 crs.)
- EAS 372 **FIELD MAPPING.** On-site exercises using field equipment and the processes and problems involved in mapping. Emphasis is on cartographic techniques, layout, and design of maps from field data. Prerequisites: EAS 271, 272, or permission of the instructor. (3 crs.)
- EAS 373 **STATISTICAL CARTOGRAPHY.** The course will stress the statistical approach to cartographic representation. Methods of data manipulation, problems of symbolization and techniques of presentation will be emphasized. (3 crs.)
- EAS 421 **SEDIMENTOLOGY.** All aspects of sediments and sedimentary rocks. Laboratory work includes hand specimen and thin-section descriptions and classification of sedimentary rocks, and the mechanical and statistical analyses of sediments. Recommended: EAS 160, 200, 331 and CHE 101. (3 crs.)
- EAS 422 **STRATIGRAPHY.** Emphasis on the time and spatial relationships of layered rocks. The use of guide fossils is stressed, and the stratigraphy of Pennsylvania is examined in detail. Students become involved in local and regional stratigraphic problems of individual interest. Recommended: Physical Geology, Historical Geology, and Paleontology. (3 crs.)

- EAS 425 STRUCTURAL GEOLOGY. An examination of the dynamic nature of the earth. The response of rocks to deforming forces, fold systems, fault systems, and the tectonic history of the earth. Modern theories of continental drift, sea-floor spreading, and sub-crustal convection. Opportunity is provided for study of local structural features of interest to the individual. Recommended: EAS 160, 200 and PHY 101. (3 crs.)
- EAS 463 SEMINAR IN OCEANOGRAPHY. This seminar is designed for department majors who have completed all or nearly all of the required courses for the major. Students will be required to select research topics which will be determined by the class and the instructor. Each student will make a copy of the written research report for each member of the class. Students will present and defend the research report before the class. (3 crs.)
- EAS 492 SUMMER FIELD COURSE IN GEOLOGY. Planned trips in summer sessions, during which lectures and discussions are conducted. Open to all students. (3 crs.)
- EAS 493 EARTH SCIENCE WORKSHOP. Designed to provide students with a combination of experiences: lectures, field work, and laboratory situations. It is hoped that through these experiences the student will gain insights relevant to present-day situations. Prerequisite: Permission of staff. (3 crs.)
- EAS 494 GEOLOGY WORKSHOP. See 493. (3 crs.)
- EAS 495 SEMINAR IN EARTH SCIENCE. (3 crs.)

ECONOMICS

- ECO 111 ACCOUNTING I - Deleted.
- + ECO 201 INTRODUCTORY MICROECONOMICS. Microeconomic relationships and methods of analyses. The theories of demand and production are studied intensively together with a careful and in-depth examination of the basic market models. (3 crs.)
- + ECO 202 INTRODUCTORY MACROECONOMICS. This beginning course seeks to familiarize the student with the basic principles of the market system. Emphasis is then placed on the monetary system, the determination of national income, and fiscal policy and its implications. (3 crs.)
- + ECO 251 DEVELOPMENT OF THE AMERICAN ECONOMY. A critical analysis of economic life in Colonial America and a study of the East-West immigration and the growth of modern business and industry in the United States. Special attention directed towards corporations and their part in the nation's dynamic growth. The causes and consequences of the great depression are also considered. Prerequisite: ECO 100 or ECO 202. (3 crs.)
- ECO 301 INTERMEDIATE MICROECONOMICS. An analysis of the theories of consumer behavior in the allocation of resources, and of general price and distribution theory, with application to current economic issues. Prerequisites: ECO 201 and 202 or permission of instructor. (3 crs.)

- ECO 302 **INTERMEDIATE MACROECONOMICS.** Analysis of the determination of national income, employment and price levels. Discussion of consumption, investment, inflation, and government fiscal and monetary policy. Prerequisites: ECO 201, 202. (3 crs.)
- ECO 304 **MONEY AND BANKING.** The functioning of the monetary and banking system as a whole and its relationship with the balance of the economy. Emphasis on commercial banks, the Federal Reserve System, the Treasury Department, the nature of money, and the significance of monetary policy. Prerequisite: ECO 201 and 202. (3 crs.)
- ECO 306 **MONETARY THEORY AND POLICY.** A theoretical treatment of the influence of money and financial markets on economic activity and prices, and of the effects of monetary policy on the markets for goods and services; the role of money in the Classical and Keynesian macro-systems; monetary and fiscal policy. Prerequisites: ECO 304 and MAT 225. (3 crs.)
- ECO 311 **LABOR ECONOMICS.** An introduction to labor economics, theories of the labor movement, the American labor movement, wage and employment theory, comparative labor movements and trade union impact on wages, prices and national income. Prerequisites: ECO 201, 202. (3 crs.)
- ECO 320 **MATHEMATICAL ECONOMICS.** The application of basic mathematical concepts to economic theories. Relationship of functions and graphs, simultaneous equations, and maximization techniques. Prerequisites: ECO 201, 202 and Tech Math I or College Algebra. (3 crs.)
- ECO 322 **MANAGERIAL ECONOMICS.** An extension of microeconomic theory to specific, case-oriented subjects, with emphasis on the decision-making process of a given firm. Production theory, empirical estimates of market demand, and demand constraints. Prerequisites: ECO 201, 202, and 320. (3 crs.)
- ECO 331 **REGIONAL ECONOMICS.** An introduction to regional analysis: Theories of city locations and hierarchies, industrial location patterns, land use patterns, the short-run impact of industrial change upon employment in one community and on long-run differentials of per capita income between regions. Prerequisites: ECO 100. (3 crs.)
- ECO 342 **ENVIRONMENTAL ECONOMICS.** Emphasis on the understanding of the impact of economic growth on the environmental and the interrelationship between production, private cost minimization, and environmental damage. Prerequisites: ECO 201 and 202. (3 crs.)
- ECO 351 **COMPARATIVE ECONOMIC SYSTEMS.** An analysis of the institutional structure of each type of economy and understanding of the reasons for the similarities and differences of institutional structures by comparing capitalist, socialist and communist economic systems. Prerequisites: ECO 201, 202. (3 crs.)
- ECO 379 **SPECIAL PROBLEMS IN ECONOMICS.** Designed to meet the changing interests of students and staff. Topics vary in response to those interests. Prerequisites: ECO 201, 202 or permission of instructor. (3 crs.)

- ECO 401 INDUSTRIAL ORGANIZATION. Analysis of market structure and its relation to market performance; changing structure of U. S. industry; and pricing policies in different industrial classifications of monopoly and competition in relation to the problems of public policy. Prerequisite: ECO 201. (3 crs.)
- ECO 405 PUBLIC FINANCE. A study of governmental activities in the collection and spending of public income. Subjects include government expenditures, tax and revenues, public debt management, fiscal policy, and fiscal administration. Prerequisites: ECO 201 and 202. (3 crs.)
- ECO 421 APPLIED ECONOMETRICS. Deals with the formulation, estimation and testing of economic models. Topics include single variable and multiple variable regression techniques, theory of identification, auto-correlation and simultaneous equations. Prerequisites: Business Statistics and ECO 320. (3 crs.)
- ECO 431 INTERNATIONAL ECONOMICS. Theory and policy of international economics, with emphasis on the application of theory to such current problems as the balance of trade and international payments. Prerequisites: ECO 201 and 202. (3 crs.)
- ECO 433 ECONOMICS OF GROWTH AND DEVELOPMENT. To provide an understanding of the obstacles to economic growth, requirements for growth, and other topics related to economic growth in underdeveloped countries. Prerequisites: ECO 201 and 202; (3 crs.)
- ECO 451 HISTORY OF ECONOMIC THOUGHT. An extensive survey of the development of economic thought from ancient times to the present stressing the contributions of Smith, Ricardo, Marx, Marshall and Keynes. This course should be taken quite late in the undergraduate career. Prerequisites: ECO 201, 202. (3 crs.)
- ECO 490 COMMUNITY RESOURCES WORKSHOP. (4 crs.)
- ECO 492 ECONOMIC INTERNSHIP. (VC)

ENGLISH FOR FOREIGN STUDENTS

- EFS 101 SPEAKING AND LISTENING SKILLS. Designed for international students who have an insufficient command of spoken American English. The course enables students to both comprehend and use oral language in formal and informal situations. (3 crs.)
- EFS 102 READING AND VOCABULARY DEVELOPMENT. This course enables international students to broaden their awareness of English vocabulary, slang expressions, levels of usage, and to spell correctly, both orally and in writing. (3 crs.)
- EFS 103 IDIOMATIC ENGLISH. (3 crs.)
- EFS 104 WRITING IN ENGLISH. (3 crs.)

ENGLISH

- + ENG 101 ENGLISH COMPOSITION I. Reviews the construction of sentences and leads the student to arrange sentences into well-formed paragraphs. (3 crs.)
- + ENG 102 ENGLISH COMPOSITION II. Includes instructions in writing a topic sentence, in using transitions, and in choosing an appropriate expository method. (3 crs.)
- + ENG 103 ENGLISH COMPOSITION III. Writing autobiographical essays, letters of application, and resumes, and procedures for writing a research paper. (3 crs.)
- + ENG 191 STUDENT PUBLICATIONS' WORKSHOP. This course uses the college newspaper and yearbook as laboratories. Under supervision, the student uses his laboratories to practice writing, editing, photography, layout, and production. Above all, the student learns to work against the clock, a journalistic necessity. (1 cr.)
- ENG 311 JOURNALISM II. A continuation of the newswriting principles presented in English 307, as applied to specialized news situations. Prerequisites: Journalism I or equivalent news-writing ability. (3 crs.)
- ENG 312 JOURNALISM III. An advanced study of the roles of editor and special staff assignment, with emphasis on editing copy, laying out pages, and understanding basic typography and the responsibility of production. Prerequisite: Journalism I or equivalent news writing ability. Journalism II recommended before taking this course. (3 crs.)
- ENG 351 PUBLISHING THE MAGAZINE. Students in this course will publish a biannual, regional magazine. They will solicit contributors, finance the magazine through advertising, market it through a state wide network, establish editorial policy, and, if need be, write such materials as are necessary to produce a top quality magazine. (3 crs.)
- ENG 352 STUDIES IN WRITING. The intent is to develop awareness of the modern, critical approaches to literature, e.g., the mimetic, expressive, objective, and affective. Through analysis of select critical essays and works of literature, the student will apply and evaluate critical theories, ultimately identify and even predict fashion in criticism. (3 crs.)
- ENG 419 INTERNSHIP IN PROFESSIONAL WRITING. This course introduces the student to the competitive world of professional writing. If the student satisfies minimum requirements, he and a cooperative institution conclude a formal agreement whereby the student works at a job and simultaneously receives college credit. (All details of the course are to be worked out with the Director of Professional Writing. Credits vary according to assignment.)
- ENG 430 ADAPTATION OF LITERARY MATERIALS. The purpose of this course is to teach the student to adapt literature to the mechanical demands of television, radio, theater, and film. While remaining faithful to an author's intent, the student must adapt one short piece of literature and one major, long piece to each of the following: radio, television, theater, and film. (3 crs.)

- ENG 435 ARTICLE WRITING. In a broad way this course deals with the styles and techniques of article writing. The student learns the editorial demands of numerous magazines, and demonstrates his versatility and writing ability by tailoring his work to the demands. The course, in addition, promotes astuteness by showing how to illustrate, "package," and market a special kind of writing. (3 crs.)
- ENG 437 ADVERTISING. This course lets the student sample advertising by having him learn marketing theories, behavior patterns, and techniques of advertising campaigns. He will learn copywriting, layout, and production of advertising through working for an actual client. (3 crs.)
- ENG 496 SEMINAR IN WRITING. (3 crs.)

LITERATURE

- LIT 136 (Deleted)
- LIT 145 (Deleted)
- LIT 156 (Deleted)
- LIT 158 (Deleted)
- LIT 165 (Deleted)
- LIT 174 MAN AND MACHINE IN LITERATURE. A discussion of the profound impact of technology on contemporary life through developments in industry, the media, warfare, transportation, medicine, and education. Man and his reactions to the machine are examined through their manifestation in his literature. (3 crs.)

ENVIRONMENTAL STUDIES

- XES 200 (Deleted)
- XES 259 (Deleted)
- XES 459 ENVIRONMENTAL RESOURCE PROBLEMS. (3 crs.)
- XES 497 ENVIRONMENTAL EDUCATION WORKSHOP. An interdisciplinary summer program designed to prepare the public school teacher for teaching environmental education. This workshop considers all aspects of the relationship of man and his institutions to the environment. It also has a large "how to do" component. (VC)

GEOGRAPHY

- GEO 210 URBAN GEOGRAPHY. An investigation of cities in selected regions. Topics investigated and analyzed about cities include their classification, location, distribution, function, growth, types, and patterns of land use. Emphasis toward urban planning is incorporated. (3 crs.)
- GEO 217 DEMOGRAPHIC ANALYSIS. This course deals with demographic processes. The determinants and consequences of population trends. Emphasis is placed on distribution patterns and environmental ramifications. (3 crs.)
- GEO 220 GEOGRAPHY OF THE UNITED STATES AND PENNSYLVANIA. The physiography, climate, vegetation, population, land utilization, production, and trade of the various regions of the United States and the Commonwealth of Pennsylvania. (3 crs.)
- GEO 275 CONTEMPORARY GEOGRAPHIC PROBLEMS. Various physically and human-oriented courses based on the application of geographic techniques and concepts to selected problems of spatial interaction. Specific course topics and course numbers are available at each registration. (3 crs.)
- GEO 337 GEOGRAPHY OF AFRICA. A regional study of Africa, showing the social and economic development of these lands in relation to their physical environment. The importance of Africa to the world, and the effect thereon of emergent nationalism in an Africa torn by strife are studied. (3 crs.)
- GEO 340 HISTORICAL GEOGRAPHY. A study of the interrelationships between the natural environment and the historical development of the United States. (3 crs.)
- GEO 345 POLITICAL GEOGRAPHY. A political geography giving attention to the problems of State, internal and external, as influenced by the human and natural resources. (3 crs.)
- GEO 370 MAP INTERPRETATION. A non-technical laboratory course designed to develop competence in map use and evaluation. Interpretation of cartograms and graphs along with the theory of map construction and mapping techniques is included. (3 crs.)

