Catalog 1988-89
Divisions and Departments

Fine Arts  Art; Music; Communication Arts.
Humanities  English; Foreign Languages; Philosophy and Religion.
Mathematical and Natural Sciences  Biological Sciences; Chemistry; Mathematics and Computer Science; Physics.
Social Sciences  History and Political Science; Psychology and Sociology.
Teacher Education  Education; Health, Physical Education, and Sports Studies; Industrial Technology.

Principles and Objectives

The Getty College of Arts and Sciences is a community with resources and opportunities for learning. Its students come from all colleges of the University, representing individual differences and diverse goals and experiences. The faculty encourages and assists students to use fully their abilities while they are learning, developing personal goals, and discovering means to achieve their goals.

Students learn to understand themselves and their environment by exploring a variety of academic disciplines. These general educational experiences help them perceive relationships among many kinds of knowledge. Students also achieve proficiency in one or more areas of study where they learn skills and cultivate insights enabling them to make beneficial contributions to society through personal relationships, community service, and career employment. Students are prepared for a lifetime of learning in a changing world by learning to reason logically, to communicate effectively, and to apply knowledge thoroughly. The College of Arts and Sciences attempts to instill in the student an appreciation for human values and a personal commitment to ethical and religious ideals which are vital throughout life.

Admission Standards

Candidates seeking admission to the College of Arts and Sciences are required to meet the general requirements for admission to the University. The College of Arts and Sciences accepts high school graduates and non-graduates who have 16 acceptable units. Twelve of these units are as follows: 4 units in English; 2 units in mathematics; 6 units in history, social studies, languages or natural sciences, or any combination thereof. Candidates are encouraged to take a foreign language while in high school. Acceptable scores on the American College Test or the College Entrance Examination Board tests are expected of all candidates.

High school seniors with superior ability and maturity must apply each quarter they plan to attend for a limited amount of course work for credit on campus during their senior year or during the summer preceding their senior year, if they have the recommendation of their high school principal and the approval of the admissions committee.

The Bachelor of Arts Degree Program

General and Advanced Courses  The General Education Program has been developed to provide the breadth of learning basics to a well-educated person. These courses furnish
the foundation and background for advanced education. Work in the student's major is mostly taken on the advanced level, along with advanced electives.

**General Education Requirements**

The following are the prescribed general education courses required of all students enrolled in a Bachelor of Arts degree program.

A. Basic Requirements

1. **Communication Skills**
   
   English 110 and 111
   
   Speech 100

2. **General Requirements**
   
   English 204 plus one additional course in literature from English or foreign languages
   
   Western Civilization 110 and 111
   
   Economics 100
   
   Philosophy 100 or 102
   
   Religion: one course from 105, 106, 107, or 108
   
   Foreign Language: First-year competency
   
   (three courses in one language)

3. **Distributional Requirements**

   Courses must be taken in each of the following divisions in addition to courses taken in (1) and (2):

   a. Fine Arts
      
      three courses (or equivalent totaling nine credit hours) in at least two disciplines: art, music, theatre. Six hours of a single, continuing activity course will equate to a three hour graduation requirement. A maximum of six activity hours will count to meet General Education Fine arts requirements.

   b. Humanities
      
      one course not in discipline of primary major:
      
      English, foreign language, philosophy, religion

   c. Social Sciences
      
      two courses not in discipline of primary major:
      
      psychology, sociology, political science

   d. Natural Sciences/Mathematics-Computer Science
      
      five courses in at least three departments:
      
      biology, chemistry, physics, mathematics, computer science

B. Graduation Requirements

A student's total education program must include the following:

1. use of the computer or substantial exposure to or study of the uses and implications of computer technology as determined by the specific program major.
2. at least one course which involves substantial exposure to or study of a non-Western or Third-World people, society, or culture
3. at least three 1-hour physical education activity courses.

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**The Bachelor of Science Degree Program**

The following are the prescribed general education courses required of all students enrolled in a Bachelor of Science degree program. A candidate for the Bachelor of Science degree may major in biology, medical technology, chemistry, mathematics, industrial technology, or computer science.

A. Basic Requirements

1. **Communication Skills**
   
   a. English 110 and 111
   
   b. Speech 100

2. **Mathematical Skills**

   two courses in mathematics (at the level of 120 or above) and two courses in mathematics or computer science (computer science 130 or above) with at least one course in computer science

3. One religion course (105, 106, 107, 108) and one course in philosophy (100 or 102)

B. General Requirements (outside the major program of study)

1. Science component (five courses)

   At least two courses in biology and two courses in chemistry or physics with one year's work in one of these disciplines

2. Arts/Humanities/Social Sciences (eight courses)

   a. English 204
   
   b. Western Civilization 110-111
   
   c. one course in social sciences
   
   d. one course in fine arts

3. three courses chosen from any combination of the following disciplines: art, music, theatre, English, literature, foreign languages, philosophy, religion, history, political science, psychology, sociology, economics.

C. Graduation Requirements

A student's total educational program must include the following:

1. at least one course which involves substantial exposure to the study of a non-Western, Third-World people, society, or culture
2. at least three 1-hour physical education activity courses below the 100-level.
Graduation Requirements—Non-Western, Third World Culture Courses (B.A. and B.S. Degree)

The following courses meet the general education graduation requirement in Non-Western, Third-World culture study:

100-290 Introduction to the Non-Western World
152-490 Non-Western Music
112-370 African Fiction
132-222 Contemporary Asia
132-223 Contemporary Africa
132-224 Contemporary Middle East
132-225 Contemporary Latin America
132-226 Human Geography
132-336 Developing Political Systems
132-471 History of the Ottoman Empire
113-329 Civilisation Francaise: Les Cultures Francophones
113-418 Francophone Literature of the Twentieth Century
113-351 Hispanic Cultural Perspectives
113-354 Civilizacion Hispanica II
113-355 Civilizacion Hispanica III
113-357 Latin American Art, Music, and Dance
133-255 Comparative Marriage and Family Systems
133-256 Work in Non-Western Societies
132-324 Russian History I
133-250 Cultural Anthropology
115-291 Islam
115-291 Buddhism

Additional courses fulfilling this requirement may be approved and will be so announced.

**Completing a Major**

The degree candidate is required to complete in a logical sequence a major of not less than 45 quarter hours. The faculty adviser assists the student in planning his major by the third quarter of his sophomore year. Candidates for the degree of Bachelor of Arts who expect to teach in the public school are required to satisfy professional education requirements and will have a member of the Department of Education for a professional adviser. In some majors, areas of concentration requiring at least 21 quarter hours are provided allowing the student to focus on a specific area within a major.

Students pursuing a dual major program in two departments within the College of Arts and Sciences are required to meet each department's requirements for the major in that discipline.

The following major fields are offered for the Bachelor's degree in the College of Arts and Sciences:

<table>
<thead>
<tr>
<th>Major, Concentration</th>
<th>Degree</th>
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<tbody>
<tr>
<td>Art</td>
<td>BA, BFA</td>
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<tr>
<td>Ceramics</td>
<td>BFA</td>
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<td>Graphic Design</td>
<td>BFA</td>
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<td>Painting</td>
<td>BFA</td>
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<td>Printmaking</td>
<td>BFA</td>
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<td>Sculpture</td>
<td>BFA</td>
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<tr>
<td>Biochemistry</td>
<td>BS</td>
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<tr>
<td>Biology</td>
<td>BA, BS</td>
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<tr>
<td>Chemistry</td>
<td>BA, BS</td>
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<tr>
<td>College Student Personnel</td>
<td>BA</td>
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<tr>
<td>Communication Arts</td>
<td>BA</td>
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<tr>
<td>Speech</td>
<td>BA</td>
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<tr>
<td>Theatre</td>
<td>BA</td>
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<tr>
<td>Public Relations</td>
<td>BA</td>
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<tr>
<td>Computer Science</td>
<td>BA, BS</td>
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<td>Criminal Justice</td>
<td>BA</td>
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<tr>
<td>Elementary Education</td>
<td>BA</td>
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<tr>
<td>English</td>
<td>BA</td>
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<td>French</td>
<td>BA</td>
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<td>Health Education</td>
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<td>History</td>
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<td>Industrial Technology</td>
<td>BA, BS</td>
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<td>International Studies</td>
<td>BA</td>
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<tr>
<td>Mathematics</td>
<td>BA, BS</td>
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<tr>
<td>Medical Technology</td>
<td>BSMT</td>
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<tr>
<td>Music</td>
<td>BA</td>
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<td>Music Education</td>
<td>BM</td>
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<td>Music Performance</td>
<td>BM</td>
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<tr>
<td>Philosophy</td>
<td>BA</td>
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<tr>
<td>Philosophy and Religion</td>
<td>BA</td>
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<tr>
<td>Physical Education</td>
<td>BA</td>
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<tr>
<td>Physics</td>
<td>BA, BS</td>
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<tr>
<td>Political Science</td>
<td>BA</td>
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<tr>
<td>Public Administration</td>
<td>BA</td>
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<tr>
<td>Psychology</td>
<td>BA</td>
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<tr>
<td>Religion</td>
<td>BA</td>
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<tr>
<td>Sociology</td>
<td>BA</td>
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<tr>
<td>Spanish</td>
<td>BA</td>
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<tr>
<td>Sports Management</td>
<td>BA</td>
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<tr>
<td>Sports Medicine</td>
<td>BA</td>
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<tr>
<td>Writing (second major only)</td>
<td>BA</td>
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**Minors**

A formal program of academic minors is available in several of the subject matter areas. Consult the chairman of the department in question for specific procedural instructions. Minors require a minimum of 30 quarter hours of approved courses, including some work above the 200 level. Minors are for students who wish to pursue organized study in a discipline without completing a major.
The Bachelor of Music, Bachelor of Fine Arts, Bachelor of Science in Medical Technology Degree Programs
A candidate for the Bachelor of Music degree may major in music education or performance. A candidate for the Bachelor of Fine Arts degree may concentrate in painting, printmaking, sculpture, ceramics or graphic design. A candidate for the Bachelor of Science in Medical Technology degree must complete the clinical year as well as other prescribed requirements.

Teacher Certification
Ohio Northern University is vitally concerned with preparing effective and efficient teachers. Certification programs are offered within the degree requirements in almost every department. (See the Department of Education listing for details.)

Students preparing to teach are expected to make formal application for admission into the Teacher Education program during the quarter in which they will complete 90 quarter hours of course work if they have completed all prerequisites. To be accepted, the student must have an overall accumulative point average of at least 2.5 with no grade less than "C". The Committee on Teacher Education, representing the five divisions of the College of Arts and Sciences and the College of Business Administration, establishes policies for admission into the program of Teacher Education and considers all applications for admission to the program.

Students preparing to teach are assigned advisers in the Department of Education to assist them with the scheduling of professional education courses and the completion of clinical/field experiences. The adviser in the student's major department continues to advise the student on the requirements for his major.

Students with degrees from other accredited universities may qualify for teacher certification by completing the required courses in the Department of Education. The Department of Education permits the completion of degree requirements and/or recommendation for teacher certification only when a student demonstrates qualities indicative of competence in teaching.

Preprofessional Programs
Medical Sciences Programs A Medical Sciences Advisory Committee with representatives from biology, chemistry, mathematics, physics, pharmacology, and a representative from outside the Division of Mathematics and Natural Sciences advises students in the areas of the medical sciences (premedicine, predentistry, preveterinary, etc.). The general objectives of the committee are to counsel students preparing for a career in the medical sciences, to serve as a source of information concerning preprofessional education in the medical sciences, and to serve as a source of recommendations to professional schools in the medical sciences.

A representative of the committee meets with all new premedical students at summer orientation and regularly during their undergraduate careers. The committee provides a guideline and a timetable to help a student pursue his career goals. The first year program usually includes biology, chemistry, English, and mathematics. After the first year, with the exceptions of organic chemistry and physics, the program is a function of the student’s choice of departmental major and the professional schools to which he/she plans to apply. For further information contact Dr. Howard L. Haight, Chairman, Medical Sciences Advisory Committee.

Medical Technology Most students in medical technology study three years on campus and spend a fourth clinical year at an accredited Medical Technology School. Forty-five quarter hours are transferred from the medical technology school to Ohio Northern University and applied toward a B.S. in Medical Technology degree. Ohio Northern University is affiliated with St. Elizabeth’s Medical Center in Dayton and Riverside Hospital in Toledo.

For additional information see Department of Biological Sciences program descriptions in this catalog. For detailed curriculum information contact the Medical Technology Adviser, Department of Biological Sciences.

Pretheology The recommendations of the American Association of Theological Schools are followed in counseling the pretheological student in planning a program leading to the Bachelor of Arts degree. An interdisciplinary major in the Department of Philosophy and Religion or a major in another appropriate department may be selected.

The chairman of the Department of Philosophy and Religion serves as adviser to the pretheological student in planning a preprofessional program, along with a departmental adviser in the major, if the student elects a major outside the Department of Philosophy and Religion.
Prelaw Students in the prelaw program select a major and complete the necessary requirements as do other students. The program is open to all students enrolled in any academic department of the College of Arts and Sciences, Engineering, Pharmacy, or Business Administration.

According to the Prelaw Handbook, students should select a major program of study which involves: (1) comprehension and expression in words, (2) critical understanding of the human institutions and values with which the law deals, and (3) creative power in thinking. Law schools seek entering students who have the capacity to think for themselves and the ability to express their thoughts with clarity and force. The prelaw student must work closely with his or her specific program adviser and with the Prelaw Advisory Committee to attain the goals of the program.

The College of Arts and Sciences in cooperation with the Ohio Northern University College of Law has developed a unique prelaw program which offers an excellent opportunity for superior students preparing for a career in law. At the present time Ohio Northern is unaware of any other comparable program in the United States which prepares undergraduate students for law school and then guarantees them preferential treatment in admission to law school after they have successfully completed the program.

To qualify for guaranteed admission to the Ohio Northern University College of Law, undergraduate students must: (1) take the prelaw series; (2) maintain an undergraduate grade point average of at least 3.0; and (3) score within the range of the 50th percentile on the LSAT. Students must complete a prelaw declaration form and file it with their department/college prelaw adviser no later than when they have completed 120 quarter hours. At that time the students' records will be reviewed by members of the Prelaw Advisory Committee, and they will be advised regarding how well they have met the intent of the program and how they should proceed to complete their courses of study. It will be the students' responsibility to inform their advisers when they have 120 hours. Placement in law school depends, in large part, upon the academic record of the student plus the recommendations which that student receives from his/her academic adviser and the Prelaw Advisory Committee.

Combination Curricula

Four and Five Year Combination Curricula

The Arts-Engineering, Arts-Pharmacy programs are five year curricula for the student challenged by the rewards of in-depth study in both the Arts and Sciences and the professional fields of Engineering or Pharmacy. The student pursues degrees simultaneously in the College of Arts and Sciences and Engineering or Pharmacy, pays tuition at the Engineering or Pharmacy College rate, has an adviser in each college, and receives an appropriate degree in each college upon graduation.

Students taking the dual degree in the College of Arts and Sciences and Engineering are required to take advanced mathematics in the first year. The curriculum outline is listed in the Engineering section of this catalog.

Students taking a dual degree in the Colleges of Arts and Sciences and Pharmacy are required to meet the three-year residency requirement to qualify for graduation from the College of Pharmacy.

Dual degree students meet all requirements in each college in the same way as students graduating with one degree.

European Studies

A European Studies Minor is offered within the College of Arts and Sciences to enhance other major programs of study with in-depth study of some aspect of European language, culture, and history in close consultation with an adviser identified by the dean. A student must complete study in the following areas:

1. Language French, German, Spanish, or other continental European language beyond the elementary level. (8 credits)

2. Core Requirements
   History 221 - Contemporary Europe
   History 377-378 - History of Modern Europe I-II

3. Recommended cognate courses (15 credits)
   Study will be in a focused area of European studies identified by the student with an adviser.

Suggested cognate courses:
Art 305, 315, 325, 335
French 219, 319, 327-328
German 291, 337, 491
Spanish 353, 447, 448, 452, 453
History 324-325, 326, 327, 328, 329
Political Science 334, 335, 421, 422, 455, 456-457
Music 245, 321-322-323
English 221-222-223
Philosophy 331, 345, 348, 349, 350
Religion 262, 346, 347, 353
Theatre 241-242
Education 401, 465
Economics 385, 411, 443

General Regulations
1. A student may not register for more than 19 hours of academic work unless he/she achieved a grade point average of 3.00 or better in the preceding quarter, in which case the dean may grant permission for extra hours. A normal program consists of 12 to 19 scheduled hours including physical education.
2. All new students in the College of Arts and Sciences are required to take freshman orientation in their major field, normally in the fall quarter.
3. A student indicates a choice of major field by filing out a declaration of major form available in the office of the department chairman.
4. No course for which a student has received a "D" is acceptable toward a major, minor, or area of concentration.
5. Juniors and seniors are expected to schedule a majority of their courses from the "300" and "400" group.
6. With the permission of the instructor and the department chairman, any course prerequisite may be waived.
7. Except where noted, credit hours earned in repeated courses may be counted only one time among the total hours required for graduation.
8. Writing I should be taken by all freshmen during their first quarter on campus. Both courses in writing should be completed by the end of the freshman year.

S/U Grade Option
Students in the College of Arts and Sciences are given the opportunity to register for one course per quarter on an S/U (Satisfactory/ Unsatisfactory) option basis, with the following stipulations:
1. The student must be a full-time student in Arts and Sciences.
2. The student must have sophomore, junior, senior or post-graduate standing.
3. The requested course cannot be in the department of the student's major.
4. The requested course cannot be a 100-level general education course.
5. The requested course cannot be a cognate.
6. The grade of "S" is to be equated with A, B, C. The grade of "U" is equated with D or F.
7. Students cannot change their mind about the grading system after the second week of class.

Classification of Students
For purpose of classification the minimum requirement for sophomore standing is 45 quarter hours of academic work; for junior standing, 90 quarter hours; for senior standing, 135 quarter hours.

Academic Probation
A grade point average of 2.00 is required for graduation. If a student's accumulative grade point average falls below 2.00 within a given quarter, that student is placed on probation, and participating in extracurricular activities is reviewed by his/her advisor, by the Vice President for Student Affairs, and by the dean of the college.

If a Freshman's accumulative grade point average falls below 1.60 within a given quarter, that student cannot participate in extracurricular activities unless approval is granted by the dean of the college. A student at sophomore standing must attain at least a 1.80 average to participate in extracurricular activities unless approval is granted by the Dean. Upper-division students at junior and senior standing are expected to maintain grades above probationary status (2.0) to participate in extracurricular activities.

Any student on probation whose work for the following quarter continues below a 2.00 will have his/her record reviewed by the Committee on Academic Qualifications of the College and may be recommended to the dean for suspension or dismissal.

Graduation
To graduate with a Bachelor of Arts, a Bachelor of Fine Arts or a Bachelor of Science degree, a student is required to complete a minimum of 182 quarter hours which includes the appropriate general education courses, complete an approved major, and have an accumulative point average of at least 2.00.
The minimum residency requirement for all students is the last three quarters and the completion of at least 45 quarter hours with at least 90 quality points elected mostly from 300- and 400-level courses.

To graduate with a Bachelor of Science in Medical Technology the student must complete the three year pre-clinical program of 138 quarter hours and a one-year clinical program in an approved program of 45 quarter hours for a total of 183 quarter hours.

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**ARTS AND SCIENCES COURSES—GENERAL (Department 100)**

**000. ORIENTATION 1 qtr hr** Familiarization with college requirements, programs and academic services; exploration of academic and career goals; planning program of courses. Required of all students who have not declared a major.

**010. STUDY SKILLS 1 qtr hr** A course designed to increase study efficiency by emphasizing improvement in motivation, concentration and memory. Attention is also given to selected study skills including time-management, listening, note-taking, reading comprehension and test-taking. CREDIT EARNED IN THIS COURSE DOES NOT SATISFY GRADUATION REQUIREMENTS FOR ANY PROGRAM OFFERED AT THE UNIVERSITY. Open to freshmen and sophomores only.

**121. CAREER PLANNING 1 qtr hr** Principles, methods, and practice in career planning with emphasis on self analysis, career information, exploration of careers, and career opportunities. The course is designed for freshmen who are uncertain about their career plans.

Special topics courses may be offered by any department within the college.

**190. SPECIAL TOPICS 1-3 qtr hrs**

**290. SPECIAL TOPICS 1-3 qtr hrs**

**390. SPECIAL TOPICS 1-3 qtr hrs**

**490. SPECIAL TOPICS 1-3 qtr hrs**

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**Medical Sciences**

**000. MEDICAL SCIENCES ORIENTATION 0 qtr hrs** Familiarity with general requirements and admissions standards for entry into colleges of medicine, dentistry, veterinary medicine, etc. Open to students interested in preparing for a career in these areas.

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**Air Force ROTC**

A TOTAL OF SIX CREDITS EARNED IN AIR FORCE ROTC MAY COUNT TOWARD THE 182 QUARTER HOURS NEEDED FOR GRADUATION IN THE COLLEGE OF ARTS AND SCIENCES

**111. AIR FORCE ORGANIZATION I 1 qtr hr** Organization of the United States Air Force, mission function and employment of strategic forces, capabilities of Army in a limited war and counterinsurgency, Naval forces structure and employment, enemy threat assessment. Leadership laboratory activities.

**112. AIR FORCE ORGANIZATION II 2 qtr hrs** U.S. general purpose force capabilities, mission, resources, operation of tactical air forces, defensive forces, airlift forces, structure and function of logistics support weapons systems development. Leadership laboratory activities.

**211. AIR FORCE HISTORY I 1 qtr hr** Development of air power from the first lighter-than-air vehicles through to the establishment of the Department of the Air Force as an independent military force. Various concepts of employment of air power and factors which have prompted research and technological change. Examples of impact of air power on strategic thought. Leadership laboratory activities.

**212. AIR FORCE HISTORY II 2 qtr hrs** Development of air power since the establishment of the independent Air Force to the present. Various concepts of employment of air power and factors which have prompted research and technological change. Examples of impact of air power on strategic thought. Leadership laboratory activities.
311. AIR FORCE MANAGEMENT I 4 qtr hrs Integrated management course emphasizing individual as leader in the Air Force. Human behavior, individual and in groups, historical development of management thought, discussion of classical leadership theory, oral and written communication, military writing, and briefing formats. Leadership laboratory activities. Prerequisite: Departmental approval.

312. AIR FORCE MANAGEMENT II 5 qtr hrs Continuation of 311. Air Force leadership, planning, organizing, coordinating, directing and controlling functions of management with emphasis on Air Force application, concept of command and staff, junior officer as administrative leader, Air Force personnel system, management of change, managerial strategy in changing environment. Leadership laboratory activities. Prerequisite: Departmental approval.

411. AIR FORCE OFFICERSHIP I 4 qtr hrs The Air Force officer as part of national security forces in contemporary American society, armed forces as an integral element of society. American civil military relations and environmental contact in which defense policy is formulated. Formulation and implementation of U.S. defense policy, framework of defense policy including domestic and international. Leadership laboratory activities. Prerequisite: Departmental approval.

412. AIR FORCE OFFICERSHIP II 2 qtr hrs The Air Force officer and his part in the evolution of defense strategy since World War II. Strategy and management of conflict, arms interaction and control, limited war, insurgency, counter-insurgency, international terrorism, military law. Initial Active Duty Orientation. Leadership laboratory activities. Prerequisite: Departmental approval.

to the art of military leadership, and the dimensions and responsibilities associated with positions of military leadership. No military service obligation or prerequisites. Freshmen and sophomores only.

107. PROFESSIONAL MILITARY ETHICS 1 qtr hr A survey of the professional dimensions of military service, including the role and responsibilities of commissioned officers and ethical precepts of military leadership. The course includes an introduction to international laws and conventions which affect military activity. No military service obligation.

201. SURVIVAL 3 qtr hrs Study and application of skills needed in basic human survival situations. Topics include land navigation, survival skills, and first aid. No military obligation or prerequisite. Freshmen and sophomores only.

204. MILITARY TACTICS 3 qtr hrs This is an introductory course in military tactics. Topics include the Principles of War, Terrain Analysis, Fundamentals of offensive and defensive combat, a comparison of U.S. and Soviet combat power and Airland Battle Doctrine. No military obligation. Departmental permission required.

211. STUDIES IN MILITARY SCIENCE 3 qtr hrs This course is a readings program into topics of classical and current military interest. Subjects that will be examined include: The emerging doctrine in military leadership, military organizations with an emphasis on stability and cohesion, and their impact on organizational effectiveness; the military profession with an emphasis on ethical issues; comparative military systems examining WW II's impact on the post-war armies of the Soviet Union, Germany, England, and the United States. No military obligation.

301. PROFESSIONALISM/LEADERSHIP 4 qtr hrs Professionalism and leadership required of the US Army officer; application of leadership principles and styles through case studies and role-playing exercises with emphasis on military situations. Participation in leadership labs, physical training program and field training exercises required. Prerequisite: Department permission and completion of one of the following: ROTC basic course at BGSU; ROTC Basic Camp at Fort Knox, KY; prior active duty service; Army Reserve/ANG basic training; or JROTC.

Army ROTC

A TOTAL OF SIX CREDITS EARNED IN ARMY ROTC MAY COUNT TOWARD THE 182 QUARTER HOURS NEEDED FOR GRADUATION IN THE COLLEGE OF ARTS AND SCIENCES.

101. THE ROTC AND ROLE OF THE U.S. ARMY 3 qtr hrs The role of the United States Army within the National Defense Establishment. Strategic purposes, tactical mission, and capabilities in terms of manning equipment, and organization. An introduction
302. SMALL UNIT OPERATIONS 5 qtr hrs Organization and employment of basic military teams. Squad and platoon level tactical operations. Progressive leadership development through application of tactical principles. Participation in leadership labs, physical training program and field training exercises required. Prerequisite: Departmental permission.

401. UNIT MANAGEMENT AND OFFICER DEVELOPMENT 4 qtr hrs Concepts and fundamentals of Army administration, supply and material readiness. Professional officership techniques and military ethics. Management at the small unit level. Organizing, planning and participating in field training exercises. Prerequisite: Departmental permission.

402. UNIT MANAGEMENT, MILITARY WRITING AND CORRESPONDENCE 5 qtr hrs Organization and concepts of the US Army judicial system including court martial, nonjudicial and nonpunitive actions. Development of military writing techniques, preparation of staff papers and staff actions. Discussions of movement of goods, and administrative details pertinent to newly commissioned lieutenants. Development and participation in field training exercises. Prerequisite: Departmental permission.

470. AMERICAN MILITARY HISTORY 5 qtr hrs A survey of American military history from the American Revolution to the present. The course will highlight the development of American military institutions, strategy, tactics, and policies throughout American history. Available to students under contract to the US Army Reserve Training Corps. This course is a requirement for commissioning. Instructor permission only.

The Departmental Courses

ART (Department 151)

Professors DeVore (Chairman), West, Associate Professor Chesser. Lecturer Greavu

The department seeks to develop within the student an understanding of the fine arts, to foster within the university an awareness of art as an essential ingredient of an educated person, and to provide the opportunity for the student to develop proficiency in various art media.

The artist should be educated comprehensively through a program combining professional training and broad study in the liberal arts. It is on this premise that the student majoring in art: (1) receives as broad an understanding of art as possible; (2) becomes acquainted with historical and cultural knowledge of the past and present; (3) develops a working proficiency through mastery of the tools and skills of his profession; (4) develops personal modes of expression in the media of the visual arts; and (5) acquires an awareness of any competency in other academic disciplines.

A student seeking a Bachelor of Arts degree with a major in art must complete 76 hours for the major including 152, 153, 161, 162, 210, 255, 265, 350, 489; six hours selected from 270, 280, 370, 379; nine hours selected from 250, 251, 355, 420; and nine hours selected from 305, 315, 325, 335.

A candidate for the Bachelor of Fine Arts degree must complete the following general requirements: A. Basic Requirements: (1) Communication Skills (3 courses); Written Communication: English 110, 111 (taken in freshman year); Oral Communication: Speech 100; (2) General Requirements (7 courses) Literature: English 204 ("Great Works of Literature," taken in sophomore year); Western Civilization 110, 111, Philosophy 100 or 102. Religion: 1 course from 105, 106, 107, 108, Foreign Language: 2 courses in one language; (3) Distributional Requirements (5 courses) (courses in each of the following divisions, in addition to courses taken in A.1 and A.2) (a) Fine Arts - two courses (or equivalent totaling 6 credit hours), one course from two disciplines in the division outside of the major area. (b) Social Sciences - one course: Psychology, Sociology, Political Science, Economics. (c) Natural Sciences/Mathematics-Computer Science - one biological science course and one physical science course.

Graduation Requirements: A student's total educational program must include the following: (1) Use of the computer or substantial exposure to or study of the uses and implications of computer technology. (2) At least one course which involves substantial exposure or study of a non-Western or 3rd-world people, society, or culture. (3) At least three 1-hour physical education activity courses.
A candidate for the Bachelor of Fine Arts degree must also complete 97 hours for the major including 151, 152, 153, 161, 162, 210, 222, 255, 265, 350, 360, 489; nine hours selected from 270, 280, 370, 379; nine hours selected from 250, 251, 355, 420; and 12 hours selected from 305, 315, 325, 335. Students concentrating in ceramics, painting, printmaking, or sculpture must complete a minimum of 24 hours in the area of major concentration. Students concentrating in graphics design must complete three hours of 222, three hours of 223; three hours of 224; six hours from 142-240, 142-341; and 15 hours of 471.

A student may obtain a minor in art by completing 151, 152, 161, 162, and 18 quarter hours of art electives. Students are urged to confer with a faculty advisor in order to make an appropriate selection of course work.

Professional education requirements are listed by the Department of Education.

A public exhibition of the student's studio work (one hour of 489) is required for graduation with a major in art for both the Bachelor of Arts and the Bachelor of Fine Arts degree.

Portfolios are required for all applications for scholarships as well as for all applications for admission with advanced standing. While portfolios are not required of entering freshmen, their submission tends to expedite admission.

000. ORIENTATION 1 qtr hr Familiarization with the department, requirements for majors, planning program of courses, university catalog, and library. Required of all majors in the department.

100. ART 3 qtr hrs Analysis of the visual arts through selected works from the past and present. Illustrated lecture.

114. ART FOR ELEMENTARY TEACHERS 3 qtr hrs For the prospective elementary teacher with emphasis on the creative and mental growth of children in relationship to their work in art. Illustrated lectures.

115. ART FOR ELEMENTARY TEACHERS 3 qtr hrs For the prospective elementary teacher with emphasis on teaching demonstrations, media, and methods in art, and the elements within. Illustrated lectures. Prerequisite: Art 114.

151. DRAWING I 3 qtr hrs Introduction to methods and media of drawing. Required of all art majors.

152. DRAWING II 3 qtr hrs Extended problems of rendering in line and tone, studies in perspective.

153. DRAWING III 3 qtr hrs Advanced problems in drawing involving complex forms including the human figure. Emphasis on the development of drawing as finished expressive work. May repeat for a total of 6 hours.

161. DESIGN I 3 qtr hrs Introduction to and application of the elements and principles of plastic and graphic design. Required of all art majors.

162. DESIGN II 3 qtr hrs Organization of elements and principles in three dimensions.

210. FIGURE DRAWING 3 qtr hrs Drawing and anatomical study of the human figure. May repeat for credit to total of 12 hours.

221. JEWELRY 3 qtr hrs Use of a variety of materials in the making of jewelry. Emphasis on design and the development of technical skills. May repeat for credit once.

222. GRAPHIC DESIGN I 3 qtr hrs Basic letter forms, emphasis on proportion, theory, rendering technique and applications of lettering in commercial art.

223. GRAPHIC DESIGN II 3 qtr hrs A continuation of 222, in addition to problem solving associated with the making of advertising for print and other media, advertising and marketing skills, copywriting and editing, and other allied communication skills.

224. GRAPHIC DESIGN III 3 qtr hrs Continuation of 222 and 223. Individual solutions to selected visual problems/projects. Media and technique varies. All assignments/solutions stress professional application and methods required of the graphic designer. Emphasis on concepting and realizing within specifications, budget, and timeframe. May repeat for credit once to total 6 hours. Prerequisites: Art 222 and/or 223.

250. PAINTING I 3 qtr hrs An introduction to techniques and modes of painting. Emphasis on theory and use of color.

251. PAINTING II 3 qtr hrs Techniques and modes of painting in oil. May repeat for credit to a total of 12 hours. Prerequisite: Art 250.

255. CERAMICS I 3 qtr hrs Methods and techniques of forming clay products with emphasis on hand construction. Introduction
to work on the potters wheel. Decorating, glazing and firing of ceramic ware.

265. SCULPTURE I 3 qtr hrs An introduction to the design and rendering of sculptural form in a variety of media and techniques. Emphasis on organizational problems of form and space.

270. RELIEF PRINTMAKING 1 3 qtr hrs Woodcut, linecut, wood engraving and other relief techniques. May repeat for a total of 9 hours. Prerequisites: Art 151, 152, 153, 161 and 162.

280. SERIGRAPHY 3 qtr hrs Methods and techniques. May repeat for total of 6 hours.

290. SPECIAL TOPICS IN ART 1-3 qtr hrs

305. ANCIENT AND MEDIEVAL ART 3 qtr hrs Art forms and styles from prehistoric times through the 14th century. Offered alternate years.

315. RENAISSANCE AND BAROQUE ART 3 qtr hrs The development of European Art and architecture from the 15th through the 18th century. Offered alternate years.

325. IMPRESSIONISM-POST IMPRESSIONISM 3 qtr hrs Emphasis on developments in French art between the Revolution of 1784 and 1900. Offered alternate years.

335. MODERN ART 3 qtr hrs Emphasis on formation and development of basic artistic movements from the beginning of the 20th century to the present. Offered alternate years.

350. CERAMICS II 3 qtr hrs Methods and techniques of forming, decorating, glazing and firing clay bodies. Emphasis on wheel throwing. May repeat for a total of 9 hours credit. Prerequisite: Art 255.

355. WATERCOLOR 3 qtr hrs Techniques and modes of painting in aqueous media. May repeat for credit to a total of 9 hours.

360. SCULPTURE II 3 qtr hrs The design and rendering of sculptural forms in a variety of media and techniques. May repeat to total of 9 hours. Prerequisite: Art 265.

370. LITHOGRAPHY 3 qtr hrs Methods and techniques. May repeat to total credit of 6 hours. Prerequisites: Art 152, 162, and 210.