GREEK

- GRE 203 INTERMEDIATE GREEK I. A continuation of the study of grammar; selections from Plato's Dialogues and the Apology will be read; composition from Greek into English and English into Greek with translations from Plato. (3 crs.)
- GRE 204 INTERMEDIATE GREEK II. A continuation of the study of grammar; selections from Homer's Iliad and translations from Homer from the Greek into English and English into Greek. (3 crs.)

HISTORY

- HIS 112 MAJOR WORLD CIVILIZATIONS IN TRANSITION. Significant factors continuing to influence the direction of change among the world's cultural areas: Industrialization and urban conflict; the democratic revolution and the rise of charismatic leaders from Napoleon to Hitler; changing life styles after World War II; the family; the workplace; values. (3 crs.)
- HIS 147 HISTORY OF THE MIDDLE EAST. A history of the peoples of the region emphasizing the 20th Century interplay of cultural changes with traditional ways; Islam and modernization; Soviet-American rivalry and the politics of oil; the Arab-Israeli conflict; Arab nationalism: its leaders; the role of terrorism. (3 crs.)
- HIS 208 THE NEW NATION, 1789-1816. Using national political developments as the organizational framework, this course will consider the changes (economic, social, political) of the first quarter-century under the Constitution. (3 crs.)
- HIS 215 THE EXPANSION OF AMERICAN FOREIGN POLICY. The emergence of modern American foreign policy and the factors that have influenced its operation in the 20th Century: the interplay of military strategy and the conduct of foreign relations; the role of an expanding intelligence activity since World War II; global economic problems; modern revolutionary movements; the scientific revolution. (3 crs.)
- HIS 218 HISTORY OF SPORT IN AMERICA. Presents sport as a pervasive facet of our popular culture, as a social institution, as an arena of human activity, as drama, even "spectacle." The course emphasizes the history of sport as a study of cultural values and value conflict, and also examines the relationship of sport to social change throughout American history. It investigates, among other things, the literature of sport, the economics of sport, and the influence of modern sport on our language, politics, religion, and education. It also looks at sport as amusing anecdote, illuminating incident, and even tremendous trifle. (3 crs.)
- HIS 220 U. S. MILITARY HISTORY. The development of America's military strategy and the growth of the U. S. military establishment: principal campaigns and battles; the role of the armed forces as a social and political institution from the revolution to the post-Vietnam Era. Emphasis is given to 20th Century strategy and related policy problems. (3 crs.)
- HIS 234 URBAN PLANNING IN HISTORICAL PERSPECTIVE. The course examines the planning implications of urbanization. It looks at the early city planning of the pre-industrial era, and traces the efforts of city planners and developers to make the city more attractive and liveable in various periods of urban growth. The course discusses social as well as physical planning, and attempts to relate both to the process of urbanization. (3 crs.)
- HIS 240 HISTORY OF THE COLD WAR. The origins and continuance of Soviet-American rivalry since World War II; confrontation in Europe; NATO; the Warsaw Pact; the growing nuclear arsenal; regional conflict in Africa, Latin America and Asia; the Congo, Angola, Cuba, Iran, China, Vietnam; the politics and leadership of both nations; the emergence of Russia as a global power. (3 crs.)

- HIS 255 GENEALOGY AND LOCAL HISTORY. Introduces students to the location, the evaluation, and the significance of local history by using the problem solving and genealogical approach to learning. Specific topics will be analyzed in order to get to know first hand the importance of local and family history at the "grass roots" level. Topics which may be considered are borough politics and economics, business and industry in the "Valley," as well as trade, communication, transportation, recreation, education, the arts and ethnic studies. (3 crs.)
- HIS 280 SCIENCE, TECHNOLOGY AND POLICY. The increasing role of science and technology in shaping American society in the 20th Century; the influence of scientists in shaping national policy during and since World War II; the growth of the military-industrial complex; policy conflicts over atomic power and nuclear weapons; the environment and the quality of life; scientists as a special interest group with values and political power. (3 crs.)
- HIS 296 THE AMERICAN REVOLUTION, 1763-1789. To introduce students to the period of transition of America from an English colony to nationhood. (3 crs.)
- HIS 336 AMERICAN URBAN ELITES. The course examines the dynamics of the urban policy process through a study of the historical evolution of American urban elites in the 20th Century. The course emphasizes the changing urban decision making structure within the framework of the contemporary urban crisis: the new Black leaders; the "old" aristocracy vs the "new" professionals; the role of the military elites, scientists and corporate elites. (3 crs.)
- HIS 337 ANTEBELLUM REFORM. U. S. Reform and Reformers, 1830-1860. Movements to regulate or prohibit "demon rum", prostitution, slavery, and war. Movements for free education, women's rights; care of blind, deaf, insane; prison reform and Utopian communities. (3 crs.)
- HIS 340 POLITICAL HISTORY OF U. S. The course is a survey of the major developments of the political party system in the United States from a chronological perspective. These include its uniqueness, trends over time, voter participation, state and regional politics, and the impact of modern political campaign techniques. (3 crs.)
- HIS 350 ADOLPH HITLER. An analysis of the philosophical and psychological elements that led to the rise of National Socialism, and its impact upon the western world. (3 crs.)
- HIS 495 SEMINAR IN U.S. HISTORY. A study of American historians and their writings. Emphasis is on the changing interpretations of major topics in American history. (3 crs.)

MATHEMATICS

- MAT 098 BASIC MATHEMATICS. This course is designed to cover the more important aspects of arithmetic and elementary algebra. This course cannot be used as a Natural Science elective. (3 crs.)

- + MAT 101 COLLEGE ALGEBRA. Lecture course covering usual algebra topics designed for terminal students, as well as, for majors in natural and social sciences. Prerequisites: MAT 100 or two years high school mathematics. (3 crs.)
- + MAT 102 COLLEGE TRIGONOMETRY. Polar coordinates, identities useful in integration techniques, solving trigonometric equations, functions and inverse functions. Prerequisites: MAT 101; the student should have an adequate background in algebra and some plane geometry would be desirable. (3 crs.)
- + MAT 103 PRE CALCULUS. Fundamental notions (lines, segments, slopes, angle between lines, graph and equations), conics, simplification by translation and rotation, algebraic and transcendental curves, Polar coordinates, parametric equations, three-dimensional analytic geometry. Prerequisites: high school algebra, trigonometry, and plane geometry desirable. (3 crs.)
- + MAT 106 TECHNICAL MATHEMATICS I. Designed to prepare the student for further study in technological fields. Review of basic arithmetic operations, introduction to exponents and radicals, introduction to algebra, and an introduction to linear equations, functions, and graphs. Prerequisites: One year high school algebra. (3 crs.)
- + MAT 107 TECHNICAL MATHEMATICS II. A continuation of Tech Math I with added emphasis on practical mathematics and the application of mathematics in business and industry rather than on abstract concepts of mathematics. Prerequisites: MAT 106 or MAT 101. (3 crs.)
- MAT 111 CALCULUS I. Introduction to analytic geometry. Prerequisites: MAT 103 or 4 years high school mathematics. (3 crs.)
- MAT 112 CALCULUS II. A continuation of Calculus I. Prerequisites: MAT 111. (3 crs.)
- MAT 205 FIELD WORK. Except for lectures presenting the theory, the course will be conducted on a laboratory basis. Students will be given the opportunity to operate and attain some degree of proficiency in the use of measuring instruments. Projects utilizing the sextant, transit, angle mirror, plane table, alidade, hypsometer, clinometer, stadia rod will be in order. Students will be encouraged to make some of the simple instruments. Prerequisites: MAT 101, MAT 102 or 3 years high school mathematics. (3 crs.)
- MAT 225 BUSINESS STATISTICS. Statistical techniques relevant to business applications are covered. Primary emphasis is placed upon identifying the proper statistical methods to use in a particular situation and the proper presentation and interpretation of results. The student will also be shown how to use various government sources of statistics that are useful in business. (Topics covered include: measures of central tendency and variation, correlation, regression, time series, index numbers, seasonal variation.) (3 crs.)

- MAT 235 DISCRETE MATHEMATICS.** An introduction to abstract mathematical structures with special emphasis on theories and methods which are relevant to Computer Science. Topics include an introduction to formal systems and techniques of proofs; combinational versus relational structures; graphs and directed graphs; Boolean Algebras; abstract languages and machines. Prerequisites: CSC 105 or CSC 121 or equivalent high-level computer language. (3 crs.)
- MAT 253 BASIC CALCULUS.** The techniques of differentiation and integration are covered without consideration of the theoretical topics such as limits and continuity. Applications in Business and Biological Science are considered. Prerequisites: MAT 101 or MAT 106, MAT 102 or MAT 107. (3 crs.)
- MAT 401 ADVANCED CALCULUS I.** To prepare students for graduate school by presenting an introductory course in mathematical analysis. To better acquaint the student with rigorous methods of mathematical proofs, and to stress the importance of definitions. Prerequisites: MAT 124. (3 crs.)
- MAT 402 ADVANCED CALCULUS II.** A continuation of Advanced Calculus I presenting an introductory course in analysis. Prerequisites: MAT 401. (3 crs.)
- MAT 495 SEMINAR IN MATHEMATICS.** Topics in this course are chosen jointly by the instructor and the student or students involved. Prerequisite: Approval of instructor. (1 to 3 crs.)

MUSIC

- +MUS 111 MUSIC IN HUMAN SERVICES I.** A preparatory course which presents the basics of music, theory, appreciation, accompaniment techniques, choral techniques and repertoire and recreational music activities through creative projects which develop and formulate positive ways to meet the needs of the clients in various agencies, institutions and organizations. (3 crs.)
- +MUS 112 MUSIC IN HUMAN SERVICES II.** A continuation and refinement of the materials and techniques presented in Human Services I. The student's background will be expanded to include additional rhythmic experiences, and recreational music activities. Creative projects will be used to develop positive ways to meet the needs of clients in various agencies, institutions, and organizations. Prerequisite: MUS 111. (3 crs.)

PHILOSOPHY

- PHI 204 WORLD RELIGIONS I - ORIENTAL.** A study of Hinduism, Jainism, Sikhism, Taoism, Confucianism, and Shintoism. It also follows the rise of Buddhism in India and its spread and development in China, Korea, and Japan. (3 crs.)
- PHI 205 WORLD RELIGIONS II - WESTERN.** A study of the growth and development of Zoroastrianism, Judaism, Christianity, and Islam. Also focuses attention on the ancient religions of Egypt, Babylonia, Greece, and Rome. (3 crs.)
- PHI 211 FORMAL LOGIC I.** Introduces the student to the semantics of truth-functional and first-order languages, and also to proof theories for such languages. (3 crs.)

- PHI 231 PHILOSOPHY OF RELIGION - B. Considers the nature of religion, speculations and arguments on the nature and existence of God, the possibility of religious knowledge, claims to religious experience and revelation, the problem of evil, the belief in immortality, and the meaningfulness of religious language. (3 crs.)
- PHI 312 FORMAL LOGIC II. - C Continues Formal Logic I, with emphasis on the meta-theory of truth-functional and first-order languages. It also considers selected topics in the philosophy of logic and the philosophy of mathematics. Prerequisite: PHI 211. (3 crs.)
- PHI 335 AESTHETIC THEORY - B. Examines the nature and basis of criticism in the fine arts and literature--the nature and function of art, aesthetic standards, the concept of beauty, artistic creativity, and meaning and truth in literature and the arts. (3 crs.)

PHYSICAL SCIENCE

- PHS 111 MAN AND HIS PHYSICAL WORLD I. Presented in a two module approach: The first module (Reaction and Reason) focuses on basic concepts and skills from the physical sciences. A second module (The Delicate Balance) reinforces and extends these concepts and skills by examining some of the environmental problems and issues we face today. (5 crs.)
- PHS 135 CHEMISTRY OF MATERIALS. A general education course without pre-requisites designed with a slant toward graphic arts. The content includes basic chemistry background, photographic chemistry and solution chemistry needed to understand graphic arts processes. (5 crs.)

POLISH

- + POL 101 POLISH I. Classroom use of audio-lingual methods. Students must provide cassette or tape players and blank tapes. Students with a grade of B or better may continue their study through Polish 469. (3 crs.)
- + POL 102 POLISH II. A continuation of Spoken Polish 101. (3 crs.)

POLITICAL SCIENCE

- + POS 203 THE POLITICS OF WELFARE. Welfare policy and administration in the United States on federal, state, and local levels, with some cross-national comparative analyses. (3 crs.)
- POS 218 POLITICAL PARTIES. This course deals with the organization and operations of political parties in the United States. Careful attention is given to the methods used by parties in nominating candidates and conducting campaigns, and to the significance of pressure groups, public opinion, and the electorate in our political life. Prerequisite: Pol. Sci. 105. (3 crs.)
- POS 227 NATIONALITY PROBLEMS OF EASTERN EUROPE. Integrative and disintegrative forces in multi-ethnic Eastern Europe and the Soviet Union. Particular attention is paid to the influence of nationalism on political structures and policies and to its effect on communist intra-bloc relations. (3 crs.)

- POS 235 STATE AND LOCAL GOVERNMENT. A treatment of the organization, powers, functions, and problems of state and local government units. Emphasis is placed on the growing complexity of relationships among the various levels of government as a result of technological developments and the growth of metropolitan areas. It is suggested that the student have some knowledge of the American federal system. (3 crs.)
- POS 236 INTERNATIONAL RELATIONS. The background of international politics since the first World War, emphasizing successes and failures of the League of Nations, the rise of totalitarianism and World War II. Major topics include: the state in global politics, the international system, international tensions, Phases I, II and III of Cold War, third world tensions, power patterns in world politics and conflict management in international politics. (3 crs.)
- POS 237 UNITED NATIONS SYSTEMS. An analysis and evaluation of the United Nations and other international organizations and consideration of some of the theoretical concepts and practical problems involved. Prerequisite: POS 100. (3 crs.)
- POS 250 CONSTITUTIONAL LAW. A study of the major provisions of the American Constitution and the growth of American Constitutional Law based on analysis and discussion of leading judicial decisions. Prerequisites: Pol. Sci. 100 and 105. (3 crs.)
- POS 270 POLITICS OF THE DEVELOPING AREAS. A systematic study of the origin and rise of Anti-Colonialism. The course is a critical investigation of the most basic problems and the most important political and constitutional developments and governmental systems of new independent states; the struggle for influence among great powers and the increasing native demands for national self-determination in the remaining colonial countries. Prerequisite: POS 100. (3 crs.)
- POS 280 POLITICS AND GOVERNMENT IN THE SOVIET UNION. Concerned with the background of the Bolshevik Revolution and the subsequent development of political institutions and processes. Considerable attention will be paid also to the role of the Party and its impact on the various sectors of Soviet society. Prerequisite: POS 100. (3 crs.)
- POS 305 20TH CENTURY PAN-MOVEMENTS. A critical investigation of the most basic obstacles in promoting economic, social, political and religious cooperation among nations of the same origin, region, religion, continent, etc. to meet and resolve their common problems. (3 crs.)
- POS 306 AMERICAN LEGISLATIVE PROCESSES. An introduction to the American Legislative Politics in Congress and in the State Legislatures. The student is exposed to the role-playing of the legislators, rules of the game, structures, policy outputs, and the like can be brought together, and general patterns of behavior can be observed and explained. (3 crs.)
- POS 307 REVOLUTION. A study of revolution as a phenomenon of violent political change involving a fundamental and total reordering of the power structure. The approach will be theoretical and empirical, referring to the many past and current revolutionary episodes. (3 crs.)

- POS 315 CIVIL LIBERTIES. A study of the development and meaning of the rights and liberties guaranteed to persons under the Constitution of the U. S. Special emphasis is placed on the antecedents of and the adoption of the Bill of Rights, and a description of the court structure through which the meaning of civil liberties is determined in specific situations. (3 crs.)
- POS 316 THE AMERICAN LEGAL SYSTEM. This course describes, explains, and analyzes the basic components of law in the U. S. and to identify some of its more serious problems. To provide students with at least an initial understanding of the law and the courts. (3 crs.)
- POS 495 SEMINAR IN POLITICAL SCIENCE. Selected studies in the literature, philosophy, techniques, and research of political science. Prerequisite: Permission of the instructor. (3 crs.)

PSYCHOLOGY

- PSY 210 PSYCHOLOGY OF SEX ROLES. Presents theories and current research on the psychological natures of women and men and their roles in society. The aim of the course is to examine assumptions critically about women held by the discipline of psychology and by our culture as a whole, and to test these assumptions in the perspective of current research and individual experience. It includes the following perspectives: biological, psycho-analytic, learning, sociological and evolutionary. This course is open to both men and women. Prerequisite: PSY 100 or its equivalent. (3 crs.)
- PSY 355 PSYCHOLOGY OF SOCIAL CONTROL. The course will consist of analyses of fictionalized descriptions of attempts to control human behavior from the viewpoint of contemporary behavioral science. Such analyses will reveal the degree to which the procedures and outcomes described in fictional accounts are consistent with what is known or assumed to be true about behavior and its causes. Prerequisite: PSY 100. (3 crs.)

SOCIAL SCIENCE

- + SOS 100 INTRODUCTION TO SOCIAL SCIENCE. An introduction to the broad field of human behavioral studies, with concern for the changing and contrasting patterns of life developed by the species. (3 crs.)
- + SOS 101 WORLD CULTURE. A survey of the evolution of man's culture--his governmental, economic, social, religious, intellectual, and aesthetic activities from ancient times to the beginning of the modern world. (3 crs.)
- SOS 107 UNIVERSAL CULTURE PROBLEMS. The problem of Technological Change--in Ancient Egypt and in Modern China; problem of social organization--in industrial Western Nations and in U.S.S.R.; problem of allocation of authority--in Ancient Greece and in Nazi Germany; and problems of religion--in Medieval Europe and in the Middle East today.
- SOS 145 CHARISMATIC LEADERS. A discussion-centered course in which students develop a mode of inquiry to investigate five charismatic leaders: Gandhi, Joan of Arc, Martin Luther King, John Kennedy, and Che Guevara. (3 crs.)

- + SOS 150 MODERN LIBERATION MOVEMENTS. Covers the liberation of European Jews, liberation of American workers, liberation of American Blacks, liberation of women, and the liberation of Colonial Peoples: Cuba. (3 crs.)
- SOS 155 CULTURAL VIEWS OF WOMEN. A study of women in five different cultures: Mead's Primitive Societies, India, Russia, Victorian America, and Modern America. (3 crs.)
- SOS 275 RESEARCH METHODS IN SOCIAL SCIENCES. (3 crs.)

SOCIAL WORK

- SOW 215 HUMAN GROWTH AND BEHAVIOR I. The course emphasis is on differences as opposed to the approach of looking at the normalcy of behavior. The sequence illustrates how diverse groups affect human development throughout the individual's life cycle. Prerequisites: SOW 150 and SOC 100 (3 crs.)
- SOW 216 HUMAN GROWTH AND BEHAVIOR II. A continuation of Human Growth and Behavior I. Prerequisite: SOW 215. (3 crs.)
- SOW 255 SOCIAL CASEWORK I. Designed for people who work with other people. It assumes that the tasks that a human service worker may be asked to perform vary from agency to agency, there are, nevertheless, certain attitudes, knowledge, and skills in all such work. It further assumes that as these attitudes, knowledge, and skills become more acutely developed, that self-awareness will develop with the subsequent development of a "professionalized self." Prerequisites: SOW 150 and SOC 100. (3 crs.)
- SOW 270 CHILD WELFARE. Designed to focus on the services which are peculiar to a program in a Child Welfare Agency. Casework with children, natural parents and substitute parents will be discussed. Separation theories will be presented and related to the understanding of this experience for children. Some historical as well as current practice in homemaker service, day care, foster care (foster home institutions, group homes, and residential treatment centers) and adoption will be presented. Case material will be used to focus the discussion of the caseworker's role in the above services. Prerequisite: SOW 150. (3 crs.)
- SOW 290 SOCIAL WELFARE AS A SOCIAL INSTITUTION. This course utilizes a historical approach to social welfare as an institution in order to focus on the process of institutionalization in which behavior that is unanticipated and unpredictable evolves into that which is regular, patterned and recurring. The historical approach also enables students to make some correlation between the values, beliefs and norms emanating from social welfare in 16th, 18th and 19th Century Europe and concepts, attitudes and philosophies associated with social welfare in 20th Century America. Prerequisites: PSY 100 and SOW 150. (3 crs.)
- SOW 346 SOCIAL WORK METHODS II: GROUP WORK. History of social group work, the social work values, the assessment of goals and objectives in the group, the principles of social group work, and the various models of group therapy. Prerequisites: SOW 150 and 255. (3 crs.)

- SOW 347 SOCIAL WORK METHODS III: COMMUNITY ORGANIZATION. A comprehensive review and descriptive history of the evolution of community organization methodologies with emphasis upon their generic social work qualities. Concern will be devoted to both the character of the process and tasks associated therewith, as well as the role community organization plays in social reform in the U. S. The course material will relate to collective social behavior, social institutions, the politics of social services delivery, community problem-solving, and social planning. Prerequisite: SOW 346. (3 crs.)
- SOW 365 DELIVERY OF SERVICES. This course deals with macro practice techniques. Theoretical underpinnings are examined from a social systems perspective. The primary value stressed is that the student must become sensitive to consumers and to their concerns. These qualities are a prerequisite to becoming a professional social worker. Such a goal cannot be attained simply by talking about consumers, but that consumerism must be experienced. Therefore, the student is required to become involved in a consumer concern, which will be agreed upon by the student and the instructor. The student must present a report describing his experience and how it relates to the course. Prerequisite: SOW 346. (3 crs.)
- SOW 370 SOCIAL CHANGE. This is a continuation of SOW 365, with emphasis on macro, generalists techniques, drawn from social system theory. It is stressed that societal representatives will effect needed changes only if the human service worker initiates change in a fashion that provides adequate feedback to decision-makers. It is assumed that decision-makers effect needed societal changes only if these changes in some way make the constituent and the decision-maker more satisfied. Prerequisites: SOW 346 and 365. (3 crs.)

SOCIOLOGY

- SOC 220 THE FAMILY. This course is to familiarize the student with the family as a social institution in terms of its social and cultural conditioning. Prerequisite: SOC 100. (3 crs.)
- SOC 225 SOCIOLOGY OF AGING. Theoretical issues of aging, research, and the methodological traditions involved in the study of the human aging process. Special emphasis is placed upon the interaction of pertinent biological and sociological variables related to the processes of work, retirement, leisure, institutionalization, and death. Prerequisite: SOC 100. (3 crs.)
- SOC 260 CRIME. Types of criminal behavior, the epidemiology of crime in the U. S., the social basis of law, and major etiological forces responsible for law-breaking. General systems theory is the basic theoretical perspective used in this course. Prerequisite: SOC 100. (3 crs.)
- SOC 305 SYMBOLIC INTERACTIONISM. This course presents the sociological contribution to the field: psychoanalytic theory, Gestalt psychology, and Neo-behaviorism. Prerequisite: SOC 100. (3 crs.)
- SOC 370 SOCIOLOGICAL THEORY BUILDING. This course provides some logical basis for determining the relative merits of alternative assumptions concerning matters of fact or social policy. Prerequisite: SOC 100. (3 crs.)

SPANISH

- SPN 300 **ADVANCED SPANISH GRAMMAR.** An intensive grammar review and a detailed study of the Spanish language and "shades of difference" in the meanings of words and sentences as used in oral and written expressions. (3 crs.)
- SPN 333 **HISTORY OF THE SPANISH LANGUAGE.** A history of the development of modern Spanish beginning with Vulgar Latin as used in the Iberian peninsula, how it changed under political and cultural influences with attention to comparison and contrast with changes in the other Romance languages. (3 crs.)

SPEECH COMMUNICATION

- + SPE 101 **ORAL COMMUNICATION.** Developing a listener's and a speaker's understanding of, recognition of, and capacity to demonstrate the methods and responsibilities of oral communicators in a free society. (3 crs.)
- + SPE 103 **ORAL COMMUNICATION - MANAGEMENT.** Developing and improving communication skills that relate to the students' potential role within organizations, businesses, or industries. (3 crs.)
- + SPE 105 **SURVEY OF RADIO, TELEVISION, AND FILM.** Introduction to communication in radio, television, and film; effects of mass media on the individual; role of mass media in news, documentaries, commercial, and entertainment broadcasting. (3 crs.)
- + SPE 106 **INTRODUCTION TO PARLIAMENTARY PROCEDURE.** The basic philosophy and rules of parliamentary procedure, with emphasis on participation in problem solving. (1 cr.)
- + SPE 107 **FUNDAMENTALS OF DISCUSSION.** Introduction to group forms, techniques, participation, and chairmanship in informal and formal discussions of contemporary issues. (3 crs.)
- + SPE 108 **INTRODUCTION TO COMMUNICATION THEORY.** Nature, origin, purposes, and functions of verbal and nonverbal communications. (3 crs.)
- + SPE 111 **INTRODUCTION TO ORAL INTERPRETATION.** Techniques of discovering denotative and connotative meanings in literature; audible and visible interpretation. (3 crs.)
- + SPE 121 **VOICE AND ARTICULATION.** Introduction to phonetics and to voice production and control, with exercises to develop adequate quality, loudness, pitch, rate, and articulation. (3 crs.)
- + SPE 192 **FORENSIC WORKSHOP.** Practical experience in inter-collegiate debate and competitive speaking. (1 cr.)
- + SPE 193 **RADIO AND TELEVISION WORKSHOP.** Practice in using equipment; projects in radio and television. (1 crs.)
- + SPE 194 **ORAL INTERPRETATION WORKSHOP.** Practical experience in the oral reading of various types of literature for presentation on and off campus. (1 cr.)