380. INTAGLIO PRINTMAKING 3 qtr hrs Methods and techniques of etching and engraving. May repeat to total of 9 hours. Prerequisites: Art 151, 152, 152, 161 and 162.

410. ADVANCED CERAMICS 3 qtr hrs Directed study. May repeat to total credit of 12 hours. Prerequisite: 9 hours of Art 350.

415. ADVANCED PRINTMAKING 3 qtr hrs Directed study. May repeat to total credit of 12 hours. Prerequisite: 6 hours of Art 270.

420. ADVANCED PAINTING 3 qtr hrs Directed study. May repeat to total credit of 12 hours. Prerequisite: 6 hours of Art 250 and 251.

425. ADVANCED SCULPTURE 3 qtr hrs Directed study. May repeat to total credit of 12 hours. Prerequisite: 9 hours of Art 360.

457. ART EDUCATION METHODS 4 qtr hrs Laboratory-seminar dealing with materials, techniques, and methods of secondary classroom instruction in art. Meets professional education requirement in methods area. Includes 30 hours of field experience. Admission to the Teacher Education Program or approval of the Director of Teacher Education.

471. INTERNSHIP 15 qtr hrs Supervised field experience in an approved commercial art studio, agency, or design department; full time five days a week. Prerequisites: Senior rank; Art 222, 223 and 224; Industrial Tech 240 and 341; and permission of the department. Application for this course must be made through the student's advisor to the department chairman not later than one full quarter in advance of enrollment.

489. SENIOR THESIS 1 qtr hr Required of all art majors. Preparation for and evaluation of the comprehensive examination and exhibit. Arrangements for this course must be made one quarter in advance with the student's advisor and the department chairman.

490. SPECIAL TOPICS IN ART 1-3 qtr hrs

494. SEMINAR IN ART 1-3 qtr hrs

497. INDEPENDENT STUDY IN ART 1-3 qtr hrs
BIOLOGICAL SCIENCES
(Department 121)

Professors Moore, Nelson; Associate Professors Hoagstrom (Chairman), Keiser; Assistant Professors Robbins, Warwick; Instructor Anderson; Assistant Instructor Magaw; Adjunct Faculty, St. Elizabeth Medical Center - Abramson, Martin; Riverside Hospital - Harding, Secord.

Students majoring in the biological sciences will be exposed to a wide range of academic disciplines within biology, including current instrumentation and research techniques and written and oral scientific communication methods. Biology 100 is a principles course with a major emphasis on the study of the cell and genetics. It provides generalizations by which advanced courses in biology can be related to one another and is therefore a prerequisite to all other courses in the curriculum. Students desiring further knowledge of general biology may take Biology 112 which surveys microbial, plant and animal life, evolution and ecology, and Biology 113 which covers the anatomy and physiology of flowering plants and of the human. These courses also provide a firm foundation for advanced work in biology and the related applied sciences.

The Bachelor of Arts and Bachelor of Science degrees are available to biology majors with the opportunity to specialize in premedical sciences (including predentistry, premedicine, and preveterinary medicine), health technology, environmental testing, field biology, and secondary education. Core requirements for both degrees are Biology 100, 112, 113, 195, 295, 395, 495; one advanced systematic survey course such as Biology 204, Biology 223, or a student may fulfill the systematic survey requirement by taking all of the vertebrate special topics courses (Ichthyology, Herpetology, Ornithology and Mammalogy) from Biology 490; one advanced organismic course such as Biology 205, 301, 302, 231 or 331; one course with considerable cellular/molecular content such as Biology 351 or Biology 430 with 431; one field biology course such as Biology 213, 251 with 252, 255, 383, 423. A minimum of 16 biology elective hours is chosen from among the following courses excluding those which have been taken as required core courses above: Biology 204, 205, 213, 223, 231, 232, 233, 244, 251, 252, 261, 262, 290, 297, 301, 302, 303, 321, 331, 332, 333, 343, 351, 355, 383, 423, 441, 451, 481, 490, 497. The independent study courses 297 and 497 and Internship 481 may count for only seven hours of these 16 biology elective hours.

Courses 361, 372 and virology from the College of Pharmacy are accepted as electives. Credit cannot be granted for both 231 and 331 or 232 and 332 or 321 and Pharmacy 372. Both degrees require a minimum of 47 biology hours not counting Biology 195. Departmental advisors will assist students in selecting relevant electives.

Both the B.A. and the B.S. degrees require a minimum of 25 hours of science cognates. Cognate requirements for the B.A. degree include three courses in chemistry, two courses in mathematics, and one course in physics, computer science or an additional mathematics course. The cognate requirements for the B.S. degree include three courses in chemistry, two courses in mathematics, one course in computer science, and an additional course in mathematics or computer science. For both degrees, courses in physics are strongly recommended. Biochemistry 341 and 342, taught in the College of Pharmacy and earth science courses taught in the College of Engineering are acceptable cognates. Kinesiology 223 offered by the Department of Health and Physical Education may count with permission of the biological sciences faculty.

In addition to the major and cognate requirements, the B.S. degree requires 20 hours of science which are taken in the Division of Mathematical and Natural Sciences in the College of Arts and Sciences. These hours may also be satisfied by taking courses in the Colleges of Engineering and Pharmacy, but are subject to the approval of the biological sciences faculty.

A student may minor in biology, biomedical sciences or environmental studies. For all three minors, a minimum of 30 quarter hours in biology is required. For the biology minor, the required courses are the same as for a major in biology with the exception that 195, 295, 395 and 495 are not required. An additional two or three hours of biology electives are required to complete the requirement of 30 quarter hours of biology.

For the biomedical sciences minor, the required courses are Biology 100, 113, 231 or 331, 232 or 332 and 233 or 333. Electives
must be chosen from Biology 301, 302, 303, 321, 343, 351, 441, 430-431, 490 (Parasitology) and Pharmacy 361 or 362 and 462.

For the environmental studies minor, the required courses are Biology 100, 112 and 113. Electives must be chosen from Biology 213, 233, 251, 252, 355, 383, 423 and certain special topics courses (Biology 490). These special topics courses may be included only with prior departmental approval.

Required cognate courses for all minors include 12 quarter hours in the Division of Mathematics and Natural Sciences, not including biology.

The Department of Biological Sciences offers a medical technology program leading to a Bachelor of Science in Medical Technology. Affiliate hospitals are St. Elizabeth Medical Center in Dayton, Ohio, and Riverside Hospital in Toledo, Ohio. The college requirements for this degree are the same as for the general B.S. degree with the exception that a second math/computer science course is not required and only 2 of 3 general elective courses are required. Departmental requirements include Biology 100, 112, 113, 195, 223, 295, 301, 321, 331, 343, 430, 431, 495 plus 8 hours of advanced biology electives. Microbiology 362 offered in the College of Pharmacy or its equivalent is also required. Courses in other areas of natural science include Chemistry 171, 172, 173, 231, 232, 233 and Biochemistry 341 offered in the College of Pharmacy, two math courses, one computer science course, and a basic electronics course, Physics 241. The B.S. in Medical Technology degree is awarded after the successful completion of the clinical year from an accredited school of medical technology. The medical technology student may choose to graduate with a major in biology, and then after graduation complete the clinical year. The student interested in this option should consult the medical technology advisor. The courses taken during the clinical year at St. Elizabeth Medical Center or Riverside Hospital are listed below and numbered from 460 to 477.

The Department of Biological Sciences has developed an internship program in which it has formed working relationships with a number of organizations and institutions. For seniors, the one quarter internship provides an off-campus practical experience in a field of biology with the earning of 15 hours of credit. Examples of possible internships include toxic waste control, environmental testing, zoo animal care and management, wildlife management, laboratory research, cardiology, cardio-pulmonary technology, biomedical computer, hospital and technical health programs. Before embarking on an internship, students must complete at least two years of courses in biology and related areas. The internship must be approved by the faculty of the department.

100. GENERAL BIOLOGY (4+1) 4 qtr hrs
Biological principles and concepts of plant and animal life with emphasis on life at the cellular level and genetics. Laboratory material is made available and discussed when appropriate.

105. BIOLOGY FOR NON-MAJORS (3+1)
3 qtr hrs
Biological concepts of plant and animal life with emphasis on classical biological principles and contemporary problems. Discussion in the presence of laboratory materials when appropriate. This is a terminal course which will not serve as a prerequisite for any other biology course and cannot be used as a basis for an in-depth sequence.

112. GENERAL BIOLOGY (4+1) 4 qtr hrs
The diversity that exists among living organisms and exemplified by the major groups of living organisms: prokaryotes, protists, fungi, plants and animals. Evolution and ecology are considered. Laboratory material is made available and discussed when appropriate. Prerequisite: Biology 100.

113. GENERAL BIOLOGY (4+1) 4 qtr hrs
Biological principles and concepts of the reproduction, development, growth, anatomy and physiology of plants and animals. Laboratory material is made available and discussed when appropriate. Prerequisite: Biology 100.

195. ORIENTATION (1+0) 1 qtr hr
Presentations and discussions relating to adjustments and requirements of academic life within the University, College and the Department of Biological Sciences.

204. BOTANY AND MYCOLOGY (2+4)
4 qtr hrs
Plant and fungal relationships including phylogeny and classification. The morphology, physiology, development and life cycles of selected taxa. Prerequisites: Biology 112 and 113.

205. ANGIOSPERM BOTANY (2+4) 4 qtr hrs
Relationships within the flowering plant division including phylogeny and classification.
tion. The morphology, physiology, development and life cycles of the flowering plants. Prerequisites: Biology 112 and 113.

213. NATURAL HISTORY (1+6) 3 qtr hrs Recognition and identification of local biotic communities and their inhabitants. Field study emphasized. Prerequisites: Biology 112 and/or permission of the instructor.

223. INVERTEBRATE ZOOLOGY (3+3) 4 qtr hrs Invertebrate relationships including morphology, physiology, life cycles and taxonomy. Prerequisite: Biology 112.

231. ANATOMY AND PHYSIOLOGY I (4+2) 4 qtr hrs Basic principles of human structure and function, including relevant aspects of exercise physiology. Includes cell physiology, metabolism histology, skin, bone and neural anatomy and physiology. Laboratory primarily covers the anatomy of the cat. Prerequisite: Biology 113.

232. ANATOMY AND PHYSIOLOGY II (4+2) 4 qtr hrs Continuation of 231. Topics covered include special senses, blood, immunology, renal system and digestive system, endocrinology and reproductive system. Laboratory presents relevant experiments on lecture topics. Prerequisite: Biology 231.

233. EXERCISE PHYSIOLOGY (4+2) 4 qtr hrs The physiological basis of physical education and athletics. Course primary emphasis is on exercise physiology. Topics covered include thermal regulation, muscle physiology, respiratory physiology, cardiovascular physiology and special topics of exercise physiology. Laboratory primarily covers techniques for evaluating physical conditioning as related to lecture topics. Prerequisites: Biology 232 or 333.

244. THE ENVIRONMENTS OF MAN (2+0) 2 qtr hrs The interactions of man and his surroundings with emphasis on the problems arising from increasing human population, pollution and resource use.

251. PRINCIPLES OF ECOLOGY 3 qtr hrs Consideration of the interaction of organisms with their environment at the level of the individual, population, community and ecosystem. Prerequisites: Biology 112 and 113.

252. PRINCIPLES OF ECOLOGY LABORATORY 1 qtr hr Laboratory and field work on the interactions of living things with their environments. Prerequisite or corequisite: Biology 251.

261. BIOGEOGRAPHY 1 3 qtr hrs Study of the current and historic distribution of plants and animals. Consideration of continental drift, glaciation, meteorology, climatology, ecology and evolutionary history and their effect on the current distribution. Prerequisites: Biology 112 and 113. Offered alternate years 1988-89.

262. BIOGEOGRAPHY 2 3 qtr hrs Continuation of Biogeography 1. Prerequisites: Biology 261 or permission of instructor. Offered alternate years 1988-89.

290. SPECIAL TOPICS IN BIOLOGY 1-3 qtr hrs Grading system at the discretion of the instructor.

295. BIOLOGICAL LITERATURE RESEARCH 1 qtr hr Experience in using the resources of the library for biological research. Reading and critical analysis of portions of classical and current papers and longer works that have had significant impact on the biological sciences.

297. INTRODUCTION TO BIOLOGICAL INVESTIGATIONS 1-3 qtr hrs Minor investigations for qualified freshmen and sophomores. Graded S-U.

301. DEVELOPMENTAL ANATOMY (2+4) 4 qtr hrs A study of the human embryonic and fetal development supplemented by laboratory studies of chick, pig and mouse embryonic development. Prerequisite: Biology 113.

302. HUMAN ANATOMY 4 qtr hrs (Formerly 300). A study of the gross anatomy of the human body and body systems. Prerequisite: Biology 113 or its equivalent. Offered alternate years: 1989-90.

303. HISTOLOGY 4 qtr hrs (Formerly 300). A study of the tissues that comprise the organ systems of the human body. Prerequisite: Biology 113 or its equivalent. Offered alternate years: 1988-89.

321. IMMUNOLOGY (3+0) 3 qtr hrs Basic anatomical, physiological, and genetic principles of immunology with some reference to clinical application. Prerequisites: Biology 112 and 113; Chemistry 173.

331. PHYSIOLOGY I (3+3) 4 qtr hrs A structural and functional approach to understanding the human body at an advanced level of study. Emphasis is placed on the integration of parameters from all levels of tissue and organ system function. Prerequi-
sits: Biology 113 and one year of chemistry.
Corequisite: Chemistry 231.

332. PHYSIOLOGY II (3+3) 4 qtr hrs Continuation of 331. Prerequisite: Biology 331.
Corequisite: Chemistry 232.

333. PHYSIOLOGY III (3+3) 4 qtr hrs Continuation of 332. Prerequisite: Biology 332.
Corequisite: Chemistry 233.

343. MICROTECHNIQUE (2+3) 3 qtr hrs Principles and procedures used in the preparation of biological specimens for microscopic study. Open to students majoring in Biology.

351. CELL BIOLOGY (3+3) 4 qtr hrs Function and structure of cells. Bioenergetics, enzyme action, and subcellular entities (their structure, function, origin and development). Some consideration of interaction between cells. Prerequisites: Biology 112 and 113; Chemistry 173.

355. INTRODUCTION TO MARINE BIOLOGY 4 qtr hrs The various marine environments and the organisms that inhabit them. A two-week field trip to a marine environment is required. May repeat for credit four times. Prerequisites: Biology 112 and/or permission of the instructor.

383. ANIMAL BEHAVIOR (ETHOLOGY) (2+2) 3 qtr hrs Basic principles of the behavior and ethology of invertebrates and vertebrates, stressing observational and descriptive techniques. Prerequisites: Biology 112, 113 and 223. Offered alternate years: 1988-89.

395. BIOLOGICAL RESEARCH 1 qtr hr Working with a research adviser, the student will prepare and submit a written report in approved scientific format. This report must detail the progress of the student’s senior thesis research including a literature review and work completed to date.

423. TOPICS IN ECOLOGY 3 qtr hrs A study of the current literature on selected topics in Ecology. No topic will be repeated in a four year period, so the course may be repeated for credit. Prerequisite: Biology 251 or permission of instructor. Offered alternate years: 1989-90.

430. GENETICS (3+0) 3 qtr hrs The principles of genetics as exemplified by microorganisms, higher plants and animals. Mendelian, biochemical, developmental and prokaryotic genetics are considered. Prerequisites: Biology 113; one year of Chemistry.

431. GENETICS LABORATORY (0+3) 1 qtr hr Experiments which demonstrate genetic phenomena. Drosophila, bacteria, microscope slides and probability studies are employed. Corequisite: Biology 430

441. PHYSIOLOGY OF AGING (1+0) 1 qtr hr A seminar format with readings, lectures and discussions concerning known physiological processes of aging in the systems of the human body. Prerequisites: Biology 231,232 and 233 or Biology 331,332 and 333 or with permission of instructor.

451. ADVANCED TOPICS IN CELL BIOLOGY (3+0) 3 qtr hrs A study of the current literature on selected topics in cell biology. No topic will be repeated in a four year period, so the course may be repeated for credit. Prerequisite: Biology 351 or Biochemistry 342. Offered on demand.

481. INTERNSHIP PROGRAM 15 qtr hrs Practical experience in areas such as wildlife biology, zookeeping, environmental monitoring, cardiopulmonary technology, pro-health programs and other specializations. Internships for which credit hours are also offered by another department are acceptable as long as the credit hours total 15 quarter hours. All departments involved must agree with the internship arrangement. Prerequisites: normally restricted to seniors, must be approved by biological sciences faculty, and the student must have a minimum of 3 years work in the fundamentals of biology and related areas.

490. SPECIAL TOPICS IN BIOLOGY 1-4 qtr hrs Courses in the following disciplines: entomology, herpetology, ichthyology, mammalogy, parasitology, ornithology, North American mammals and plant taxonomy.

495. SEMINAR IN BIOLOGY 1 qtr hr

497. INDEPENDENT STUDY IN BIOLOGY 1-3 qtr hrs Graded S-U.

Medical Technology

460. ORIENTATION TO MEDICAL TECHNOLOGY 2 qtr hrs An introduction to basic laboratory instruments, methods, procedures, terminology, ethics and safety.

461. CLINICAL BACTERIOLOGY- LECTURE 4 qtr hrs Study of micro-organisms found in human infection, principles of isolation and identification.
462. CLINICAL MYCOLOGY - LECTURE
2 qtr hrs Study of fungi found in human infection, principles of isolation and identification.

463. CLINICAL PARASITOLOGY - LECTURE
2 qtr hrs Study of parasites found in human infection, principles of isolation and identification.

464. CLINICAL MICROBIOLOGY LABORATORY
6 qtr hrs Laboratory methods, procedures, and instrumentation to correlate with Bacteriology, Mycology, and Parasitology lectures.

465. IMMUNOHEMATOLOGY LECTURE
3 qtr hrs Theory of human blood groups, compatibility testing, detection, and identification of antibodies.

466. IMMUNOHEMATOLOGY LABORATORY
3 qtr hrs Laboratory methods and instrumentation to correlate with lectures.

467. CLINICAL IMMUNOLOGY LECTURE
2 qtr hrs Theory of information and detection of antigens and antibodies in disease states, both in vivo and in vitro.

468. CLINICAL IMMUNOLOGY LABORATORY
2 qtr hrs Laboratory methods and instrumentation to correlate with lectures.

469. CLINICAL HEMATOLOGY/COAGULATION LECTURE
4 qtr hrs Theory of hematopoiesis, cell morphology, blood dyscrasias, coagulation mechanism and abnormalities. Correlation of findings with human physiology and disease.

470. CLINICAL HEMATOLOGY/COAGULATION LABORATORY
4 qtr hrs Laboratory instrumentation and procedures to correlate with the lectures.

471. CLINICAL CHEMISTRY LECTURE
8 qtr hrs Theory of chemical constituents of body fluids in normal and disease states. Includes General Chemistry, Toxicology and DIA, Instrumentation, Statistics and Quality Control.

472. CLINICAL CHEMISTRY LABORATORY
8 qtr hrs Laboratory instrumentation and procedures to correlate with the lectures.

473. URINALYSIS LECTURE
1 qtr hr Physiology of urinary system, related diseases and correlation to disease states.

474. URINALYSIS LABORATORY
1 qtr hr Laboratory methods and instrumentation to correlate with lectures.

475. LABORATORY MANAGEMENT LECTURE P/F
0 qtr hrs Theory and discussion of supervision and management.

476. CLINICAL PATHOLOGY
1 qtr hr Correlation of clinical laboratory findings with different human physiological states. Consists of case studies, review sessions, management and education orientation. Prerequisite: Completion of the pre-professional medical technology curriculum for students at St. Elizabeth Medical Center. Enrollment limited to medical technology interns.

477. CLINICAL PATHOLOGY SEMINAR
1 qtr hr Consists of presentation and discussion of special topics and current developments in clinical laboratory medicine. Topics are presented by students and guest lecturers. Prerequisite: Completion of the pre-professional medical technology curriculum for students at St. Elizabeth Medical Center. Enrollment limited to medical technology interns.

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CHEMISTRY
(Department 122)

Professors Haight, Hawbecker (Chairman), Kurtz, Wilhelm; Associate Professors Canagaratna, Hruschka, J. (Sabb.), Lamb, Sadurski; Assistant Professor Peterson; Instructor Mitchell.

The objectives of this department are to help serve the cultural need for an understanding of science in our modern society, to provide the basic preparation in chemistry for those who plan to enter the chemical industry, the teaching profession, pursue graduate study in chemistry or related fields, and to serve those who need an understanding of the fundamentals of this physical science as a prerequisite to various professional studies and career goals.

The Department of Chemistry is on the list of departments approved by the American Chemical Society for the professional education of chemists and offers both the Bachelor of Science and Bachelor of Arts degrees.

Major in Chemistry Four major programs are available in the Department of Chemistry. They are the American Chemical Society certified program, the basic program, the modified program, and the biochemistry program.
The American Chemical Society Certified Major The student who wishes to be certified as a professional chemist by the American Chemical Society may complete a program leading to either the Bachelor of Science or the Bachelor of Arts degree. This certified program is designed to prepare students for direct entry into the chemical industry or for graduate studies in chemistry. The following chemistry core courses are required for the certified degree: Chemistry 000, 181-182-183, 241-242-243, 300, 341-342-343, 304, 324, 351 and 494. To this core must be added a "professional" component which includes Chemistry 451 and 462 plus a minimum of 9 credit hours from among the following: Chemistry 311; Chemistry 473; Chemistry 474; Chemistry 481-482-483, and advanced biochemistry, mathematics, computer science, or physics courses approved by the department. The following cognate courses must also be added: Mathematics 163, 261, 262, and 272; Computer Science 134 or 230, and Physics 231-232-233 with related laboratories. Interested students should note that some of the courses in biochemistry are available in the College of Pharmacy.

The Basic Major Basic Bachelor of Science and Bachelor of Arts degree programs are also available for those who wish to become chemists, follow a preprofessional program such as premedicine or pursue graduate studies. The student who wishes to complete a basic major must complete the chemistry core and the cognate courses listed above. The "professional" component is not required.

The Modified Major A modified major program is available for those who wish to prepare for related areas such as certain medical science specialties, sales or management in the technical industries, patent law, scientific communication and information retrieval, and environmental science. Entrance into the modified major program must be approved by the departmental faculty. It is expected that a second major or teacher certification will be completed along with this modified major. The second major will usually dictate whether the BS or BA degree is chosen. This program permits more course selection in areas that support the student's chemistry-related career goal. The student participates in designing his own program within the following framework: chemistry 000, 181-182-183, 241-242-243, 494, plus three courses from among 304, 311, 324, 337, 351, and a minimum of 12 credit hours in 300-400 level courses in the Division of Mathematical and Natural Sciences or other 300-400 level courses acceptable to the department. If Chemistry 311 is chosen as one of the three courses noted above, the other two courses must be distributed as follows: either 304 or 324 and either 337 or 351. In addition, two of the following three cognate units must be selected: 1. Physics 211-212-213 or 231-232-233 with related laboratories; 2. Biology 100-112-113; 3. three mathematics courses at the level of Mathematics 120 and above. It is recommended that the college computer science requirement be met by taking a course in the Department of Mathematics and Computer Science.

The Biochemistry Major The Bachelor of Science degree in biochemistry closely follows guidelines jointly proposed by the American Chemical Society and the American Society of Biological Chemists. This program is designed to prepare students for professional employment as biochemists or for graduate studies in biochemistry and related fields. The following core courses are required: Chemistry 000, 181-182-183, 241-242-243, 341-342-343, 311, 324, 351 and 494. Also required is Biology 100-112-113. To this core must be added a series of advanced biochemistry and biology courses approved by the chemistry department. The following cognate courses must also be added: Mathematics 163, 261, 262 and 272; Computer Science 134 or 230, and Physics 231-232-233 with related laboratories.

Minor in Chemistry A student wishing to receive a minor in chemistry should complete the following: Chemistry 181-182-183 (or 171-172-173) and 241-242 (or 231-232) plus three additional courses from among Chemistry 243 (or 233), 304, 324, 337, 351, 363, and Chemistry 311 or Biochemistry 341.

000. ORIENTATION (1+0) 1 qtr hr Familiarization with the department, requirements for majors, planning a program of courses, university catalog, career planning and library. Required of department majors. Course marked S or U.

100. CHEMISTRY (3+1) 3 qtr hrs Orientation to and understanding of the fundamental nature of chemistry; models and measure-
ments. Chemistry 171 recommended for science majors. Credit may be received for either Chemistry 100 or 171, but not for both.

114. CHEMISTRY OF LIFE (3+0) 3 qtr hrs An introduction to the chemical nature of the major groups of biological molecules and to their activities in living systems. Credit may be received for either Chemistry 114 or Biochemistry 341-342, but not for both. Prerequisite: Chemistry 100 or 162 or 171. Offered alternate years.

115. ENVIRONMENTAL CHEMISTRY
(3+0) 3 qtr hrs Chemical aspects of the natural and polluted environment. Particular emphasis is given to air and water pollution. Prerequisite: Chemistry 100 or 162 or 171.

162. CHEMISTRY-CONCEPTS AND APPLICATIONS 1 (4+3) 5 qtr hrs A survey of fundamental concepts of chemistry. Basic chemical theories are introduced and applied to practical situations. The laboratory is designed to reinforce the lecture program. Prerequisites: Math 261 and Physics 231, 232 and 233 with related laboratories, or the equivalent, or approval of the department chairman.

163. CHEMISTRY-CONCEPTS AND APPLICATIONS 2 (3+0) 3 qtr hrs Chemical properties of the elements and the application of those properties to such problems as synthesis, analysis, industrial processes and environmental quality. Prerequisite: Chemistry 162.

168. BASICS OF CHEMISTRY (3+0) 3 qtr hrs Basic skills and concepts needed to understand the nature of chemical processes. Recommended for students with little or no previous background in chemistry prior to entry into Chemistry 171. Students who have had high school chemistry ordinarily begin with Chemistry 171. Chemistry 168 does not satisfy a general education requirement and it should not be used to satisfy specific departmental or program requirements.

169. BASICS OF CHEMISTRY LABORATORY (0+2) 1 qtr hr Recommended as a complement to Chemistry 168. Emphasizes basic skills and techniques. Course graded S-U.

171. INTRODUCTORY CHEMISTRY 1
(4+3) 5 qtr hrs Fundamental principles of chemistry in terms of the atomic theory and its application to compound formation, bonding, structure, acid-base and oxidation-reduction reaction chemistry. The laboratory relates physical observations to the principles presented in lecture. Credit may be received for either Chemistry 100 or 171, but not for both. High school chemistry or the equivalent is required.

172. INTRODUCTORY CHEMISTRY 2
(4+3) 5 qtr hrs Physical principles of chemistry including spectroscopy, thermodynamics, kinetics, and the study of the states of matter. The laboratory introduces quantitative measurements to experiments designed to illustrate principles presented in lecture. Prerequisite: Chemistry 171.

173. INTRODUCTORY CHEMISTRY 3
(4+3) 5 qtr hrs Qualitative and quantitative aspects of chemical reactivity including general and ionic equilibrium, electrochemistry, descriptive inorganic reaction chemistry and nuclear chemistry. The laboratory illustrates qualitative and quantitative behavior and group trends of chemical species. Prerequisite: Chemistry 162 or 172.

181. INTRODUCTORY CHEMISTRY FOR MAJORS 1 (4+3) 5 qtr hrs The same lecture and laboratory as Chemistry 171.

182. INTRODUCTORY CHEMISTRY FOR MAJORS 2 (4+3) 5 qtr hrs The same lecture and laboratory as Chemistry 172.

183. INTRODUCTORY CHEMISTRY FOR MAJORS 3 (4+3) 5 qtr hrs The same lecture and laboratory as Chemistry 173.

231. ORGANIC CHEMISTRY 1 (3+3) 4 qtr hrs Applications of the concepts of bonding, structure, synthesis and mechanisms to the chemistry of organic compounds. Emphasis is on bonding, nomenclature, acid-base theory, stereoisomerism, and the chemistry of alkanes, alkenes, alkyl halides and alcohols. Laboratory emphasizes special techniques including chromatography and synthetic procedures pertaining to substitution and elimination reactions. Prerequisite: Chemistry 173 or 183.

232. ORGANIC CHEMISTRY 2 (3+3) 4 qtr hrs Spectroscopy and the chemistry of carbonyl compounds, carboxylic acids and derivatives, lipids, polyenes, terpenoids and aromatic compounds. Laboratory features organic synthesis and structural determinations which illustrate the concepts from the lecture. Prerequisite: Chemistry 231 or 241.
233. ORGANIC CHEMISTRY 3 (3+3) 4 qtr hrs A study of active methylene chemistry, polymerization and the functional behavior of organic nitrogen compounds, carbohydrates, amino acids and proteins. Laboratory features multistep synthesis and qualitative organic analysis. Prerequisite: Chemistry 232 or 242.

241. ORGANIC CHEMISTRY 1 -MAJORS (3+3) 4 qtr hrs The same lecture and laboratory as Chemistry 231. Prerequisite: Chemistry 173 or 183.

242. ORGANIC CHEMISTRY 2 -MAJORS (3+3) 4 qtr hrs The same lecture and laboratory as Chemistry 232. Prerequisite: Chemistry 231 or 241.

243. ORGANIC CHEMISTRY 3 -MAJORS (3+6) 5 qtr hrs The same lecture as Chemistry 233 with separate laboratory emphasizing qualitative organic analysis and the use of modern instrumentation in the separation and identification of organic compounds. Prerequisite: Chemistry 232 or 242.

290. SPECIAL TOPICS IN CHEMISTRY 1-3 qtr hrs

297. INDEPENDENT STUDY IN CHEMISTRY 1-3 qtr hrs Prerequisite: Approval of the department chairman.

300. INTRODUCTION TO CHEMICAL RESEARCH (1+0) 0 qtr hrs An introduction to the concept of chemical research including a survey of undergraduate research opportunities in the chemistry department. Required of all students in the Basic, ACS or Biochemistry programs prior to enrollment in Chemistry 497 or 481-2-3. Course marked S-U. Prerequisite: Junior standing or approval of the department chairman.

304. ORGANIC SYNTHESIS (2+6) 4 qtr hrs An intermediate course in synthetic methods. Lecture emphasizes major carbon skeletal alteration techniques and modern methods of interconverting functional groups. Laboratory consists of planning and executing multistep syntheses of graded complexity. Use of synthetic literature is emphasized. Prerequisite: Chemistry 233 or 243.

311. CHEMISTRY OF BIOLOGICAL MOLECULES (4+0) 4 qtr hrs A study of the structures and properties of the major classes of biological molecules with emphasis on the physical properties of macromolecules. Topics include thermodynamics, enzyme kinetics and mechanism, isolation and characterization techniques, and an introduction to the design and regulation of metabolic pathways. Prerequisites: Chemistry 233 or 243 and Mathematics 262.

321. INTERMEDIATE INORGANIC CHEMISTRY-BIOCHEMISTRY MAJORS (3+3) 4 qtr hrs The same lecture as Chemistry 324 with a separate laboratory program. Lecture emphasizes preparation, structures, properties and reactions of main group and transition metal elements and their compounds. The laboratory involves the application of fundamental techniques to the synthesis of inorganic compounds and their characterization using standard instrumental methods with an emphasis on techniques useful to the biochemistry major. Prerequisite: Chemistry 233 or 243 or approval of the department chairman.

324. INTERMEDIATE INORGANIC CHEMISTRY-CHEMISTRY MAJOR (3+3) 4 qtr hrs The same lecture as Chemistry 321 with a separate laboratory program. Lecture emphasizes preparation, structures, properties, and reactions of main group and transition metal elements and their compounds. The laboratory involves the application of fundamental techniques to the synthesis of inorganic compounds and their characterization using standard instrumental methods. Prerequisite: Chemistry 304 or approval of the department chairman.

337. ELEMENTS OF PHYSICAL CHEMISTRY (4+0) 4 qtr hrs A survey of principles and applications of selected areas of physical chemistry, including thermodynamics and kinetics. Intended for students in the modified chemistry major or the chemistry minor who wish to enhance their chemistry background. Prerequisites: Chemistry 163 or 232 or 242 and three courses from the Department of Mathematics and Computer Science. Offered alternate years.

341. PHYSICAL CHEMISTRY 1 (3+3) 4 qtr hrs Classical thermodynamics. Laboratory illustrates principles and exemplifies applications. A knowledge of computer programming is recommended. Prerequisites: Chemistry 233 or 243, Physics 231, 232, 233 with related laboratories, and Mathematics 262 and 272.

342. PHYSICAL CHEMISTRY 2 (3+3) 4 qtr hrs Quantum mechanics. Laboratory illustrates applications in spectroscopy. A knowledge of elementary differential equations is recommended. Prerequisite: Chemistry 341.
343. PHYSICAL CHEMISTRY 3 (3+3) 4 qtr hrs Statistical thermodynamics, kinetic molecular theory and chemical kinetics. Laboratory illustrates principles and applications. Prerequisite: Chemistry 342.

351. INTERMEDIATE QUANTITATIVE ANALYSIS (2+6) 4 qtr hrs The practice and principles of modern chemical methods of analysis; an introduction to instrumental methods of analysis. A terminal course for the non-major and an intermediate course for the major. Prerequisite: Chemistry 173 or 183.

363. APPLICATIONS OF CHEMICAL INSTRUMENTATION (1+5) 3 qtr hrs An introduction to the principles and methods of instrumental measurements for the analysis of real samples. The integrated laboratory and lecture deal with the collection, preparation and analysis of environmental, geological, biological, and industrial samples. Automated sequencing and process analysis are also discussed. Prerequisite: Chemistry 163 or 233 or 243. Offered in alternate years.

411. ADVANCED TOPICS IN BIOCHEMISTRY (3+0) 3 qtr hrs Studies on the biochemical basis for hormone action, gene expression and photosynthesis. Recombinant DNA techniques are emphasized. Prerequisites: Biochemistry 342 and Chemistry 343 or approval of the department chairman.

414. BIOCHEMISTRY LABORATORY 1 (0+6) 2 qtr hrs A laboratory course featuring the chemical and physical properties of biological molecules plus an introduction to enzyme kinetics and metabolism. Prerequisite: Biochemistry 342.

415. BIOCHEMISTRY LABORATORY 2 (0+6) 2 qtr hrs An intermediate laboratory course featuring enzyme and RNA isolation and the arrangement of simple biochemical components into macromolecular structures. Prerequisites: Biochemistry 342 and Biochemistry Laboratory 414.

416. BIOCHEMISTRY LABORATORY 3 (0+6) 2 qtr hrs An advanced laboratory course featuring modern methods of nucleic acid analysis with an emphasis on recombinant DNA techniques. Prerequisites: Biochemistry 411 and Biochemistry Laboratory 415.

451. ADVANCED INORGANIC CHEMISTRY (3+3) 4 qtr hrs The study of the theory, bonding, spectroscopy, and reaction mechanisms of inorganic compounds and an introduction to organometallic chemistry. The laboratory involves the application of modern laboratory techniques and equipment in the preparation and study of inorganic compounds. Prerequisites: Chemistry 324 and 343 or approval of the department chairman.

462. ADVANCED ANALYTICAL CHEMISTRY (3+3) 4 qtr hrs Theoretical-experimental study of modern methods of instrumental analysis. The physico-chemical principles as well as the design and use of chemical instrumentation. Laboratory stresses independent, investigative experiment. Prerequisite: Chemistry 351 and 343 or approval of the department chairman.

473. ADVANCED TOPICS IN PHYSICAL CHEMISTRY (3+0) 3 qtr hrs Advanced studies in theories and applications of selected topics in physical chemistry. A knowledge of computer programming is recommended. Prerequisite: Chemistry 304 and 343 or approval of the department chairman.

481. SENIOR RESEARCH 1 2 qtr hrs Prerequisites: Chemistry 300 and approval of the department chairman.

482. SENIOR RESEARCH 2 2 qtr hrs Prerequisites: Chemistry 481 and approval of the department chairman.

483. SENIOR RESEARCH 3 2 qtr hrs Prerequisites: Chemistry 482 and approval of the department chairman.

490. SPECIAL TOPICS IN CHEMISTRY 1-3 qtr hrs

494. SEMINAR IN CHEMISTRY (1+0) 1 qtr hr Includes oral presentation of a seminar lesson plus a formal paper on a chemical topic related to a selected seminar theme. Required of all senior chemistry majors.

497. INDEPENDENT STUDY IN CHEMISTRY 1-3 qtr hrs Prerequisites: Chemistry 300 and approval of the department chairman.

BIOCHEMISTRY 4 qtr hrs See course description for Biochemistry 341-342 under the Department of Pharmacology and Biomedical Sciences in the College of Pharmacy.
COMMUNICATION ARTS (Department 153)
Associate Professor Roberts; Assistant Professors Bayliss, Johnson, Riess (Chairman), Visiting Assistant Professor Lawlor; Instructor Heck.

Departmental Objectives
1. To emphasize a strong liberal arts education for further graduate study or entering the job market.
2. To provide a flexible program that adapts easily to individual needs and interests while maintaining professional standards.
3. To encourage critical thinking by providing students with opportunities for practical application of both historical and contemporary communication theory.
4. To encourage participation in and appreciation of the fine arts thereby developing aesthetic standards.

The course offerings of the department are structured around a series of core courses which are fundamental to an understanding of how man communicates theoretically, practically, and aesthetically. The student majoring in the Communication Arts builds upon these core courses in pursuing a concentration particular to his professional and educational goals. Concentrations are offered in the following areas:

- Speech
- Theatre
- Public Relations

Some concentrations require internships; some concentrations also require cognate courses outside the department. A formal concentration need not be pursued, in which case a student would pursue a generalist program. A generalist program should be selected in consultation with an advisor.

Departmental majors as well as dual majors whose primary major is from another department/college may elect to pursue more than one concentration. Those concentrations can be specified as majors, minors, or a combination.

Beyond the traditional classroom learning situation the department offers and encourages active involvement in speech, theatre, and broadcasting activities. Participation in Individual Events and Debate is open to all university students. Individual Events encompasses all individual speaking opportunities such as persuasive, informative, sales, impromptu, extemporaneous, and oral interpretation of all forms of literature.

Debate encompasses formal debate on national topics as well as off-topic debating. Participation in theatre productions is also open to all university students. Students may participate in the University Theatre, the Theatre of YOUth (a touring children's theatre company), and in the Studio Theatre (student mounted laboratory productions). All Communication Arts activities often include local, state, and national competition. In addition, Radio Station WONU provides practical experiences for those students interested in broadcasting and management.

The curriculum of a Communication Arts major is divided into four elements:
I. Communication Arts Core Requirements
II. Concentration Requirements
III. Concentration Electives (Departmental)
IV. Concentration Cognates (non-Departmental)

Communication Arts Core Required of all majors and minors (15 hours).
- Introduction to Public Relations (CA 130)
- Introduction to Broadcasting (CA 150)
- Public Speaking (CA 211)
- Interpersonal Communication (CA 225)
- Theatre History I (CA 291)

Communication Arts with Speech Concentration (51 hours)

I. Communication Arts Core Requirements (15 hours)

II. Concentration Requirements: Speech (27 hours)
- Communication Theory (CA 230)
- Interviewing (CA 221)
- Persuasive Speaking (CA 311)
- Business and Professional Spkg. (CA 315)
- Group Communication (CA 321)
- Argumentation (CA 121)
- Oral Interpretation (CA 160)
- I.E. Acts (CA 201) (3 hrs min.)
- Debate (CA 202) (3 hrs min.)

III. Speech Concentration Electives (Departmental) (9 hours)

- Choose three
  - Parliamentary Procedure (CA 240)
  - Radio Theory & Ops (CA 251)
  - Acting (CA 260)
  - Voice & Dictation (CA 340)
  - Readers Theatre (CA 361)
  - Independent Study (CA 499)

IV. Speech Concentration Cognates
None are required, but electives should be
selected in close consultation with an advisor.

Communication Arts with Theatre Concentration (51 hours)

I. Communication Arts Core Requirements (15 hours)

II. Concentration Requirements: Theatre (18 hours)
- Oral Interpretation (CA 160)
- Acting (CA 260)
- Theatre Technology (CA 275)
- Makeup (CA 278)
- Theatre History II (CA 292)
- Production Analysis (CA 385)

III. Theatre Concentration Electives (18 hours)
A. (Choose two)
- Creative Drama (CA 350)
- Children’s Theatre (CA 352)
- Readers Theatre (CA 361)
- Cinema (CA 390)
- Text Study (CA 460)
- Arts Management (CA 480)
- Theatre Criticism (CA 492)

B. (Choose two)
- Stage Management (CA 285)
- Scene Design (CA 375)
- Lighting Design (CA 376)
- Costume Design (CA 377)
- Directing (CA 386)

C. (Choose two)
- Performance Practicum (CA 261)
- Production Practicum (CA 276)
- Children’s Theatre Tour (CA 353)
- Design Practicum (CA 378)
- Directing Practicum (CA 387)

IV. Theatre Cognates
None are required, but electives should be selected in close consultation with an advisor.

Communication Arts with Public Relations Concentration (87 hours)

I. Communication Arts Core Requirements (15 hours)

II. Concentration Requirements: Public Relations Core (17-27 hours)
- Newswriting (Eng 241)
- Publicity, Media & Campaigns (CA 330)
- Public Relations Research (CA 342)
- Public Relations Case Studies (CA 430)
- Internship (CA 335) (5 hrs. minimum)

III. Public Relations Concentration Electives (Departmental) (12 hours)
(Choose four)
- Interviewing (CA 221)
- Communicating Theory (CA 230)
- Radio Theory & Ops (CA 251)
- TV Theory & Ops (CA 253)
- Persuasive Speaking (CA 311)
- Bus. & Prof. Speaking (CA 315)
- Group Communication (CA 321)
- Radio/TV Brdcast Journalism (CA 355)
- Broadcast Copywriting (CA 356)
- Media Ethics (CA 453)

IV. Public Relations Cognates (33 hours)
A. English (Choose two)
- Magazine Writing (Eng 243)
- Press/Freedom/Law (Eng 244)
- Journalism, Layout & Design (Eng 246)
- Fiction Writing (Eng 342)
- Persuasive Writing (Eng 343)
- Writing from Evidence (Eng 344)

B. Social Sciences (Choose one)
- Prin. of Behav. Anal. (Psych 212)
- Cultural Anthropology (Soc. 250)
- Social Psychology (Psych 301)
- Organizational Psychology (Psych 316)

C. Graphic Skills (Choose two)
- Intro to Graphic Comm. (IT 240)
- Advanced Graphic Comm. (IT 340)
- Photography (IT 341)
- Design I (Art 161)
- Design II (Art 162)
- Graphic Design I (Art 222)
- Graphic Design II (Art 223)

D. Computer Science/Statistics (Choose two)
- Intro to Info. Proc. (CS 130)
- PC Apps for Business (Bus 201)
- Intro to Programming (CS 134)
- Prob/Stats I (Math 142)
- Prob/Stats II (Math 143)

E. Business Administration (Choose four)
- Business Law I (Bus 322)
- Prin. of Mgmt (Bus 330)
- Marketing (Bus 351)
- Human Rel. in Bus. (Bus 365)
- Salesmanship (Bus 371)
- Advertising (Bus 372)
- Business & Society (Bus 410)

College General Education requirements may be used to satisfy some cognate courses.
Communication Arts (without concentration) (48 hours)

I. Communication Arts Core Requirements (12 hours)

II. Additional Requirements (18 hours)
- Interpersonal Communication (CA 225)
- Communication Theory (CA 230)
- Oral Interpretation (CA 160)
- Argumentation (CA 121)
- Theatre Technology (CA 275)
- Acting (CA 260)

III. Electives (15 hours)
Any 15 hours from departmental offerings, selected in consultation with an advisor.

IV. Cognates (3 hours)
One advanced writing course (English Department)

Minors A general Communication Arts minor (30 hours) is available and consists of the following courses:
- Intro to Public Relations (CA 130)
- Intro to Broadcasting (CA 150)
- Agrumentation (CA 121)
- Public Speaking (CA 211)
- Communication Theory (CA 230)
- Interpersonal Communication (CA 225)
- Theatre History I (CA 292)
- Bus & Professional Spkg (CA 315)
- Radio/TV Copywriting (CA 356)
- Arts Management (CA 480)

Grading Any grade below “C” that is received in a departmental course will not count toward major and minor requirements.

Teacher Certification Certification in Speech and Communications (a combination of Speech, Theatre, English, Journalism, and Reading) is available through the Department of Communication Arts.

Prelaw Program The department cooperates with the Pettit College of Law at Ohio Northern University relative to the “guaranteed admission” prelaw program. Those interested in the program and a course of studies within the department should contact the chairman for information and/or advising.

Business Option A Business Option is available for any student majoring in Communication Arts. The courses for the option are in addition to concentration coursework. The option is designed to provide a business focus for students within their communication career goals. The option consists of:
- 500-131 Principles of Accounting I
- 500-132 Principles of Accounting II
- 500-133 Principles of Accounting III
- 500-202 Principles of Microeconomics
- 500-362 Managerial Finance
- 500-351 Marketing
- 500-322 Business Law I
- 500-330 Principles of Management
- 500-363 Human Resources
- 500-202 Principles of Microeconomics
- 500-371 Salesmanship

000. ORIENTATION 1 qtr hr Familiarization with the departmental requirements for majors, planning a program of courses, university catalog and library. Required of departmental majors. Graded S-U.

100. SPEECH COMMUNICATION 3 qtr hrs Group lectures which cover the basic concepts and practices of interpersonal, public, and group communication. Preparation, composition, and presentation of speeches. Basic knowledge of the process of communication in society. Laboratory experiences in Communication Skills Center are available to the student.

105. THEATRE 3 qtr hrs Survey of the theatre utilizing the screening of films. Emphasis is on acting, directing and design.

121. ARGUMENTATION 3 qtr hrs Course focuses on basic skills in critical thinking by applying elementary debate theory through oral and written activities.

130. INTRODUCTION TO PUBLIC RELATIONS 3 qtr hrs Primarily a theory course describing the role, function, and responsibilities of the public relations practitioner within organizations.

150. INTRODUCTION TO BROADCASTING 3 qtr hrs A survey course that examines various aspects of broadcasting including mass communication, programming and electronic technology.

160. ORAL INTERPRETATION 3 qtr hrs Analysis and oral interpretation of the logical, emotional and aesthetic experience in poetry, prose, and dramatic dialogue, with emphasis on individual preparation and performance.

201. SPEECH TEAM: INDIVIDUAL EVENTS 1-3 qtr hrs Extra-curricular individual events activities including participation in speech tournaments. Students can become
involved in persuasive, informative, impromptu, and extemporaneous speaking, as well as the oral interpretation of prose and poetry. May be repeated for graduation credit by non-majors up to a maximum of 6 hours. Graded S-U.

202. SPEECH TEAM: DEBATE 1-3 qtr hrs Extra-curricular debate activities including participation in debate tournaments in neighboring states on topics of national interest. May be repeated for graduation credit by non-majors up to a maximum of 6 hours. Graded S-U.

211. PUBLIC SPEAKING 3 qtr hrs Extensive application of basic principles of oral communication in the composition and delivery of original speeches. Prerequisite: CA 100.

221. INTERVIEWING 3 qtr hrs The basic principles and structures of interviewing are examined and applied to employment, journalistic, persuasive, survey, counseling, and performance/appraisal interview types.

225. INTERPERSONAL COMMUNICATION 3 qtr hrs Analysis of dimensions in interpersonal relationships such as needs, perceptions, orientations, contexts, and barriers to intimacy. Course is oriented around exercises, demonstrations, and applications of the transactional analysis model to students' own experiences.

230. COMMUNICATION THEORY 3 qtr hrs The course is designed to provide a framework of knowledge about the theories, nature, and dynamics of human communication/interaction. Prerequisite: CA 100.

240. PARLIAMENTARY PROCEDURE 3 qtr hrs Methods of conducting formal meetings by parliamentary rules.

251. RADIO THEORY AND OPERATION 3 qtr hrs To acquaint students with operational procedures of commercial/ non-commercial radio stations. Participation in radio performance, production, and writing techniques. Practice in performance skills offered via required labs and provided through production facilities at WONU radio. Prerequisite: CA 150.

252. BROADCASTING ACTIVITIES 1-3 qtr hrs Broadcasting practicum involving, but not limited to, announcing, traffic, management, scheduling, programming, writing, etc. May be repeated for graduation credit by non-majors up to a maximum of 6 hours. Graded S-U.

253. TELEVISION THEORY AND OPERATIONS 3 qtr hrs To acquaint students with operational procedures of commercial/ non-commercial television stations. Participation in television performance, production, and writing techniques. Practice in performance skills offered via required labs and provided through University production facilities. Prerequisite: CA 150.

260. ACTING 3 qtr hrs A studio class designed to introduce and develop fundamental acting skills through readings, discussions, exercises, monologues, and scenes. Course may be repeated for a maximum of 6 hours by non-majors for graduation credit and for a maximum of 9 hours by majors for graduation credit.

261. PERFORMANCE PRACTICUM 1-3 qtr hrs Open only to those students who have auditioned for and have been awarded roles in major University Theatre or Studio Theatre productions. 1-3 hours credit depending on role. May be repeated by non-majors for graduation credit up to a maximum of 6 hours. Prerequisite: Permission of director. Graded S-U.

275. THEATRE TECHNOLOGY 3 qtr hrs Introduction to theoretical and practical work in the fundamentals of technical theatre production. Content includes scenic construction, property construction, theatrical sound, basic drafting, basic design theory. Required lab work.

276. PRODUCTION PRACTICUM 1-3 qtr hrs Participation in technical/production aspects of University and/or Studio Theatre productions. A maximum of 6 hours may be taken by non-majors for graduation credit.

278. MAKEUP 3 qtr hrs Methods and practice in the creation and application of stage makeup. Students may comprise makeup crews for University Theatre and Studio Theatre productions.

285. STAGE MANAGEMENT 3 qtr hrs A study of the principles and practices of stage management and logistical organization of the commercial and noncommercial theatre. Content includes scheduling, pre-production planning, auditions, rehearsals, performance procedures, budgeting, and company organization and structure.

291. THEATRE HISTORY 1 3 qtr hrs History and social impact of the theatre from ancient times to 1800.
292. THEATRE HISTORY 2 3 qtr hrs History and social impact of the theatre from 1800 to the present.

311. PERSUASIVE SPEAKING 3 qtr hrs Understanding and applying theories and techniques of persuasion through audience analysis, and the preparation and delivery of persuasive speeches. Prerequisite: CA 100.

315. BUSINESS AND PROFESSIONAL SPEAKING 3 qtr hrs A course to assist the student in acquiring the knowledge and skills especially pertinent to meeting the speech communication tasks of a business or professional person. Prerequisite: CA 100.

321. GROUP COMMUNICATION 3 qtr hrs Combines group theory and problem solving through a discussion format. Students focus on the process from analyzing a problem to implementing a solution. Prerequisite: CA 100.

330. PUBLICITY, MEDIA, AND CAMPAIGNS 3 qtr hrs A course analyzing techniques for motivating target audiences along with practical analysis and preparation of communication materials to elicit reactions or support from specialized groups. Prerequisite: CA 130.

335. INTERNSHIP 1-15 qtr hrs A skills course designed to blend classroom theory with practical experience through working in an outside organization. Approval of department required prior to registration for course. One to 15 hours credit toward graduation for the major and a maximum of 5 hours credit for the minor.

340. VOICE AND DICTION 3 qtr hrs Voice and speech production; intensive drill, on a phonetic basis, in articulating the sounds which make up the English language, with attention to the production of good vocal quality and expression.

342. PUBLIC RELATIONS RESEARCH FOR PLANNING AND EVALUATION 3 qtr hrs A course designed to study the planning and evaluation process of public relations programs. It will emphasize the difference between public relations research and social science research methodologies by examining social groupings with whom messages are to be exchanged, ascertaining the impact of the action and information system on communication participants and the evaluation of the results. Prerequisite: CA 130.

350. SPEECH/THEATRE METHODS 3 qtr hrs Investigation, survey, readings, methods, and application of teaching techniques in speech, communication, broadcasting, and theatre. Required of all majors seeking teacher certification. Includes approximately 30 hours of field experience. Prerequisite: Acceptance into teacher education program or permission of the instructor.

351. CREATIVE DRAMA 3 qtr hrs Methods and practice of incorporating theatre into educational, community, religious, and recreational activities.

352. CHILDREN'S THEATRE 3 qtr hrs Study of script analysis, directing, acting, and designing as they relate to children's developmental stages. Rehearsal and/or construction of ONU Theatre for Youth spring tour. May be repeated for a total of 6 credit hours. Prerequisite: Permission of the instructor.

353. CHILDREN'S THEATRE TOUR 3 qtr hrs Tour and performance by ONU Theatre for Youth. Possible field experience credit for education majors. May be repeated for a total of 6 hours. Prerequisite: Permission of director.

354. BROADCAST LAW 3 qtr hrs An examination of the federal government's role in the regulating and licensing of public, private, and satellite broadcasting. Prerequisite: CA 150.

355. RADIO AND TELEVISION BROADCAST JOURNALISM 3 qtr hrs An examination of the principles of news gathering and reporting primarily for television and radio. Subjective and objective analysis of news, its presentation, and its effects. Practical assignments emphasized. Prerequisite: CA 251 or 253.

356. RADIO AND TELEVISION COPYWRITING 3 qtr hrs A study of the principles and techniques of commercial copywriting for radio and television. Prerequisite: CA 251 or 253.

361. READERS THEATRE 3 qtr hrs Group performance in the dramatic interpretation of the novel, short story, drama, and poetic forms of literature.

375. SCENE DESIGN 3 qtr hrs Methods and practice in the art of scenography; application via University Theatre, Children's Theatre, and/or Studio Theatre productions.
376. LIGHTING DESIGN 3 qtr hrs
Methods and practice in the art of lighting design; application via University Theatre, Children’s Theatre, and/or Studio productions.

377. COSTUME DESIGN 3 qtr hrs
Methods and practice in costume design and construction; application via University Theatre, Children’s Theatre, and/or Studio Theatre productions.

378. DESIGN PRACTICUM 3 qtr hrs
The actual design, supervision, and execution of lights, set, costumes, sound, or props for a main stage or studio production. The student is assigned a departmental advisor for the project. Course may be repeated for maximum of 6 hours by non-majors for graduation credit, and for a maximum of 9 hours by majors for graduation credit. Prerequisites: CA 375, 376 or 377 and/or permission of the department.

385. PRODUCTION ANALYSIS 3 qtr hrs
The course explores the techniques for the interpretation of dramatic literature for staging by the producer, director, and designers. Content includes the basic concepts of interpretation, theme, style, play analysis, and staging.

386. DIRECTING 3 qtr hrs
Methods, theories, exercises, and practices in directing and presenting dramatic scenes. Prerequisite: 3 hours of acting and permission of the instructor.

387. DIRECTING PRACTICUM 3 qtr hrs
The actual directing of a main stage or studio production. The student is assigned a departmental advisor for the project. Course may be repeated for a maximum of 6 hours by non-majors for graduation credit, and for a maximum of 9 hours by majors for graduation credit. Prerequisite: CA 386 and permission of the instructor.

390. CINEMA 3 qtr hrs
An examination of the development of contemporary cinema focusing on influential directors, producers, major critics, and the business of marketing a film. Prerequisite: CA 105.

421. ORGANIZATIONAL COMMUNICATION 3 qtr hrs
A course designed to introduce students to the functions, patterns, and problems of communication in organizations. Course also covers techniques for improving organizational communication/management.

430. PUBLIC RELATIONS CASE PROBLEMS 3 qtr hrs
An examination of public relations case studies concerning problems in industry, business, education, government, social welfare and trade associations. Prerequisite: CA 130.

453. MEDIA ETHICS 3 qtr hrs
An examination of major media functions: Public Service, Journalism, Promotion and Sales, and Entertainment. The course introduces relevant ethical theories as a basis for decision-making. Prerequisite: CA 150.

454. TELEVISION DIRECTING 3 qtr hrs
Television scripting, direction, and production principles as applied to television. Prerequisite: CA 253.

455. BROADCAST STATION MANAGEMENT 3 qtr hrs
A study of sales, programming, marketing, and management techniques unique to the broadcast medium. Prerequisite: CA 150.

460. TEXT STUDY 3 qtr hrs
Explores techniques for studying dramatic literature by the actor to make the work accessible for performance. Prerequisite: CA 260 or permission of the instructor.

480. ARTS MANAGEMENT 3 qtr hrs
Explores the management of commercial and non-commercial arts organizations. Content includes philosophy, finances, operations, and promotion.

490. SPECIAL TOPICS IN COMMUNICATION ARTS 1-3 qtr hrs

492. THEATRE CRITICISM 3 qtr hrs
A survey of theatre criticism from classic Greece to the present. Prerequisites: CA 291 or 292.

499. INDEPENDENT STUDY IN COMMUNICATION ARTS 1-3 qtr hrs
Prerequisite: Permission of department.

EDUCATION (Department 141)
Professors Miller, Traxler; Associate Professors Haynes (Chairperson), Perry; Assistant Professors Griggs, Kitterman.

The Teacher Education Program is designed to provide the prospective teacher with the general education, subject area concentration, and professional education experiences that will enable the student to enter the profession of teaching with competency.
Teaching certificates are issued by the State of Ohio to students who have successfully completed an approved program of teacher preparation and met all requirements prescribed by the State Board of Education. Approved programs and requirements may be obtained in the Education Department Office.

PLEASE NOTE: All general education, curriculum area, professional education, and admission to teacher education program requirements listed herein are subject to the approval of the State Board of Education.

Students are required to participate in a minimum of 300 hours of supervised field/clinical experience before student teaching. These experiences are included in the required education courses. (Additional information about clinical and field experiences is available in the Education Department Office and from professional education advisors.)

Admission to the Teacher Education Program - specific requirements may be obtained in the Education Department Office.

Elementary Education (1-8) Certification - General education, curriculum area, and concentration area requirements may be obtained in the Education Department Office. The courses in General Education and Curriculum area will meet College of Arts and Sciences and state-approved program requirements.

A concentration of thirty quarter hours must be completed in one of the following disciplines: biology, French, German, history, literature, mathematics, political science, psychology, sociology, Spanish.

Options/Minors (30 hours)

An option is required of all elementary education majors. The ten options to choose from are as follows:

**BIOLOGY:**
- General Biology 100
- General Biology 112
- General Biology 113
- Botany and Bycology 204
- Angiosperm Botany 205
- Invertebrate Zoology 223
- Anatomy and Physiology I 231
- Anatomy and Physiology II 232
- The Environments of Man 244

**SPANISH:**
- Elementary Spanish 1 140
- Elementary Spanish 2 141

Elementary Spanish 3 142
Intermediate Spanish 1 244
Intermediate Spanish 2 245
Business Spanish 240
Spanish Phonetics 248
Spanish Conversation & Composition 341
Advanced Spanish Language 342

**FRENCH:**
- Elementary French 1 120
- Elementary French 2 121
- Elementary French 3 122
- Intermediate French 1 214
- Intermediate French 2 215
- French Phonetics 217
- Introduction to French Literature 219
- French Conversation and Composition 311
- Advanced French Language Study 312

**GERMAN:**
- Elementary German 1 130
- Elementary German 2 131
- Elementary German 3 133
- Intermediate German 1 224
- Intermediate German 2 225
- Business German 220
- Introduction to German Literature 261
- German Conversation and Composition 321
- History of the German Speaking World 337

**HISTORY:**
- Western Civilization I 110
- Western Civilization II 111
- History of the U.S. to 1800 211
- History of the U.S.: 1800 to 1898 212
- History of the U.S.: 1898 to Present Time 213
- Human Geography 226
- Afro-American History 365
- Electives: Choose one
  - Contemporary Asia 222
  - Contemporary Africa 223
  - Contemporary Middle East 224
  - Contemporary Latin America 225
  - Russian History I 324
  - Russian History II 325
  - History of the Ottoman Empire 471
- Electives: Choose one
  - Contemporary Europe 221
  - History of Ohio 303
  - American Urban History 310

**LITERATURE:**
- Great Works 204
- Choose one of the following:
  - Modern Poetry 207
  - Modern World Drama 208
  - Modern Friction 209
- Approaches to Children's Literature 225

EDUCATION 67
Choose one of the following:

English Literature 1660-201
English Literature Before 1500 310
Chaucer 410

Choose one of the following:

English Literature 1660-1830 202
Restoration and the 18th Century 322
English Romanticism 323

Choose one of the following:

English Literature After 1830 203
Victorian Period 324

Twentieth-Century British Literature 326
Shakespeare I (311) or Shakespeare II (312)

American Literature to 1865 (211) or Major American Writers of the 19th Century (334)

American Literature after 1865 (212) or Major American Writers of the 10th Century (335)

Choose one of the following:

World Literature 1 221
World Literature 2 222
World Literature 3 223

African Literature 370

MATHEMATICS:

Probability and Statistics I 142
Probability and Statistics II 143
Calculus I 163
Mathematics for Elementary Teachers 171
Fundamental Mathematics I 172
Fundamental Mathematics II 173

Calculus 2 261
History of Mathematics (245) or Introduction to Linear Algebra (272)

Foundations of Mathematics 294

POLITICAL SCIENCE:

Modern Political Conflicts and Issues 105
American National Government I 201
American National Government II 202
State and Local Government 203

Human Geography 226

Electives:

Choose one of the following:

Contemporary Asia 222
Contemporary Africa 223
Contemporary Middle East 224
Contemporary Latin America 225

Choose one of the following:

Communist Political Systems
Developing Political Systems
Government of the Soviet Union 421
Foreign Policy of the Soviet Union 422

Choose one of the following:

American Urban History 310
Democratic Political Systems 334
American Political Parties and Elections 347

The American Presidency 424
American Constitution I (348) and American Constitution II (349)
or
Recent American History I (361) and Recent American History II (362)

PSYCHOLOGY:

Psychology 100
Principles of Behavior Management 212
Development Psychology 215
Psychology of the Exceptional Child 218
Social Psychology 301
Adult Development and Aging 305
Theories of Learning 310
Psychology of Personality 311
Classical and Instrumental Conditioning 314

SOCIOLOGY: (may be minor)

Sociology 105
Marriage and the Family 240
Minority Relations (203) or Social Inequality (247)

Social Deviance I (243) or Crime and Delinquency (347)

Quantitative Methods in Behavioral Research 251
Quantitative Methods in Behavioral Research 252
Sex Role Socialization (241) or Social Psychology (301)

Gerontology (302) or Medical Sociology (348)

Social Thought (446)

Professional education course requirements are:

Ed. 110: Introduction to Education, 3 hours
Ed. 150: Field Experience, 1 hour
Ed. 195: Orientation, 1 hour
Ed. 225: Child and Adolescent Psychology, 4 hours
Ed. 263: Educational Psychology, 4 hours
Ed. 306: Teaching Social Studies & Science in the Elementary School, 4 hours
Ed. 308: Teaching Math in the Elementary School, 4 hours
Ed. 312: Teaching Reading I, 4 hours
Ed. 314: Teaching Reading II, 4 hours
Ed. 385: Curriculum, 4 hours
Ed. 470: Student Teaching, 14 hours
Ed. 475: Student Teaching Seminar, 1 hour

Elementary Education with Specific Learning Disabilities (K-12) Certification (LD): completion of the elementary education program, plus:

Ed. 210: Introduction to Special Education, 4 hours
Ed. 315: Education of Children with Learning Disabilities, 4 hours
Secondary Education Certification programs are offered in the following areas:
- Biological Science
- Bookkeeping/Basic Business
- Chemistry
- Comprehensive Communications
- Computer Science
- Drama/Theater
- Economics
- English
- General Science
- History
- Industrial Technology
- Mathematics
- Physical Education
- Physics
- Political Science
- Psychology/Sociology
- Sales
- Science Comprehensive
- Social Studies Comprehensive
- Speech/Communication

Secondary Education with Specific Learning Disabilities (K-12) Certification (LD): completion of requirements in a specific teaching field, plus:
- Ed 210: Introduction to Special Education, 4 hours
- Ed 315: Education of Children with Learning Disabilities, 4 hours
- Ed 360: Evaluation and Measurement of Learner Progress, 3 hours
- Ed 365: Classroom Management - The Exceptional Learner, 4 hours
- Ed 420: Methods of Teaching the Learning Disabled, 3 hours
- Ed 421: Assessment and Evaluation of Exceptional Learners, 3 hours
- Ed 422: Student Teaching - Learning Disabilities, 9 hours

Secondary Education Certification with Reading (K-12) Endorsement: completion of requirements in specific teaching fields, plus:
- Ed 340: Diagnosis and Correction of Reading Difficulties, 3 hours
- Ed 341: Advanced Reading Methods and Materials - Clinical Practice in Remedial Reading, 3 hours
- Ed 342: Reading in the Content Area, 4 hours

Secondary Education (7-12) Certification
Requirements for certification in the various secondary teaching fields may be obtained in the Education Department office.

Professional education requirements are:
- Ed 110: Introduction to Education, 4 hours
- Ed 150: Field Experience, 1 hour
- Ed 225: Child and Adolescent Psychology, 4 hours
- Ed 263: Educational Psychology, 4 hours
- Ed 342: Reading in the Content Area, 4 hours
- Ed 385: Curriculum, 4 hours
- Ed 450: Secondary School Methods or Methods in Specific Teaching Field, 4 hours
- Ed 475: Student Teaching Seminar, 1 hour
- Ed 480: Student Teaching, 14 hours
Secondary Education Certification with Driver Education Endorsement: completion of requirements in a specific teaching field, plus:
HPE 219: Psychological Factors in Driving, 3 hours
HPE 433: Driver Education, 3 hours
HPE 434: Organization and Administration of Drivers-Traffic Safety, 3 hours

All Grades (K-12) Certification
Requirements for certification in the various all grades (K-12) areas may be obtained in the Education Department Office.

Professional education requirements are:
Ed. 110: Introduction to Education, 4 hours
Ed. 150: Field Experience, 1 hour
Ed. 225: Child and Adolescent Psychology, 4 hours
Ed. 263: Educational Psychology, 4 hours
Ed. 342: Reading in the Content Area, 4 hours
Ed. 385: Curriculum, 4 hours
Ed. 450: Secondary School Methods, 4 hours

plus
Methods in Specific Teaching Field, 4 hours
Ed. 470: Student Teaching, 7 hours
Ed. 475: Student Teaching Seminar, 1 hour
Ed. 480: Student Teaching, 7 hours

Specific methods courses:
Art 457, 4 hours
English 450, 4 hours
Foreign Language 380, 4 hours
Health 350, 4 hours
Industrial Technology 473, 4 hours
Music 361, 461 and 462, 3 hours each
Physical Education 351, 4 hours

All Grades (K-12) Education certification programs are offered in the following areas:
Art, Visual
Health Education
Industrial Technology
Languages:
French
Spanish
Music
Physical Education

All Grades Education with Specific Learning Disabilities (K-12) Certification (LD): completion of requirements in a specific teaching field, plus:
Ed. 210: Introduction to Special Education, 4 hours
Ed. 315: Education of Children with Learning Disabilities, 4 hours

Ed. 360: Evaluation and Measurement of Learner Progress, 3 hours
Ed. 365: Classroom Management - The Exceptional Learner, 4 hours
Ed. 420: Methods of Teaching the Learning Disabled, 3 hours
Ed. 421: Assessment and Evaluation of Exceptional Learners, 3 hours
Ed. 422: Student Teaching - Learning Disabilities, 9 hours

The following courses are strongly recommended:
Ed. 308: Teaching Mathematics in the Elementary School, 4 hours
Ed. 312: Teaching Reading I, 4 hours
Ed. 314: Teaching Reading II, 4 hours

All Grades Certification with Reading (K-12) Endorsement: completion of requirements in a specific teaching field, plus:
Ed. 312: Teaching Reading I, 4 hours
Ed. 314: Teaching Reading II, 4 hours
Ed. 340: Diagnosis and Correction of Reading Difficulties, 3 hours
Ed. 341: Advanced Reading Methods and Materials - Clinical Practice in Remedial Reading, 3 hours

All Grades Certification with Driver Education Endorsement: completion of requirements in a specific teaching field, plus:
HPE 219: Psychological Factors in Driving, 3 hours
HPE 433: Driver Education, 3 hours
HPE 434: Organization and Administration of Drivers-Traffic Safety, 3 hours.

COLLEGE STUDENT PERSONNEL
The purpose of this program is to prepare the student to enter the field of college student personnel in universities, colleges, community colleges and junior colleges, and any other type of post-secondary educational institution. (This program also prepares the student to enter graduate school for additional preparation before entering the field on a full-time basis.) The College Student Personnel field covers many facets of the academic support and student personnel services including positions such as dean of men or dean of women; director of the student union; various positions in career counseling, placement, and admissions; also positions for personnel working in areas such as financial aid, housing, fraternities and sororities, student-operated businesses, and student government.
A professional in college student personnel must be strong in the areas of interpersonal/intrapersonal relationships and group dynamics; hence most of the professional preparation is in the fields of psychology, sociology, and education. Since such a large proportion of the professional course work is in the field of psychology, the student may also obtain a major in psychology with additional courses for the double major of college student personnel and psychology.