- SPE 212 **ADVANCED ORAL INTERPRETATION.** Detailed analysis and evaluation of literary forms. Preparation and presentation of suitable programs. Prerequisite: SPE 111. (3 crs.)
- SPE 220 **PERSUASION.** Methods of changing attitudes and behaviors through speech communication; analysis of individuals, audiences, occasions, and subjects for persuasive appeals. Study of logical and psychological arrangements and the ethics of persuading and being persuaded. Preparation of persuasive speeches. Prerequisites: SPE 101, 107, or consent of instructor. (3 crs.)
- SPE 230 **ARGUMENTATION AND DEBATE.** Logical advocacy; briefing and supporting logically-adequate cases advocating propositions of policy; negative positions, exposing fallacious evidence and reasoning; refutation and rebuttal. Applications to inter-collegiate and mass media topics. Prerequisites: SPE 101, 107, or consent of instructor. (3 crs.)
- SPE 231 **GROUP DISCUSSION.** Using a rational sequence to derive group approved solutions to group and public problems. Techniques of involvement, creativity, conflict resolution, morale building, and decision making. Prerequisites: SPE 107, or consent of instructor. (3 crs.)
- SPE 240 **INTRODUCTION TO TELEVISION PRODUCTION.** Fundamentals of television production, including the use of equipment. Maintaining logs and records and scheduling of programs and commercials. Directing, planning, and evaluating programs. (3 crs.)
- SPE 245 **INTRODUCTION TO RADIO PRODUCTION.** Fundamentals of radio production including study of various types of broadcast equipment, different radio formats and their rationales, various regulatory agencies which affect radio broadcasting, maintenance of logs and records, and evaluating, planning, and directing programs. (3 crs.)
- SPE 246 **RADIO AND TELEVISION ANNOUNCING.** Theories and practice of gathering, evaluating, writing, and delivering newscasts, sports, commercials, interviews, editorials, and documentaries for radio and television audiences. Prerequisites: SPE 240 or consent of instructor. (3 crs.)
- SPE 260 **FREEDOM OF SPEECH.** History of free speech in the world, with special attention to its development in the U. S.; legal decisions in contemporary attacks upon and attempts to expand the principle of freedom of speech. (3 crs.)
- SPE 270 **APPRECIATION OF TELEVISION.** Screening and analysis of exceptional television and film productions. Examination of media presentations for understanding of their goals, accomplishments, and shortcomings. The application of critical standards for the purpose of evaluation of instructive, persuasive, and entertainment values of selected screenings. Problems related to creative use of media are explored in some detail. Recommendations are given for constructive use of media as an educational correlative. (3 crs.)
- SPE 293 **RADIO AND TELEVISION WORKSHOP.** Practice in using equipment; projects in radio and television. Prerequisite: SPE 193. (1 cr.)
- SPE 294 **ORAL INTERPRETATION WORKSHOP.** Practical experience in the oral reading of various types of literature for presentation on and off campus. Prerequisite: SPE 194. (1 cr.)

- SPE 305 ORAL DECISION PROCESSES. Cooperative planning, individual research and reporting, group discussion, debate, and parliamentary procedure in rational group decision processes. Prerequisites: Composition and Public Speaking. (3 crs.)
- SPE 307 INTERPRETATION OF PROSE LITERATURE. Analysis and oral presentation of prose literature. Prerequisite: SPE 212 or consent of instructor. (2 crs.)
- SPE 308 INTERPRETATION OF POETRY. Analysis and oral presentation of poetry. Prerequisite: SPE 212 or consent of instructor. (2 crs.)
- SPE 315 LANGUAGE AND BEHAVIOR. Developing language habits that improve sensory and symbolic perception, inference-making, evaluation, and the resolving of conflicts. Prerequisite: SPE 115 or consent of instructor. (3 crs.)
- SPE 316 INTERPRETATION OF DRAMA. Analysis and oral presentation of drama. Prerequisite: SPE 212 or consent of instructor. (2 crs.)
- SPE 317 CONTEMPORARY AMERICAN PUBLIC ADDRESS. Study of selected United States speakers and speeches of major significance in national issues since 1960. (2 crs.)
- SPE 330 RADIO AND TELEVISION WRITING: NEWS AND COMMERCIAL. The writing of news, commentary, documentary, educational, and commercial scripts for radio and television. Prerequisite: SPE 240 or 245 or consent of instructor. (3 crs.)
- SPE 335 RADIO AND TELEVISION WRITING: THE DRAMATIC SCRIPT. Prepares dramatic scripts for radio or television from original or other sources; examination of series, comedy, serial, and drama. Prerequisite: SPE 240 or 245. (3 crs.)
- SPE 340 ADVANCED TELEVISION PRODUCTION. Further application and extension of practical and creative techniques and skills learned in earlier production course. Prerequisite: SPE 240. (3 crs.)
- SPE 355 BROADCAST MANAGEMENT. Development of administrative responsibilities concerned with media personnel, programming, budgeting, technical maintenance, and compliance to FCC regulations. (3 crs.)
- SPE 360 APPRECIATION OF FILM. Preparation for intelligent response to cinema. Discussion of the screen play, director, and actor. Critical evaluation of outstanding films of the past and present. (3 crs.)
- SPE 393 RADIO AND TELEVISION WORKSHOP. Practice in using equipment; projects in radio and television. Prerequisite: SPE 293. (1 cr.)
- SPE 394 ORAL INTERPRETATION WORKSHOP. Practical experience in the oral reading of various types of literature for presentation on and off campus. Prerequisite: SPE 294. (1 cr.)
- SPE 420 CONTEMPORARY WORLD ADDRESS. A study of the rhetoric of contemporary world leaders on current issues. (2 crs.)

- SPE 429 SPECIAL PROBLEMS IN SPEECH COMMUNICATION. Independent study and reporting of topics of interest to the student but not available to him in scheduled courses. Prerequisite: Consent of instructor and Dept. Chairman. (VC)
- SPE 440 PRODUCING AND DIRECTING FOR RADIO AND TELEVISION. Theory and practice of producing radio and television programs. Prerequisite: SPE 240 or 245 or consent of instructor. (3 crs.)
- SPE 445 RADIO AND TELEVISION IN A FREE SOCIETY. A study of the rights and obligations of the mass media producer, purveyor and audience. (3 crs.)
- SPE 460 SPEECH CRITICISM. A study of historical, experimental, and other methodologies in speech criticism and development of critical skills. Analysis of significant speeches and speakers. (3 crs.)

THEATRE

- + THE 098 COMMUNITY THEATRE WORKSHOP. For in-service high school students and teachers. Practical and intensive experience in production, rehearsal, and performance techniques useful for high school theatre programs. (3 crs.)

URBAN AFFAIRS

- + XUA 120 INTRODUCTION TO RECREATION SERVICES. A survey course designed to introduce the student to a variety of vocational opportunities in recreation. Field experience and individual study are emphasized. (4 crs.)
- + XUA 151 OUTDOOR RECREATION. The course consists of lecture and laboratory sections with emphasis on existing values, programs, trends and opportunities in outdoor recreation. Students will participate in hikes, outdoor cooking, and environmental education activities. (4 crs.)
- + XUA 173 COMMUNITY ACTION AND NEIGHBORHOOD GOVERNMENT. (3 crs.)
- XUA 203 URBAN AFFAIRS AND POLICY ANALYSIS. (3 crs.)
- + XUA 215 PLANNING AND PUBLIC MANAGEMENT. A survey of the policy system in urban affairs with a view to illuminating (a) the contexts and the institutional settings in which social policy decisions relevant to urban problems are made, and (b) the relevant influence of various factors on these decisions. (3 crs.)
- + XUA 217 POLITICAL ECONOMY. The application to issues in urban affairs of the analytic methods and principles common to planning law, politics, and economics. (3 crs.)
- + XUA 221 RECREATION AND SOCIALIZATION FOR THE ELDERLY. Designed to prepare the student of gerontology and/or recreation to provide meaningful leisure time activities for persons over fifty years of age. Its emphasis is upon preparing the student to guide the adult to plan and direct his own leisure life. The investigatory approach to the individualization and evaluation of programs will be stressed. Laboratory and field experiences are required. There will be a weekly one-hour lecture/discussion period and a two-hour laboratory period and/or a two-hour field experience. (3 crs.)
- + XUA 250 DATA ANALYSIS FOR PUBLIC DECISION. (3 crs.)

- + XUA 254 HOUSING AND HOUSING POLICY. Urban housing from the sociological, economic, and historical perspective. It deals with the nature of shelter, the elements and housing, and discuss such topics as housing and transportation, housing and the private sector, public housing, housing design, housing finance and slum creators. Main objective of the course will be to examine housing in the process of community building. (3 crs.)
- + XUA 264 ORGANIZATIONAL AND ADMINISTRATIVE BEHAVIOR. This course provides a survey of organizational and administrative behavior in the context of planning, policy development, purveyance, and implementation. In order to promote basic understanding of the various activities and processes involved, a number of concrete policy cases will be used as vehicles for discussion and illumination. (3 crs.)
- XUA 328 LEISURE LEARNING. Provides an overview of both leisure and recreation with emphasis placed upon the history, economics, education and the role of government and the private sector as they affect both leisure and recreation in the twentieth century. (3 crs.)
- XUA 335 RECREATION LEADERSHIP. Provides a study of leadership theory and practices as they relate to the administration, service and delivery of recreational programs. (3 crs.)
- XUA 344 PROGRAM EVALUATION AND PERFORMANCE ANALYSIS. Process of analyzing a number of plans or projects on programs with a view to searching out their comparative effectiveness in meeting public objectives. Evaluation of plans is an essential component of urban planning and management. Proper evaluations have considerable potential for furnishing a much better guide than presently exists for decisions on whether specific on-going programs should be retained, modified, expanded, or dropped. The evaluation process is also a great help in testing programs before large resource commitments are made. (3 crs.)
- XUA 345 WORKSHOP IN URBAN PLANNING. The planning workshop provides experience in applying academic skills to specific urban and regional problems, often for actual clients. Workshop participants analyze a real or hypothetical problem, develop and evaluate alternative approaches, and recommend courses of action. (3 crs.)
- XUA 350 RECREATION IN THE SCHOOLS. Provides an overview of the administration, supervision, implementation and evaluation of community-school recreational programs. (3 crs.)
- XUA 355 SCHOOL INTRAMURAL RECREATIONAL PROGRAMS. Presents an overview of the organization and administration of intramural activities. Laboratory sessions provide an opportunity to direct intramural events. (3 crs.)
- XUA 357 RECREATION FOR THE PHYSICALLY AND EMOTIONALLY DISABLED. Designed to assist students to develop personalized recreation programs for those who are "mainstreamed" into both public and private recreation programs. (3 crs.)
- XUA 420 URBAN AND REGIONAL MANAGEMENT (3 crs.)

THE SCHOOL OF CONTINUING EDUCATION

The School of Continuing Education was established in 1974 to relate the College to the needs of the surrounding communities. Each semester a new schedule of credit-free mini-courses, conferences, and workshops is offered. The subjects are varied and include skills and hobbies as well as academically-oriented topics. In addition, short courses and seminars are presented to professional groups such as local businessmen and government officials. Non-credit programs are open to all interested adults. Admission to the College is not required. Fees are nominal.

Extension courses and programs for college credit are also coordinated through the School of Continuing Education. Specific classes and their locations vary somewhat from semester to semester. For these courses, admission requirements and tuition charges are the same as those for other undergraduate students.

This School also coordinates the two-year associate degree programs offered by the College. Currently, four such programs are offered. They are: Administration and Management, Accounting, Early Childhood Education, and Computer Science Technology. The courses in these programs are drawn from the regularly taught college courses. Descriptions of these courses are found in the College Catalog under the appropriate department.

The A.S. in Administration & Management

The Department of Business and Economics offers this two-year associate degree (A.S.) to provide students with the basic instruction to an entry-level management position with business or industry. In addition, all of the credits earned in this program are transferable towards the four-year degree.

Career Possibilities in Administration and Management (A.S.)

1. General Management
2. Employee Relations
3. Government Administration
4. Sales
5. Purchasing
6. Business

General Studies: Required 9 credits

English Composition I
 Technical Mathematics I
 General Psychology

Free Electives: In this program, the student, along with his academic advisor, will choose ten credits of free elective courses. These credits must be taken outside of the area of concentration.

Restricted Electives: 6 courses chosen from the list below with the consent of the advisor

Accounting I	Cobol I
Accounting II	Money & Banking
Accounting III	Business Statistics
Federal Income Tax Accounting	Math of Finance I
Personnel Management	Investments
Collective Bargaining	Real Estate & Risk Management
Industrial Psychology	Business Law
Sales Management	Mathematical Economics
Principles of Production	Managerial Economics

Area of Concentration: Requirements leading to the Associate of Science Degree in Administration & Management

- Introduction to Business
- Elements of Economics or Microeconomics
- Microeconomics or Macroeconomics
- Accounting I
- Accounting II
- Principles of Management
- Principles of Marketing
- Financial Management
- Business Writing

The A.S. in Computer Science Technology

The Department of Mathematics and Computer Science offers this two-year associate degree (A.S.) to provide students with training in Computer Science. This high-quality program is career-oriented. All credits earned in this program are directly transferable to the four-year bachelors degree in mathematics and computer science.

General Studies

Humanities: Students must take two courses in the humanities. This includes courses from the following departments: English, Modern Foreign Languages and Cultures, Speech, and Theatre.

Natural Sciences: Students must take two courses in the natural sciences. These courses come from the following departments or areas: Biology, Chemistry, Geology, Earth Science, Mathematics and Computer Science, Physics, Physical Science.

Social Sciences: Students must take two social science courses. These courses come from the following departments or areas: Anthropology, Economics, Geography, History, Political Science, Psychology, Social Studies, Social Work, and Sociology.

Free Electives: Students must take at least seven credits of free electives. These will be chosen along with the academic advisor.

Area of Concentration: (39 credits)

MAT 106	Technical Math I	3 cr.
MAT 107	Technical Math II	3 cr.
MAT 225	Math of Finance I	3 cr.
MAT 253	Basic Calculus	3 cr.
MAT 215	Statistics	3 cr.
CSC 105	Basic Program Lang.	3 cr.
CSC 121	Computer Science I	3 cr.
CSC 222	Computer Science II	3 cr.
CSC 108	Cobol I	3 cr.
CSC 323	Assembler Language	3 cr.
CSC 216	Logic and Switching	3 cr.
	Theory of the Computer	
CSC 275	Computer Operations	3 cr.
	Computer Elective (with consent of advisor)	3 cr.

The A.S. in Early Childhood Education

The Department of Elementary Education offers this two-year associate degree (A.S.) to provide training in early childhood education. This program is particularly valuable for day care and head start aides.

Career Possibilities in Early Childhood Education

1. Day Care Aide
2. Head Start Aide
3. Nursery School Aide

General Studies: Required 9 credits

Oral Communications
 General Psychology
 Diagnostic and Remedial Techniques in Mathematics
 or
 Technical Mathematics I

General Studies Electives

Three credits each in the humanities, social sciences and natural sciences

Free Electives: In this program, the student, along with his academic advisor, will choose five credits of free elective courses.

Area of Concentration (required)

Professional Education: 11 cr.

EDU 100	Teaching in a Multi-cultural Society
PSY 110	Educational Psychology
PSY 205	Child Psychology
EDF 305	Intro to Ed. Media

Area of Concentration: 30 cr.

ECE 493	Development of the Pre-School Child	3 cr.
ECE 491	Fundamentals of Day Care Education	3 cr.
ECE 318	Comm. Arts for Early Childhood	3 cr.
ECE 316	The Child in His Social & Phys. Environ.	3 cr.
ECE 217	Music for Early Childhood	3 cr.
ECE 317	Science in Early Childhood	3 cr.
ECE 215	Art for Early Childhood	3 cr.
ECE 311	Children's Literature I	3 cr.
ECE 301	Reading Experiences in Early Childhood	3 cr.
ECE 315	Math Content in Early Childhood	3 cr.

The Department of Business and Economics offers this two-year associate degree (A.S.) to provide students with high quality training in accounting. In the career ladder concept, the College has designed the proposed program so that students may transfer into the

Career Possibilities:

1. Accounting
2. Purchasing
3. Bookkeeping
4. Business
5. Sales

General Studies:

Required:

English Composition I
 General Psychology
 Mathematics

Free Electives: In this program, the student, along with his academic advisor, will choose ten credits of free elective courses. These credits must be taken outside of the area of concentration.

Area of Concentration:

BUS 100 Intro to Business
 ECO 100 Elements of Economics or
 ECO 201 Microeconomics
 ECO 201 Microeconomics or
 ECO 202 Macroeconomics or
 ECO 104 Current Economics Issues
 BUS 111 Accounting I
 BUS 112 Accounting II
 BUS 201 Principles of Management
 BUS 321 Principles of Marketing
 BUS 332 Financial Management
 ENG 211 Business Writing

Accounting Electives: 9 cr. (3 courses)

(to be chosen with advisor's consent)

Restricted Electives: 3 courses

(to be chosen from list below with the consent of the advisor)

BUS 118	Federal Income Tax Accounting	BUS 361	Real Estate & Risk Management
BUS 351	Personnel Management	BUS 241	Business Law
BUS 355	Collective Bargaining	ECO 320	Mathematical Economics
PSY 326	Industrial Psychology	ECO 322	Managerial Economics
BUS 323	Sales Management		
GCT 475	Principles of Production		
CSC 108	Cobol I		
ECO 304	Money and Banking		
MAT 225	Business Statistics		
MAT 171	Math of Finance I		
BUS 335	Investments		

School of Education

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The following requirements in Elementary Education and the Early Childhood Curriculum were revised after the publication of the 1977-79 College Catalog.

ELEMENTARY EDUCATION

- A. General Education 60 credit hours
- Humanities (9 credit minimum)
 - Social Sciences (9 credit minimum)
 - Natural Sciences (9 credit minimum)
 - 3 credits from the following:
 - Teaching in a Multicultural Society
 - Impact of Technology in Society
 - Free electives (30 credits)

All other requirements in the Elementary Education Program remain unchanged. (Refer to page 184 of the 1977-79 College Catalog.)

EARLY CHILDHOOD

- A. General Education 60 credit hours
- Humanities (9 credit minimum)
 - Social Sciences (9 credit minimum)
 - Natural Sciences (9 credit minimum)
 - 3 credits from the following:
 - Teaching in a Multicultural Society
 - Impact of Technology in Society
 - Free electives (30 credits)

All other requirements in the Early Childhood Program remain unchanged. (Refer to page 184 of the 1977-79 College Catalog.)

The following requirements in the Secondary Education Curriculum were revised after the publication of the 1977-79 College Catalog.

THE SECONDARY EDUCATION CURRICULUM

- A. General Education 60 credit hours
- Humanities (9 credit minimum)
 - Social Sciences (9 credit minimum)
 - Natural Sciences (9 credit minimum)
 - 3 credits from the following:
 - Teaching in a Multicultural Society
 - Impact of Technology in Society
 - Free electives (30 credits)

All other requirements in the Secondary Education Curriculum remain unchanged. (Refer to pp. 189-196 of the 1977-79 College Catalog.)

The following requirements in Special Education - Mentally and/or Physically Handicapped Curriculum were revised after the publication of the 1977-79 College Catalog.

**SPECIAL EDUCATION - MENTALLY AND/OR
PHYSICALLY HANDICAPPED CURRICULUM**

- A. General Education 60 credit hours
- | | |
|------------------|--------------------|
| Humanities | (9 credit minimum) |
| Social Sciences | (9 credit minimum) |
| Natural Sciences | (9 credit minimum) |
- 3 credits from the following:
- Teaching in a Multicultural Society
 - Impact of Technology in Society
 - Free electives (30 credits)

B. Professional Education

Science in Elementary Grades was changed to an elective course.

The other course requirements remain unchanged.

SPEECH PATHOLOGY AND AUDIOLOGY

The following requirements in Speech Pathology and Audiology were revised.

- A. General Education 60 credit hours
- | | |
|------------------|--------------------|
| Humanities | (9 credit minimum) |
| Social Sciences | (9 credit minimum) |
| Natural Sciences | (9 credit minimum) |
- 3 credits from the following:
- Teaching in a Multicultural Society
 - Impact of Technology in Society
 - Free electives (30 credits)

The other course requirements remain unchanged.

The name of the Educational Foundations Department was changed to Educational Studies.

Two new endorsement programs have been initiated by the School of Education:

1. Environmental Education Endorsement Program
2. General Science Endorsement Program

ENVIRONMENTAL EDUCATION ENDORSEMENT PROGRAM

Environmental education should be a life-long process. It is a way of looking at life, fostering awareness of other life and of interrelationships, and learning to recognize the effects (both good and bad) man has on his physical and biological surroundings. The need for teachers to direct environmental programs and provide environmental teaching is pressing. The courses listed below are designed to develop an individual's ability to teach and/or direct the development of a school's environmental education program.

Each student will be expected to complete satisfactorily all requirements within the core courses listed below:

Man and His Environment	(3 credits)
Environmental Geology	(3 credits)
Environmental Chemistry	(3 credits)

In addition, each student will satisfactorily complete at least one course in each of the following areas listed below:

- A. Laboratory Science:
 - Ecosystems Ecology
 - Intro to Biology/Principles of Biology
 - General Geology or Physical Geology
 - Meteorology
 - Man and His Physical World
- B. Techniques and Procedures:
 - Environmental Education Workshop
 - Field Work in Mathematics
 - Plant Taxonomy
- C. Outdoor Activities:
 - Conservation of Biological Resources
 - Game and Habitat Management
 - Wildlife Techniques
 - (Also included in this section are all courses offered through the Marine Science Consortium, Wallops Island, Virginia.)
- D. Human Involvement:
 - Human Ecology
 - Contemporary Problems in Human Ecology

GENERAL SCIENCE ENDORSEMENT PROGRAM

The School of Education offers an endorsement program for a student seeking to be qualified as a teacher of General Science in a secondary school. In order to fulfill the requirements of this program, the student must complete twenty-seven (27) semester hours. The required courses are as follows:

General Biology I	(4 credits)
General Biology II	(4 credits)

General Chemistry I	(4 credits)
General Chemistry II	(4 credits)
General Physics I	(4 credits)
General Physics II	(4 credits)
Earth Science Elective	(3 credits)

Total: 27 credits

The School of Education offers an Associate Degree in Early Childhood Education.

EARLY CHILDHOOD ASSOCIATE DEGREE

The Department of Elementary Education offers a sixty-four (64) credit program which entitles the student to receive an Associate Degree in Early Childhood. The program qualifies the prospective student to be a center supervisor or head teacher in pre-school programs. The program is also designed to enable a student who completes it to obtain a Bachelor of Science Degree in Early Childhood after receiving an additional sixty-four credits.

A summary of the requirements for the Early Childhood Associate Degree is given below:

- | | |
|---|--------------|
| A. General Studies | (18 credits) |
| Humanities | (6 credits) |
| SPE 101 Oral Communications | (3 credits) |
| Social Science | (6 credits) |
| PSY 100 General Psychology | (3 credits) |
| Natural Science | (6 credits) |
| MAT 106 Technical Math I | (3 credits) |
| MAT 151 Diagnostic & Remedial
Techniques in Math | (3 credits) |
| B. Free electives | (5 credits) |
| C. Professional Education | (11 credits) |
| EDU 100 Teaching in a Multicultural Society | (3 credits) |
| PSY 110 Educational Psychology | (3 credits) |
| PSY 205 Child Psychology | (3 credits) |
| EDF 305 Intro to Ed. Media | (2 credits) |
| D. Area of Concentration | (30 credits) |
| ECE 493 Development of the Pre-School Child | (3 credits) |
| ECE 491 Fundamentals of Day Care Education | (3 credits) |
| ECE 318 Comm Arts for Early Childhood | (3 credits) |
| ECE 316 The Child in His Social & Phy Envir. | (3 credits) |
| ECE 217 Music for Early Childhood | (3 credits) |
| ECE 317 Science in Early Childhood | (3 credits) |
| ECE 215 Art for Early Childhood | (3 credits) |
| EDE 311 Children's Literature I | (3 credits) |
| ECE 301 Reading Exp in Early Childhood | (3 credits) |
| ECE 315 Math Content in Early Childhood | (3 credits) |

INTRODUCTION

The School of Science and Technology offers ten programs leading to the Bachelor of Science degree and one program leading to the Bachelor of Arts degree. These programs prepare students for employment in a variety of technical and professional occupations. Each program combines a broad, balanced technical option with substantial foundation studies in communications, humanities, social sciences and mathematics. In addition, each curriculum has a flexible general education component containing a minimum of thirty hours of free elective credits which provides students the opportunity to select courses in their individual area of interest. All students are expected to consult regularly with an advisor to insure satisfactory completion of all curricular requirements.

The following program outlines should be considered guides to courses and requirements necessary for graduation. Program review is a continuous process and changes in program content occur from time to time. Up-to-date program information can always be obtained by inquiring at the School Office or writing to Dr. Richard B. Hart, Dean of the School of Science and Technology, 100 Noss, California State College, California, Pennsylvania, 15419.

GENERAL EDUCATION

The School of Science and Technology's General Education program, equivalent to a minimum of 60 credit hours, is divided into two parts. The first part is comprised of a series of required courses in the following areas: communications, mathematics, psychology and managerial sciences. These required general education courses vary depending upon the student's major program; therefore, students should consult their major advisor before making course selections and before registering. The second part of the program is comprised of a minimum of 30 credits of free elective courses. Students are encouraged and expected to select courses carefully in the latter group in consultation with their faculty advisors. Special emphasis is expected to be placed on courses in the humanities, social sciences, and natural sciences that are not directly related to the student's major course of study.

BUSINESS ADMINISTRATION

The business world has grown in complexity in recent years. Significant developments in quantitative decision theory, the behavioral sciences and computer technology must now be treated as well as the more traditional areas of both economics and general business theory. The business administration curriculum has been designed to insure the prospective student an adequate background in all of these important areas. Additionally, the possibility for an option in accounting is available for students wishing to specialize in this particular facet of business.

SPECIALIZED EDUCATION - 54 crs.Economics Core - 15 crs.

Elements of Economics	3 cr.
Intro. Microeconomics	3 cr.
Intro. Macroeconomics	3 cr.
Labor Economics	3 cr.
Money and Banking	3 cr.

Business Core - 27 crs.

Introduction to Business	3 cr.
Accounting I	3 cr.
Accounting II	3 cr.
Intermediate Accounting I or Cost Accounting	3 cr.
Principles of Management	3 cr.
Principles of Marketing Management	3 cr.
Financial Management	3 cr.
Collective Bargaining	3 cr.
Business Law	3 cr.

Restricted Electives - 12 crs.

(Choose from the list below)

Seminar	3 cr.
Real Estate and Risk Mgt.	3 cr.
Advertising	3 cr.
Investments	3 cr.
Business, Society and Government	3 cr.
Mathematical Economics	3 cr.
Managerial Economics	3 cr.
Industrial Organization	3 cr.
Personnel Management	3 cr.
Accounting	3 cr.
Principles of Production	3 cr.
Salesmanship	3 cr.
Sales Management	3 cr.

GENERAL EDUCATION - 74 crs.Communication Skills - 15 crs.

Advanced Writing	3 cr.
Business Writing I	3 cr.
Business Writing II	3 cr.
Oral Comm.: Management	3 cr.
Group Discussion	3 cr.

Quantitative Skills - 15 crs.

Mathematics	3 cr.
Math of Finance I	3 cr.
Computer Science I	3 cr.
Cobol I	3 cr.
Business Statistics	3 cr.

Interpersonal Relationships - 12 crs.

General Psychology	3 cr.
Industrial Psychology	3 cr.
Psychology (Elective)	3 cr.
Principles of Sociology	3 cr.

Free Electives - 32 crs.

ACCOUNTING OPTION

SPECIALIZED EDUCATION - 62 crs.

Economics Core - 15 crs.

Elements of Economics	3 cr.
Intro. Microeconomics	3 cr.
Intro. Macroeconomics	3 cr.
Labor Economics or Collective Bargaining	3 cr.
Money and Banking	3 cr.

General Business Core - 12 crs.

Principles of Management	3 cr.
Principles of Marketing Mgt.	3 cr.
Financial Management	3 cr.
Business Law	3 cr.

Accounting Core - 24 crs.

Accounting I	3 cr.
Accounting II	3 cr.
Intermediate Accounting I	3 cr.
Intermediate Accounting II	3 cr.
Cost Accounting	3 cr.