A major in college student personnel consists of the following requirements:
- Biology 113, 231
- Education 225, 366, 425, 426, 463, 487 (9-15 hours of internships/practicum)
- Mathematics 142
- Psychology 100, 111, 210, 212, 215, 301, 311, 411, 420, 424
- Sociology 105, 240, 243, 246
- Speech 321

To complete the major in psychology, the student also needs:
- Psychology 211 and nine hours of psychology electives.

110. INTRODUCTION TO EDUCATION 4 qtr hrs An introduction to the field of education. The course is designed for elementary, secondary, and all-grades education majors. Philosophy, history, organization of school, finance, and social issues. A minimum of 30 hours of field experience is required. (Thirty hours of clinical/field experience equals one credit hr).

150. FIELD EXPERIENCE 1 qtr hr Observation and participation with students and teachers in a public school setting for five consecutive school days - minimum of 35 hours. Must be repeated one time. One experience must be in a culturally, racially and socioeconomically diverse setting. Required during freshman or sophomore year of all students seeking teacher certification. Approval of education advisor is required prior to this experience. Graded S-U.

195. ORIENTATION 1 qtr hr Familiarization with the department, requirements for majors, planning program of courses and field-based experiences, University catalog, and library. Required of elementary education majors.

200. CHILD DEVELOPMENT PRACTICUM 1 qtr hr Assignment as a regular assistant in the Child Development Center. Registration with permission of the department chairman.

210. INTRODUCTION TO SPECIAL EDUCATION 4 qtr hrs A course for education and non-education majors. To familiarize students with the varying characteristics and needs of exceptional individuals, their rights under the law and programming alternatives developed to meet their needs. Includes a minimum of 30 hours of field experience.

225. CHILD AND ADOLESCENT PSYCHOLOGY 4 qtr hrs Characteristics of the child and adolescent at different levels of maturity; physical, mental, social and emotional growth; growth and organization of meanings and concepts; controls and factors included in social behavior; personality development. Includes a minimum of 30 hours of field experience. Prerequisites: Students seeking teacher certification: Psychology 100 with a grade of "C" or better; all others Psychology 100. (Formerly 223 and 224).

230. INTRODUCTION TO GIFTED EDUCATION 3 qtr hrs An introduction to gifted children and adolescents; covering topics such as identification of the gifted, self-concept of the gifted; Renzoulli's Enrichment Triad and Revolving Door Identification Model; IEP's for the gifted, gifted pre-school children, and parenting the gifted. Anticipated field experience would include a school for the gifted and programs for the gifted within the usual schools.

240. INTRODUCTION TO EARLY CHILDHOOD EDUCATION 3 qtr hrs History, philosophy and current developments in the field of early childhood education. Discussion of Montessori, Piaget, Headstart, Day Care, Nursery School, and Kindergarten Education. Introduction to the field of early childhood education.

241. METHODS & MATERIALS IN EARLY CHILDHOOD EDUCATION 3 qtr hrs Curriculum planning and organization, teaching processes, development of materials for early childhood settings.

242. EARLY CHILDHOOD PRACTICUM 3 qtr hrs Sixty hours of field experience in an early childhood setting, plus seminars. One credit hour equals 30 hours of field experience.

251. INSTRUCTIONAL MEDIA LABORATORY 1 qtr hr Development of competence in operating audio-visual equipment and preparing instructional materials.
263. EDUCATIONAL PSYCHOLOGY
4 qtr hrs The learner, the learning process, and conditions that promote learning. Application of psychological principles to teaching in the classroom. Includes a minimum of 30 hours of clinical/field experience. Prerequisite: Psychology 100 with a grade of "C" or better.

290. SPECIAL TOPICS IN EDUCATION
1-3 qtr hrs

306. TEACHING SOCIAL STUDIES AND SCIENCE IN ELEMENTARY SCHOOL
4 qtr hrs Objectives, trends, issues, and evaluation of the teaching of social studies and science in the elementary school. Includes preparation of units and organization of learning activities for problem solving. Includes a minimum of 30 hours of field experience. Prerequisite: Admission to Teacher Education. Offered beginning in 1989-90.

308. TEACHING MATHEMATICS IN THE ELEMENTARY SCHOOL
4 qtr hrs Content, strategies, materials, and evaluation that reflect the current emphasis in mathematics. Includes approximately 30 hours of field experience. Prerequisite: Admission to Teacher Education.

309. TEACHING SCIENCE IN THE ELEMENTARY SCHOOL
4 qtr hrs The role of science in childhood education, the preparation of materials, and organization of learning activities for problem solving. Includes approximately 30 hours of field experience. Prerequisite: Admission to Teacher Education.

310. CHILDREN'S LITERATURE
4 qtr hrs Knowledge and appreciation of children's books and teaching of creative writing skills. Emphasis will be placed on the study of all areas of literature for children including realism, fantasy, folk literature, poetry, biography, and informational books. Includes approximately 30 hours of field experience. Prerequisite: Admission to Teacher Education.

311. TEACHING SOCIAL STUDIES IN THE ELEMENTARY SCHOOL
4 qtr hrs Objectives, trends, issues and evaluation of the teaching of social studies, relative to the concepts and principles underlying the disciplines of the social sciences. Includes approximately 30 hours of field experience. Prerequisite: Admission to Teacher Education.

312. TEACHING READING I
4 qtr hrs Introduction to reading. Emphasis will be placed on phonics, word attack skills, and communication skills including listening, speaking, spelling, grammar and usage. Includes approximately 30 hours of field experience. Prerequisite: Admission to Teacher Education.

314. TEACHING READING II
4 qtr hrs Principles and methods of teaching reading, including comprehension skills, diagnostic skills, and preparation and evaluation of reading materials. Includes approximately 30 hours of field experience. Prerequisites: Education 312 and admission to Teacher Education.

315. EDUCATION OF CHILDREN WITH LEARNING DISABILITIES (LD)
4 qtr hrs The study of the meaning and concepts associated with the field of learning disabilities and the history, definitions, theories, issues, instructional strategies, delivery systems and trends in the field. Includes approximately 30 hours of field experience. Prerequisites: Education 210 and admission to Teacher Education.

340. DIAGNOSIS AND CORRECTION OF READING DIFFICULTIES
3 qtr hrs A study of reading difficulties and related causal factors. Investigation and utilization of diagnostic procedures and techniques, including experience in administration and interpretation. Appropriate teaching procedures for remedial reading will be studied. Prerequisites: Education 312, 314, and admission to Teacher Education.

341. ADVANCED READING METHODS AND MATERIALS-CLINICAL
3 qtr hrs Intensive study and discussion of specific areas of interest in reading and practical application of diagnostic techniques and procedures in a clinical field experience situation. Thirty hours of field experience are included. Prerequisites: Education 312, 314 and 340 and admission to Teacher Education.

342. READING IN THE CONTENT AREA: SECONDARY EDUCATION
4 qtr hrs Strategies for teaching developmental reading skills in a variety of curricular areas. Emphasis on the following aspects of reading: study skills, individualization, diagnosis, vocabulary, comprehension and evaluation. Includes approximately 25-35 hours of field experience. Prerequisite: Admission to Teacher Education.
350. DEPARTMENTAL FIELD EXPERIENCE 1 qtr hr Individually planned field experience based on an area of certification purposes and objectives and/or student teaching objectives. Specific objectives and experience proposed by student and must be approved by major department and education advisors. Required for students seeking secondary or all-grades certification if 300 hours of field experience is not complete in other professional education courses. Graded S-U. May be repeated once for a total of two hours credit.

360. EVALUATION AND MEASUREMENT OF LEARNER PROGRESS 3 qtr hrs Evaluation and measurement as they apply to instruction. Attention is given to instructor-made tests, standardized tests and basic statistics. Prerequisite: Admission to Teacher Education.

365. CLASSROOM MANAGEMENT - THE EXCEPTIONAL LEARNER 4 qtr hrs Principles and techniques of behavior shaping are related to classroom structure, managing development of academic skills, and measurement of behavior change. Alternative approaches of behavior management are compared. Principles and approaches will be applied to the challenges of the learning disabled student through class lectures and field experiences. Includes 30 hours of field experience. Prerequisites: Education 210 and admission to Teacher Education.

370. SOCIAL ISSUES AND THE SECONDARY SCHOOL 4 qtr hrs A sociologically oriented course analyzing the institution of education, focusing on the interrelation of schools to other institutions in society. Special emphasis on responsibilities and characteristics of teachers, students, and school administrators. Includes 25-35 hours of field experience in an urban secondary school. Prerequisite: Admission to Teacher Education.

380. THE SECONDARY SCHOOL CURRICULUM 4 qtr hrs Secondary school curriculum standards, practices, instructional materials, curriculum development, functions, changes and trends. Includes 25-35 hours of field experience. Prerequisite: Admission to Teacher Education.

385. CURRICULUM 4 qtr hrs School curriculum practices, instructional materials, curriculum development changes and trends. Discussion of mainstreaming and gifted education. Designed for elementary, secondary and all-grades education majors. Includes a minimum of 30 hours of clinical/field experience. Prerequisite: Admission to Teacher Education. Offered beginning 1989-90.

420. METHODS OF TEACHING THE LEARNING DISABLED 3 qtr hrs Techniques and methods of educational intervention for children with learning disorders are related to diagnosis, material development, individual program development, and evaluation of pupil change in terms of academic skill development. Prerequisites: Admission to Teacher Education; Education 210 and 315. Corequisites: Education 421 and 422.

421. ASSESSMENT AND EVALUATION OF EXCEPTIONAL LEARNERS 3 qtr hrs Analysis, administration, and interpretation of criterion and norm referenced instruments used to appraise the perceptual, cognitive, and academic abilities and capabilities of the exceptional child. Prerequisites: Education 210, 315 and 360; Admission to Teacher Education. Corequisites: Education 420 and 422.

422. STUDENT TEACHING - LEARNING DISABILITIES 9 qtr hrs Approximately 200 hours of classroom experience in public school learning disabilities programs. Prerequisites: Education 210, 315, 365 and 360; Admission to Teacher Education. Corequisites: Education 420 and 421.

425. ORGANIZATION AND ADMINISTRATION OF HIGHER EDUCATION 3 qtr hrs A survey of post-secondary institutions of education in the United States. Covers universities, colleges, community colleges, junior colleges, technical institutes and other forms of higher education. Deals with all aspects of operation including academic, financial, student personnel and institutional governance. Prerequisite: Approval of instructor.

426. ORGANIZATION AND ADMINISTRATION-COLLEGE STU- DENT PERSONNEL 3 qtr hrs Involves the study of many diverse areas involved in college student personnel including orientation, student government, residence halls, counseling and career counseling, placement, admissions, financial aid and student unions. Prerequisite: Approval of the instructor.

450. TEACHING METHODS IN THE SECONDARY SCHOOL 4 qtr hrs Methods, devices and techniques which are
most effective in directing learning in the various subject areas at the high school level. Includes 30 hours of field experience. Prerequisite: Admission to Teacher Education.

470. STUDENT TEACHING IN THE ELEMENTARY SCHOOL 7,14 qtr hrs
Planning and teaching under supervision in the elementary grades; weekly seminar on campus. Prerequisites: An overall accumulative point average of 2.50 with no grade less than "C" in education or major courses required for certification; a minimum of 300 hours of supervised clinical and field experiences; recommendation of the major department advisor and chairperson, professional education advisor, and Director of Teacher Education. Students seeking all grades (K-12) certification enroll for 7 hours. Students seeking elementary (K-8 or 1-8) certification enroll for 14 hours. Corequisite: Education 475.

475. STUDENT TEACHING SEMINAR 1 qtr hr Weekly seminar to be taken concurrently with student teaching. Includes such discussion topics as classroom management, legal aspects, communication with parents, certification, and interviewing techniques, etc. Corequisite: 141-470 or 480.

480. STUDENT TEACHING-JUNIOR AND SENIOR HIGH SCHOOL 7,14 qtr hrs Planning and teaching under supervision in the junior or senior high school, full time, five days per week, in the major teaching field of the student; weekly seminar on campus. Prerequisite: An overall accumulative point average of 2.50 with no grade less than "C" in education or major courses required for certification; a minimum of 300 hours of supervised clinical and field experiences; recommendation of the major department advisor and chairperson, professional education advisor and Director of Teacher Education. Students seeking all grades (K-12) certification enroll for 7 hours. Students seeking elementary (K-8 or 1-8) certification enroll for 14 hours. Corequisite: 141-475.

487. INTERNSHIPS/PRACTICA IN COLLEGE STUDENT PERSONNEL 1-6 qtr hrs Field experience in the various areas of college student personnel. Prerequisite: Approval of the instructor. May be repeated for a maximum of 15 hours.

490. SPECIAL TOPICS IN EDUCATION 1-3 qtr hrs

497. INDEPENDENT STUDY IN EDUCATION 1-3 qtr hrs In areas of student interest with permission of department chairman.

ENGLISH
Department 112

Professors Banks, Beck, Dornbusch, Magee (Sabb. Wtr. Oqr.), Oliver, R. Robinson; Associate Professors Green (Chairperson), C. Smith; Instructor Lietz

Sara A. Ridenour Chair of Humanities established in 1983 from funds provided by Miss Florence G. Ridenour, A.B., 1918. The 1987-88 recipient of this chair is Dr. Clyde Dornbusch, Professor of English.

Objectives The courses in English are designed to help students demonstrate an awareness of style together with an ability to express themselves maturely, clearly, concisely; understand generally the symbolic process of language and particularly the structure and usage of the English language; read critically as a means of gathering, understanding, evaluating, and enjoying recorded human experience; comprehend the growth and continuity of Western ideas and become acquainted with the humanizing qualities of the Western World through the study of literature; analyze a piece of literature by applying some of the techniques of the specialist; understand and respect the techniques of research and the accomplishments of scholarship in the discipline of English; recognize the relationship of language and literature to other areas of knowledge; and develop the ability to apply language skill in other academic disciplines as well as later careers.

Advanced courses increasing the breadth and depth of the objectives listed above are offered as humanities electives and as part of the curriculum for majors. Only literature courses (excluding 204) and not writing or journalism courses can be used to fulfill general education requirements in the humanities. The only exceptions are 341 and 342. The prerequisite for 300 and 400 level courses is one course at the 200 level.

Two majors—English and Writing (as a second major only) are offered. The major in English provides for a concentration in writ-
ing. Two minors—Literature and Writing—are also offered. The programs are designed to help students apply a sound background in reading and writing to the requirements of journalism, communications, law, teaching, and other careers.

Teacher certification can be earned in English and communications (a combination of English, speech, theatre, and journalism). Requirements for a student majoring in English and desiring certification are slightly different from those for the regular English major. Details are available from the department.

For a 45-hour major in English, the following courses are required: 201, 202, 203 (or suitable substitutes); 211, 212 (or suitable substitutes); 311 or 312; 351, 410; 489; and six free electives in English excluding journalism activities.

Also required are either 1) intermediate foreign language at the college level or 2) three courses in philosophy excluding Philosophy 100. The student is, however, strongly urged to take both the intermediate language and the three courses in philosophy.

For a 45-hour major in English with a concentration in writing, the following credit-hour and course distribution is required: three hours—The English Language 351; 15 hours—journalism and advanced writing with The Senior Essay 489 required; three hours—Journalism Activities/Newspaper 250; 24 hours—literature electives (distributed by period and type).

For a 40-hour minor in literature, the following courses are required: 201, 202, 203; 211, 212; 311 or 312; 351; advanced writing—six hours (excluding Journalism Activities), and one free elective—3 hours. Two approved literature courses (excluding Special Topics) may be substituted for one of the three English literature survey courses and for one of the two American literature survey courses.

For a 30-hour minor in writing, the following credit-hour and course distribution is required: three hours—The English Language 351; 12 hours—advanced writing, including up to 3 hours of Journalism Activities/Newspaper 250; and 15 hours—literature electives (distributed by period and type).

All majors are required to earn credit (one hour) in the Proseminar in English 195, which counts as the Arts and Sciences College orientation.

Before graduation, all majors must demonstrate proficiency on the word processor to meet the college requirement for computer literacy.

English 110, 111, 204 do not count toward any major or minor in the Department of English, nor does any course with a grade below "C."

Business Option for English Majors
A student wishing an option in business with a major in English must complete a 30 hour program in the College of Business Administration.

Business Option
Accounting 131
Accounting 132
Accounting 133
Mathematics 142
Business 322
Economics 202
Economics 203
Management 330
Marketing 351
Finance 362

110. WRITING 1 3 qtr hrs Beginning writing. Emphasis throughout the course on the development of writing skills, based on the principles of critical thinking. Prerequisite for all 200 level courses.

111. WRITING 2 3 qtr hrs Continuation of Writing 1. Prerequisite for English 204.

151. ENGLISH AS A SECOND LANGUAGE 3 qtr hrs Communication skills for non-native speakers of English with emphasis on reading and writing in a cultural context. English 151 may be substituted for English 110.

152. ENGLISH AS A SECOND LANGUAGE 3 qtr hrs Continuation of English 151. English 152 and 153 together may be substituted for English 111.

153. ENGLISH AS A SECOND LANGUAGE 3 qtr hrs Continuation of 152. English 152 and 153 together may be substituted for English 111. Prerequisites: English 151 or 110 and 152.

195. PROSEMINAR IN ENGLISH 1 qtr hr Orientation to the College of Arts and Sciences and to the Department of English. Required of all freshmen and transfer majors in the fall quarter. Counts as Arts and Sciences orientation requirement.
201. ENGLISH LITERATURE TO 1660 3 qtr hrs A survey of Anglo-Saxon, Medieval, and Renaissance literature.


203. ENGLISH LITERATURE AFTER 1830 3 qtr hrs A survey of Victorian and Modern literature.

204. GREAT WORKS OF LITERATURE 3 qtr hrs A study in depth of a small number of important literary texts. Not open to Freshmen. Prerequisite for all 300 and 400 level courses.

207. MODERN POETRY 3 qtr hrs A study of modern English and American poets with emphasis on one or two major figures such as Yeats and Frost.

208. MODERN WORLD DRAMA 3 qtr hrs A study of modern drama, concentrating on major works and playwrights, including influences, movements, and types.

209. MODERN FICTION 3 qtr hrs A study of selected works of modern fiction, including influences, movements, and types.

211. AMERICAN LITERATURE TO 1865 3 qtr hrs A survey of Colonial and Romantic literature.

212. AMERICAN LITERATURE AFTER 1865 3 qtr hrs A survey of Modern literature.

221. WORLD LITERATURE 1 3 qtr hrs Major literary masterpieces of the ancient and medieval periods.

222. WORLD LITERATURE 2 3 qtr hrs Major literary masterpieces from the Renaissance to the mid-nineteenth century.

223. WORLD LITERATURE 3 3 qtr hrs Major literary masterpieces from the mid-nineteenth century to the present.

225. APPROACHES TO CHILDREN'S LITERATURE 3 qtr hrs Knowledge and appreciation of literature specifically suited for children and adolescents. The readings selected from various genres will be studied using the same critical approaches that are traditionally used to analyze literature for adults.

241. NEWSWRITING 3 qtr hrs The fundamentals of gathering information and writing for a newspaper.

242. NEWSWRITING 2 3 qtr hrs An advanced course in gathering information and writing for a newspaper.

243. MAGAZINE WRITING 3 qtr hrs The discipline and technique of writing articles for magazines.

244. PRESS/FREEDOM-LAW 3 qtr hrs A survey of press freedom and law in the United States, including recent developments within the collegiate press.

246. JOURNALISM LAYOUT AND DESIGN 3 qtr hrs The theory and technique of layout and design of newspapers and magazines.

250. JOURNALISM ACTIVITIES—NEWSPAPER 1 qtr hr

251. JOURNALISM ACTIVITIES—MAGAZINE 1 qtr hr

252. JOURNALISM ACTIVITIES—YEARBOOK 1 qtr hr

253. JOURNALISM ACTIVITIES—INTERNSHIP 1 qtr hr Supervised work on and contributions to the publications. The student may enroll for only one activities course per quarter. Six hours in one area or a combination of six hours from the four areas (250, 251, 252, 253) may be counted toward graduation, but only the required three credit hours of Journalism Activities—Newspaper (250) may be counted toward a major in English with a concentration in writing or toward a minor in writing. Journalism activities do NOT count toward a major in English or toward a minor in literature. No prerequisites.

254. JOURNALISM ACTIVITIES—HIGH SCHOOL PUBLICATIONS 1 qtr hr Students work on high school publications in an area high school under the supervision of a high school teacher and a faculty member of the English Department. Prerequisites: 112–110; and either 112–241, 244 or 246.

290. SPECIAL TOPICS IN ENGLISH 1-3 qtr hrs

291. SPECIAL TOPICS IN WORLD LITERATURE 1-3 qtr hrs

292. SPECIAL TOPICS IN ENGLISH LITERATURE 1-3 qtr hrs

293. SPECIAL TOPICS IN AMERICAN LITERATURE 1-3 qtr hrs

297. INDEPENDENT STUDY IN ENGLISH 1-3 qtr hrs

310. ENGLISH LITERATURE BEFORE 1500 3 qtr hrs A study of the epic, lyric poetry and drama forming the background for later English literature: "Beowulf," the King Arthur tales, Irish and Welsh poetry and
311. **SHAKESPEARE I** 3 qtr hrs Represen-
tative plays and poems.

312. **SHAKESPEARE II** 3 qtr hrs Continua-
tion of 311.

321. **MILTON** 3 qtr hrs Milton’s major lyric
poems, “Paradise Lost” and “Samson
Agonistes.”

322. **RESTORATION AND THE EIGHT-
EENTH CENTURY** 3 qtr hrs A concen-
trated study of two or three major writ-
ers, movements, or genres in the Neo-
Classic period.

323. **ENGLISH ROMANTICISM** 3 qtr hrs
A concentrated study of two or three major
writers.

324. **VICTORIAN PERIOD** 3 qtr hrs
A concentrated study of two or three major
writers, movements, or genres.

326. **TWENTIETH-CENTURY BRITISH
LITERATURE** 3 qtr hrs A concentra-
ted study of two or three major writers,
movements, or genres.

334. **MAJOR AMERICAN WRITERS OF
THE NINETEENTH CENTURY** 3 qtr hrs A
concentrated study of selected nineteenth-
century writers.

335. **MAJOR AMERICAN WRITERS OF
THE TWENTIETH CENTURY** 3 qtr hrs A
concentrated study of selected twentieth-
century writers.

341. **POETRY WRITING** 3 qtr hrs The dis-
cipline and technique of writing poetry. Pre-
requisite: a literature course above the fresh-
man level. Graded S-U. May be continued as
498 (independent study in writing).

342. **FICTION WRITING** 3 qtr hrs The dis-
cipline and technique of writing fiction. Pre-
requisite: a literature course above the fresh-
man level. Graded S-U. May be continued as
498 (independent study in writing).

343. **PERSUASIVE WRITING** 3 qtr hrs An
advanced writing course stressing the art of
persuasive prose in letters, reports and cri-
tiques. Prerequisite: a literature course above
the freshman level. Graded S-U. May be con-
tinued as 498 (independent study in writing).

346. **PRELAW WRITING** 3 qtr hrs Clear
analysis and direct communication of facts
and ideas according to the mode of legal writ-
ing. Graded S-U.

347. **ADVANCED WRITING** 3 qtr hrs An
advanced writing course tailored to fit the
specific needs of students in various disci-
plines, including scholarly research, business
letters, scientific reports, abstracts, memo-
randa and writing for the general public.

351. **THE ENGLISH LANGUAGE** 3 qtr hrs
An introduction to the study of linguistics with
the emphasis on a description of the struc-
ture of English grammar.

364. **THE ENGLISH NOVEL** 3 qtr hrs
Representative novels from the eighteenth
century to the present.

365. **THE AMERICAN NOVEL** 3 qtr hrs
Representative novels from the nineteenth
century to the present.

370. **AFRICAN LITERATURE** 3 qtr hrs
Novels and short stories that reflect African
imagination, mentality and ethnic life in colo-
rial and post-independence periods. This
course satisfies the general education
requirement for non-Western culture.

381. **LITERARY CRITICISM** 3 qtr hrs A
study of major theories and their practical
applications.

410. **CHAUCER** 3 qtr hrs A study of
Chaucer with special emphasis on “The Can-
terbury Tales,” some reading of the chief
literary forms of the Middle Ages, some skill in
understanding and reading Middle English.

450. **METHODS OF TEACHING EN-
GLISH IN THE SECONDARY SCHOOL**
4 qtr hrs Effective methods of teaching
grammar, writing, and literature at the high
school level. Includes approximately 30 hours
of field experience. Prerequisites: 141-110,
150, 151 and 225.

481. **INTERNSHIP** 1-15 qtr hrs Internships
in English are designed to provide practical
experience outside the classroom and to
enhance the student’s professional interests.
Prerequisite: Courses appropriate for the
internship.

489. **THE SENIOR ESSAY** 3 qtr hrs
Required of all English majors during the
senior year. The student will enroll in the
quarter during which he expects to complete
the essay.

490. **SPECIAL TOPICS IN ENGLISH**
1-3 qtr hrs

494. **SEMINAR IN ENGLISH LITERA-
TURE** 3-6 qtr hrs
495. SEMINAR IN AMERICAN LITERATURE 3-6 qtr hrs
497. INDEPENDENT STUDY IN LITERATURE 1-3 qtr hrs
498. INDEPENDENT STUDY IN WRITING 1-3 qtr hrs
499. INDEPENDENT STUDY IN JOURNALISM 1-3 qtr hrs

FOREIGN LANGUAGES
(Department 113)

Professors Davey (Chairman), Lippert; Associate Professor Khoury; Assistant Professor Dickson; Instructor Wolber

The foreign language program is designed to train students to speak, understand, read, and write a foreign language; to ensure a strong background in the culture and literature of peoples whose language they are studying; to provide the language ability necessary for students to work in a number of fields; to prepare students for graduate work; to train students to be teachers of foreign languages at the elementary and secondary levels. See departmental brochure for descriptions of career opportunities.

The University Audio Center provides the student with opportunities for language practice and extends his/her contact with the living language. Recorded materials used in the center are prepared as an adjunct to class work and are coordinated with class instruction. Additional materials including video cassettes and computer programs are also available which give the student ample opportunity for aural comprehension, audiovisual drill, speaking, and self-correction.

Requirements for a non-teacher-certification major in French or Spanish: 52 hours are required beginning with French 120 or Spanish 140; to include nine hours of civilization courses to be selected from among the following: 324, 325, 327, 328, 329 (French) or 351, 353, 354, 355, 356, 357, 358, 359 (Spanish). Students develop individual programs of study with advisers. Ordinarily courses are taken in sequence through French 312 or Spanish 342. Civilization courses assume completion of French 215 or Spanish 245. Unless otherwise indicated, other courses at the 300- and 400-level assume completion of French 312 or Spanish 342.

Requirements for a teacher-certification (Ohio) major in French or Spanish: 68 hours are required beginning with French 120 or Spanish 140; to include nine hours of civilization courses to be selected from those listed in the previous paragraph; six hours of literature courses are also required. Students develop individual programs of study with advisers. Ordinarily courses are taken in sequence through French 312 or Spanish 342. Civilization courses assume completion of French 215 or Spanish 245. Unless otherwise indicated, other courses at the 300- and 400-level assume completion of French 312 or Spanish 342.

It is strongly recommended, although not required, that language majors take part in summer-study abroad or junior-year abroad programs. Faculty advisers assist students in developing these programs of study. Language majors are also encouraged to develop a second academic area of interest in addition to their language major.

For a minor in French, German or Spanish: 37 hours are required beginning with French 120, German 130, or Spanish 140. Individual programs are devised for students, but emphasis is on language and civilization.

Individualized study in certain less frequently taught languages is provided under the auspices of the Audio Center. Students pursue taped courses in those languages elected, with the aid of native tutors. Selected qualified persons evaluate and grade student performance.

Business Option for Spanish/French Majors
A student wishing an option in business with a major in French or Spanish must complete a 30-hour program in the College of Business Administration.

Business Option
Accounting 131
Accounting 132
Accounting 133 (Elective)
Economics 100
Economics 202
Economics 203
Marketing 351
Managerial Finance 362
Management 330
Business Law 322
000. ORIENTATION 1 qtr hr Familiarization with the department, requirements for majors, planning program of courses, university catalog, library, career and employment opportunities, foreign study opportunities, certification requirements; required of majors in the department.

380. TEACHING FOREIGN LANGUAGES 4 qtr hrs Theory and practice of current methods for teaching foreign languages in elementary and secondary schools; evaluation of textbooks; use of audio-visual media; methods of evaluating student progress. (One credit hour of field experience equals 30 hours.) Prerequisites: minimum of 18 hours in foreign languages; admission to teacher education or permission of the director of teacher education.

403. LITERATURE IN TRANSLATION 3 qtr hrs One-quarter course in either Spanish, French or German literature in translation. Focus on major writers and literary trends of different periods. Lectures and assignments in English. Does not fulfill the General Education requirement in Foreign Language.

French

120. ELEMENTARY FRENCH 1 4 qtr hrs To develop the ability to understand, speak, read and write French; functional grammar, early and fluent speaking; elementary reading based on French life, customs, and manners. Four class periods and one hour of scheduled laboratory/drill practice per week.

121. ELEMENTARY FRENCH 2 3 qtr hrs Continuation of 120. Three class periods and one hour of scheduled laboratory/drill practice each week.

122. ELEMENTARY FRENCH 3 3 qtr hrs A conversation and culture course with limited presentation of structural items, designed to improve language skills introduced in the first two courses. Based on francophone cultural perspectives, the course emphasizes speaking and understanding through conversations in French, role playing and skits. Some written practice. Prerequisite: 121 or proficiency established by placement examination.


214. INTERMEDIATE FRENCH 1 4 qtr hrs The completion of basic French grammar begun in Elementary French 1 and 2. Conversational practice and composition based on reading passages, films, popular music, videos, and "cultural" capsules. Four class periods and one hour of scheduled laboratory/drill practice per week. Prerequisite: 122 or proficiency established by placement examination.

215. INTERMEDIATE FRENCH 2 4 qtr hrs Continuation of 214.

217. FRENCH PHONETICS 3 qtr hrs A basic introduction to linguistic terminology and a comparative analysis of the French and English sound systems, with emphasis on improving students' pronunciation in French. Open to all students. Prerequisites: 113-122 or permission of the department.

219. INTRODUCTION TO FRENCH LITERATURE 3 qtr hrs An intermediate-level course intended as an introduction to serious reading in French. Class discussion, in French, based on selections of short literary masterpieces (classic and modern).

290. SPECIAL TOPICS IN FRENCH 1-3 qtr hrs

297. INDEPENDENT STUDY IN FRENCH 1-3 qtr hrs Students may request a one-credit-hour grammar review course under this heading. Individualized instruction may include work in the language lab.

311. FRENCH CONVERSATION AND COMPOSITION 3 qtr hrs To increase oral and written proficiency in French through the use of communicative activities, conversations with native speakers, and writing of articles. Prerequisite: 215 or permission of the department.

312. ADVANCED FRENCH LANGUAGE STUDY 3 qtr hrs An intensive study of grammar and syntax with emphasis on constructions of high-frequency usage. Written compositions and oral practice. Prerequisite: 311 or permission of the department.

314. THE FRENCH TEXT: THE SHORT STORY 3 qtr hrs Reading of short fiction by classic and contemporary authors. Selections progress according to difficulty.

315. THE FRENCH TEXT: THE NOVEL 3 qtr hrs Reading of contemporary and classical novels, primarily for fluency of comprehension. Study of the genre's development in French literature.
497. INDEPENDENT STUDY IN FRENCH 1-3 qtr hrs

German

130. ELEMENTARY GERMAN 1 4 qtr hrs
To develop the ability to understand, speak, read, and write German; functional grammar; early and fluent speaking; elementary reading based on German life, customs, and manners. Four class periods and one hour of scheduled laboratory(drill practice per week.

131. ELEMENTARY GERMAN 2 3 qtr hrs
Continuation of 130. Three class periods and one hour of scheduled laboratory(drill practice each week.

132. ELEMENTARY GERMAN 3 3 qtr hrs
A conversation and culture course with limited presentation of structural items, designed to improve language skills introduced in the first two courses. Based on Germanic cultural perspectives, the course emphasizes speaking and understanding through conversations in German, role playing and skits. Some written practice. Prerequisite: German 131 or proficiency established by placement examination.

220. BUSINESS GERMAN 3 qtr hrs
A survey of German business practice including office procedure and advertisements. Students develop writing and conversational skills related to business. Some translation. Prerequisite: 225 or permission of department.

224. INTERMEDIATE GERMAN 1 4 qtr hrs
Review of the fundamentals of grammar, pronunciation, vocabulary, and idioms; conversational practice and composition; readings and discussion about German life and culture; occasional viewing of slides, films, and newreels. Four class periods and one hour of scheduled laboratory(drill practice per week. Prerequisite: 132 or proficiency established by placement examination.

225. INTERMEDIATE GERMAN 2 4 qtr hrs
Continuation of 224.

261. INTRODUCTION TO GERMAN LITERATURE 3 qtr hrs
Reading and discussion of well-known poetry, plays, and short prose selections, from classic to contemporary. Presentations, in German, to focus on genre, the work as representative of literary movements, and the reflection of society and social change in literature. Prerequisite: 132 or permission of the department.
291. SPECIAL TOPICS IN GERMAN
1-3 qtr hrs

298. INDEPENDENT STUDY IN GERMAN
1-3 qtr hrs

321. GERMAN CONVERSATION AND COMPOSITION 1
3 qtr hrs
To develop a useful command of the German language and an appreciation of German civilization. Material and topics chosen to encourage and facilitate speaking and writing ability. Occasional laboratory practice. An advanced study of grammatical and phonetic problems aimed at perfecting clarity and accuracy of expression. Prerequisite: 225 or proficiency established by placement examination.

322. GERMAN CONVERSATION AND COMPOSITION 2
3 qtr hrs
Continuation of 321.

323. GERMAN CONVERSATION AND COMPOSITION 3
3 qtr hrs
Continuation of 322.

337. THE GERMAN-SPEAKING WORLD
3 qtr hrs
A survey of history, culture, social and political institutions in the German-speaking countries. Outside reading and written reports on assigned topics. Lectures in German. Prerequisite: 225 or permission of the department.