9 crs. from the list below

Advanced-Cost Accounting	3 cr.
Auditing	3 cr.
Federal Taxation	3 cr.
Advanced Federal Taxation	3 cr.
Accounting Internship	3 cr.
Other upper level accounting courses	3 cr.

Restricted Electives - 11 crs.
(Choose from the list below)

Real Estate and Risk Management	3 cr.
Investments	3 cr.
Industrial Organization	3 cr.
Mathematical Economics	3 cr.
Managerial Economics	3 cr.
Applied Econometrics	3 cr.
Personnel Management	3 cr.
Business, Society, and Government	3 cr.

GENERAL STUDIES - 66 crs.

Communication Skills - 15 crs.

Advanced Writing	3
Business Writing I	3
Business Writing II	3
Oral Comm.: Management	3
Group Discussion	3

Quantitative Skills - 12 crs.

*Mathematics	3
Math of Finance I	3
Cobol I or Computer Science I	3
Business Statistics	3

Interpersonal Relationships - 9 crs.

General Psychology	3
Industrial Psychology	3
Principles of Sociology	3

Free Electives - 30 crs.

*Course to be determined by advisor

The United States is currently facing a multitude of problems in the field of energy. Reasonable and workable solutions to this intricate network of interrelated problems--scientific, technological, environmental, social, economic and political--must be found if society is to continue to enjoy the benefits of growth and continued development. The energy technology curriculum is purposefully designed to educate students to be problem solvers in the energy field. Careful curricular attention is given to the student's background in mathematics, physics and chemistry. These studies are complemented by several appropriate technical energy-related courses.

TECHNICAL EDUCATION - 78 crs.

Physics - 23 crs.

College Physics I	4 cr.
College Physics II	4 cr.
College Physics III	4 cr.
Intermediate Mechanics	4 cr.
Intermediate Electricity/ Magnetism	4 cr.
Modern Physics I	3 cr.

Energy Technology - 20 crs.

Energy & Power Seminar I	1 cr.
Energy & Power Seminar II	1 cr.
Intermediate Energy & Power	3 cr.
Advanced Energy & Power I	3 cr.
Advanced Energy & Power II	3 cr.
Global Technology	3 cr.
Applied Thermodynamics	3 cr.
Fluid Flow & Heat Transfer	3 cr.

Mathematics - 15 crs.

Calculus I	3 cr.
Calculus II	3 cr.
Calculus III	3 cr.
Differential Equations	3 cr.
Systems Analysis	3 cr.

Business & Economics - 9 crs.

Intro. Microeconomics	3 cr.
Environment/Energy Economics	3 cr.
Principles of Management	3 cr.

Chemistry - 11 crs.

General Chemistry I	4 cr.
General Chemistry II	4 cr.
Environmental Chemistry	3 cr.

GENERAL EDUCATION - 50 crs.

Communication Skills - 9 crs.

English Composition I	3 cr.
Scientific/Technical Writing	3 cr.
Oral Comm.: Management	3 cr.

Mathematics Related Skills - 9 crs.

Pre-Calculus	3 cr.
Computer Science I	3 cr.
Computer Science II	3 cr.

Free Electives - 32 crs.

GRAPHIC COMMUNICATIONS TECHNOLOGY

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The graphic communications industry is made up of a large number of diverse but allied industries producing an enormous variety of different products. Chief among these is the printing, publishing, and packaging industry. Students selecting a career in graphic communications technology are entering a growth industry. The graphic communications field has been growing at an annual rate of six to eight percent per year. The graphic communications curriculum is designed to provide students with two major educational benefits. The first is a comprehensive introduction to the theories and practices of modern graphic communications processes. The second is the opportunity to select a specialized technical option area--photo-offset lithography, screen printing or electrographics for further concentrated study. One additional attractive aspect of this program is that it is possible for students to elect to pursue an industrial internship.

ELECTRO-GRAPHICS OPTION

TECHNICAL EDUCATION - 64 crs.

Professional Specialty - 20 crs.

Industrial Safety 3 cr.
Estimating/Cost Analysis I 3 cr.
Industrial Internship or
Restricted Electives 14 cr.

Occupational Specialty - 38 crs.

Intro to Technical Drawing 2 cr.
Photographic Techniques 3 cr.
Graphic Communications I 3 cr.
Graphic Communications II 3 cr.
Electricity/Electronics I 3 cr.
Electricity/Electronics II 3 cr.
Electronic Composition I 3 cr.
Fundamentals of Digital Elect. 3 cr.
Fundamentals of Micro Processors 3 cr.
Advanced Micro Processors 3 cr.
Television Circuits 3 cr.
Industrial Electronics 3 cr.
Power Technology 3 cr.

Area of Concentration Elec. - 6 crs.

⁴Selected with approval of advisor

GENERAL EDUCATION - 64 crs.

Communication Skills - 6 crs.

English Composition I 3 cr.
Scientific/Technical Writing 3 cr.

Interpersonal Relationships - 9 crs.

General Psychology 3 cr.
Industrial Psychology 3 cr.
Principles of Management 3 cr.

Science and Mathematics - 19 crs.

Technical Math I 3 cr.
Technical Math II 3 cr.
Chemistry of Materials 3 cr.
General Physics - I. A. 4 cr.
Computer Science I 3 cr.
Computer Science II 3 cr.

Free electives - 30 crs.

PHOTO-OFFSET LITHOGRAPHY OPTION

Technical Education 70 cr.

Professional Specialty - 23 crs.

Industrial Safety	3 crs.
Estimating/Cost Analysis I	3 crs.
Industrial Internship or Restricted Electives	14 crs.
Principles of Production	3 crs.

Occupational Specialty - 33 crs.

Principles of Layout/Design	3 crs.
Photographic Techniques	3 crs.
Graphic Communications I	3 crs.
Graphic Communications II	3 crs.
Electricity/Electronics I	3 crs.
Electricity/Electronics II	3 crs.
Electric Composition I	3 crs.
Photo Lithography Tech. I	3 crs.
Photo Lithography Tech. II	3 crs.
Photo Lithography Tech. III	3 crs.
Finishing/Binding Techniques	3 crs.

*Area of Concentration Elec. - 14 crs.

*Selected with approval of Advisor

SCREEN PRINTING OPTION

Technical Education - 70 crs.

Professional Specialty - 23 crs.

Industrial Safety	3 crs.
Estimating/Cost Analysis I	3 crs.
Industrial Internship or Restricted Electives	14 crs.
Principles of Production	3 crs.

Occupational Specialty - 33 crs.

Principles of Layout/Design	3 crs.
Photographic Techniques	3 crs.
Graphic Communications I	3 crs.
Graphic Communications II	3 crs.
Electricity/Electronics I	3 crs.
Electricity/Electronics II	3 crs.
Electronic Composition I	3 crs.
Screen Printing Tech. I	3 crs.
Screen Printing Tech. II	3 crs.
Screen Printing Tech. III	3 crs.
Finishing/Binding Techniques	3 crs.

*Area of Concentration Electives 3 crs.

*Selected with the approval of the advisor

General Education - 58 crs.

Communication Skills - 6 crs.

English Composition I	3 crs.
Scientific/Technical Writing	3 crs.

Interpersonal Relationships - 9 crs.

General Psychology	3 crs.
Industrial Psychology	3 crs.
Principles of Management	3 crs.

Science and Mathematics - 13 crs.

Technical Math I	3 crs.
Technical Math II	3 crs.
Chemistry of Materials	3 crs.
General Physics - I.A.	4 crs.

Free Electives - 30 crs.

General Education - 58 crs.

Communication Skills - 6 crs.

English Composition I	3 crs.
Scientific/Technical Writing	3 crs.

Interpersonal Relationships - 9 crs.

General Psychology	3 crs.
Industrial Psychology	3 crs.
Principles of Management	3 crs.

Science and Mathematics - 13 crs.

Technical Math I	3 crs.
Technical Math II	3 crs.
Chemistry of Materials	3 crs.
General Physics - I.A.	4 crs.

Free Electives - 30 crs.

With soaring energy prices and lagging industrial productivity gains becoming increasingly severe, the need for educated personnel to participate in the development and application of technological change is evident. There is always a pressing need for trained and experienced managers of production who will insure that the benefits of modern technology are maintained. The complexity of modern production processes requires higher levels of sophistication in mechanisms for planning, organizing and controlling these activities. The industrial management curriculum combines a core of business and management courses with a selected technical area of study to prepare graduates for managerial roles in industry. The technical option areas available are computer science, manufacturing, and printing management.

MANAGEMENT AND COMPUTER SCIENCE OPTION

TECHNICAL EDUCATION - 63 crs.

Management - 30 crs.

Accounting I	3 cr.
Accounting II	3 cr.
Cost Accounting	3 cr.
Business Statistics	3 cr.
Intro. Microeconomics	3 cr.
Intro. Macroeconomics	3 cr.
Principles of Management	3 cr.
Managerial Economics	3 cr.
Financial Management	3 cr.
Collective Bargaining	3 cr.

Computer Science - 33 crs.

Basic Programming Language	3 cr.
Computer Science I	3 cr.
Computer Science II	3 cr.
Cobol I	3 cr.
Cobol II	3 cr.
Data Structures	3 cr.
Survey of Oper. Research	3 cr.
Systems Analysis	3 cr.
Computer Architecture	3 cr.
Logic/Switching Theory of Computer	3 cr.
Computer Graphics	3 cr.

GENERAL EDUCATION - 65 crs.

Communication Skills - 12 crs.

English Composition I	3
Business Writing I	3
Scientific/Technical Writing	3
Oral Comm.: Management	3

Interpersonal Relationships - 6 crs.

General Psychology	3
Industrial Psychology	3

Science and Mathematics - 15 crs.

Technical Math I	3
Technical Math II	3
Math of Finance I	3
Math of Finance II	3
Basic Calculus	3

Free Electives - 32 crs.

MANUFACTURING OPTION**TECHNICAL EDUCATION - 58 crs.**Management - 24 crs.

Accounting I	3 cr.
Accounting II	3 cr.
Cost Accounting	3 cr.
Principles of Management	3 cr.
Intro Microeconomics	3 cr.
Intro Macroeconomics	3 cr.
Managerial Economics	3 cr.
Collective Bargaining	3 cr.

Manufacturing - 34 crs.

Intro to Technical Drawing	2 cr.
Machine Drawing	2 cr.
Fundamentals of Machine	3 cr.
Advanced Machine	3 cr.
Numerical Control Prog. I	3 cr.
Numerical Control Prog. II	3 cr.
Adv. Numerical Control Prog.	3 cr.
Materials Testing	3 cr.
Quality Control	3 cr.
Fluid Power	3 cr.
Electricity/Electronics I	3 cr.
Electricity/Electronics II	3 cr.

GENERAL EDUCATION - 70 crs.Communication Skills - 12 crs.

English Composition I	3 cr.
Business Writing I	3 cr.
Scientific/Technical Writing	3 cr.
Oral Comm.: Management	3 cr.

Interpersonal Relationships - 6 crs.

General Psychology	3 cr.
Industrial Psychology	3 cr.

Science and Mathematics - 19 crs.

Technical Math I	3 cr.
Technical Math II	3 cr.
Math of Finance I	3 cr.
General Physics - I. A.	3 cr.
Computer Science I	3 cr.
Cobol I	3 cr.

Free Electives - 33 crs.

PRINTING MANAGEMENT OPTION

Technical Education - 66 crs.

Management - 24 crs.

Intro Microeconomics	3 crs.
Accounting I	3 crs.
Accounting II	3 crs.
Principles of Management	3 crs.
Financial Management	3 crs.
Principles of Production	3 crs.
Collective Bargaining	3 crs.
Principles of Marketing	3 crs.

Graphic Communications - 33 crs.

Prin. of Layout/Design	3 crs.
Photographic Techniques	3 crs.
Graphic Communications I	3 crs.
Graphic Communications II	3 crs.
Electricity/Electronics I	3 crs.
Electricity/Electronics II	3 crs.
Estimating/Cost Analysis I	3 crs.

***Area of Concentration Elec. - 9 crs.**

***Selected with approval of advisor**

General Education - 62 crs.

Communication Skills - 9 crs.

English Composition I	3 crs.
Scientific/Technical Writing	3 crs.
Oral Comm.; Management	3 crs.

Interpersonal Relationships - 6 crs.

General Psychology	3 crs.
Industrial Psychology	3 crs.

Science and Mathematics - 17 crs.

Technical Math I	3 crs.
Technical Math II	3 crs.
Math of Finance I	3 crs.
General Physics - I.A.	4 crs.
Chemistry of Materials	4 crs.

Free Electives - 30 crs.

INDUSTRIAL TECHNOLOGY

The Industrial Technology program prepares professionals with a broad scientific and technical background in a variety of disciplines related to industry. Typically included in this background are studies in technical drawing, industrial materials, metalworking and machining, power technology, electricity and electronics, and computer science. Three specialty option areas are available to students for additional concentrated study: general, scientific, and management science.

TECHNICAL EDUCATION - 66 crs.**Professional Specialty - 7 crs.**

Industrial Safety	3 cr.
Intro. Industrial Technology	3 cr.
Seminar Industrial Technology	3 cr.

Required Laboratory Courses - 33 crs.

Intro. Industrial Materials	3 cr.
Graphic Communications I	3 cr.
Graphic Communications II	3 cr.
Electricity/Electronics I	3 cr.
Electricity/Electronics II	3 cr.
Fundamentals of Metal Work	3 cr.
Fundamentals of Machine	3 cr.
Power Technology	3 cr.
Lab Elective Courses -	
Choose from IAR 341, IAR	3 cr.
346, IAR 351, IAR 357,	3 cr.
IAR 456, IAR 465, IAR 466,	3 cr.
IAR 470, IAR 476 and selected	
technology courses.	

Required Drawing Courses - 6 crs.

Intro. Technical Drawing	2 cr.
Machine Drawing	2 cr.
Elective Drawing Course-	
Choose from IAR 115,	2 cr.
IAR 330, IAR 437,	
IAR 438.	

*** General Option - 20 crs.**

Business and Management Electives -
at least three courses must be upper
division courses12 crs.

Science and Mathematics Electives -
must be upper division courses..8 crs.

GENERAL EDUCATION - 62 crs.**Communication Skills - 9 crs.**

English Composition I	3 cr.
Scientific/Technical Writing	3 cr.
Oral Comm.: Management	3 cr.

Interpersonal Relationships - 6 crs.

General Psychology	3 cr.
Industrial Psychology	3 cr.

Science and Mathematics - 17 crs.

Technical Math I or	
Advanced Math	3 cr.
Technical Math II or	
Advanced Math	3 cr.
Computer Science I	3 cr.
College Physics I and	4 cr.
College Physics II	4 cr.
or	
General Chemistry I and	4 cr.
General Chemistry II	4 cr.

Free Electives - 30 crs.

* Selection of courses with advisor's
consent. Substitutions may be made
with the approval of the advisor
and the Dean.

MANAGEMENT OPTION

TECHNICAL EDUCATION - 76 crs.

Professional Specialty - 7 crs.

Industrial Safety	3 cr.
Intro. Industrial Technology	1 cr.
Seminar Industrial Technology	3 cr.

Required Laboratory Courses - 33 crs.

Intro. Industrial Materials	3 cr.
Graphic Communications I	3 cr.
Graphic Communications II	3 cr.
Electricity/Electronics I	3 cr.
Electricity/Electronics II	3 cr.
Fundamentals of Metal Work	3 cr.
Fundamentals of Machine	3 cr.
Power Technology	3 cr.
Lab Elective Courses -	
Choose from IAR 341, IAR	3 cr.
346, IAR 351, IAR 357, IAR	3 cr.
456, IAR 465, IAR 466, IAR	3 cr.
470, IAR 476 and selected	
technology courses	

Required Drawing Courses - 6 crs.

Intro to Technical Drawing	2 cr.
Machine Drawing	2 cr.
Elective Drawing Course -	
Choose from IAR 115, IAR	2 cr.
330, IAR 437, IAR 438	

Required Management Courses - 30 crs.

Accounting I	3 cr.
Accounting II	3 cr.
Cost Accounting	3 cr.
Intro Microeconomics	3 cr.
Intro Macroeconomics	3 cr.
Principles of Management	3 cr.
Financial Management	3 cr.
Mathematical Economics	3 cr.
Managerial Economics	3 cr.
Collective Bargaining	3 cr.

GENERAL EDUCATION - 52 crs.

Communication Skills - 9 crs.

English Composition I	
Scientific/Technical Writing	
Oral Comm.: Management	

Interpersonal Relationships - 6

General Psychology	
Industrial Psychology	

Science and Mathematics - 6 crs.

Math (by advisement)	
Cobol I	

Free Electives - 31 crs.

SCIENTIFIC OPTION**TECHNICAL EDUCATION - 79 crs.****Professional Specialty - 7 crs.**

Industrial Safety	3 cr.
Intro. Industrial Technology	1 cr.
Seminar Industrial Technology	3 cr.

Required Laboratory Courses - 33 crs.

Intro. Industrial Materials	3 cr.
Graphic Communications I	3 cr.
Graphic Communications II	3 cr.
Fundamentals of Metal Work	3 cr.
Fundamentals of Machine	3 cr.
Electricity/Electronics I	3 cr.
Electricity/Electronics II	3 cr.
Power Technology	3 cr.
Lab Elective Courses -	
Choose from IAR 341, IAR 346,	3 cr.
IAR 351, IAR 357, IAR 456,	3 cr.
IAR 465, IAR 466, IAR 470,	3 cr.
IAR 476 and selected technology courses.	

Required Drawing Courses - 6 crs.

Intro. Technical Drawing	2 cr.
Machine Drawing	2 cr.
Elective Drawing Course -	
Choose from IAR 115,	2 cr.
IAR 330, IAR 437,	
IAR 438	

Scientific Option - 32 crs.

Calculus I	3 cr.
Calculus II	3 cr.
Computer Science I	3 cr.
Computer Science II	3 cr.
College Physics I	4 cr.
College Physics II	4 cr.
College Physics III	4 cr.
General Chemistry I	4 cr.
General Chemistry II	4 cr.

GENERAL EDUCATION - 50 crs.**Communication Skills - 9 crs.**

English Composition I	3 cr.
Scientific/Technical Writing	3 cr.
Oral Comm.: Management	3 cr.

Interpersonal Relationships - 6 crs

General Psychology	3 cr.
Industrial Psychology	3 cr.

Free Electives - 35 crs.

One measure of man's growth and progress is his ability to manufacture goods effectively. Students considering enrolling in this program should be interested in learning how things are made. Manufacturing related topics covered are machine tool operation, metal cutting operations, technical and machine drawing, welding, casting, heat treatment, materials testing, fluid power, solid state electronics and many other ancillary subject areas. Special emphasis is placed on numerically controlled manufacturing processes.

TECHNICAL EDUCATION - 58 crs.

GENERAL EDUCATION - 70 crs.

Professional Specialty - 21 crs.

Communication Skills - 6 crs.

Industrial Safety	3 cr.
Estimating/Cost Analysis I	3 cr.
Industrial Internship or Restricted Electives	13 cr.
Industrial Practicum	3 cr.

English Composition I	3
Scientific/Technical Writing	3

Occupational Specialty - 37 crs.

Interpersonal Relationships - 6 crs.

Intro. to Technical Drawing	2 cr.
Machine Drawing	2 cr.
Fundamentals of Machine	3 cr.
Advanced Machine	3 cr.
Numerical Control Prog. I	3 cr.
Numerical Control Prog. II	3 cr.
Adv. Numerical Control Prog.	3 cr.
Electricity/Electronics I	3 cr.
Electricity/Electronics II	3 cr.
Quality Control	3 cr.
Fluid Power	3 cr.
Materials Testing	3 cr.
Electronic Control Unit Maintenance	3 cr.

General Psychology	3
Industrial Psychology	3

Science and Mathematics - 22 crs.

Technical Math I	3
Technical Math II	3
Basic Calculus	3
Chemistry of Materials	3
General Physics - I. A.	4
Computer Science I	3
Basic Programming Language	3

Free Electives - 36 crs.

MEDICAL TECHNOLOGY

Medical Technology is one of the fastest growing professions associated with modern advances in medical science. Medical technologists are highly skilled members of the medical care team. They perform a wide range of routine and specialized tests which may be utilized by physicians for determining and diagnosing disease and treatment. The curriculum requires three years of concentrated study of biology and chemistry as well as other related sciences. A fourth year of applied practical study in an approved clinical hospital school of medical technology allows the student to complete the degree requirements. California State College students currently do not pay tuition to the College for their clinical studies at the hospital school. The College hopes to continue this arrangement; however, this policy may be changed by the Pennsylvania Department of Education. The student is required to apply for graduation and pay the graduation fees.

California State College is affiliated with the following schools of Medical Technology:

Allegheny General Hospital	- Pittsburgh, Pa.
Altoona Hospital	- Altoona, Pa.
Conemaugh Valley Memorial Hospital	- Johnstown, Pa.
McKeesport Hospital	- McKeesport, Pa.
Mercy Hospital	- Pittsburgh, Pa.
St. Vincent Hospital	- Erie, Pa.
Washington Hospital	- Washington, Pa.
West Penn Hospital	- Pittsburgh, Pa.

TECHNICAL EDUCATION - 55 crs.Biological Sciences - 32 crs.

Principles of Biology	4 cr.
Botany I	4 cr.
Zoology II	4 cr.
Human Anatomy	4 cr.
Human Physiology	4 cr.
Genetics	4 cr.
Clinical Microbiology	4 cr.
Instrumentation	4 cr.

Auxiliary Courses - 23 crs.

General Chemistry I	4 cr.
General Chemistry II	4 cr.
Organic Chemistry I	4 cr.
Analytical Chemistry I	4 cr.
College Algebra	3 cr.
(or higher math)	
General Physics - Med	4 cr.
Tech	

Strongly Recommended by the Hospital Schools of Medical Technology

English Composition II
Organic Chemistry II
Parasitology
Mycology
Radiation Biology
Biochemistry I
Statistics

GENERAL EDUCATION - 14 crs.Humanities - 3 crs.

English Composition I 3 cr.

Social Sciences - 3 crs.

Principles of Management 3 cr.

Natural Sciences - 8 crs.

Zoology I 4 cr.
Microbiology 4 cr.

Free Electives - 30 crs.

* Approved School of Medical Technology 29 cr.

*California State College cannot guarantee that every student will receive an acceptance to a Medical Technology School.

PETROLEUM TECHNOLOGY

The energy crisis and the need for national independence from foreign energy suppliers have led to a renewed interest in the fields of petroleum exploration and petroleum production. Industrial firms and governmental agencies actively engaged in the search for, and the production of, oil place a high priority on those students who have training and a background in petroleum technology. Therefore, the petroleum technology curriculum has been designed to provide the student with the necessary scientific background in geology, physics, and chemistry to master the intricate interrelationships within this discipline as they apply to the exploration of new sources of petroleum and natural gas.

TECHNICAL EDUCATION 87 crs.Chemistry - 11 crs.

Gen. Chemistry I	4 cr.
Gen. Chemistry II	4 cr.
Geochemistry	3 cr.

Physics - 20 crs.

Intro to Power/Energy	3 cr.
College Physics I	4 cr.
College Physics II	4 cr.
Geophysics	3 cr.
Applied Geophysics	3 cr.
Reservoir Evaluation	3 cr.

Mathematics - 15 crs.

College Algebra	3 cr.
Calculus I	3 cr.
Calculus II	3 cr.
Statistics	3 cr.
Computer Science I	3 cr.

Geology - 41 crs.

Intro to Geology	4 cr.
Historical Geology	4 cr.
Mineralogy	3 cr.
Petrology	3 cr.
Sedimentology	3 cr.
Stratigraphy	3 cr.
Micropaleontology	3 cr.
Structural Geology	3 cr.
Regional Geomorphology	3 cr.
Cartography	3 cr.
Petroleum Geology I	3 cr.
Petroleum Geology II	3 cr.
Petroleum Prod./Econ.	3 cr.

GENERAL EDUCATION 38 crs.Scientific and Technical WritingFree Electives

PRE-ENGINEERING (COOPERATIVE 3:2 PROGRAMS)

California State College participates in cooperative liberal arts engineering programs with both the Pennsylvania State University and the University of Pittsburgh. The enrolled student undertakes a three-year curriculum at California State College concentrating on studies in liberal arts and pre-engineering courses in Natural Sciences. Upon successful completion of that curriculum and recommendation, the student spends two years at the Pennsylvania State University or the University of Pittsburgh, at which time the student will complete the engineering course requirements as specified by that institution.

Refer to pages 242-244 of the 1977-79 College Catalog for complete details.

WATER ANALYSIS TECHNOLOGY

Controlling environmental pollution and assessing the quality of aquatic and terrestrial ecosystems have been a national concern since the environmental crisis of the late sixties. Early alarmism has now given way to direct approaches to problem-solving at federal, state and local levels. A definite need exists for technically educated individuals to participate in the control and management of water resources. This program, scientific in concept and design, emphasizes the development of a strong background in biology, chemistry, physics and environmental science. Special emphasis is placed on the application of the aforementioned disciplines to aquatic systems and problems.

TECHNICAL EDUCATION - 66 crs.Chemistry - 20 crs.

General Chemistry I	4 cr.
General Chemistry II	4 cr.
Analytical Chemistry I	4 cr.
Organic Chemistry I	4 cr.
Organic Chemistry II	4 cr.

Related Math and Sciences - 21 crs.

General Geology	4 cr.
Meteorology	3 cr.
Physics I - Biology	4 cr.
Physics II - Biology	4 cr.
Calculus I	3 cr.
Statistics	3 cr.

Field of Specialization - 25 crs.

Man and His Environment	3 cr.
Principles of Biology	4 cr.
Biotic Indicators of Water Pollution	4 cr.
Techniques in Water and Water Analysis	4 cr.
Water Treatment Facilities	3 cr.
Lab Instrumentation	4 cr.
Environmental Resource Problems	3 cr.

GENERAL EDUCATION - 62 crs.Humanities - 18 crs.

English Composition I	3 cr.
English Composition II	3 cr.
Scientific/Technical Writing	3 cr.
Elective	3 cr.
Elective	3 cr.
Elective	3 cr.

Social Sciences - 12 crs.

Elements of Economics	3 cr.
Elective	3 cr.
Elective	3 cr.
Psychology or Sociology	3 cr.
Elective	3 cr.

Free Electives - 32 crs.

BUSINESS

BUS 100 - INTRODUCTION TO BUSINESS

An introduction to the internal and functional setting of a business enterprise. (3 crs.)

BUS 111 - ACCOUNTING I

An introduction to basic accounting concepts including: the use of journals and ledgers; adjusting and closing entries; completion of the accounting cycle; and preparation of pertinent financial statements. (3 crs.)

BUS 112 - ACCOUNTING II

A continuation of basic accounting principles with an emphasis on partnership, corporate accounting and cost accounting systems. Prerequisites: Accounting I (3 crs.)

BUS 118 - FEDERAL INCOME TAX ACCOUNTING

An introduction to federal income tax accounting. (3 crs.)

BUS 201 - PRINCIPLES OF MANAGEMENT

A survey of the theories in the field of management covering concepts developed by the classical school, behavioral school, and the management science school. Prerequisites: PSY 100 or permission of instructor (3 crs.)

BUS 221 - SALESMANSHIP

Basic principles underlying all types of selling, practical application of these selling principles to various selling situations and the legal aspects of selling. Prerequisites: Intro Microeconomics and Intro Macroeconomics (3 crs.)