338. CONTEMPORARY WEST GERMANY
3 qtr hrs
A close examination of the Federal Republic from its beginning to the present. Topics include social services, communications, political parties, foreign workers, current issues, the educational system, employment, family life, language and leisure. Presentations, discussions, and readings in German. Prerequisite: 225 or permission of the department.

339. EAST GERMANY-AUSTRIA-SWITZERLAND
3 qtr hrs
A study of contemporary social, cultural and political elements in the three countries. This survey will examine the political and social structures, educational system, working world, language differences, and leisure activities of each country. Presentations, discussions, and readings in German. Prerequisite: 225 or permission of the department.

491. SPECIAL TOPICS IN GERMAN
1-3 qtr hrs

498. INDEPENDENT STUDY IN GERMAN
1-3 qtr hrs

Spanish

140. ELEMENTARY SPANISH 1
4 qtr hrs
To develop the ability to understand, speak, read and write Spanish; functional grammar; early speaking; elementary reading based on Hispanic life, customs, and manners; using materials dealing with Spain, Mexico, and South America. Four class periods and one scheduled laboratory/drill practice per week.

141. ELEMENTARY SPANISH 2
3 qtr hrs
Continuation of 140. Three class periods and one hour of scheduled laboratory/drill practice each week.

142. ELEMENTARY SPANISH 3
3 qtr hrs
A conversation and culture course with limited presentation of structural items, designed to improve language skills introduced in the first two courses. Based on Hispanic cultural perspectives, the course emphasizes speaking and understanding through conversations in Spanish, role playing and skits, and some written practice. Prerequisite: 141 or proficiency established by placement examination.

240. BUSINESS SPANISH
3 qtr hrs
A survey of Spanish business practice including office procedure and advertisements. Students develop writing and conversational skills related to business. Some translation. Prerequisite: 245.

244. INTERMEDIATE SPANISH 1
4 qtr hrs
A review of grammar and pronunciation; conversational practice and occasional lectures in Spanish on Hispanic life, history, art and civilization, illustrated with slides, photographs, reproductions, and realia. Four class periods and one hour of scheduled laboratory/drill practice per week. Prerequisite: 142 or proficiency established by placement examination.

245. INTERMEDIATE SPANISH 2
4 qtr hrs
Continuation of 244.

248. SPANISH PHONETICS
3 qtr hrs
A basic introduction to linguistic terminology and a comparative analysis of the Spanish and English sound systems, with emphasis on improving students' pronunciation in Spanish. Open to all students. Prerequisite: 142 or permission of the department.

292. SPECIAL TOPICS IN SPANISH
1-3 qtr hrs
299. INDEPENDENT STUDY IN SPANISH 1-3 qtr hrs

341. SPANISH CONVERSATION AND COMPOSITION 3 qtr hrs Extensive oral and written practice designed to increase control of vocabulary and grammatical structures, especially the verb system. Prerequisite: 245 or permission of the department.

342. ADVANCED SPANISH LANGUAGE STUDY 3 qtr hrs An intensive study of grammar and syntax with emphasis on constructions of high-frequency usage. Written compositions and oral practice. Prerequisite: 341 or permission of the department.

349. SPANISH-LANGUAGE THEATER PRODUCTION 1-3 qtr hrs Up to three hours of credit, depending on role. May be repeated for graduation credit up to a maximum of six hours. Permission of instructor required.

351. HISPANIC CULTURAL PERSPECTIVES 3 qtr hrs A study of how Spaniards and Spanish Americans view the world, in contrast to typical American perspectives. Emphasis on the various social concepts, attitudes, orientations, and life styles which make up different and sometimes unique points of view. Prerequisite: 245 or permission of department.

353. SPAIN TO THE NINETEENTH CENTURY 3 qtr hrs Integrates the geographical, political, economic, social, and cultural forces which have molded Spain from prehistoric times to the nineteenth century. Outside reading and written reports on assigned topics. Prerequisite: 245 or permission of department.

354. LATIN AMERICA TO THE NINETEENTH CENTURY 3 qtr hrs A general survey of the geography, history, and cultural forces of Latin America up to the nineteenth century, with special attention to the pre-Colombian indigenous culture of Mexico, Central and South America. Reference to architecture, sculpture, ceramics and other art forms. Outside reading and written reports on assigned topics. Prerequisite: 245 or permission of department.

355. CONTEMPORARY SPAIN AND LATIN AMERICA 3 qtr hrs A general survey of contemporary Spain and Latin America. Political, economic, social and cultural evolution. Artistic and literary creation. Modern Spanish thought. Outside reading and written reports on assigned topics. Prerequisite: 245 or permission of department.

356. SPANISH ART, MUSIC AND DANCE 3 qtr hrs Students follow the development in Spanish art, music and dance up to the present day. Major emphasis is on the twentieth century. Outside reading and listening (music) and written reports on assigned topics. Prerequisite: 245.

357. LATIN AMERICAN ART, MUSIC AND DANCE 3 qtr hrs Students follow the development in Latin American art, music and dance up to the present day. Major emphasis is on the twentieth century. Outside reading and listening (music) and written reports on assigned topics. Prerequisite: 245.

358. SPANISH MEDIA 3 qtr hrs A general survey of contemporary Spanish radio, television, newspapers and magazines. Written reports on assigned topics based on readings, listening (radio) and viewing (television). Prerequisite: 245.

359. LATIN AMERICAN MEDIA 3 qtr hrs A general survey of contemporary Latin American radio, television, newspapers and magazines. Written reports on assigned topics based on readings, listening (radio) and viewing (television). Prerequisite: 245.

449. CONTEMPORARY SPANISH AMERICAN NOVEL 3 qtr hrs Study and analysis of selected twentieth-century Spanish American novels.

451. SPANISH LITERATURE TO 1681 3 qtr hrs A study of the chief authors of Spain from the beginnings up to and including the Golden Age.

452. EIGHTEENTH- AND NINETEENTH-CENTURY SPANISH LITERATURE 3 qtr hrs Neoclassicism, romanticism, realism, generation of 1898.

453. TWENTIETH-CENTURY SPANISH LITERATURE 3 qtr hrs Main currents of Spanish literature from the generation of 1898 to the present.

456. NINETEENTH-CENTURY SPANISH AMERICAN LITERATURE 3 qtr hrs Romanticism (including Gaucho Literature), Realism, Modernism.

457. TWENTIETH-CENTURY SPANISH AMERICAN LITERATURE 3 qtr hrs The main currents from the Post-Modernist period to the present.
Independent Course Study

113. ELEMENTARY ARABIC 1 4 qtr hrs
Self-instruction, including use of tapes and native language tutors; designed to develop fluency in spoken Arabic. Prerequisite: Permission of the department. Offered alternate years.

114. ELEMENTARY ARABIC 2 3 qtr hrs
Continuation of 113-113.

115. ELEMENTARY ARABIC 3 3 qtr hrs
Continuation of 113-114.

116. ELEMENTARY ITALIAN 1 4 qtr hrs
Self-instruction, including use of tapes and native language tutors; designed to develop fluency in spoken Italian. Prerequisite: Permission of the department. Offered alternate years. (Formerly 113-111).

117. ELEMENTARY ITALIAN 2 3 qtr hrs
Continuation of 116. (Formerly 113-112).

118. ELEMENTARY ITALIAN 3 3 qtr hrs
Continuation of 113-117.

HEALTH, PHYSICAL EDUCATION AND SPORTS STUDIES
(Department 143)

Professor Lauth, Wallace; Associate Professors Campoli, Daugherty, Kovalchik (Chairman); Strayer; Assistant Professors Kaczkowski, Keller; Instructors Hankins, Mackie, Quinn; Visiting Instructor Montgomery.

The purposes of this department include: 1) to improve the quality of living by providing opportunities for students to acquire scientific knowledge, skills, favorable attitudes, as well as desirable habits of personal and community health, physical activities and safety, 2) to prepare teachers of health education, physical education, drivers education, and coaches of sports activities for the elementary and secondary schools, 3) to prepare students to do graduate work in health education, physical education, safety education, recreation, coaching, athletic training and athletic/sports management as well as other sports fields, 4) to prepare students for leadership roles in health, physical education, recreation, athletic training, drivers education, coaching, athletic/sport management, 5) to provide opportunities for individuals to participate in a variety of recreational, intramural and intercollegiate activities, 6) to prepare water safety instructors, 7) to prepare athletic trainers through the apprenticeship program of the National Athletic Trainers Association (NATA) or through the institutional program, 8) to prepare officials for sports activities; 9) to provide instruction to the general student body and other members of the university community for the development of skills, knowledge and appreciation of and positive attitudes, practices and habits towards lifetime, leisure physical activities.

Intramural Sports. An intramural program offers activity for each university student. The following sports are offered for men: touch football, basketball, softball, billiards, ping pong, bowling, swimming, handball, racquetball, volleyball, tennis, wrestling, track, golf, one-on-one basketball, and horse-shoes; for women: touch football, softball, volleyball, basketball, badminton, swimming, racquetball, three-on-three basketball, three-on-three volleyball, table tennis, archery, track and field; coed: water polo, volleyball, basketball, softball, wallyball, and triathlon.

Special requirements for majors within the department To satisfy the requirements for a teaching field in health and physical education, all students are required to complete the following for final approval by the department:

1. Participation during the junior year in one of the three courses 304-305-306 practical techniques of teaching and assisting in health and physical education.

2. Completion of field experiences required by the Education Department.

3. Successful completion of one quarter of aquatics prior to graduation.

4. Physical education majors are exempt from the service class requirement.

Required physical education service courses Physical education services classes meet two hours per week for one quarter hour credit. The physical education courses are given out-of-doors, in McIntosh Center and in the gymnasium. Service classes are graded on the S/U basis and
designed to fit the needs, abilities and interests of the individual student.

In the College of Arts and Sciences two of the three required hours must be taken in either the pool or the gymnasium. However, the other one hour may be taken in the gymnasium or in McIntosh Center. The required physical education service courses are not sequential and should be completed prior to senior status. None of the service courses may be repeated for graduation.

All carry one quarter hour credit; and a maximum of six hours may be counted toward graduation in the College of Arts and Sciences. Students may not receive credit toward graduation for more than one quarter-hour of physical education service credit during their collegiate career for any single varsity sport.

Additional fees are charged for bowling, billiards, archery, racquetball, golf and tennis.

**Athletic Training Certification Program**

(Sport Medicine Major/Athletic Training Minor) The athletic trainer is an important part of a complete athletic program. He/she is the individual charged with preventing athletic injury whenever possible, administering first aid if an injury should occur, and supervising the rehabilitation program designed in cooperation with the team physician. Students wishing to pursue the sports medicine major may choose to pursue a college major in another academic discipline. Candidates may qualify to be examined for National Athletic Training Association (NATA) certification through the apprenticeship program (program A) or with a minor in athletic training the institutional certification program (program B).

In the apprenticeship program (sports medicine major) students are expected to take part in **1800 hours of practical work experience** throughout the four years of study. These opportunities enable the prospective athletic trainer to perform many of the duties of an athletic trainer while under the direct supervision of the Ohio Northern University.

Upon successful completion of the athletic training curriculum and upon the recommendation of the program director, the student will be able to sit for the National Athletics Trainers’ Association Certification Examination by virtue of the apprenticeship program at Ohio Northern University.

The University also provides an alternative program involving **800 hours of practical work experiences** at the University for future athletic trainers (minors). Individuals successfully completing this option will receive an institutional certificate as an athletic trainer and must obtain an additional **1000 hours of practical work experience** while serving as an athletic trainer (under a NATA trainer) prior to sitting for the NATA examination.

**Required courses for Sports Medicine Major** (45 hours):


**Required courses for Athletic Training Minor** (36 hours): Biology 231, 232, 233, (plus 1800 or 800 apprentice hours). (The 800 hours require 1000 more hours prior to sitting for the NATA examination.)

Additional information may be obtained by contacting the Chairperson of the Health and Physical Education Department in King-Horn Convocation and Physical Education Center.

**Athletic Coaching Certification Program**

Ohio Northern University offers, through the Ad-Hoc Committee of the Ohio Association of Physical Education Directors, a “Voluntary Endorsement Certificate” for Athletic Coaching in the secondary schools of the State of Ohio. This Athletic Coaching Certificate is awarded by Ohio Northern University as evidence of the successful completion of a course of study leading to competency in coaching interscholastic sports for male and female students. Required courses of study leading to the Coaching Certificate from this University include:

- 112 First Aid and Safety Education 3 hours
- 256 Sociology of Sport
- 303 Organization and Administration of Health, Physical Education, Recreation and Athletics 3 hours
- 324 Psychology of Coaching 2 hours
- 334, 335, or 336 Advanced Coaching;
  - Internship/Externship 1 hour/3 maximum
- 243 Basic Athletic Training 3 hours
- 375 Advanced Athletic Training 4 hours
- Plus—two theory of coaching courses 4 hours
- (308, 310, 319, 320, 321, 322, 323, 327)
- Total 23-25 hours (25 maximum)
Major in Health and/or Physical Education, Sports Medicine, and Sports Management

The department offers a major in the following programs:

- Health and Physical Education K-12
- Physical Education K-12
- Health Education K-12
- Physical Education 7-12
- Sports Medicine
- Sports Management

The areas indicated are the areas that the department recognizes as a major. The other areas of certification require a college major in another academic discipline.

Additionally, the students are able to obtain a certification in the following:

- Athletic Training (Program A), apprenticeship program of the National Athletic Trainers Association—NATA; Program B, institutional certification.

Finally, the department provides courses of study leading to validation or certification in Drivers Education

For specific information concerning these areas of certification, please contact the Health and Physical Education Department Chairman.

Required courses for Dual Major in Health and Physical Education K-12 (87-90 hours):

- Biology 231, 232, 233; Sociology 105; HPE 000, 111, 112, 119, 132, 133, 147, 151, 211, 212, 213, 223, 233, 271, 303, 304, 305, six hours of coaching (308, 310, 319, 320, 321, 322, 323, 327) 243, 315, 317, 341, 342, 350, 351, 360, 402, one quarter of aquatics, four hours of electives in physical education, and six hours of electives in health.

Required courses for Physical Education Major K-12 (69-71 hours):

- Biology 231, 232, 233; HPE 112, 119, 132, 133, 147, 151, 211, 212, 213, 223, 233, 243, 271, 303, 304, 305, six hours of coaching, 351, 360, 402, one quarter of aquatics, five hours of physical education electives.

Required courses for Health Education Major K-12 (46 hours):

- Biology 231, 232, 233; Sociology 105; HPE 111, 112, 119, 151, 210, 303, 360, 402, 494, 497, 243, 350, 12 hours of electives.

Required courses for Physical Education Major 7-12 (45-47 hours):

- Biology 231, 233; PE 112, 132, 133, 147, 151, 211, 212, 213, 223, 303, 304, 351, 402, one quarter of aquatics, six hours of physical education electives.

Required Courses for Sports Management Major HPE 112, 151, 256, 486, 496, 303; Communication Arts 121, 130, 321, 421 and two of the following: 221, 311, 315, 330, 430; two of the following: HPE 324, Sociology/Psychology 203, 301, 316; Business 322, 330 and three of the following: 131, 323, 325, 335, 363, 365, 351, 371, 372.

Those interested in pursuing a career as a Sports Media Specialist should elect as many of the following as possible after those selected above. HPE 150, 251, 252, 340, 430; English 241, 243, 244, 343, 344.

Required courses for Drivers Education Certification: HPE 219, 433, 434.

All required courses must be completed with a grade of "C" or better.

001. VARSITY FOOTBALL PARTICIPATION 1 qtr hr

002. VARSITY CROSS COUNTRY PARTICIPATION 1 qtr hr

003. VARSITY SOCCER PARTICIPATION 1 qtr hr

004. VARSITY VOLLEYBALL PARTICIPATION 1 qtr hr

005. VARSITY BASKETBALL PARTICIPATION (MEN) 1 qtr hr

006. VARSITY BASKETBALL PARTICIPATION (WOMEN) 1 qtr hr

010. VARSITY TRACK PARTICIPATION (WOMEN) 1 qtr hr

011. VARSITY WRESTLING PARTICIPATION 1 qtr hr

012. VARSITY TRACK PARTICIPATION (MEN) 1 qtr hr

013. VARSITY TENNIS PARTICIPATION (MEN) 1 qtr hr

014. VARSITY TENNIS PARTICIPATION (WOMEN) 1 qtr hr

015. VARSITY GOLF PARTICIPATION 1 qtr hr

016. VARSITY SOFTBALL PARTICIPATION 1 qtr hr

017. VARSITY BASEBALL PARTICIPATION 1 qtr hr

018. VARSITY SWIMMING PARTICIPATION 1 qtr hr
021. WEIGHT TRAINING AND PHYSICAL CONDITIONING 1 qtr hr
Provide knowledge and skills in various types of weight training and conditioning activities. To provide a knowledge of the Nautilus and Universal equipment. To promote better fitness through weight training activity and exercise.

023. RECREATIONAL GAMES 1 qtr hr
To provide the student with background to enjoy the popular social games of backgammon, bridge, and cycling. To provide the student with the opportunity to use the swimming pool and the fitness trail.

024. BEGINNERS GOLF 1 qtr hr
Only for novice and non-golfers. To learn about the past history of golf, proper etiquette and safety involved, basic fundamentals involved in stance, approach, short, middle and long irons, woods, etc. Also scoring and creating an interest for carry over value.

025. SOCCER AND SOFTBALL 1 qtr hr
To provide the student with basic skills in both soccer and softball. To provide a basic understanding and appreciation for the games themselves. To promote some degree of physical activity which should help an individual be more fit. Offered on demand.

029. RACQUETBALL 1 qtr hr
To learn the basic skills and rules of racquetball so that one can become fit and a competent participant. To promote fitness in later life. To provide enough information that the student will become a better spectator in regard to the history and rules of the sport.

030. BEGINNERS SWIMMING 1 qtr hr
Only non-swimmers are allowed to take this course. To develop knowledge and skills necessary to save oneself and others. To provide background so students can progress toward Lifesaving and Water Safety Instructors certificate. Intermediate and advanced swimmers should not register for this course.

032. BASKETBALL 1 qtr hr
Elementary fundamentals in such skills as ‘shooting’ (lay-ups, free throw, jump shot); ‘dribbling’ (speed and control); ‘passing and receiving’ (two hand chest pass, wrap around, overhead pass, bounce pass); ‘basics of defense’ (stance, help-side technique, etc.); ‘half and full court’ games (2 on 2, 3 on 3, 4 on 4, 5 on 5). This course is not recommended for students who have played basketball on the high school level (competitive play).

033. INTERMEDIATE SWIMMING 1 qtr hr
To appreciate the recreational as well as physiological benefits of swimming. To perfect those elements found in beginning swimming and to further develop skills and knowledge necessary for increased enjoyment and safety in and around water. To further develop a working knowledge of basic rescue skills to ensure the safety of oneself and others. To acclimate oneself to the medium of deep water, both psychologically and physically.

034. BOWLING 1 qtr hr
To offer an opportunity to understand the fundamentals of bowling. To teach scoring, rules of etiquette and common courtesies. To develop coordination and provide an appreciation of the sport as a carry over in their personal lives.

050. SOCIAL DANCE 1 qtr hr
An introduction to the traditional dance (i.e., waltz, foxtrot, swing, samba, rhumba, cha-cha, tango). To acquire an understanding of dances and courtesies of dance. To identify music for appropriate dances. To develop basic knowledge of social dance steps, execution, leading and following.

060. ARCHERY 1 qtr hr
The scope and extent of archery, selection of equipment, safety, bracing of the bow, methods of shooting, points of aim, scoring, correction of problems. Use of indoor and outdoor ranges.

078. BADMINTON 1 qtr hr
To develop basic knowledge of history, rules, scoring, strategies in playing both doubles and singles badminton matches.

080. BEGINNING TENNIS 1 qtr hr
Recommended for non-tennis players. To develop basic knowledge of history, rules, serving, strategies in playing both doubles and singles match. To develop basic skills in executing the ground strokes, the service, the volley, lob, and smash shots with minimum success. To provide a basic understanding and appreciation of the game of tennis.

083. SQUARE AND FOLK DANCE 1 qtr hr
To develop skills in folk and square dance. To acquire an understanding of the background and tradition (American and other countries) of folk and square dance. To develop an appreciation of folk and square dancing. A carry over activity for later life.

085. INTERMEDIATE TENNIS 1 qtr hr
To develop and improve on skills already acquired. To develop a competitive knowl-
edge of strategies for playing both singles and doubles tennis matches. To improve on
skills in executing the ground strokes, serve, volley, lob and smash shots. This course is
not for beginners.

086. VOLLEYBALL 1 qtr hr To recognize and appreciate the values of volleyball as a
highly skilled, competitive game as well as a
recreational activity. To perform basic skills
and combination of skills pertinent to volleyball so that the student is able to demonstrate
success and satisfaction both in drills and
game like situations. To demonstrate an
understanding of official rules, related to vol-
leyball, by application in a game situation and
in written test performance.

087. AEROBIC EXERCISE 1 qtr hr To help
students develop an understanding of aerobic exercise and take the opportunity to pick
activities to accomplish their individual needs.
To help students create an interest so that
carry over values will be obtained.

000. ORIENTATION-HEALTH, PHYSICAL
EDUCATION, SPORTS STUDIES 1 qtr hr
Introduction to the profession of Health, Physical
Education, Recreation, Dance & Athletics.

110. INTRODUCTION TO HEALTH AND
FITNESS (WELLNESS) 3 qtr hrs A
beginning course designed for the individual
who wishes to gain knowledge, skill and
experience in managing one's lifestyle in a
positive manner. Primary purpose is to
acquaint students with the basic knowledges,
understandings and values of physical activity
as well as wise health choices as these
physical activities and health choices relate to
optimal healthful living and positive well-
ness. Designed for individuals, regardless of
age or sex, who desire total health/wellness
through a combination and application of atti-
tudes, knowledge and wise health choices/activities within the realm of diet, nutrition and
exercise.

111. CURRENT PERSONAL HEALTH
PROBLEMS 3 qtr hrs The identification and
study of timely health issues from a personal
viewpoint.

112. FIRST AID AND PERSONAL
SAFETY 3 qtr hrs Lectures, discussion and
practice in the giving of first aid in emergen-
cies. The American Red Cross Certificate
and CPR certification may be obtained by
students who pass an examination.

114. ADVANCED LIFESAVING 2 qtr hrs
To develop knowledge and skills to aid in the
prevention of aquatic accidents and an ability
to give assistance to victims. The American
Red Cross Advanced Lifesaving certificate/
emblem may be obtained by passing an
examination. Prerequisite: Instructor approval.

115. WATER SAFETY INSTRUCTION
3 qtr hrs Teaching of swimming and water
safety skills, methods and techniques. Suc-
cessful completion of the course will lead to
American Red Cross Water Safety Instruction
certification. Meets 5 days per week. Prereq-
quisite: Current certification in advanced
lifesaving.

119. SCHOOL AND COMMUNITY
HEALTH 3 qtr hrs Skills and knowledge for
aiding teachers and others to observe and
understand the school child in health and
illness; the health program of the public
schools and the relationship of the school to
the students' habits, attitudes and knowledge
conducive to good health. Health matters with
focus on health problems amenable to com-
unity action. Health and physical education
majors only or permission of department
chairman.

132. GYMNASTICS METHODS 2 qtr hrs
The fundamental skills, methods and tech-
niques in teaching the following activities:
trampoline, tumbling, parallel bars, uneven
bars, rings, horse, free exercise, balance
beam, vaulting, and horizontal bar.

133. GENERAL METHODS - MAJORS
2 qtr hrs The fundamental skills, methods
and techniques in teaching the following
activities: track and field, basketball, softball,
recreational games. Offered alternate years
(1986-87).

147. BASIC MOVEMENT - MAJORS 2 qtr
hrs The principles and laws of motion as ap-
piled to basic human movement and perfor-
ance. An introduction to the basic locomo-
tor and axial movements possible in the
human body and the utilization of these basic
movements as they are combined in the effi-
cient performance of complex tasks.

151. FOUNDATIONS OF HEALTH,
PHYSICAL EDUCATION, RECREA-
TION AND ATHLETICS 3 qtr hrs The student is
introduced to five foundation areas - the his-
torical, philosophical, psychological, physio-
logical and sociological - of physical educa-
tion, health education, recreation, safety and
athletics. A sixth unit treats the scope, justification and needs of the profession and professional opportunities.

210. ADVANCED FIRST AID-EMERGENCY CARE 3 qtr hrs To increase knowledge, skill and experience in the application of first aid and emergency care. Students must hold a current and valid American Red Cross first aid card. Information and skills will be built upon those acquired while completing requirements of the Standard First Aid and Personal Safety Course or Multi-Media First Aid Course. Successful completion of this course entitles the student to an American Red Cross Advanced First Aid Card.

211. TEAM SPORTS - MAJORS 2 qtr hrs The fundamental skills, methods and techniques in teaching the following activities: speedball, soccer, various versions of touch football, field hockey, and volleyball.

212. DANCE - MAJORS 3 qtr hrs Required of all physical education majors. The fundamental skills and methods of teaching various areas of the dance; folk, square and social dance and rhythmic fundamentals. Offered alternate years (1986-87).

213. INDIVIDUAL-DUAL ACTIVITIES - MAJORS 2 qtr hrs The fundamental skills, methods and techniques in teaching the following activities: tennis, badminton, archery, golf, weight lifting and bowling. Offered alternate years (1985-86).

219. PSYCHOLOGICAL FACTORS IN DRIVING 3 qtr hrs A study of behavior with emphasis on attitudes, motivation, and adjustment and their relationship to unsafe driving. Investigation of principles and methods appropriate in identifying, understanding, and modifying unsatisfactory driving behavior. Prerequisite: 133-100. Offered alternate years (1986-87).

223. KINESIOLOGY 3 qtr hrs The study of the general body mechanics of the human organism; the activities of the physical education program in their relation to coordination and the proper body mechanics, analysis of movement. Prerequisites: 121-231 and 232.

233. PHYSICAL EDUCATION FOR THE ELEMENTARY SCHOOL 3 qtr hrs The aims, objectives, methods, and techniques of teaching physical education in the elementary school. The need for physical activity and practical application of theories are emphasized. Prerequisite: sophomore standing. Includes approximately 10 hours of field experience.

243. BASIC ATHLETIC TRAINING 3 qtr hrs To meet the need of the high school coach; training procedures and conditioning of athletic teams for all sports; treatment of athletic injuries. Laboratory designed to familiarize student with taping techniques. Lab fee.

256. SOCIOLOGY OF SPORT 3 qtr hrs The study of the broad prospective of sport in society; sport as it differs from play and game; the relationship between sport and economics, politics, popular culture, mass media, religion, law, minorities, females, and education; sport and socialization, social structure and stratification, social mobility and deviance.

271. MOTOR LEARNING 3 qtr hrs The study of rather permanent change in performance brought about through practice and excludes changes due to maturation, drugs or nutrients.

303. ORGANIZATION AND ADMINISTRATION OF HEALTH, PHYSICAL EDUCATION, RECREATION AND ATHLETICS 3 qtr hrs Examination of the philosophy, principles, problems, policies and procedures essential in the organization and administration of meaningful programs in health education, physical education, recreation and athletics. Prerequisite: One year of physical education for majors and junior status.

304. PRACTICAL TECHNIQUES OF TEACHING AND ASSISTING IN HEALTH AND PHYSICAL EDUCATION 1 qtr hr Required of all physical education majors, preferably in their junior year. This class involves assisting in service classes.

305. PRACTICAL TECHNIQUES OF TEACHING AND ASSISTING IN HEALTH AND PHYSICAL EDUCATION 1 qtr hr Continuation of 143-304. Required of all physical education majors. Prerequisite: 143-304.

306. PRACTICAL TECHNIQUES OF TEACHING AND ASSISTING IN HEALTH AND PHYSICAL EDUCATION 1 qtr hr Continuation of 143-305. Prerequisite: 143-304 and 305.

308. TECHNIQUES-COACHING VOLLEYBALL 2 qtr hrs To develop a basic expertise in the techniques and knowledge of coaching volleyball. To provide laboratory experiences in the practical application of techniques and knowledge of coaching volleyball. Upon successful completion of course requirements and instructor's recomm
mendment, participants may receive USVBA Level I certification.

310. TECHNIQUES - COACHING SOFTBALL 2 qtr hrs To develop a basic expertise in the knowledge and techniques of coaching softball. To provide laboratory experiences in the practical application of techniques and knowledge of coaching softball. Offered alternate years (1986-87).


317. THEORY OF TRACK AND FIELD OFFICIATING 2 qtr hrs Knowledge and techniques of officiating track and field. National Federation rules. Laboratory experiences during intramural track and field. Offered even numbered years only.

319. THEORY AND METHOD OF COACHING TRACK 2 qtr hrs Methods and forms for all of the events in track and field. Lectures, reports, demonstrations and practice. Offered alternate years (1986-87).

320. THEORY OF COACHING AND OFFICIATING WRESTLING 2 qtr hrs Equipment, fundamentals of the art and skill of wrestling. Prerequisite for students seeking state certification in physical education; junior status. Offered even numbered years only.

321. THEORY OF FOOTBALL COACHING 2 qtr hrs Equipment, fundamentals of the game, kicking, passing, handling the ball, tackling, blocking; individual position play; offensive and defensive formation; strategy and generalship. To prepare students to coach on the junior high and senior high level.

322. THEORY OF COACHING BASKETBALL 2 qtr hrs The fundamentals: passing, shooting, dribbling, feinting and pivoting, styles of offense and defense, equipment, conditioning, the handling of a team in games. Lectures, demonstrations and practice. Open to juniors and seniors only or by permission of instructor.

323. THEORY OF COACHING BASEBALL 2 qtr hrs Individual position and team play in men's baseball. Lectures, reports, demonstration, and practice.

324. PSYCHOLOGY OF COACHING 3 qtr hrs The cultural, emotional, psychological and sociological aspects of coaching. Player-coach relationship, understanding the athlete, improving coaching effectiveness.

327. THEORY OF COACHING SOCCER 2 qtr hrs Equipment, fundamentals of the game: kicking, passing, playing the ball, strategy and generalship. Offered on demand.

334. ADVANCED COACHING INTERNSHIP-EXTERNSHIP 1-3 qtr hrs Coaching under supervision in all sports in season. Hours arranged. Six hours maximum toward graduation. Prerequisite: Permission of chairperson.

335. ADVANCED COACHING INTERNSHIP-EXTERNSHIP 1-3 qtr hrs Prerequisite: Permission of department chairperson.

336. ADVANCED COACHING INTERNSHIP-EXTERNSHIP 1-3 qtr hrs Prerequisite: Permission of department chairperson.

342. BASKETBALL OFFICIATING 2 qtr hrs The study of basketball rules and mechanics from the standpoint of player, coach and official.

350. HEALTH METHODS AND EVALUATION 4 qtr hrs For the special teacher and supervisor of health; health problems arising in a school system; methods and materials for teaching health and conducting evaluation. Prerequisites: two quarters of health, one of which must be 143-111; admission to Teacher Education or permission of the Director of Teacher Education. Includes 30 hours of field experience.

351. METHODS AND PRINCIPLES OF PHYSICAL EDUCATION 4 qtr hrs Methods, devices and techniques which are most effective in the teaching of the discipline in the public schools. Lab experiences in area schools. Prerequisite: one year of physical education for majors and junior status; admission to Teacher Education or permission of the Director of Teacher Education. Includes 30 hours of field experience.

360. TESTS AND MEASUREMENT OF HEALTH, PHYSICAL EDUCATION, AND ATHLETICS 3 qtr hrs Fundamental considerations of measurement; physical education and health measurements; test evaluation; criteria of tests; validity of tests; accuracy of tests; physical fitness; skills tests; application of measurement; elements of statistics.
sional skills. To be taken concurrently with the Sports Management Seminar to assist the students with the integration of field work and classroom learning.

490. SPECIAL TOPICS IN HEALTH, PHYSICAL EDUCATION, SPORTS
1-3 qtr hrs Specially planned work throughout the quarter. Permission of department chair.

494. HEALTH SEMINAR 3 qtr hrs An indepth analysis of current health problems, issues and trends as they apply to the teacher of health education. Offered even numbered years only.

496. SPORTS MANAGEMENT SEMINAR
1 qtr hr Discussion and analysis of the field setting, practice and organization. Includes monitoring and evaluation of the student internships. To be taken concurrently with Sports Management Internship.

497. INDEPENDENT STUDY 1-3 qtr hrs

HISTORY AND POLITICAL SCIENCE
(Department 132)
Professors Saffell (Chairman), Davis, Gilbreth (Leave), Hammond, Ludanyi, Peltier, Assistant Professors Bessen, Scott, Wilson.

The Wilfred E. Binkley Chair of History and Political Science, inaugurated in 1971, has been made possible by a grant from the Carthage Foundation of Pittsburgh. The 1987-88 recipient of this professorship is David M. Bessen, Assistant Professor of History.

The Kernan Robson Chair in Political Science, inaugurated in 1972, has been made possible by a trust established by the late Kernan Rob- son. The 1987-88 recipient of this professorship is Mary K. Hammond, Professor of Political Science.

The department offers separate majors and minors in history, political science, criminal justice, and international studies. To pursue a dual major students must complete all the requirements for each separate major. Department majors are required to complete two research papers—one in their junior year and one in their senior year.
Majors in history and political science prepares students generally for careers in teaching, law, journalism, government service, or business. Criminal justice prepares students for employment in law enforcement, corrections, and court management. International studies majors prepare for careers in government or business. There are special departmental advisers for prelaw, teacher certification, criminal justice, and international studies.

The department offers majors a freshman advising program; a career development program; Phi Alpha Theta, the national historical honorary and Pi Sigma Alpha, the national political science honorary. In addition public service internships are available at all levels of government, including the Ohio Legislature. Public history interns include work in museums and in archival management. Students annually participate in the National Model United Nations in New York City. The department also offers students the opportunity to participate in the Washington Semester Program sponsored by American University.

Minor

Minor in History
History 110-111 3 hours
American History 211, 212, 213 9 hours
Contemporary Affairs 221, 222, 223, 224, 225, 226 3 hours
World History 6 hours
U.S. History 6 hours
Elective 3 hours
TOTAL 33 hours

Minor in Political Science
Political Science 105 3 hours
American National Government 201, 202, 203 9 hours
Contemporary Affairs 221, 222, 223, 224, 225, 226 3 hours
Political Thought (455, 456, 457 or 387) 3 hours
American Politics 6 hours
World Politics 6 hours
Elective 3 hours
TOTAL 33 hours

Departmental Advising In addition to regular academic advisers, the department also provides more specialized prelaw, teacher education, and public administration advisement. Normally, majors interested in prelaw studies will be assigned to the departmental prelaw adviser, who not only assists the student in making a judicious selection of courses, but also maintains a law school catalog library and acts as the department's central information officer in matters related to prelaw education. Similarly, majors interested in a teaching career will be assigned to the departmental teacher education adviser, who provides academic advice and guidance, and also supervises the departmental aspects of the student teaching program. Public administration majors are assigned to an adviser who supervises internships and maintains materials on public employment.

Prelaw Program In addition to its emphasis upon prelaw advisement, the department cooperates with the College of Law at Ohio Northern University relative to the formal guaranteed admission prelaw program.

Basically, this program guarantees admission to the Pettit College of Law for those students who maintain at least a 3.0 grade point average during their undergraduate years at Ohio Northern, complete suggested categories of courses and score within the range of the 50th percentile on the LSAT.

Teacher Certification with Major in History or Political Science

History
Orientation 000 1 hour
Western Civilization 110-111 6 hours
History 200 1 hour
American National Government 201, 202, 203 9 hours
American History 211, 212, 213 9 hours
Contemporary Affairs 221, 222, 223, 224, 225, 226 3 hours
Non-Western History 6 hours
European History 6 hours
U.S. History 6 hours
Electives* 12-15 hours
TOTAL 56 hours

Political Science
Orientation 000 1 hour
Political Science 105 3 hours
Political Science 200
American History 211, 212, 213 9 hours
American National Government 201, 202, 203 9 hours
Contemporary Affairs 221, 222, 223, 224, 225, 226 3 hours
Theory 455 and 378, 456 or 457 6 hours
American Politics 6 hours
World Politics 6 hours
Electives* 15 hours
TOTAL 59 hours

* Must include courses in non-western history or political science.
Comprehensive Social Studies Certification
Ohio Northern University does not offer a major in comprehensive social studies. Students may, however, obtain such certification through the efficient utilization of free electives by taking the appropriate additional courses which will then qualify the student for teaching certification in comprehensive social studies by the State Department of Education of Ohio.

The following electives taken in addition to the history or political science major qualify the student for certification in comprehensive social studies:

Economics 100
Economics 202
Economics 203
Geography 226
Sociology 105
Sociology 240 or 245
Sociology 250
Social Studies Electives:
12 hours (the 12 hours of electives must all be taken in the same field, excluding the major—Political Science or History or Economics or Sociology.)

Grand Total: 91 quarter hours.

In addition to the requirements for the major or social studies comprehensive and the general education requirements the student must complete the following courses in the Department of Education: Education 224, 250, or 251, 342, 370, 380, 450, 480-481.

History
Specific requirements for the history major:
1. Orientation 000
2. History 110-111
3. History 200
4. Political Science 201-202-203
5. History 211-212-213
6. One contemporary affairs course (221-222-223-224-225-226)
7. 30 hours history electives, distributed as follows:
   World History—6 hours (excluding contemporary affairs courses)
   American History—6 hours
   Electives—18 hours (excluding contemporary affairs courses)

000. ORIENTATION 1 qtr hr Familiarization with the department, requirements for majors, planning a program of courses, the University catalog and library. Required of departmental majors. Also listed as Political Science 000.

110. WESTERN CIVILIZATION I 3 qtr hrs A broad historical study focusing on the development of Western Civilization from ancient times to 1648, designed to introduce the beginning student to the ideas, attitudes, and institutions basic to civilization as it developed in the West.

111. WESTERN CIVILIZATION II 3 qtr hrs A broad historical study focusing on the development of Western Civilization from 1648 to the present, designed to introduce the beginning student to the ideas, attitudes, and institutions basic to civilization as it developed in the West.

200. RESEARCH METHODS 1 qtr hr Instruction in research methods appropriate for History, Political Science, and Criminal Justice majors. Students will become familiar with relevant library and other resource materials and they will learn ways of organizing and writing research papers. Also listed as Political Science 200.

211. HISTORY OF THE UNITED STATES TO 1800 3 qtr hrs A survey of American colonial and United States history from 1492 to 1800. Emphasis is placed on the formation of American political, economic, and social attitudes and their application in the early Republic.

212. HISTORY OF THE UNITED STATES: 1800 TO 1898 3 qtr hrs A survey of nineteenth century United States history. Emphasis is placed on the age of the common man, the struggle between North and South, and the rise of big business.

213. HISTORY OF THE UNITED STATES 1898 TO THE PRESENT TIME 3 qtr hrs A survey of twentieth century United States history. Major topics include the role played by the U. S. in global affairs and U. S. domestic policy, particularly the changed perceptions of welfare and civil rights.

221. CONTEMPORARY EUROPE 3 qtr hrs An explanation of the political, socioeconomic and intellectual development of Europe since the conclusion of the second World War. Also listed as Political Science 221. Open to freshmen.

222. CONTEMPORARY ASIA 3 qtr hrs An examination of the political, socioeconomic and intellectual development of Asia since the conclusion of the second World War. Also listed as Political Science 222. Open to freshmen.
223. CONTEMPORARY AFRICA 3 qtr hrs
An examination of the political, socioeconomic and intellectual development of Africa since the conclusion of the second World War. Also listed as Political Science 223. Open to freshmen.

224. CONTEMPORARY MIDDLE EAST 3 qtr hrs
An examination of the political, socioeconomic and intellectual development of the Middle East since the conclusion of the second World War. Also listed as Political Science 224. Open to freshmen.

225. CONTEMPORARY LATIN AMERICA 3 qtr hrs
An examination of the political, socioeconomic and intellectual development of Latin America since the conclusion of the second World War. Also listed as Political Science 225. Open to freshmen.

226. HUMAN GEOGRAPHY 3 qtr hrs
An analysis of the elements of human geography, including cultures, cultural regions, race, language and religion, human population, population movement, urbanization, and political organization. Also listed as Political Science 226. Open to freshmen.

285. THE MILITARY AND SOCIETY IN THE WEST 3 qtr hrs
A survey of changes in military techniques and the effects of those developments on western society since 1000 A.D.

290. SPECIAL TOPICS IN HISTORY 1-3 qtr hrs

303. HISTORY OF OHIO 3 qtr hrs
The political and cultural evolution of the area from prehistoric times to the present. Attention also will be given to Ohio as part of the regions known as the Old Northwest and the Middle West.

310. AMERICAN URBAN HISTORY 3 qtr hrs
A study of the influence of the American city on American culture, and of the impact of American traditions on urban development, from colonial times to the present. Also listed as Political Science 310.

315. THE WAR IN VIETNAM 3 qtr hrs
An examination of events leading to American military involvement in Vietnam, strategic decisions in waging the war, its effects in the United States, and the longrun consequences for national security policy and American politics. Also listed as Political Science 315.

321. ENGLISH HISTORY I 3 qtr hrs
The English people in their political, social, and institutional development from the begin-

322. ENGLISH HISTORY II 3 qtr hrs
An examination of the Tudor-Stuart period with special emphasis on the Henrician Reformation, the emergence of England as a world power, and the seventeenth century conflict between the Crown and Parliament.

323. ENGLISH HISTORY III 3 qtr hrs
An examination of England and the political, social, and institutional development of the English people from the end of the Stuart period to the present including the growth of the British Empire.

324. RUSSIAN HISTORY I 3 qtr hrs
The social, political, and economic development of the Russian state from ancient Kiev to Appanage Russia and the Mongol Invasion to the Muscovite State of Ivan the Dread, the Time of Troubles, and the early Romanovs.

325. RUSSIAN HISTORY II 3 qtr hrs
A survey of Imperial Russia. Emphasis will be placed on the political, economic, social and intellectual climate from Peter the Great to Nicholas II and the economic intellectual climate leading to the Revolution of 1917.

326. MEDIEVAL EUROPE 3 qtr hrs
Europe from the decline of the Roman Empire to the beginning of the Renaissance. Special attention is given to those institutions most instrumental in shaping modern European development.

327. THE FRENCH REVOLUTIONARY ERA 3 qtr hrs
A survey of France during the "old regime," social classes, the establishment of constitutional monarchy, the Republic and Robespiere, the crowds in the French Revolution, and Napoleon Bonaparte as protector of the Revolution.

328. RENAISSANCE AND REFORMATION 3 qtr hrs
The political evolution of the Italian communes; the cultural development of the period, the Church and European society during the late Middle Ages and the expansion of Protestantism in Europe.

329. AGE OF EUROPEAN ABSOLUTISM 3 qtr hrs
A survey of European civilization during the Early Modern Period (1500-1789) with an emphasis on the development of the national state system, the concepts of divine right monarchy and absolutism, and the eighteenth century Enlightenment.
348. AMERICAN CONSTITUTION I 3 qtr hrs A study of the social and political forces that shaped constitutional political theory and of the interaction of law and politics through the Reconstruction era. Also listed as Political Science 348.

349. AMERICAN CONSTITUTION II 3 qtr hrs The adaptation of the original Constitution to twentieth century problems of economic regulation, civil rights, industrial liberation, the welfare state and the American Empire. Also listed as Political Science 349.

353. AMERICAN COLONIAL AND REVOLUTIONARY HISTORY 3 qtr hrs An intensive analysis of colonial American history, with particular emphasis on Massachusetts, Virginia, and Pennsylvania and a survey of those conditions which led to the Revolutionary War.

354. CIVIL WAR AND RECONSTRUCTION 3 qtr hrs An intensive analysis of the Civil War era in American history. Special emphasis will be placed on slavery and other causal factors which precipitated the war between the states.

360. HISTORY OF AMERICAN BUSINESS AND LABOR 3 qtr hrs An historical study exploring the interaction of economic and political forces as a factor helping to explain the position occupied by business enterprises and labor organizations in American political life. Also listed as Political Science 360.

361. RECENT AMERICAN HISTORY I 3 qtr hrs An intensive analysis of American history from the beginning of World War I until the conclusion of World War II. Also listed as Political Science 361.

362. RECENT AMERICAN HISTORY II 3 qtr hrs An examination of the major social, economic, and political issues in American history since World War II. Also listed as Political Science 362.

365. AFRO-AMERICAN HISTORY 3 qtr hrs The essential facts, trends, and interpretations in the history of the black American from African beginnings to the present time.

377. HISTORY OF MODERN EUROPE I 3 qtr hrs A survey focusing on Western Europe from 1815 to 1870. Emphasizes the search for stability in an age of revolution, industrialization, and unification.

378. HISTORY OF MODERN EUROPE II 3 qtr hrs A survey of Western Europe from 1870 to the present, considers changes brought on by the "Second Industrial Revolution," imperialism, the rise of "totalitarianism," World Wars, Civil War, and the post war period.

381. U S FRONTIER 3 qtr hrs An examination of territorial expansion from colonial times to the end of the nineteenth century, emphasizing Indian relations, land policy, transportation and trade, and the influence of the West on American ideals and institutions. The course includes a brief consideration of comparative frontiers.

387. AMERICAN POLITICAL THOUGHT 3 qtr hrs An examination of American political theory commencing with the colonial period and proceeding to modern political thinkers. Also listed as Political Science 387.

404. AMERICAN CULTURAL HISTORY 3 qtr hrs The evolution of American culture from the colonial era to the present day in philosophy, theology, belles-lettres, political and economic theory, social theory, historical literature, art, music, and drama.

414. THE ANCIENT WORLD 3 qtr hrs A survey of the political, social, and economic development of Near Eastern, Greek, and Roman civilizations during the ancient period.

451. HISTORY OF LAW 3 qtr hrs A survey of the evolving principles of law as an instrument of social control, with an examination of legal norms as developed in Greek and Roman systems, canon law, law merchant and law maritime, civil law, common law and equity, and the Asiatic system. Also listed as Political Science 451.

452. AMERICAN FOREIGN RELATIONS 3 qtr hrs A conceptual review of the inception, development and contemporary interpretation of the major foreign policies of the United States. Also listed as Political Science 452.

455. WESTERN POLITICAL THOUGHT I 3 qtr hrs An examination of Western political theory commencing with the ancient period (Plato, Aristotle, Cicero) and proceeding to Machiavelli. Also listed as Political Science 455.
9. 27 hours political science electives, distributed as follows:  
World Politics—6 hours (excluding contemporary affairs courses)  
U.S. Government—6 hours  
Electives—15 hours (excluding contemporary affairs courses)  

000. ORIENTATION 1 qtr hr Familiarization with the department, requirements for majors, planning program of courses, University catalog and library. Required of departmental majors. Also listed as History 000.

105. MODERN POLITICAL CONFLICTS AND ISSUES 3 qtr hrs Fundamental political processes and principles, placed in the context of contemporary domestic and world problems.  

121. INTRODUCTION TO CRIMINAL JUSTICE 3 qtr hrs Introduction to the basic concepts, issues and substance of American justice. Structures of the American criminal justice system, causes of criminal behavior, theories of law and punishment, the roles various actors play within the system, and major issues in Criminal Justice.

200. RESEARCH METHODS 1 qtr hr Instruction in research methods appropriate for History, Political Science, and Criminal Justice majors. Students will become familiar with relevant library and other resource materials and they will learn ways of organizing and writing research papers. Also listed as History 200.

201. AMERICAN NATIONAL GOVERNMENT I 3 qtr hrs An examination of the Constitution, federalism, interest groups, public opinion, political parties, and elections. Open to freshmen.

202. AMERICAN NATIONAL GOVERNMENT II 3 qtr hrs An examination of the structure and operation of Congress, the presidency, the federal bureaucracy, and the federal court system. Open to freshmen.

203. STATE AND LOCAL GOVERNMENT 3 qtr hrs An examination of the structures and functions of state and local governments in the United States. Open to freshmen.

221. CONTEMPORARY EUROPE 3 qtr hrs An examination of the political, socioeconomic and intellectual development of Europe since the conclusion of the second World War. Also listed as History 221. Open to freshmen.

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Political Science

1. Orientation 000  
2. Political Science 105  
3. Political Science 200  
4. Political Science 201-202-203  
5. History 211-212-213  
6. One contemporary affairs course (221-222-223-224-225-226)  
7. Western Political Thought 455  
8. Political Thought 456 or 457 or 387
222. CONTEMPORARY ASIA 3 qtr hrs
An examination of the political, socioeconomic and intellectual development of Asia since the conclusion of the second World War. Also listed as History 222. Open to freshmen.

223. CONTEMPORARY AFRICA 3 qtr hrs
An examination of the political, socioeconomic and intellectual development of Africa since the conclusion of the second World War. Also listed as History 223. Open to freshmen.

224. CONTEMPORARY MIDDLE EAST 3 qtr hrs
An examination of the political, socioeconomic and intellectual development of the Middle East since the conclusion of the second World War. Also listed as History 224. Open to freshmen.

225. CONTEMPORARY LATIN AMERICA 3 qtr hrs
An examination of the political, socioeconomic and intellectual development of Latin America since the conclusion of the second World War. Also listed as History 225. Open to freshmen.

226. HUMAN GEOGRAPHY 3 qtr hrs
An analysis of the elements of human geography, including cultures, cultural regions, race, language and religion, human population, movement, urbanization, and political organization. Also listed as History 226. Open to freshmen. (Formerly Political Science 400.)

241. POLICE IN AMERICA 3 qtr hrs
Historical, philosophical and legal basis of police institutions and procedures. The course is intended to be an issues course and discussion topics will vary with prevailing issues.

245. CORRECTIONS IN AMERICA 3 qtr hrs
Historical, philosophical and legal basis of correctional procedures and institutions. The course is intended to be an issues course and the discussion topics will vary with prevailing issues.

291. SPECIAL TOPICS IN POLITICAL SCIENCE 1-3 qtr hrs

310. AMERICAN URBAN HISTORY 3 qtr hrs
A study of the influence of the American city on American culture, and of the impact of American traditions on urban development, from colonial times to the present. Also listed as History 310.

312. URBAN POLITICS AND ADMINISTRATION 3 qtr hrs
An examination of urban governments, the problems they face, and the growing importance of professional urban administrators. Analysis of current federal policy as it affects urban America.

315. THE WAR IN VIETNAM 3 qtr hrs
An examination of events leading to American military involvement in Vietnam, strategic decisions in waging the war, its effects in the United States, and the long run consequences for national security policy and American politics. Also listed as History 315.

334. DEMOCRATIC POLITICAL SYSTEMS 3 qtr hrs
A comparison of the politics of contemporary democracies, stressing the impact of political culture and the operations of governmental institutions, parties and interest groups in the process of public policy-making.

335. COMMUNIST POLITICAL SYSTEMS 3 qtr hrs
A comparison of the politics of contemporary communist systems, stressing the operations of the single-party control system, the role of governmental agencies and ideological orientations.

336. DEVELOPING POLITICAL SYSTEMS 3 qtr hrs
A comparison of contemporary politics in developing societies, stressing the impact of cultural fragmentation, modernization, social unrest and rising expectations on the stability and effectiveness of governmental institutions and processes.

341. CRIMINAL LAW 3 qtr hrs
This course is intended to introduce and familiarize students with both substantive criminal law and the laws regarding the prosecution and incarceration of the criminally accused. During the course, students will critically analyze criminal liability, defenses to criminal culpability, the historical development of criminal law, and the limits of the criminal sanctions.

347. POLITICAL PARTIES-INTEREST GROUPS-ELECTIONS 3 qtr hrs
An examination of the organization and activities of political parties and interest groups and their impact on the political process, especially their roles in election campaigns.

348. AMERICAN CONSTITUTION I 3 qtr hrs
A study of the social and political forces that shaped constitutional political theory and of the interaction of law and politics through the Reconstruction era. Also listed as History 348.

349. AMERICAN CONSTITUTION II 3 qtr hrs
The adaptation of the original Constitution to twentieth century problems of economic
regulation, civil rights, industrial liberation, the welfare state and the American Empire. Also listed as History 349.

360. HISTORY OF AMERICAN BUSINESS AND LABOR 3 qtr hrs An historical study exploring the interaction of economic and political forces as a factor helping to explain the position occupied by business enterprises and labor organizations in American political life. Also listed as History 360.

361. RECENT AMERICAN HISTORY I 3 qtr hrs An intensive analysis of American history from the beginning of World War I until the conclusion of World War II. Also listed as History 361.

362. RECENT AMERICAN HISTORY II 3 qtr hrs An examination of the major social, economic, and political issues in American history since World War II. Also listed as History 362.

363. PUBLIC ADMINISTRATION AND POLITICS 3 qtr hrs Bureaucrats as actors in the American political system. Their sources of power and their relationships to elected public officials. The problems of controlling bureaucracies.

371. INTERNATIONAL RELATIONS 3 qtr hrs An examination of the forces which determine the policies of the nation states and their organizations in the international setting.

387. AMERICAN POLITICAL THOUGHT 3 qtr hrs An examination of American political theory commencing with the colonial period and proceeding to modern political thinkers. Also listed as History 387.

421. GOVERNMENT OF THE SOVIET UNION 3 qtr hrs An examination of the demographic, historical and ideological basis of Soviet rule, stressing the impact of culture and structure on governmental and social institutions as well as domestic and foreign policy-making.

422. FOREIGN POLICY OF THE SOVIET UNION 3 qtr hrs An examination of the forces that have shaped Russian and Soviet foreign policy to the present, considering the impact of Marxism-Leninism, internal conditions and foreign interference and the pattern of expansion and power consolidation.

424. THE AMERICAN PRESIDENCY 3 qtr hrs A study of the historical development and contemporary operation of the presidency. Topics discussed include presidential selection, congressional-presidential relations, management of the federal bureaucracy, executive decision-making, and presidential personality.

425. THE AMERICAN CONGRESS 3 qtr hrs An examination of the structure and operation of Congress; committees, rules and procedures, party organization, and executive oversight; contributions from the President, interest groups, public opinion, and the courts.

426. THE AMERICAN LEGAL SYSTEM 3 qtr hrs A political analysis of how justice is administered in American courts. The roles of lawyers, judges and juries are examined. The organization of American courts, both federal and state, is studied with attention directed to trials, appellate proceedings, and constraints on the courts.


436. AMERICAN PUBLIC POLICY ANALYSIS 3 qtr hrs An introduction to the basic dynamics and problems of the American policymaking process, as well as some of the more widely used analytical approaches to public policy.

441. INTERNATIONAL LAW AND ORGANIZATIONS 3 qtr hrs An examination of the structure, operation and legal setting of international organizations, with particular emphasis on the United Nations as well as regional institutions such as the European Common Market.

443. ADMINISTRATIVE LAW 3 qtr hrs An examination of the internal bureaucratic judicial process, its relationship to the broader legal system and the changing attitudes of the Supreme Court toward administration rule making.

451. HISTORY OF LAW 3 qtr hrs A survey of the evolving principles of law as an instrument of social control, with an examination of legal norms as developed in Greek and Roman systems, canon law, law merchant and law maritime, civil law, common law and equity, and the Asiatic system. Also listed as History 451.
452. AMERICAN FOREIGN RELATIONS
3 qtr hrs A conceptual review of the inception, development and contemporary interpretation of the major foreign policies of the United States. Also listed as History 452.

455. WESTERN POLITICAL THOUGHT I
3 qtr hrs An examination of Western political theory commencing with the ancient period (Plato, Aristotle, Cicero) and proceeding to Machiavelli. Also listed as History 455.

456. WESTERN POLITICAL THOUGHT II
3 qtr hrs An examination of Western Political theory commencing with the contract theorists (Rousseau, Locke, Hobbes) and proceeding to the age of the French Revolution (Burke). Also listed as History 456.

457. WESTERN POLITICAL THOUGHT III
3 qtr hrs An examination of Western political theory commencing with the early nineteenth century (Hegel) and proceeding to the twentieth century (Lenin, Nietzsche). Also listed as History 457.

475. UNITED NATIONS TODAY
3 qtr hrs Prepares students to participate in the National Model United Nations in New York City. This is an integrated and serious simulation of many aspects of the United Nations. Students travel to New York City in the spring. Application to and approval of the departmental Model U.N. advisors are prerequisites for registering for this course. May be repeated 3 times for credit, but only 6 hours can count toward major or minor requirements.

481. PUBLIC SERVICE INTERNSHIP PROGRAM
6-15 qtr hrs Field experience in the area of public service. Selected students upon proper application, screening, and acceptance, will work in close relationship with public offices and officials. Those interns serving in a local agency would generally receive six quarter hours credit for approximately ten hours of service per week, while those interns serving in Columbus or Washington D.C. on a full-time quarterly basis, would generally receive fifteen hours credit. Prerequisites: Consultation with the departmental internship committee and completion of the application process. A maximum of six hours will count toward major requirements. Also listed as History 481.

491. SPECIAL TOPICS IN POLITICAL SCIENCE
1-3 qtr hrs

495. SEMINAR IN POLITICAL SCIENCE
1-3 qtr hrs

498. INDEPENDENT STUDY IN POLITICAL SCIENCE
1-3 qtr hrs Approval of department chairman required prior to registration.

Criminal Justice
Specific requirements for the criminal justice major:
1. Orientation 000
2. Research Methods 200
3. Introduction to Criminal Justice 121
4. Police in America 241
5. Corrections 245
6. Psychology 100
7. Psychology 215 or 305 or 311
8. Psychology 301 or 420
9. Political Science 202
10. Political Science 426, 427, 441, 443 (any two)
11. Political Science 203 or 363 or 436
12. Sociology 105
13. Sociology 240, 247, 347 (any two)
14. History 211 or 212 or 213
15. History 348 or 349 or 451
16. Criminal Law
17. Senior Seminar
18. Electives: (9 hours)

International Studies
Specific requirements for the International Studies major:
1. Orientation 000
2. Political Science 200
3. Political Science 221, 222, 223, 224, 225 (any two)
4. Political Science 226
5. Political Science 371
6. Political Science 452
7. Economics 202-203
8. Economics 385 or 411
9. Political Science 334, 335, 336, 421, 422, 441, 475 (any five)

Majors are required to show second year competency in a foreign language (usually French, Spanish, or German) as determined by the Department of Foreign Languages. Majors are encouraged to take Religion 107 and Political Science 105 to meet general education requirements. In addition, they are required to take Economics 100.
INTRODUCTION TO DRAFTING AND DESIGN 220
CONSTRUCTION DESIGN 221
PRODUCT DESIGN 222
FINISHING TECHNOLOGY 230
INTRODUCTION TO GRAPHIC COMMUNICATION 240
COMPUTER ASSISTED DRAFTING AND DESIGN 324
MACHINING TECHNOLOGY 332
CASTING TECHNOLOGY 333
FABRICATING TECHNOLOGY 334
INTRODUCTION TO CONSTRUCTION 350
INTRODUCTION TO ENERGY/POWER 360
FACILITY PLANNING 412
INDUSTRIAL MATERIALS AND PROCESSES II 430
PRODUCT MANUFACTURING 431
FUNDAMENTALS OF ELECTRICITY/ELECTRONICS 461
QUALITY CONTROL AND WORK MEASUREMENT 470
SEMINAR IN INDUSTRIAL TECHNOLOGY 474
SENIOR PROJECT IN INDUSTRIAL TECHNOLOGY 495
AMERICAN TOUR OF INDUSTRIES 496

OPTIONS/MINORS (30 hours)

An option or minor is required of all industrial technology-industry bound students. The five structured options to choose from are as follows:

- **Management:** (may be minor)
  - Economics 100
  - Accounting 131, 132, 133
  - Business Law 322
  - Managerial Finance 362
  - Principles of Management 330
  - Production & Operations Management 364
  - Electives in Management 9 hours

- **Business:** (option only)
  - Accounting 131, 132
  - Business Law 322
  - Principles of Management 330
  - Management Organizational Behavior 335
  - Personnel Management 363
  - Production & Operations Management 364
  - Business Communications 391
  - Electives in Business 6 hours

- **Marketing:** (may be minor)
  - Economics 100
  - Accounting 131, 132, 133
  - Marketing 351
  - Business Law 322
  - Managerial Finance 362
  - Industrial Marketing 376
  - Electives in Marketing 9 hours

- **Design:**
  - Advanced Graphic Communication 142-340
  - Technical Illustration 142-421
  - Creative Design 201-114
  - Drawing 151-151
  - Drawing 151-152

**Industrial Technology Major** (70 hour major, option/minor and internship not included)

- Orientation 000
- Introduction to Industrial Technology 110
- Industrial Materials and Processes I 130
Design 151-161
Design 151-162
Graphic Design 151-222
Electives (nine hours taken from design related art, communication arts, industrial technology, or engineering courses).
Note: May be art minor if 30 hours of art are completed.

Computer Science (may be minor)
Introduction to Information Processing 130
Introduction to Fortran 131
Intermediate Programming 132
Assembly Language 234
Computer Organization 236
File Processing 238
Electives in Computer Science (6 hours 300-400 level)

Alternative minors/technical options may be selected to match a given student's career goals. This decision is made in consultation with the Department of Industrial Technology.

Internship
All industrial technology-industry bound students (major or minor) are encouraged to complete 15 hours of Internship 142-484 in an industrial setting either during a summer(s) or academic year. The arrangements are made through the department prior to the student's registration for the internship.

Industrial Technology Minor (30 hours)
Students from other disciplines who desire to gain a basic introduction to industry may select a minor as follows:
Industrial Materials and Processes I 130
Introduction to Drafting and Design 220
Introduction to Graphic Communication 240
Machining Technology 332
Introduction to Construction 350
Electives (minimum of nine hours credit) any course(s) selected from: 131, 140, 200, 221, 222, 230, 260, 324, 333, 334, 340, 341, 360, 412, 421, 430, 431, 461, 470, 490, 495, 496, or 497.

Industrial Technology Teacher (7-12)
Certification Major (65 hours)
Orientation 000
Introduction to Industrial Technology 110
Industrial Materials and Processes I 130
Introduction to Drafting and Design 220
Construction Design 221
Product Design 222
Finishing Technology 230
Introduction to Graphic Communication 240
Machining Technology 332
Casting Technology 333

Fabricating Technology 334
Introduction to Construction 350
Introduction to Energy/Power 360
Facility Planning 412
Industrial Materials and Processes II 430
Product Manufacturing 431
Fundamentals of Electricity/Electronics 461
Seminar in Industrial Technology 494
Senior Project in Industrial Technology 495
American Tour of Industries 496

All students pursuing 7-12 certification must complete the following courses:
142-473, 141-110, 141-150, 141-151, 141-225, 141-263, 141-342, 141-325, 141-475, and 141-480.
(Psychology 100 is also required and may be part of the BS-BA general education courses.)

Industrial Technology Teacher (K-12) Certification Major (69 hours)
Same as 7-12 certification plus:
Technology Education in the Elementary School 210
Teaching Methods in the Secondary School 141-450

Technical Electives - All Majors
There are several technical courses offered by the department which may be selected by students to add greater depth. These include:
Microcomputer Application in Ind. Tech. 142-140
Technology and Society 142-200
Photography 142-341
Advanced Graphic Comm. 142-340
Technical Illustration 142-421
Custom Woodworking 142-231
Auto Preventive Maintenance 142-260

000. ORIENTATION 1 qtr hr An introduction to the department, introduction to college life. Familiarization with the basic curriculum, options. Planning a course program. University student services. The library. The departmental major requirements. Required of all department majors.

110. INTRODUCTION TO INDUSTRIAL TECHNOLOGY 3 qtr hrs Introductory course for students majoring, minoring, or interested in the Department of Industrial Technology. An overview of the career path options offered by the department; industrial technology teaching or industrial technology-industry bound. An introduction to industrial technology with study of its major components, i.e., construction, manufacturing, com-
130. INDUSTRIAL MATERIALS AND PROCESSES 15 qtr hrs A study of major industrial materials and an introduction to the processes involved in their conversion from basic (raw) materials into industrial products; including metallic, polymeric, ceramic, wood, and various other materials, and the related refining and processes utilized in the production of durable goods. (Formerly 460).

131. CREATIVE CRAFTS 3 qtr hrs Laboratory experiences in working with craft materials; craft design, wood carving, art metals, wood, plastic, leather and others. (Formerly 120).

140. MICRO COMPUTER APPLICATIONS IN INDUSTRIAL TECHNOLOGY 3 qtr hrs An introduction to operating micro computers and various software programs. Students will also be exposed to writing simple programs to control CNC machines and robots. No prior experience with computers is required.

200. TECHNOLOGY AND SOCIETY 3 qtr hrs A survey dealing with the major concepts of technology, its development, its effects on society, and the problems associated with it. Students will be required to critically evaluate these effects through written and verbal activities. Guest lectures will be an integral part of the class.

210. TECHNOLOGY EDUCATION IN THE ELEMENTARY SCHOOL 4 qtr hrs Introduction to the use of technology and technical activity at the elementary level to assist the children in learning. The use of materials, tools and processes to enhance learning and to assist in developing interests and talents. A presentation of the rationale, materials, creative and manipulative activities. Typical problems and the planning and organizing of the learning environment.

220. INTRODUCTION TO DRAFTING AND DESIGN 3 qtr hrs An introduction to the technical drawing field and graphic representation in the design process. Consideration will be given to orthographic projections, pictorial drawings, and applied geometry. Initial consideration of the design process will be given. (Formerly 121).

221. CONSTRUCTION DESIGN 3 qtr hrs Study of construction planning, design, engineering and layout. Basic residential planning, building construction principles, architectural details, plot surveying and layout, architectural working drawings, and related information. Prerequisite: 142220 or equivalent. (Formerly 122).

222. PRODUCT DESIGN 3 qtr hrs Emphasis on an awareness of design as it is applied to fabrication using industrial materials. Study and practice in relating good design to application in the manufacturing of finished products. Prerequisite: 142-220 or equivalent. (Formerly 123).

230. FINISHING TECHNOLOGY 3 qtr hrs Coverage of finishing materials and processes with all contemporary industrial applications; the study of coatings, treatments, methods of application and equipment, involved in the finishing of metals, plastics, wood products, ceramics, fabrics, and all other industrial materials. (Formerly 241).

231. CUSTOM WOODWORKING 3 qtr hrs An introduction to basic processes, tools, and materials employed in the production of custom, individually designed, and crafted wood products.

240. INTRODUCTION TO GRAPHIC COMMUNICATIONS 3 qtr hrs Study of the history of graphic reproduction, its present day procedures, and the machinery, equipment, and materials that are associated with it; including the fundamentals of graphic reproduction layout, design and composition, as well as relief, intaglio, lithography, screen and duplicating reproduction processes, binding, and finishing. (Formerly 311).

260. AUTOMOTIVE PREVENTIVE MAINTENANCE 3 qtr hrs General automotive maintenance and servicing geared towards the automobile owner/operator. Topics covered include: automotive tune-up, trouble shooting, seasonal adjustments, and preventative maintenance scheduling.

324. COMPUTER ASSISTED DRAFTING AND DESIGN 2 qtr hrs This class will provide students with an introduction to CADD software and hardware systems. There will be laboratory experiences in both technical drawing and design applications including simulation of production processes. Prerequisite: 142-220 or equivalent.

332. MACHINING TECHNOLOGY 5 qtr hrs Machining practices primarily used for the separating of metallic materials will be emphasized. A variety of machine tools will be used in the instruction and lab activities with nontraditional machining techniques.
333. CASTING TECHNOLOGY 3 qtr hrs A study of pattern making, molding and pouring operations used in casting various materials. Casting techniques used will include investment, centrifugal, rotational molding, slip casting and others. Students will be exposed to casting non-ferrous metals, plastics and ceramics. (Formerly 313).

334. FABRICATING TECHNOLOGY 3 qtr hrs A survey of the practices and principles of fabricating materials. Emphasis will be placed on various welding operations including electric and gas power units for metal, as well as plastics welding, metal, wood, plastic, ceramic, and other industrial material mechanical fasteners and adhesives. (Formerly 343).

340. ADVANCED GRAPHIC COMMUNICATIONS 3 qtr hrs Study of advanced offset lithography processes including line and halftone process camera work, stripping of negatives to produce flats, platemaking, and press operations. Simple signature layout, binding and finishing are also covered. Advanced study in silk screen and relief processes will be designed for students with special interests. Prerequisite: 142-240 or equivalent. (Formerly 322).

341. PHOTOGRAPHY 3 qtr hrs Techniques of photographic composition, camera types, uses and accessories, photographic optics, and laboratory methods and materials; dark room developing and printing; color photography. (Formerly 330).

350. INTRODUCTION TO CONSTRUCTION 5 qtr hrs Basic concepts of construction techniques used today; including the methods and materials involved in framing, enclosing, and finishing residential and light commercial buildings. Study of financing, contracting, procuring, supervising, site-operation, foundation, structural elements, utilities, landscaping, and personnel associated with construction activities. (Formerly 353).