BUS 241 - BUSINESS LAW

To convey an understanding of the nature of law and the part it plays in the regulation of modern business. Prerequisites: Elements of Economics and at least sophomore standing. (3 crs.)

BUS 311 - INTERMEDIATE ACCOUNTING I

A review of basic accounting principles and concepts. A preparation for advanced courses in accounting and for the theory and practice sections of the uniform CPA exam. Prerequisites: Accounting II (3 crs.)

BUS 312 - INTERMEDIATE ACCOUNTING II

A continuation of the review of basic accounting principles and concepts including financial statement analysis. A preparation for advanced courses in accounting and for the theory and practice sections of the uniform CPA exam. Prerequisites: Intermediate Accounting I (3 crs.)

BUS 315 - COST ACCOUNTING

An introduction to basic cost accounting principles, cost-volume, profit analysis, standard costing, process and job order costing and departmental budgeting. Prerequisites: Accounting II (3 crs.)

BUS 321 - PRINCIPLES OF MARKET MANAGEMENT

An introduction to basic principles of marketing management. Prerequisites: Elements of Economics or Intro Microeconomics (3 crs.)

BUS 323 - SALES MANAGEMENT

An analysis of the problems involved in the management of sales force: recruiting, selection, training and evaluation of the selling performance of salesmen, collection and analysis of relevant marketing data and controlling function. Prerequisites: Intro Microeconomics, Intro Macroeconomics, and Principles of Management (3 crs.)

BUS 332 - FINANCIAL MANAGEMENT

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The study of financial analysis, planning and control including working capital management, decisions involving long-term assets, sources and forms of long-term financing and other selected subjects. Prerequisites: Accounting II, Intro Microeconomics and Math of Finance I (3 crs.)

BUS 335 - INVESTMENTS

An introduction to financial investments. Topics include securities and securities markets; investment risks, returns and constraints; portfolio policies; and institutional investment policies. Prerequisites: Technical Math or permission of instructor (3 crs.)

BUS 342 - BUSINESS, SOCIETY AND GOVERNMENT

A survey of the historical and contemporary relationship between government and business in the United States. Special emphasis is given to the developments of the past two decades. Prerequisites: Elements of Economics (3 crs.)

BUS 351 - PERSONNEL MANAGEMENT

Decision making and analysis of major management problems that arise in manpower planning, recruitment, selection, development, compensation, and appraisal of employees in various organizations. (3 crs.)

BUS 355 - COLLECTIVE BARGAINING

A comprehensive examination of collective bargaining as a work place institution, including a survey of practical methods in use in industry and government; the various laws, court decisions and government agency regulations pertinent to the subject are reviewed. (3 crs.)

BUS 361 - REAL ESTATE AND RISK MANAGEMENT

An introduction to real estate principles, the nature and significance of risk in business enterprise and the use of insurance in resolving problems involving personal and business risks. Prerequisites: Introduction to Business or Elements of Economics (3 crs.)

BUS 379 - SPECIAL PROBLEMS IN BUSINESS

Prerequisite: Consent of the instructor (VC)

BUS 406 - ADVANCED FEDERAL TAXATION

Advanced topics in federal taxation including partnerships, decedents, estates, trusts, corporations, pension and profit sharing plans, foreign income, and securities transactions. Prerequisite: Federal Taxation (3 crs.)

BUS 410 - AUDITING

Prerequisite: Intermediate Accounting II (3 crs.)

BUS 412 - ADVANCED FINANCIAL ACCOUNTING

Prerequisite: Intermediate Accounting II

BUS 415 - ADVANCED COST ACCOUNTING

Prerequisites: Accounting II and Cost Accounting (3 crs.)

BUS 491 - ACCOUNTING INTERNSHIP

Practicum with Public Accounting firm, government, or industry. Prerequisites: 18 credits in Accounting and consent of the instructor (VC)

BUS 492 - BUSINESS INTERNSHIP

Prerequisite: Senior standing or permission of the instructor (3 crs.)

BUS 495 - SEMINAR IN BUSINESS

An intensive examination of selected subjects from the general field of business. Prerequisite: Consent of the instructor (3 crs.)

WATER ANALYSIS TECHNOLOGY

WAT 341 - TECHNIQUES IN WATER AND WASTEWATER ANALYSIS

A thorough study of the chemical testing of water in wastewater plants, streams, and drinking water sources is presented. Emphasis is placed on learning acceptable levels of chemicals in the different types of water. Samples of water from sources of concern are analyzed in the laboratory portion of the course. (3 credits)

WAT 355 - WATER TREATMENT FACILITIES

An examination of the operation of modern water works and wastewater treatment systems utilizing an integrated lecture-laboratory approach. Emphasis is on a practical understanding of concepts related to water processing and familiarity with the various techniques currently employed. Lecture material is correlated with the inspection tours of local water and wastewater treatment facilities and laboratory demonstrations of processes and associated analyses of water quality. (3 credits)

MANUFACTURING TECHNOLOGY

MTE 335 and
IAR 335 - NUMERICAL CONTROL PROGRAMMING I

A course to acquaint students with basic numerical control operations and provide experiences that will identify how numerical control is used in various manufacturing processes. (3 credits)

MTE 336 - NUMERICAL CONTROL PROGRAMMING II

A presentation of the techniques involved in the manual programming of numerically controlled machines. The method of programming a three-axis contouring milling machine with a linear interpolation capability to machine an arc simultaneously on three axes within an acceptable tolerance will be demonstrated and practiced. (3 credits)
Prerequisite: MTE 335)

MTE 337 - COMPUTER PROGRAMMING NUMERICAL CONTROLLED EQUIPMENT (COMPACT II)

A study of the Compact II computer language used to produce machine tape instructions for manufacturing parts. Students will learn to access and utilize a computer to describe part geometry and direct a machine tool in a cutter path around the contours. (3 credits)
Prerequisite: MTE 336

MTE 465 - ELECTRONIC CONTROL UNIT MAINTENANCE

A presentation of the various electronic controls used with manufacturing equipment. Students will develop an understanding of machine electronic schematics and will be able to troubleshoot various controls to identify and repair malfunctioning components. The necessary electronic theory for understanding control unit operations will be included. (3 credits)

MTE 455 - FLUID POWER

A study of basic hydraulics including hydraulic fluids, filtration, power supply, circuits, actuators, controls, conditioners, and monitoring devices. Teaching and learning activities include lectures, class discussion and laboratory activities. (3 credits)

MTE 445 - QUALITY CONTROL

A critical examination of how industry assesses the quality function of manufactured goods. A method of quality planning will also be developed. (3 credits)

TE 495 - MANUFACTURING INTERNSHIP

A field experience course for Manufacturing Technology majors. The content of this course depends upon the manufacturing firm selected for an internship. Although the intern will do some writing on various manufacturing practices, his/her first-hand practical manufacturing experience will be the dominant factor in the credit award. Each intern will be judged by his supervisor and instructor on his/her ability to interact with people. Oral and written communication skills, technical knowledge and its application to the job as well as problem solving ability will also be evaluated. (Variable credit)
Prerequisite: Junior or senior status

INDUSTRIAL TECHNOLOGY

TE 101 - INDUSTRIAL SAFETY

An introduction to the fundamental aspects of safety. A thorough examination of the many facets of safety as it applies to the work-a-day world both on and off the job is provided. Students will be able to identify the cause of accidents involving both people and property in industry. Various methods of prevention and correction of situations that cause accidents will be presented. (3 credits)

GCT 225 - PRINCIPLES OF LAYOUT AND DESIGN

A presentation of various design elements employed to produce graphic communications materials. Printed materials will be analyzed in terms of these design elements. The development of harmonious relationship between these elements and various type styles will be considered in detail. Some knowledge of how to prepare art for reproduction, i.e., how to pasteup, keyline, and instruct the cameraman is required for this course. (3 credits)

GCT 235 - PHOTOGRAPHIC TECHNIQUES

A study of the basic properties of the photographic system and how each of these properties affects and influences the total system. The nature of light will be examined and its effect on light sensitive materials will be studied. A thorough examination of lens and lens systems will be undertaken. The chemistry of photography as used in the process of microphotography as it relates to the graphic communication industry in the form of microfilm and microfiche will be discussed. (3 credits)

Prerequisite: IAR 467

GCT 245 - GRAPHIC COMMUNICATIONS PROCESSES

An introduction of different graphic arts processes. The various artists media used to produce printed pieces, such as books, booklets, pamphlets, advertising copy, magazine advertising will be considered. Students will be expected to collect a representative set of printed pieces in each of the major printing processes. This collection will be analyzed in terms of the process and the art technique used. The language and vocabulary of the graphic communication industry will be presented. (3 credits)

GCT 320 - ELECTRONIC COMPOSITION I

An introduction to the production principles, procedures and techniques for preparing composition by electronic photographic systems. Special attention is given to the study of justify and non-justify keyboards and their place in the typesetting system as well as analysis of various photo outputs including video display terminals. Additional work with proofing and paste-up techniques will be included. (3 credits)

Prerequisite: GCT 350, 351

GCT 321 - ELECTRONIC COMPOSITION II

Emphasis is placed on analysis of photocomposition systems and an understanding of basic functions and their compatibility

other components or systems. Some hands-on experience will be provided to alter the compatibility for better system function. (3 credits)
Prerequisite: GCT 321

GCT 340 - ESTIMATING AND COST ANALYSIS I

A critical examination of the operations involved in producing graphic materials for the purpose of determining costs of each operation will be undertaken. The procedures necessary to assemble this information to produce estimates of typical printed matter will be discussed. The identification and study of cost centers as they relate to the hour costs and ultimately to the selling price will be discussed. (3 credits)
Prerequisite: IAR 322

GCT 341 - ESTIMATING AND COST ANALYSIS II

Attention will be devoted to cost determination, price determination, break-even analysis, effective use of press equipment and the application of computer methods to the solution of graphics production problems. (3 credits)
Prerequisite: GCT 340

GCT 350 - PHOTOLITHOGRAPHIC TECHNIQUES I

An in-depth study of line photography from determination of basic operational functions to the creation of projects reflecting an understanding of the knowledge of the techniques employed in the production of graphic materials in the communications industry. Students will be required to handle film through stripping, platemaking and press operations. Emphasis is placed on the fundamental understanding of the processes involved, so that the students will be able to adapt this knowledge to different situations. (3 credits)

GCT 351 - PHOTOLITHOGRAPHIC TECHNIQUES II

Emphasis is placed on halftone photographic techniques and on the relationship of quality reproduction to careful stripping, platemaking and presswork. A variety of projects will be carried out to reinforce the concepts and to provide further insight into the complexities of producing printed material. Special emphasis will be placed on stripping, platemaking and press operation as it relates to halftone photography.
Prerequisite: GCT 350 (3 credits.)

GCT 352 - PHOTOLITHOGRAPHIC TECHNIQUES III

Primary emphasis will be placed on developing an understanding of the nature of light, the nature of color, its relation to filters and printing inks used in the graphics industry and the problems caused by color contamination in making color separations. A presentation of direct and indirect methods of color separations as well as the various masking

techniques will be included. The use of various control devices will also be discussed and employed in the laboratory. Special techniques required to strip projects, make the plates and produce them on the press will also be covered.

Prerequisite: GCT 351 (3 credits)

GCT 360 - SCREEN PRINTING TECHNIQUES I

An examination of the elements that make up stencil systems screen printing. An in-depth study of each element and its function as an integral part of the stencil system will be provided. Each student will have the opportunity to participate in the identification and calibration of proper elements for stencil systems. (3 credits)

GCT 361 - SCREEN PRINTING TECHNIQUES II

An introduction to the substrates imaged by the screen print with considerations of storage, handling, printability and printing quality. Planning and execution of image transfer flat printing, textiles, decals, pressure sensitives, cylindrical objects and contour shapes will be considered and demonstrated. (3 credits)

Prerequisite: GCT 360

GCT 362 - SCREEN PRINTING TECHNIQUES III

A study of halftone and process color photography and its application to screen printing. The nature of light, nature of color, its relation to filters and printing inks used will be discussed. Special techniques in the selection and use of screen materials, stencil systems and other elements of screen printing will be covered. (3 credits)

Prerequisites: GCT 361

GCT 456 - FUNDAMENTALS OF DIGITAL ELECTRONICS

A study of microprocessors as digital controllers. Emphasis will be placed on the terminology, the capabilities, the limitations, and the application of these powerful integrated circuits. (3 credits)

Prerequisite: IAR 456

GCT 457 - ADVANCED MICROPROCESSORS

An advanced treatment of microprocessor technology. Emphasis will be placed on the 8080 and Z80 families of microprocessor chips with both hardware and software implementation problems addressed. (3 credits)

Prerequisite: GCT 456

CT 465 - FINISHING AND BINDING

This course provides an introduction to the operations performed in the binding of printed materials. Various operations such as cutting, trimming, folding, gathering, stitching, casemaking, gluing, laminating, perforating, sewing, round-corning, and drilling will be considered. Analysis of the kinds of adhesives available and their most effective uses will be discussed. (3 credits)

CT 475 - PRINCIPLES OF PRODUCTION

An introduction to the methods used in analyzing the production flow from raw material to the finished product. Topics covered include a study of material handling, plant layout, operations analysis, purchasing estimating, industrial engineering, inventory control and shipping. An overview of the role of production management as it relates to the various areas of an industrial environment will be presented. (3 credits)

CT 495 - GRAPHIC COMMUNICATIONS INTERNSHIP

Student interns will be placed with an organization which most nearly approximates their goals for employment. If this is not possible, students will be placed in any type of graphics environment which is available at the time. The intent of the internship is to provide students with practical work experience in an environment in which they will be dealing with real problems requiring real solutions in a relatively short time frame. (VC)