360. INTRODUCTION TO ENERGY/POWER 5 qtr hrs Concepts of power generation, transmission, and conversions. Internal and external combustion converters, steam, atomic, solar, wind, geothermal, hydro, and other energy principles and devices. Methods of maintaining and repairing energy conversion and transmission units. (Formerly 451).

412. FACILITY PLANNING 4 qtr hrs Principles of facility planning, architectural features, selection, arrangement, and maintenance of equipment, organization of material flow and the nature of facility design will be covered. Both educational and industrial facilities will be considered.

421. TECHNICAL ILLUSTRATION 2 qtr hrs Techniques of illustration for mechanical and architectural drawing. Activities in the use of shading mediums of graphite and ink will be covered including stippling, line shading, texture boards, and airbrush rendering. Prerequisite: 142-220 or equivalent.

430. INDUSTRIAL MATERIALS AND PROCESSES II 3 qtr hrs A general review of the materials and processes of industry. Examination of the processes; the associated application of procedures, materials, equipment and current practices of industry. Laboratory experiments and research projects are required. Prerequisite: 142-130 or equivalent. (Formerly 450).

431. PRODUCT MANUFACTURING 3 qtr hrs Machine operations in the manufacture of various types of products with special emphasis on wood product manufacturing. Emphasis will be placed on process design, material handling, organization of work, division of labor, etc. relating to mass production industries. A major line production will be completed by each class. Prerequisite: 142-222 or equivalent.

461. FUNDAMENTALS OF ELECTRICITY AND ELECTRONICS 5 qtr hrs The principles of electricity and electronics applied to the areas of power utilization and communications will be emphasized. The operation of various electrical and electronics devices will also be covered. (Formerly 402).

470. QUALITY CONTROL AND WORK MEASUREMENT 3 qtr hrs A survey course of methods applied to quality assurance and work measurement in mass production industries. Consideration will be given to statistical applications, qualitative and quantitative analysis, bio mechanics, work station design, and the planning of systems for total quality assurance programs.

473. ORGANIZATION AND METHODS OF TEACHING INDUSTRIAL TECHNOLOGY 4 qtr hrs A professional course in the organization and methods of teaching industrial technology. Philosophical con-
structs, organizing courses, program and course objectives, preparing lesson plans and industrial materials, laboratory procedures, and administrative practices. Opportunity to conduct micro-teaching units. Includes approximately 30 hours of field experience. Prerequisite: 30 hours or more of industrial technology courses.

484. INTERNSHIP IN INDUSTRIAL TECHNOLOGY 5-15 qtr hrs The industrial technology internship provides qualified students with a supervised program of experiences in production practices, management techniques, research applications, and other activities representative of modern industry. Selected students upon proper application, screening, and acceptance by an appropriate industry will pursue either five hours of credit for 3-4 weeks of full-time work in the summer or fifteen hours of credit for one full-time quarter during the year. It will be graded S-U and a student may only use a maximum of fifteen hours to count toward graduation. A weekly seminar will be held.

490. SPECIAL TOPICS IN INDUSTRIAL TECHNOLOGY 1-3 qtr hrs

494. SEMINAR IN INDUSTRIAL TECHNOLOGY 1-3 qtr hrs May be repeated for a total of 3 hours.

495. SENIOR PROJECT IN INDUSTRIAL TECHNOLOGY 3 qtr hrs Individual studies and investigations involving the application of knowledge to the solution of technical problems including research and development, testing, fabrication, assembly, and evaluation.

496. TOUR OF AMERICAN INDUSTRIES 1 qtr hr Participation with the annual department-sponsored comprehensive tour of industries including the structured pre- and posttrip seminars and the submission of a written technical report pertaining to one or more facets of the experience.

497. INDEPENDENT STUDY IN INDUSTRIAL TECHNOLOGY 1-3 qtr hrs

MATHEMATICS AND COMPUTER SCIENCE (Department 123)

Professors Berton, Lhamon; Associate Professors Childress, R. Evans (Chairman), Hovis, O'Dell, Putt, Shult; Assistant Professor Blauer, Palled, Retterer; Instructors Gregg (Leave), Roepke; Adjunct Associate Professor Hadley.

Mary Reichelderfer Chair of Mathematics and Computer Science established in 1983 from funds of the estate of Mary K. Werkman. The 1987-88 recipient of this chair is Earl E. Lhamon, Professor of Mathematics.

The department offers majors and minors in both mathematics and computer science as well as courses in mathematics, statistics, and computer science to complement almost all disciplines in the University. Students with primary major in the department may choose a general education program leading to either the Bachelor of Arts degree or the Bachelor of Science degree. In addition, the department cooperates with the Division of Teacher Education in program planning for certification for those desiring to teach at the secondary school level. Students should consult with the department in which they are considering a major to determine the best choice of courses in mathematics and computer science.

In general, the sequence 171-172-173 is designed for prospective elementary school teachers, 142-143 for social science and business students, 154-155-156 for life science students and 163-261-262-263 for students in engineering, the physical sciences, mathematics and computer science. Mathematics 272 should be of interest to students in many areas. Mathematics 120 and 122 are designed for students who require or desire additional preparation in algebra (120) or trigonometry (122) before enrolling in other required mathematics courses.

Mathematics 105 is designed to meet the needs of students who, although otherwise well-prepared for college work, require remedial work in mathematics before beginning the mathematics required for their chosen major. Because it is a remedial course it carries credit neither toward graduation nor toward any major or minor. It does, however, count in the student's load, rank and GPA calculation. Entrance into Mathematics 105 is determined by the departmental placement test and requires permission of the department chairman. Students whose ACT in mathematics is below 16 (SAT below 370) usually need to take this course before enrolling in any other mathematics course.

Students who want an introduction to
computer programming should take either Introduction to Information Processing (CS 130), which is of general interest and includes programming in BASIC, or Introduction to Programming (CS 134), an introduction to programming via Pascal. For a greater exposure to programming either the sequence 134-135 or 134-135-138 should be taken. Programming courses in FORTRAN (CS 230) and COBOL (CS 231) are also available.

All courses in the department which are to be counted toward a major or minor in either mathematics or computer science must be completed with a grade of "C" or better.

Mathematics
For the mathematics major the student must complete the calculus sequence 163-261-262-263, Mathematics 272, 294, 311, 361, 452 and at least 14 credit hours in mathematics courses at the 300/400 level. Computer Science 134 is a required cognate course. For a minor in mathematics, the student must complete 163-261-262-272-294 plus 10 additional hours of electives in mathematics numbered 245 or higher.

Students planning to pursue a graduate degree in mathematics should also take 312, 313, 324, 363, and 453. Students interested in a career in the actuarial sciences should also take 332, 381, 382, 461, and 462, as well as 131, 132, 133, 202, 203, and 462 from the College of Business Administration.

000. ORIENTATION 1 qtr hr Familiarization with the department, requirements for majors planning programs of study, University catalog and library. Required of departmental majors. Also listed as Computer Science 000.

105. INTERMEDIATE ALGEBRA 3 qtr hrs Algebraic expressions and operations, equations and problem solving, special products and factoring, linear equations, simultaneous equations, exponents, radicals and graphs. For the student whose score on the department placement exam indicates the need for a review of the fundamentals of algebra. Usually the student whose ACT is 15 or less should expect to take this course. CREDIT EARNED IN THIS COURSE DOES NOT SATISFY GRADUATION REQUIREMENTS FOR ANY PROGRAM OFFERED AT THE UNIVERSITY. Admission to this course is restricted by the placement examination and requires departmental approval.

120. ELEMENTARY FUNCTIONS 1 4 qtr hrs Real number system, functions, theory of polynomial equations, systems of equations and inequalities. Not open for credit to students who have received a grade of C or higher in any calculus course. Prerequisite: Two years of high school algebra or satisfactory performance on the mathematics placement examination. (Formerly 161).

122. ELEMENTARY FUNCTIONS 2 3 qtr hrs Trigonometric functions, identities, solutions of triangles, complex numbers. Not open for credit to students who have received a grade of C or higher in Mathematics 163 or above. Prerequisite: 123-120 or its equivalent. (Formerly 162).

142. PROBABILITY AND STATISTICS 1 3 qtr hrs Descriptive statistics, probability, binomial distribution, normal distribution, confidence intervals, hypothesis testing.

143. PROBABILITY AND STATISTICS 2 3 qtr hrs Chi-square tests, analysis of variance, non-parametric statistics, decision making under uncertainty, the classical time series model, index numbers; oriented toward business applications. Prerequisite: 123-142 or equivalent.

154. CALCULUS AND PROBABILITY 1 4 qtr hrs Differential and integral calculus involving algebraic and exponential functions; applications. Prerequisite: 123-120 or equivalent.

155. CALCULUS AND PROBABILITY 2 4 qtr hrs Differential and integral calculus of algebraic, logarithmic and exponential functions; applications, including basic probability theory. Prerequisite: 123-154 or equivalent.

156. INTRODUCTORY DATA ANALYSIS 4 qtr hrs Basic statistical techniques with emphasis on the applications to biological sciences. Prerequisite: 123-155 or equivalent.

160. PRE-CALCULUS MATHEMATICS 5 qtr hrs Algebraic expressions. Functions and equations, and graphs inverse and composite functions. Exponential and logarithmic functions. Trigonometric functions, trigonometric equations, identities, inverse trigonometric functions, Prerequisites: 2 yrs. high school algebra, 1 yr. geometry, and ½ yr. trigonometry.

163. CALCULUS 1 5 qtr hrs Limit of a function, continuity, the derivative, extreme, curve plotting, Mean Value Theorem, applications of the derivative, and the Fundamental Theorem
of Calculus. Prerequisite: 123-120 and 122 or equivalents.

171. MATHEMATICS FOR ELEMENTARY TEACHERS 3 qtr hrs Problem solving skills and techniques. Introduction to mini and micro-computer programming; fundamentals of counting, probability, and statistics. OPEN ONLY TO ELEMENTARY EDUCATION MAJORS.

172. FUNDAMENTAL MATHEMATICS 1 3 qtr hrs Theory of arithmetic, systems of numeration, relations, algorithms, whole numbers, integers, rational numbers, real numbers, patterns of proof. OPEN ONLY TO ELEMENTARY EDUCATION MAJORS.

173. FUNDAMENTAL MATHEMATICS 2 3 qtr hrs Geometric figures, transformations on the plane, geometric congruence, symmetry and similarity. OPEN ONLY TO ELEMENTARY EDUCATION MAJORS.

245. HISTORY OF MATHEMATICS 3 qtr hrs An introduction to the history and origin of mathematics, restricted principally to mathematics through elementary calculus, a chronological study of some mathematicians and their contributions to mathematical thought. Offered alternate years; next offered 1988-89.

261. CALCULUS 2 4 qtr hrs The algebra of vectors, integration techniques, applications of the integral, the exponential function, and inverse functions. Prerequisite: 123-163.

262. CALCULUS 3 4 qtr hrs Sequences and series, Taylor series, polar coordinates, parametric equations, conic sections, planes and lines in space. Prerequisite: 123-261.

263. CALCULUS 4 4 qtr hrs Vector-valued functions, multivariate functions, spherical and cylindrical coordinates, differential calculus of multivariate functions, integral calculus of multivariate functions. Prerequisite: 123-262.

272. INTRODUCTION TO LINEAR ALGEBRA 4 qtr hrs Vector space methods. Vector spaces over R, principally R to the nth power. Linear transformations, their matrices, eigenvalues and eigenvectors. Applications. Prerequisites: 123-262 or consent of the instructor.

290. SPECIAL TOPICS IN MATHEMATICS 1-4 qtr hrs

294. FOUNDATIONS OF MATHEMATICS 4 qtr hrs Introduction to sets, logic and mathematical proof; application of these concepts. Prerequisite: 123-261.

301. MATHEMATICS FOR SECONDARY TEACHERS 4 qtr hrs To include topics from theory of arithmetic, number systems, theory of equations, functions, inequalities, limits, Euclidean geometry, coordinate geometry, solids, number theory, numerical methods and applications of math to science and computer studies. Offered alternate years. This course will not count toward the major in mathematics. Prerequisite: 123-294.

310. INTRODUCTION TO NUMBER THEORY 4 qtr hrs Introduction to number theoretic concepts including divisibility and primes, properties of congruences, quadratic reciprocity, arithmetic function, Diophantine equations, Gaussian integers, arithmetic in quadratic fields. Prerequisite: 123-294 or permission of instructor. 5 qtr hrs

311. ABSTRACT ALGEBRA 1 4 qtr hrs Introduction to algebraic structures, groups, rings and fields. Prerequisite: 123-294. Offered alternate years; next offered 1988-89.

312. ABSTRACT ALGEBRA 2 3 qtr hrs Continuation of 311.

313. ADVANCED LINEAR ALGEBRA 3 qtr hrs Finite and infinite dimensional vector spaces over a field, linear transformations, inner product spaces, and canonical forms. Prerequisites: 123-272 and 311. Offered alternate years; next offered 1988-89.

324. TOPOLOGY 3 qtr hrs General point set topology and metric spaces. Prerequisites: 123-263 and 294. Offered alternate years; next offered 1989-90.

332. OPERATIONS RESEARCH 3 qtr hrs Introduction to optimal decision making in deterministic systems; linear programming model, simplex method and algorithms, primal and dual problem, sensitivity analysis, transportation and transshipment, assignment, shortest route, minimal spanning tree, maximal flow, PERT. (Also listed as Computer Science 332.) Prerequisite: 123-272.

336. DISCRETE MATHEMATICS 4 qtr hrs Introduction to and application of topics from mathematics relevant to computer science: combinatorics, relations, digraphs, trees, and elementary algebraic structures. Prerequisites: 123-135, 272 and 294.

361. DIFFERENTIAL EQUATIONS 5 qtr hrs First order differential equations with applications; second order linear differential equations with applications. Laplace transforms, systems of first order equations. Prerequisites: 123-262 and 272.
461. NUMERICAL ANALYSIS 1 4 qtr hrs
Solutions of equations in one variable, interpolation and polynomial approximation, direct methods for solving linear systems. (Also listed as Computer Science 461.) Prerequisites: 123-230,262 and 272.

462. NUMERICAL ANALYSIS 2 3 qtr hrs
Numerical differentiation and integration; initial value problems for ordinary differential equations; iterative techniques in matrix algebra. (Also listed as Computer Science 462.) Prerequisite: 123-361. Offered alternate years; next offered 1988-89.

490. SPECIAL TOPICS IN MATHEMATICS 1-4 qtr hrs

494. SEMINAR IN MATHEMATICS 1-4 qtr hrs

497. INDEPENDENT STUDY IN MATHEMATICS 1-3 qtr hrs

Computer Science
For the computer science major the student must complete the following computer science courses:
CS 134 Introduction to Programming
CS 135 Intermediate Programming
CS 138 Programming Environments
CS 234 Assembly Language Programming
CS 236 Introduction to Computer Organization
CB 238 Introduction to File Processing
CB 330 Organization of Programming Languages
CB 334 Operating Systems and Computer Architecture I
CS 338 Data Structures and Algorithm Analysis
CS 429 Senior Project Definition
CS 430 Senior Project
CS 434 Software Engineering
and one of the following sets of courses
Math 262 Calculus 3
CS 230 FORTRAN Programming
CS 461 Numerical Analysis I or
CS 231 Introduction to COBOL
CS 331 Advanced COBOL

In addition, the student is required to complete 8 hours of computer science electives at the 300/400 level (Computer Graphics, 204-443 may be used as one of the courses in satisfying this requirement.) The computer science major must also com-
Mathematics Component
Math 163 Calculus 1
Math 261 Calculus 2
Math 272 Introduction to Linear Algebra
Math 294 Foundations of Mathematics
Math 336 Discrete Mathematics
and one of the following sets of courses:
Math 142 Probability and Statistics 1
Math 143 Probability and Statistics 2
or
Math 156, Introduction to Data Analysis
or
Math 381 Statistics 1
Math 382 Statistics 2

Science Component
At least two courses in biology and two courses in chemistry or physics with one year's work in one of the disciplines (the year's work must be one of the sequences: Biology 100, 112, 113
Chemistry 171, 172, 173
Physics 231+234, 232+235, 233+236
In addition the student must complete a year's work (at least 9 credit hours) in some discipline (the year's work must come from the required course list for a major (or minor) in that discipline and must be beyond (in addition to) any courses used for the major requirement listed above or for general education).
For the computer science minor the student must complete CS 134, 135, 136, 234, 238, plus 10 hours of electives in computer science, at least six of which must be from among: CS 330, 331, 332, 334, 335, 338, ME 443 (or 444).

000. ORIENTATION 1 qtr hr Familiarization with the department, requirements for majors, planning programs of study, University catalog and library. Required of departmental majors. Also listed as Mathematics 000.

130. INTRODUCTION TO INFORMATION PROCESSING 4 qtr hrs An introduction to the language, technology, techniques, and applications of information processing; a discussion of these topics and their place in the world of information; an introduction to programming in BASIC.

134. INTRODUCTION TO PROGRAMMING 4 qtr hrs An introduction to problem solving and algorithm development using a block structured language. Design, code, debug, and document computer programs using techniques of good programming style.

Not open to students who have credit for 123-132.

135. INTERMEDIATE PROGRAMMING 4 qtr hrs Continued development of discipline in problem design, in style and expression, in debugging and testing, especially for larger programs. Introduction to algorithm analysis. Introduction to basic concepts of string processing, recursion, internal search/sort methods, and simple data structures. Not open to students who have credit for 123-132. Prerequisite: 123-134.

138. PROGRAMMING ENVIRONMENTS 4 qtr hrs Introduction to software tools and operating system utilities available under popular operating systems such as UNIX. Introduction to the basic features of a system's programming language such as "C." Libraries of source and object code will be utilized. Prerequisite: 123-135.

230. FORTRAN PROGRAMMING 4 qtr hrs An introduction to the FORTRAN 77 language with an emphasis on using it for problem solving in mathematics, science, and engineering. Not open to students who have credit for 123-131 or 201-122.

231. INTRODUCTION TO COBOL 4 qtr hrs An introduction to programming in COBOL with business application.

234. ASSEMBLY LANGUAGE PROGRAMMING 4 qtr hrs Introduction to computer structure and machine language, assembly language programming, macros, program segmentation and linkage. Prerequisite: 123-138.

236. INTRODUCTION TO COMPUTER ORGANIZATION 4 qtr hrs Introduction to computer architecture; basic logic design. Prerequisite: 123-138.

238. INTRODUCTION TO FILE PROCESSING 4 qtr hrs Introduction to file processing environment; sequential and direct access file manipulation techniques. Prerequisite: 123-138.

330. ORGANIZATION OF PROGRAMMING LANGUAGES 4 qtr hrs Theoretical investigation of programming language constructs; illustration of construct implementation in popular programming languages. Prerequisite: 123-234.

331. ADVANCED COBOL 4 qtr hrs Through the use of the COBOL programming language students are exposed to file organizations. They are introduced to advanced file
332. OPERATIONS RESEARCH 3 qtr hrs
Introduction to optimal decision making in
deterministic systems; linear programming
model, simplex method and algorithms, primal
and dual problem, sensitivity analysis, trans-
portation and transshipment, assignment,
shortest route, minimal spanning tree, max-
imal flow, PERT. (Also listed as Mathematics
332.) Prerequisite: 123-272.

334. OPERATING SYSTEMS AND COM-
PUTER ARCHITECTURE 1 4 qtr hrs
Operating system principles; organization and
architecture of computer systems at the
register-transfer and programming levels of
system development. Prerequisite: 123-234
and 236.

335. OPERATING SYSTEMS AND COM-
PUTER ARCHITECTURE 2 4 qtr hrs Con-
tinuation of 334. Prerequisite: 123-334.
Offered alternate years; next offered 1989-90.

338. DATA STRUCTURES AND ALGO-
RITHM ANALYSIS 4 qtr hrs Basic tech-
niques for the design and analysis of efficient
algorithms for sorting, merging, searching and
memory management. Prerequisite: 123-238.

341. ARTIFICIAL INTELLIGENCE 1 4 qtr
hrs Introduction to artificial intelligence prob-
lems and techniques for their solution.
Includes use of LISP, search algorithms,
knowledge representation, expert systems,
parsing language and language comprehen-
sion, learning. Offered alternate years. Next
offered 1989-90. Prerequisite: Knowledge
equivalent of 2 quarters of a programming
language or consent of instructor.

342. ARTIFICIAL INTELLIGENCE 2 4 qtr
hrs Continuation of 341. Prerequisite:
123-341.

429. SENIOR PROJECT DEFINITION
1 qtr hr An examination of the software life
cycle and a discussion of software engineer-
ing methodologies. The goal of the course is
to produce a problem definition that can be
used as the basis for the 123-430 Senior Pro-
ject course.

430. SENIOR PROJECT IN COMPUTER
SCIENCE 4 qtr hrs An applications project
conducted by student teams. Students will be
responsible for the definition, design, and
implementation of a software project. Stu-
dents doing an off-campus project will be
graded S-U.

434. SOFTWARE ENGINEERING 4 qtr
hrs A study of methodologies used to design,
create, evaluate and maintain software sys-
tems. The study includes coverage of several
modern methodologies with emphasis on
one. A course project written in a modern
software development environment ( Ada) will
be developed.

461. NUMERICAL ANALYSIS 1 4 qtr hrs
Solution of equations in one variable; inter-
polation and polynomial approximation; direct
methods for solution of linear systems. (Also
listed as Mathematics 461.) Prerequisites:
123-230, 262 and 272.

462. NUMERICAL ANALYSIS 2 3 qtr hrs
Numerical differentiation and integration; initial
value problems for ordinary differential equa-
tions; iterative techniques in matrix algebra.
(Also listed as Mathematics 462.) Prerequi-
site: 123-361. Offered alternate years; next
offered 1988-89.

470. COMPUTER SCIENCE INTERNSHIP
3-12 qtr hrs Analysis, design, coding, or test-
ing of a software project. Normally achieved
off-campus working for an industrial organiza-
tion or government agency. Open to computer
science majors who have completed eight
quarters of work and have junior standing.

491. SPECIAL TOPICS IN COMPUTER
SCIENCE 1-4 qtr hrs

495. SEMINAR IN COMPUTER SCIENCE
1-4 qtr hrs

498. INDEPENDENT STUDY IN COM-
PUTER SCIENCE 1-3 qtr hrs

MUSIC
(Department 152)
Professor Sonntag; Associate Professor E.
Williams (Chairman); Assistant Professors
Smoot, Kratzer; Instructor Climer; Visiting
Lecturer Gramm; Lecturers Biddinger, Hill,
Laukhuf, D. Lennsen, Sherrick, Dyke, R.
Williams.
The Department of Music offers a full
course of music and music education stu-
dies for the aspiring music educator or pro-
fessional performer. The department also
serves the general university community
through its course offerings, its performing
groups which are open to all students, and
through its many concerts, recitals, and
other performances which enhance the cul-
tural life and atmosphere of the university.
Ohio Northern University is an accredited institutional member of the National Association of Schools of Music.

The music major is given a variety of courses and experiences to help him/her gain the knowledge and proficiency in breadth and depth which will help him/her achieve future success in his/her chosen area of endeavor in the music field. Special topics and studies may be undertaken to enrich the basic course offerings.

A variety of degree programs are offered: Bachelor of Music with majors in music education and performance, and Bachelor of Arts with a major in music. A minor in music is also offered. Specific degree requirements are listed below.

**Bachelor of Music** A candidate for the Bachelor of Music degree must complete the following general education requirements:

**Fine Arts:** an art course, a theatre course, and Speech 100. 
**Humanities:** English 110, 111 and 204, Philosophy 100 or equivalent 102. Religion 105 or equivalent.

**Foreign Language:** two quarters of any foreign language.

**Social Sciences:** a course in Economics, Psychology, Sociology, or Political Science.

**Western Civilization:** 110-111.

**Mathematics and Natural Sciences:** a course in Biology and a physical science course. Also exposure to computer usage and at least one non-Western or 3rd world course. All students are required to take three hours of physical education credit (see Department of Health and Physical Education and Sports Studies).

All majors include a basic musicality core of courses: 121, 122, 123, 131, 132, 133, 221, 222, 223, 231, 232, 233, 241, 242, 311, 312, 313, 321, 322, 323, and 341. Vocal majors also take diction 261, 262, 263.

A minimum of one major performing group is taken each quarter. Regular student recital performances and participation in performing group concerts provide continuous growth in musicianship. Special requirements for the individual majors within the Bachelor of Music are as follows:

The **Bachelor of Music with a music education major** requires 22 hours of applied private instruction, proficiency in piano and classroom instruments; senior recital; music education courses 043, 336, 338, 339, 361, 461, and 462 (instrumental majors also take 463); and professional education courses 111, 223, 224, 250 or 251, 342, 370, 380, student teaching (one quarter), and field experience.

The **Bachelor of Music with a performance major** requires an acceptance audition, piano proficiency, 36 hours of applied private instruction, applied field literature, ensemble, music electives, and junior and senior recitals.

**Bachelor of Arts** The candidate for the Bachelor of Arts degree must complete the bachelor arts general education requirements listed earlier in this catalog. The major in music course sequence is comprised of music 100, 121, 122, 123, 131, 132, 133, 221, 222, 223, 231, 232, 233, 321, 322, 323; a minimum of 12 hours of private applied instruction well distributed over the college years; a minimum of six quarters in a major performing group; eight hours of music electives, and a senior project.

All music majors are required to attend a specified number of recitals and concerts each quarter, registering for Music 001.

The advanced music section of the Graduate Record Examination (GRE) is the required senior comprehensive examination for all music majors. This exam must be taken before the last quarter of the senior year.

Teacher certification in music, vocal and instrumental, K-12, is acquired through the Bachelor of Music major in music education.

Double majors in music and another field, prelaw programs with music majors, interdisciplinary programs, or double degree programs can be arranged. Contact the department chair for details.

A **minor in music** may be earned by taking a minimum of 33 hours which must include music 121, 122, 123, 131, 132, 133, 321, 322, 323; six quarters of private applied instruction in one area and six quarters in a major performing group.

**Applied Music** Each music major generally takes two credit hours of individual instruction in his major applied area each quarter. Non-music majors and music majors studying minor applied areas usually register for one credit hour of class or individual instruction each quarter. Non-music majors are assessed an extra fee only for individual lessons, and the availability of these lessons is dependent upon the schedule and load of the instructor involved.

**Note:** 1. All class instruction carries one hour credit per quarter. The amount of
instruction depends upon the size of the class, but is not less than one-half nor more than two class hours per week.

2. Individual instruction is offered for varying hours of credit. The section number will determine the number of hours credit. Usually, two hours for majors and one hour for minors are taken. Generally, one half hour of individual instruction is given for each hour of credit taken.

010. VOICE CLASS 1 qtr hr
015. VOICE-INDIVIDUAL 1-3 qtr hrs
020. PIANO CLASS 1 qtr hr
021. PIANO CLASS - MAJORS 1 qtr hr
025. PIANO-INDIVIDUAL 1-3 qtr hrs
026. HARPSCICHORD-INDIVIDUAL 1-3 qtr hrs
030. ORGAN CLASS 1 qtr hr
035. ORGAN-INDIVIDUAL 1-3 qtr hrs
040. STRINGS CLASS 1 qtr hr
041. VIOLIN-VIOLA CLASS 1 qtr hr
042. CELLO-BASS CLASS 1 qtr hr
043. GUITAR-CLASSROOM INSTRUMENTS CLASS 1 qtr hr
045. VIOLIN-INDIVIDUAL 1-3 qtr hrs
046. VIOLIN-INDIVIDUAL 1-3 qtr hrs
047. CELLO-INDIVIDUAL 1-3 qtr hrs
048. DOUBLE BASS-INDIVIDUAL 1-3 qtr hrs
049. GUITAR-INDIVIDUAL 1-3 qtr hrs
050. WOODWIND CLASS 1 qtr hr
055. FLUTE-INDIVIDUAL 1-3 qtr hrs
056. OBOE-INDIVIDUAL 1-3 qtr hrs
057. CLARINET-INDIVIDUAL 1-3 qtr hrs
058. BASSOON-INDIVIDUAL 1-3 qtr hrs
059. SAXOPHONE-INDIVIDUAL 1-3 qtr hrs
060. BRASS CLASS 1 qtr hr
065. TRUMPET-INDIVIDUAL 1-3 qtr hrs
066. FRENCH HORN-INDIVIDUAL 1-3 qtr hrs
067. TROMBONE-INDIVIDUAL 1-3 qtr hrs
068. EUPHONIUM-INDIVIDUAL 1-3 qtr hrs

Music Performing Groups
Membership in performing groups is open to all University students, and they are encouraged to participate. Students may enroll as many times as they wish; however, there are certain restrictions on the amount of ensemble credit which may count toward minimal graduation requirements in the College of Arts and Sciences. In-depth requirements in fine arts may be satisfied by two to four years of membership in a major performing group.

069. TUBA-INDIVIDUAL 1-3 qtr hrs
070. PERCUSSION CLASS 1 qtr hr
075. PERCUSSION-INDIVIDUAL 1-3 qtr hrs

080. CHORUS 1 qtr hr A large choral group open to all qualified students. Music of all types, accompanied and a cappella, is studied and sung throughout the year in concerts and performances on and off campus.

081. CHAPEL CHOR 1 qtr hr A choral group open to all students for the study and performance of sacred and traditional music. The Chapel Choir sings at chapel services and gives occasional concerts.

082. VOCAL ENSEMBLE 1 qtr hr Selected ensembles of vocalists for the study and performance of characteristic literature. Membership by audition.

083. UNIVERSITY SINGERS 1 qtr hr A select group of men and women singers designed to perform a wide variety of choral literature with the highest musical standards. Performances include concerts and programs on and off campus and on tour. Membership by audition.

084. CONCERT BAND 1 qtr hr A concert ensemble open to all qualified students who play band instruments. A wide variety of band literature is studied and performed in regular campus concerts.

086. PEP BAND 1 qtr hr A band specially organized to provide music for athletic events.

087. SYMPHONIC BAND 1 qtr hr A select, fully-instrumented concert ensemble studying and performing the finest band literature with the highest musical standards. Performances include concerts and programs on campus and tour concerts.

110 MUSIC
008. JAZZ ENSEMBLE  1 qtr hr Selected ensembles for the study and performance of jazz and popular music. Performances on and of campus are scheduled throughout the year, including the annual jazz festival. Membership priority is given to members of symphonic and concert bands.

090. MARCHING BAND  1 qtr hr A musical organization devoted to the preparation and performance of football game shows at home and selected away games. Open to all university students who play band instruments or who are accepted for auxiliary groups. Fall Quarter only. Includes a drill camp in advance of the Fall Quarter.

092. WOODWIND ENSEMBLE  1 qtr hr Selected ensembles of woodwind instrumentalists for the study and performance of characteristic literature.

094. BRASS ENSEMBLE  1 qtr hr Selected ensembles of brass instrumentalists for the study and performance of characteristic literature.

095. PERCUSSION ENSEMBLE  1 qtr hr Selected ensembles of percussion players for the study and performance of characteristic literature.

096. ORCHESTRA  1 qtr hr Credit may be earned for membership in the Lima Symphony Orchestra (by audition) and for orchestras on campus which perform for large choral works and the annual spring musical theater production.

098. STRING ENSEMBLE  1 qtr hr Ensembles of string instrumentalists for the study and performance of characteristic literature.

099. NEW MUSIC ENSEMBLE  1 qtr hr The rehearsal and performance of solo, chamber, and small ensemble music from the twentieth century. In addition, significant experimental music from previous centuries will be included. Emphasis will be on landmark works by major composers, and post-1960 music. Major composers such as Stravinsky, Cowell, Crumb, Bartok, Varese, and Babbitt will be represented. Permission of the instructor.

Music Courses

000. ORIENTATION  1 qtr hr Familiarization with the department, requirements for majors, planning programs of courses, university catalog and library. Required of departmental majors.

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211. INTRODUCTION TO ELECTRONIC MUSIC 2 qtr hrs The study of history, development, materials, and techniques of electronic music. Emphasis on composition in the medium. Concentration of classical (tape recorder) techniques and use of synthesizer. Work in the electronic laboratory. Prerequisite: Permission of the instructor.

221. ADVANCED THEORY OF MUSIC 2 qtr hrs Continuation of Music 123. Study of 18th, 19th and 20th century compositional techniques. Development of analytical skills. Creative projects in composition. Continuation courses must be taken in sequence. Prerequisite: Music 123.

222. ADVANCED THEORY OF MUSIC 2 qtr hrs Continuation of 221.

223. ADVANCED THEORY OF MUSIC 2 qtr hrs Continuation of 222.

231. ADVANCED EAR TRAINING 1 qtr hr Continuation of Ear Training 131-132-133. Designed to supplement and be taken in conjunction with second year of music theory. Prerequisite: Music 133 or proficiency.

232. ADVANCED EAR TRAINING 1 qtr hr Continuation of 231.

233. ADVANCED EAR TRAINING 1 qtr hr Continuation of 232.

241. BASIC CONDUCTING 2 qtr hrs General conducting techniques and principles of score study. Laboratory experiences. Continuation courses must be taken in sequence. Prerequisite: Music 121.

261. LATIN AND ITALIAN DICTION FOR SINGERS 1 qtr hr Designed to acquaint vocalists with the proper pronunciation of vocal and choral texts in Latin and Italian. Required of all vocal music majors.

262. FRENCH DICTION FOR SINGERS 1 qtr hr Continuation of 261 in French.

263. GERMAN DICTION FOR SINGERS 1 qtr hr Continuation of 261-262 in German.

280. PIANO PROFICIENCY 0 qtr hrs

310. AMERICAN MUSIC 3 qtr hrs An investigation of sacred and secular American music from colonial America to the present with particular attention to native art music and the incorporation of jazz into symphonic works of the 20th century.

311. COUNTERPOINT 2 qtr hrs Polyphonic music in various styles with particular emphasis on that of the eighteenth century.

Creative projects in contrapuntal writing. Prerequisite: Music 223.

312. FORM AND ANALYSIS 2 qtr hrs The evolution of musical forms and styles from the Baroque to the present. Theoretical and stylistic analysis of representative music. Prerequisite: Music 223.

313. ORCHESTRATION 2 qtr hrs The instruments of the band and orchestra. Arrangements for the band and orchestra. Arrangements for string, woodwind and brass combinations. A study of orchestrations by romantic, classical, and modern composers. Prerequisite: Music 223.

314. MUSIC COMPOSITION 2 qtr hrs Study of principles general to all compositional styles, and application of these principles through weekly composition projects. Includes work in the electronic music laboratory. In class performances. Prerequisite: Permission of the instructor.

321. MUSIC HISTORY AND LITERATURE 3 qtr hrs The historical development of music literature. Study of representative literature and composers: Ancient, Medieval and Renaissance periods. Prerequisite: Music 100.

322. MUSIC HISTORY AND LITERATURE 3 qtr hrs Study of the Baroque and Classical periods. Prerequisite: Music 100.

323. MUSIC HISTORY AND LITERATURE 3 qtr hrs Study of the Romantic and Twentieth Century periods. Prerequisite: Music 100.

334. WOODWIND METHODS 2 qtr hrs Study, elementary performance skills, pedagogy, and materials of the woodwind instruments. For future school music teachers.

336. BRASS METHODS 2 qtr hrs Study, elementary performance skills, pedagogy, and materials of the brass instruments. For future school music teachers.

338. PERCUSSION METHODS 2 qtr hrs Study, elementary performance skills, pedagogy, and materials of the percussion instruments. For future school music teachers.

339. STRING METHODS 2 qtr hrs Study, elementary performance skills, pedagogy, and materials of the orchestral stringed instruments. For future school music teachers.
342. ADVANCED CONDUCTING - INSTRUMENTAL 2 qtr hrs Further development of baton techniques and other conducting skills relating to practice, reading and preparation of scores for working with instrumental ensembles. Prerequisite: Music 241. (Formerly 152-242).

343. ADVANCED CONDUCTING - CHORAL 2 qtr hrs Adaptation of basic conducting techniques to the choral ensemble, including leadership, error detection, tonal development, stylistic accuracy and analysis. Exploration of choral philosophy and development. Prerequisite: Music 241. (Formerly 152-341).

361. ELEMENTARY MUSIC METHODS (MUSIC EDUCATION MAJORS) 3 qtr hrs Philosophy, techniques, materials, curriculum planning for the elementary music teacher and supervisor. Includes approximately 8 hours of field experience.

371. APPLIED FIELD LITERATURE-PEDAGOGY 1 1 qtr hr Study of the professional and educational literature in a specific applied field.

372. APPLIED FIELD LITERATURE-PEDAGOGY 2 1 qtr hr Continuation of 371.

373. APPLIED FIELD LITERATURE-PEDAGOGY 3 1 qtr hr Continuation of 372.

380. JUNIOR RECITAL 0 qtr hrs

461. SECONDARY CHORAL METHODS AND TECHNIQUES 3 qtr hrs Procedures in the development and direction of school choral groups, including choral literature of all types. Includes approximately 8 hours of field experience.

462. SECONDARY INSTRUMENTAL METHODS AND TECHNIQUES 3 qtr hrs Procedures in the development and direction of school bands and orchestras, including band literature of all types. Includes approximately 8 hours of field experience.

463. MARCHING BAND METHODS AND TECHNIQUES 2 qtr hrs Methods, materials, and techniques in the development and direction of the marching band. Show planning, precision drill, rehearsal techniques, and selection and rehearsal of music. Membership in Marching Band required in conjunction with class. Includes approximately 8 hours of field experience.

480. SENIOR RECITAL 0 qtr hrs

490. SPECIAL TOPICS IN MUSIC 1-3 qtr hrs Group study of approved specialized topics not offered in catalog.

497. INDEPENDENT STUDY IN MUSIC 1-3 qtr hrs A wide variety of specialized musical subjects are available through individual study with a faculty member.

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PHILOSOPHY AND RELIGION

(Department 115)

Professor Beanblossom, Hinderliter (Chairman); Associate Professors M. Lenssen; Instructor Plunkett.

The orientation of the department is non-sectarian and reflects a serious commitment to the academic study of philosophy and religion within the liberal arts tradition. Recognizing that both philosophy and religion, as academic disciplines, are concerned with basic questions of meaning and value in human life and with historical approaches to those questions, the department offers a range of general and specialized courses designed to broaden the educational experience of all undergraduate students at Ohio Northern. Students wishing a more concentrated study of philosophy and religion may choose to major or minor in the department.

General Education Requirements. All undergraduates are required to take one course in philosophy and one in religion. Philosophy 100 or 102 may be taken to fulfill the philosophy requirement. Religion 105, 106, 107, or 108 may be taken to fulfill the religion requirement.

Philosophy Major The major in philosophy requires a minimum of 45 quarter hours, including the following courses: 234, two of the following (102, 237, 238), two courses in the history of philosophy (331, 343, 347, 371, 374), and three hours of either 494 or 497. A maximum of three courses in religion may be applied to the philosophy major. A senior comprehensive exam is not required.

Religion Major The major in religion requires a minimum of 45 quarter hours beyond religion 105 and must include three hours of either 495 or 498. A maximum of three courses in philosophy may be applied towards the religion major. A senior comp-
prehensive exam is not required.  

**Philosophy and Religion Major** The major in philosophy and religion requires a minimum of 45 quarter hours beyond philosophy 100 and religion 105. Selection of course is subject to approval by the department and must include three hours of independent study (497 or 498) or a seminar (494 or 495). A senior comprehensive exam is not required.  

It is recommended that majors in the department who plan to attend theological seminary or graduate school take two years of foreign language.  

**Minor Programs** Minors are offered in both philosophy and religion. A minimum of 30 hours is required with the selection of courses subject to approval by the department. Contact the department chairman for further information about these programs.  

**Prelaw Program** The department cooperates with the Pettit College of Law in the “guaranteed admission” prelaw program (see elsewhere in this catalog). Information about the curricular requirements of the program can be secured from the department chairman.  

**Philosophy**  
Philosophy is a quest for a comprehensive understanding of human existence. The objective of philosophy is to consider the rational justification of logical inferences, human values, criteria for establishing the claims of knowledge and certainty, and interpretations of the nature of reality. The diverse insights of significant philosophers from ancient times to the present contribute resources to stimulate contemporary philosophical thinking in each of these areas.  

A major in philosophy prepares students generally for careers in areas which require the ability to analyze problems and to think and write clearly. It is an appropriate major for students planning to continue their education for professional careers such as law, medicine, and theology.  

**102. GREAT PHILOSOPHERS 3 qtr hrs** An introduction to philosophical inquiry, its scope, methodology, and persistent problems through a study of major philosophers from Bacon to James, including such thinkers as Descartes, Hobbes, Locke, Hume and Kant. Most of the following courses are offered in alternate years or on demand. Prerequisite for these courses, except 234: one course in philosophy or consent of instructor.  

**210. DEATH AND DYING 3 qtr hrs** An exploration of the experience and meaning of death. Emphasis on choices and decisions related to dying that involve medical treatment, aging, grief, institutional care, and social policy.  

**234. LOGIC 3 qtr hrs** The study of logical fallacies and the principles of correct reasoning. The application of formal logical analysis to arguments encountered in ordinary language.  

**237. KNOWLEDGE AND TRUTH 3 qtr hrs** An examination of the scope and justification of knowledge with reference to problems such as skepticism, sense perception, reason, belief, and truth.  

**238. ETHICS 3 qtr hrs** An examination of selected ethical theories and their rational justification. The use of ethical theories for resolving ethical issues in personal and social decision-making.  

**290. SPECIAL TOPICS IN PHILOSOPHY 1-3 qtr hrs**  
**294. SEMINAR IN PHILOSOPHY 1-3 qtr hrs**  
**320. SOCIAL JUSTICE 3 qtr hrs** Theories of justice in contemporary society including conceptions of the law, human rights, equality, liberty, and responsibility.  

**325. PHILOSOPHY OF RELIGION 3 qtr hrs** Critical inquiry into issues such as the nature and existence of God, the problem of evil, the significance of religious experience, the justification of religious belief, the relation of faith and reason. Also listed as Religion 325.  

**331. PLATO AND ARISTOTLE 3 qtr hrs** A study of the Greek philosophers, Plato and
Aristotle, against the background of the Pre-Socratics and Socrates.

334. SYMBOLIC LOGIC 3 qtr hrs The evaluation of deductive arguments by means of the formal procedures of modern symbolic logic. Prerequisite: 115-234.

338. BIOETHICS 3 qtr hrs Ethical issues involving personal and social values in matters of life and death, such as experimentation with human subjects, genetic control, abortion, and patients' rights to receive and refuse treatment.

339. BUSINESS ETHICS 3 qtr hrs A study of philosophical approaches to ethics and their application to moral issues in business, such as conflicts of interest, whistle blowing, trade secrets, hiring, promotion and disciplinary practices, corporate responsibility to consumers and to society.

341. AESTHETICS 3 qtr hrs An examination of classical and contemporary theories of art and aesthetic experience. Consideration of the nature of various arts and of issues such as meaning, truth, and value in art.

343. AMERICAN PHILOSOPHY 3 qtr hrs Main currents in American philosophy, including representative thinkers in such traditions as Puritanism, Transcendentalism, Pragmatism, and Realism.

345. EXISTENTIALISM 3 qtr hrs The historical roots of existentialism in Kierkegaard and Nietzsche, and the thought of representative writers such as Heidegger, Sartre, Marcel, Camus, Dostoyevsky, and Kafka.

347. MEDIEVAL THOUGHT 3 qtr hrs The development of theological and philosophical thought from 500 A.D. to 1350 A.D. Also listed as Religion 347.

371. MAJOR PHILOSOPHICAL MOVEMENTS 3 qtr hrs A study of the writings of a major, distinctive philosophical school of thought or period such as Idealism, Utilitarianism, Continental Rationalism, British Empiricism. To be offered every other year or on demand. May be repeated for credit, depending upon content.

374. MAJOR PHILOSOPHERS 3 qtr hrs A study of the thought and important writings of a single philosopher, or a pair or triad of philosophers such as Augustine, Descartes, Mill, Hume and Kant, Hegel and Marx. To be offered every other year or on demand. May be repeated for credit, depending upon content.

490. SPECIAL TOPICS IN PHILOSOPHY 1-3 qtr hrs

494. SEMINAR IN PHILOSOPHY 1-3 qtr hrs

497. INDEPENDENT STUDY IN PHILOSOPHY 1-3 qtr hrs Departmental permission required.

Religion

Religion is an integral part of human life and culture. It includes the ultimate commitments, attitudes, beliefs and forms of worship by which people live and find meaning for their personal and social existence. The courses in religion are intended to acquaint the student with the living religious traditions, primarily of the West, through an examination of their origins and development, their interaction with the changing cultural context, and their insights for dealing with the perennial questions of human existence and destiny. The approach to the study is ecumenical and makes use of current scholarly methods of research and findings.

000. ORIENTATION 1 qtr hr Familiarization with the department, requirements for majors, planning program of courses, University catalog and library. Also listed as Philosophy 000. Required of departmental majors.

105. RELIGION 3 qtr hrs An exploration of the religious dimension of the human search for personal identity, meaningful existence, and ultimate reality, through the examination of various aspects and expressions of the religious life of humanity.

106. INTRODUCTION TO THE BIBLE 3 qtr hrs An introduction to the Old and New Testaments, with special emphasis on the origin, history, and message of the biblical writings, and the central personalities, events, and ideas which form the basis of the Judeo-Christian tradition.

107. RELIGIONS EAST AND WEST 3 qtr hrs An introduction to representative major religions of the world, their origins, sacred writings, basic beliefs, and life practices, with special attention to non-Western religious traditions.

108. INTRODUCTION TO CHRISTIANITY 3 qtr hrs A study of the major teachings, practices and institutional forms of Christianity in their historical and contemporary settings.
Most of the following courses are offered in alternate years or on demand. Prerequisite for these courses, except Hellenistic Greek: one course in religion or consent of instructor.

251. OLD TESTAMENT NARRATIVES 3 qtr hrs Critical examination of the narrative books of the Old Testament, concentrating on the Pentateuch and historical books and how they convey their religious convictions through stories.

256. INTRODUCTION TO NEW TESTAMENT 3 qtr hrs Critical examination of the New Testament: its historical background, literary features and theological claims.

262. CHRISTIANITY AND CULTURE 3 qtr hrs An examination of various interpretations of the relationship of Christianity to particular cultural phenomena, including literature, science, philosophy, psychology and the economic and political orders.

263. CHRISTIAN ETHICS 3 qtr hrs The relation of biblical and theological thought to the development of ethical principles. Application to personal and social moral issues, such as marriage, family, race, politico-economic life, international affairs.

281. HELLENISTIC GREEK 1 3 qtr hrs Study of Hellenistic Greek with heavy emphasis on grammar, and some readings from the Greek New Testament. Offered on demand.

282. HELLENISTIC GREEK 2 3 qtr hrs Study of Hellenistic Greek with heavy emphasis on grammar, and readings from the Greek New Testament. Offered on demand. Prerequisite: 115-281.

283. HELLENISTIC GREEK 3 3 qtr hrs Study of Hellenistic Greek with heavy emphasis on grammar, and readings from the Greek New Testament and other Hellenistic Greek literature. Offered on demand. Prerequisite: 115-282.

291. SPECIAL TOPICS IN RELIGION 1-3 qtr hrs

295. SEMINAR IN RELIGION 1-3 qtr hrs

325. PHILOSOPHY OF RELIGION 3 qtr hrs Critical inquiry into issues such as the nature and existence of God, the problem of evil, the significance of religious experience, the justification of religious belief, the relation of faith and reason. Also listed as Philosophy 325.

346. EARLY CHRISTIAN THOUGHT 3 qtr hrs Christianity from the post-New Testament period to the Council of Chalcedon in 451 A.D.

347. MEDIEVAL THOUGHT 3 qtr hrs The development of theological and philosophical thought from 500 A.D. to 1350 A.D. Also listed as Philosophy 347.

353. REFORMATION AND MODERN CHRISTIANITY 3 qtr hrs The Protestant-Catholic conflict and the impact of modern secular thought on Christianity from the Reformation through the nineteenth century.

361. CONTEMPORARY CHRISTIAN THOUGHT 3 qtr hrs Basic issues, major theological positions, and representative theologians of twentieth century Christian thought.

363. OLD TESTAMENT PROPHETS 3 qtr hrs Critical examination of the prophetic books of the Old Testament from historical, literary and theological perspectives.


383. READINGS IN HELLENISTIC GREEK 1 1 qtr hr Assigned readings in the Greek New Testament and other Hellenistic Greek literature. Offered on demand. Prerequisite: 115-283.

463. LIFE AND TEACHINGS OF ST. PAUL 3 qtr hrs The insights of the most influential thinker and apostle in the early church.

491. SPECIAL TOPICS IN RELIGION 1-3 qtr hrs

495. SEMINAR IN RELIGION 1-3 qtr hrs

498. INDEPENDENT STUDY IN RELIGION 1-3 qtr hrs Departmental permission required.

PHYSICS
(Department 124)

Professors Gangemi (Chairman), Weimer; Associate Professors Messick, Roll.

The primary aim of the Physics Department is to offer courses that will stimulate scientific thought, train the student to reason from fundamental experimental fact, further the
student's desire to continue scientific investigation, and meet the needs of those students who are interested in physics for its cultural or its vocational value.

The department aims to give a training sufficiently broad to enable the student to appreciate the physics of scientific articles; to teach physics in the public schools; to apply physics in engineering, medicine, and other sciences; and to pursue graduate work.

Ohio Northern University offers both the Bachelor of Arts degree and the Bachelor of Science degree with majors in Physics.

The physics major who desires the Bachelor of Arts degree in addition to satisfying any requirement for that degree mandated by the Ohio Northern University College of Arts and Sciences must complete 47 hours in the major field. The required courses are: Physics 231, 232, 233, 234, 235, 236, 303, (310, 320, 330, 340), 351, 352, 353, 361, 363, 411, 412, 463. Six of the 47 hours are taken from the advanced laboratory group: Physics 310, 320, 330, 340. At the discretion of the department, the courses Physics 413, 432 and/or 433 may also be required of the student. This determination will be made by the department chairman in consultation with the physics department staff and to a large extent will be determined by the career goals of the student.

The Physics major who desires the Bachelor of Science degree in addition to satisfying any requirements for that degree mandated by the Ohio Northern University College of Arts and Sciences must complete 55 hours in the major field. The required courses are: Physics 231, 232, 233, 234, 235, 236, 303, 361, 363, 351, 352, 353, 310, 320, 330, 340, 411, 412, 463, 432, 413, 433.

A senior comprehensive examination is not required for the physics major.

The Physics Department also offers a minor in physics. The student desiring to complete the requirements for the physics minor must complete the following courses: Physics 231, 232, 233, 234, 235, 236, 351, 352, 411, 412, and six additional hours from among Physics 303, 353, 310, 320, 330, and 340. In some instances, substitutions for the above courses may be made with the approval of the department chairman.

In addition to the major and minor in physics, the Department of Physics also offers a program leading to certification for teaching in the Ohio public schools. The program is designed for students whose goal is to teach physics in the high schools and will include 45 hours chosen to satisfy Ohio State certification requirements and to a limited extent the personal interests of the student. Although some flexibility is permitted, the courses taken in this program are chosen in consultation with the chairman of the Department of Physics and will depend upon the completion of any necessary prerequisites.

This program differs from the major in physics in that the student desiring certification for teaching must also be registered in the Department of Education and satisfy all requirements as determined by the State of Ohio and the Department of Education of Ohio Northern University. A detailed description of these requirements can be obtained from the chairman of the Department of Education.

000. ORIENTATION 1 qtr hr Familiarization with the department, requirements for majors' programs, University catalog and library. Required of departmental majors. Offered every year in the Fall Term.

100. PHYSICS 3 qtr hrs Intended for liberal arts students. Study of the basic laws and principles which govern the behavior of nature with special emphasis on mechanics, and atomic and nuclear structure. The interaction of physics with other areas of culture will be considered. Offered each term every year.

180. SEMINAR 1 qtr hr Reading, discussion and reports on problems of historical and current interest in physics. Offered only when sufficient interest warrants.

Physics 211, 212 and 213 are non-calculus, general physics courses intended primarily for pre-pharmacy and secondary education students. Physics 211 must precede Physics 212 and 213. Prerequisites: Mathematics 160 or both 120 and 122.

211. GENERAL PHYSICS: MECHANICS OF SOLIDS AND FLUIDS 3 qtr hrs Basic principles of Newtonian mechanics of solids and liquids. The laboratory corresponding to this course is Physics 234. Offered every year in the Fall Term.
212. GENERAL PHYSICS: SOUND, HEAT, AND LIGHT 3 qtr hrs Basic principles of sound propagation, heat and heat transfer, and light propagation. The laboratory corresponding to this course is Physics 235. Offered every year in the Winter Term.

213. GENERAL PHYSICS: ELECTRICITY AND MAGNETISM 3 qtr hrs Basic principles of electrical and magnetic phenomena. The laboratory corresponding to this course is Physics 236. Offered every year in the Spring Term.

Physics 231, 232 and 233 are the calculus based general physics courses designed for physics and engineering students. Physics 231 must precede 232 and 233. Prerequisite: Mathematics 261 which may be taken concurrently or its equivalent.

231. PHYSICS: MECHANICS OF SOLIDS AND FLUIDS 4 qtr hrs Basic principles of Newtonian mechanics of solids and fluids employing the differential and integral calculus. The laboratory corresponding to this course is Physics 234. Offered every year in the Fall and Winter Terms.

232. PHYSICS: HEAT, SOUND, AND LIGHT 4 qtr hrs Basic principles of sound propagation, heat transfer and light propagation. Differential and integral calculus are used. The laboratory corresponding to this course is Physics 235. Offered every year in the Fall and Winter Terms.

233. PHYSICS: ELECTRICITY AND MAGNETISM 4 qtr hrs Basic principles of electrical and magnetic phenomena. Differential and integral calculus are used. The laboratory corresponding to this course is Physics 236. Offered every year in the Spring term.

234. PHYSICS LABORATORY: MECHANICS 1 qtr hr Experiments in basic Newtonian mechanics. Physics 231 should be taken concurrently, or instructor's permission must be obtained. Offered every year in the Fall and Winter Terms.

235. PHYSICS LABORATORY: HEAT, SOUND, AND LIGHT 1 qtr hr Experiments in heat, sound and light. Physics 232 should be taken concurrently, or instructor's permission must be obtained. Offered every year in the Fall and Winter Terms.

236. PHYSICS LABORATORY: ELECTRICITY AND MAGNETISM 1 qtr hr Experiments with basic electrical and magnetic phenomena. Physics 233 should be taken concurrently or instructor's permission must be obtained. Offered every year in the Spring Term.

241. BASIC ELECTRONICS FOR MEDICAL TECHNICAL STUDENTS 2 qtr hrs Basic physics of medical laboratory instruments, including principles of operation and techniques of use. Offered every year in the Spring Term.

250. ASTRONOMY I 3 qtr hrs The evolution of man's understanding of the structure and extent of the solar system. A review of current knowledge of the solar system, and an introduction to stellar systems. Offered every other year in the Fall Term.

251. ASTRONOMY II 3 qtr hrs The structure and evolution of stars and stellar systems. Cosmology. Prerequisite: Physics 250. Offered every other year in the Winter Term.

303. MODERN PHYSICS 3 qtr hrs The concepts of relativity, quantum and wave mechanics, atomic structure and absorption and emission processes. Prerequisites: Mathematics 264 and Physics 233. Offered every year in the Winter Term.

310. THEORY AND ADVANCED LABORATORY: MECHANICS 1-3 qtr hrs Prerequisite: One year of physics. Part of the Physics major program and offered when needed.

320. THEORY AND ADVANCED LABORATORY: LIGHT, HEAT, SOUND 1-3 qtr hrs Prerequisite: One year of physics. Part of the Physics major program and offered when needed.

330. THEORY AND ADVANCED LABORATORY: ELECTRICITY, MAGNETISM AND ELECTRONICS 1-3 qtr hrs Prerequisite: One year of physics. Part of the physics major program and offered when needed.

340. THEORY AND ADVANCED LAB: NUCLEAR PHYSICS AND SOLID STATE 1-3 qtr hrs Prerequisite: One year of physics. Part of the Physics major program and offered when needed.

351. ANALYTICAL MECHANICS 1 3 qtr hrs Vector analysis, kinematics, conservative forces, planetary motion, pendulum, free and forced oscillations, coupled systems and normal coordinates, angular momentum, rigid bodies. Prerequisites: Mathematics 361 and Physics 233. Part of the physics major program and offered when needed.
352. ANALYTICAL MECHANICS II 3 qtr hrs LaGrange equations, canonical formulation, principle of least action, normal coordinates, rigid bodies, special relativity, mathematical methods. Prerequisites: Mathematics 362 and Physics 351. Part of the Physics major program and offered when needed.

353. NUCLEAR PHYSICS 3 qtr hrs Nuclear radiation detection instruments, nuclear constituents and structure, nuclear models, nuclear reactions, fundamentals of nuclear reactor theory and design, shielding and safety principles in nuclear physics. Prerequisites: Physics 231, 232, 233 and 303. Offered every year in the Spring Term.

361. ELECTRONICS 3 qtr hrs Theory of solid state devices, rectifier circuits, transistor amplifiers, oscillators and modulators, instrumentation applications. Prerequisites: Physics 213 or 233. Offered every year in the Fall Term.

363. GEOMETRICAL OPTICS 2 qtr hrs The laws of geometrical optics, image formation by mirrors and lenses, optical aberrations and optical instruments. Prerequisite: Physics 232. Part of the Physics major program and offered when needed.

411. ELECTRICITY AND MAGNETISM I 3 qtr hrs Electrostatic field theory, capacitance, multipole expansion, dielectric properties of matter; magnetic field theory; electromagnetic induction; magnetic properties of matter; Maxwell’s equations and electromagnetic waves. Prerequisites: Mathematics 361 and Physics 233. Part of the Physics major program and offered when needed.

412. ELECTRICITY AND MAGNETISM II 3 qtr hrs Advanced electric and magnetic fields; electric and magnetic properties of solids, electromagnetic radiation. Prerequisites: Mathematics 362 and Physics 411. Part of the Physics major program and offered when needed.

413. SOLID STATE 3 qtr hrs A lecture and problems course in the structure of solids and their phenomena. Quantum and statistical mechanics concepts are introduced to develop theories of internal stress and strain in crystals, conductivity of electricity in metals, semiconductors and superconductors, magnetism, the thermal properties of solids and imperfections in solids. Prerequisite: Physics 303. Part of the Physics major program and offered when needed.


433. THEORETICAL PHYSICS 4 qtr hrs For students intending advanced work in physics, chemistry or mathematical physics. Selected topics in classical mechanics, electromagnetic theory, quantum theory, relativity, nuclear theory, and statistical mechanics. Part of the Physics major program and offered when needed. Prerequisites: Physics 362 and 412; Mathematics 362.

463. PHYSICAL OPTICS 3 qtr hrs The laws of physical optics, interference, diffraction and polarization and instrumentation. Prerequisite: Physics 363. Part of the Physics major program and offered when needed.

490. SPECIAL TOPICS IN PHYSICS 1-3 qtr hrs Part of the Physics major program and offered when needed.

494. SEMINAR IN PHYSICS 1-3 qtr hrs Part of the Physics major program and offered when needed.

497. INDEPENDENT STUDY 1-3 qtr hrs Part of the Physics major program and offered when needed.

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PSYCHOLOGY AND SOCIOLOGY
(Department 133)

Professors Compton, Cohoe, Wildman (Chairman); Associate Professor P. Hruschka.

The objectives of the department are to develop within each student an understanding of human relationships, institutions, and social processes; familiarity with the nature and causes of social problems; acquaintance with the theories of behavior; ability to think more critically and to integrate insights for useful participation in community life; and preparation for advanced study in the individual’s selected field.

Prelaw with Psychology and Sociology
Study in the behavioral sciences provides an especially suitable background for
prelaw students. The department, in cooperation with the College of Law at Ohio Northern University, offers a formal prelaw program with "guaranteed admission" to the law school.

To qualify for guaranteed admission students must complete the program with at least a 3.30 GPA. The program requires specially selected electives. Specific curricular requirements are available from the department chairman.

Secondary Certification Secondary teacher certification programs are offered in social psychology, sociology, and comprehensive social studies. Information on these programs is available from the department chairman or the Office of the Director of Teacher Education.

Course Numbering Code To simplify identification of courses in the department the following numbering code is used:
1st Digit—Level (1st year, 2nd year, etc.)
2nd Two digits—discipline:
0—multi-discipline (except for 100,105)
10’s, 20’s, 30’s—psychology
40’s, 50’s—sociology
90’s—special topics, independent study

Examples:
141—1st year, sociology
335—3rd year, psychology

Field Work, Externships and Practica The department offers a number of opportunities for out-of-class learning through field work, externships and practica. See the department chairman for details and eligibility requirements.

Careers in the Behavioral Sciences The study of the various behavioral sciences provides preparation for entry into a number of different job opportunities. Consult with department faculty to explore various career options.

Psychology The psychology core is required for both the major and minor in psychology:

Core
1. Psychology 100
2. Psychology 111
3. Psychology 210
4. Psychology 211
5. Biology 100
6. Math 142

For the major
1. Psychology 000
2. The Psychology Core
3. 32 hours of Psychology Electives
4. Biology 113 & 231 or 2 approved mathematics courses

For the minor
1. The Psychology Core
2. 17 hours of Psychology Electives

000. ORIENTATION 1 qtr hr Familiarization with the departmental requirements for majors, planning programs of courses, University catalog and library, career options. Also listed as Sociology 000 and Social Work 000.

100. PSYCHOLOGY 4 qtr hrs General research and concepts in human behavior. Lectures, demonstrations, and observations.

111. INTRODUCTORY LABORATORY 2 qtr hrs Experiments which demonstrate basic psychological principles and acquaint the student with laboratory procedures and report writing. Usually to be taken concurrently with Psychology 100, but can be taken later. Required for Psychology majors, optional for other students enrolled in Psychology 100.

190. SPECIAL TOPICS IN PSYCHOLOGY 1-3 qtr hrs

200. PRACTICUM IN CHILD DEVELOPMENT 1 qtr hr Work with children in the department’s Child Development Center under supervision of an instructor and nursery school teacher. Practical experience in behavior management. Prerequisite: Approval of department chairman.

210. EXPERIMENTAL PSYCHOLOGY I 4 qtr hrs An introduction to the logic of experimental research and the application of the methods of science to the study of behavior. Particular emphasis on framing empirically testable hypotheses, experimental design, and analysis of data. Taught through lecture, computer simulation, and actual research experience. Extensive instruction in scientific communication and the APA Publications Manual. Prerequisites: Psychology 100 and 111, Mathematics 142.

211. EXPERIMENTAL PSYCHOLOGY II 4 qtr hrs Continuation of 210.

212. PRINCIPLES OF BEHAVIOR MANAGEMENT 3 qtr hrs The theory and supporting research which underlie behavior modification. Taught through lecture and
laboratory demonstrations. Prerequisite: Psychology 100.

215. DEVELOPMENTAL PSYCHOLOGY
3 qtr hrs Basic theories in human development from conception through old age; contemporary research at each age level. Prerequisite: Psychology 100.

218. PSYCHOLOGY OF THE EXCEPTIONAL CHILD
3 qtr hrs The study of the atypical child. Prerequisite: Psychology 100.

226. HUMAN SEXUAL BEHAVIOR
3 qtr hrs The course will draw heavily on research literature in an attempt to provide students with an understanding of what is known (as well as what is not known) about the major facets of human sexual behavior. Prerequisite: Psychology 100.

290. SPECIAL TOPICS IN PSYCHOLOGY
3 qtr hrs

300. PRACTICUM IN TEACHING IN THE BEHAVIORAL SCIENCES
2 qtr hrs Specialized planned teaching experiences in courses in the department and preparation of demonstrations. May be repeated to 6 hours but repeated hours do not apply to major requirements listed as Sociology 300 and Social Work 300. Prerequisites: Psychology 212 and approval of the chairman.

301. SOCIAL PSYCHOLOGY
4 qtr hrs The effect of social and cultural forces upon the individual. The nature and development of attitudes, languages, cognitive processes. Individual and group projects illustrative of the methodology of social psychology. Also listed as Sociology 301. Prerequisite: Psychology 100.

304. PRACTICUM IN RESEARCH IN THE BEHAVIORAL SCIENCES
1-3 qtr hrs Assist and participate in ongoing research by faculty members within the department. May be repeated up to 6 hours but repeated hours do not apply to major or graduation requirements. Also listed as Sociology 304 & Social Work 304. Prerequisites: Psychology 111 or 202 and approval of the chairman.

305. ADULT DEVELOPMENT AND AGING
3 qtr hrs A study of the basic psychological processes in adult development and aging with an emphasis on a dynamic view of human development throughout the life span. Heavily oriented towards research methods and experimental findings. Prerequisite: Psychology 215.

310. THEORIES OF LEARNING
3 qtr hrs Major theories of learning, their origins and relevance in the light of current research and findings. Prerequisite: Psychology 212.

311. PSYCHOLOGY OF PERSONALITY
4 qtr hrs The major theories of personality from Freud to contemporary theoretical approaches. Prerequisite: Psychology 100.

312. PSYCHOLOGICAL ASSESSMENT
4 qtr hrs The study of psychological measurement and evaluation in the areas of intelligence tests, tests of separate abilities, and personality inventories. Experience will be gained in test administration, scoring and interpretation. Prerequisite: Psychology 100.

314. CLASSICAL & INSTRUMENTAL CONDITIONING
3 qtr hrs A quasi-historical account of the major issues involved in classical and instrumental conditioning. The course emphasizes major empirical findings and the major theoretical issues that have resulted. Current work in learning and memory is covered on both the animal and human level. Course to be taught in alternate years with Psychology 310. Prerequisite: Psychology 212.

316. ORGANIZATIONAL PSYCHOLOGY
3 qtr hrs A study of the interplay between people and organizations emphasizing basic psychological processes such as motivation, perception, and learning. Other areas of study include organizational climate, leadership, conflict resolution, decision making, and communication. Prerequisite: Psychology 100.

320. PSYCHOLOGY AND THE LAW
3 qtr hrs A review of the role of the psychologist in civil commitment procedures, the insanity defense, patient's rights, the determination of competency, and testifying as an expert witness. An examination of significant court cases involving psychology and the law, research in the areas of jury selection, eyewitness testimony and psychologists' licensing procedures. Prerequisite: Psychology 100.

335. PHYSIOLOGICAL PSYCHOLOGY
3 qtr hrs Psychology as a biological science. Physiological events underlying behavior, including sensory, neural, and glandular involvement in such topics as motivation, emotion, and learning. Prerequisite: Psychology 100 and Biology 231 or 331.

336. SENSATION AND PERCEPTION
3 qtr hrs A study of sensory systems. Dem-
onstruction and evaluation of selected experiments in visual, auditory, gustatory, olfactory, and cutaneous perception. Prerequisites: Psychology 100 and Biology 231 or 331.

337. COMPARATIVE PSYCHOLOGY
3 qtr hrs Survey of behavior of different phylogenetic levels from lower forms to man with special emphasis on primate behavior. Prerequisites: Psychology 100 and Biology 100.

338. BRAIN AND BEHAVIOR
3 qtr hrs A survey of the brain systems involved in anxiety, arousal, depression, schizophrenia, etc. Consideration will also be given to the behavioral and neurophysiological effects of various psychoactive drugs. Prerequisite: Psychology 335 and Biology 231 or 331.

390. SPECIAL TOPICS IN PSYCHOLOGY
1-3 qtr hrs

411. COUNSELING PSYCHOLOGY
3 qtr hrs Basic methods of counseling plus a study of seven models for counseling intervention. Prerequisites: Psychology 311 or 420.

420. ABNORMAL PSYCHOLOGY I

421. ABNORMAL PSYCHOLOGY II
3 qtr hrs A review of the causes, diagnosis and treatment of schizophrenic disorders, paranoid disorders, disorders of impulse control, psychosexual disorders, personality disorders, organic mental disorders, and a survey of multiaxial diagnostic procedures and therapeutic techniques used in clinical psychology. Prerequisite: Psychology 100.

424. PRACTICUM IN COUNSELING PSYCHOLOGY
3 qtr hrs Work with patients in a clinical setting under supervision, practical experience in interviewing and administering routine psychological tests. May be repeated once. Prerequisite: Approval of instructor.

426. PRACTICUM IN PSYCHOLOGY
6-15 qtr hrs A field experience in the area of psychology. Open to seniors. Prerequisite: Approval of chairman.

434. HISTORY AND SYSTEMS OF PSYCHOLOGY
3 qtr hrs An overview of the major lines of thinking which have influenced the field of psychology beginning with ancient Greek philosopher-scientists to the twentieth century. Emphasis is given to theories of Empiricism, Associationism, and Scientific Materialism as well as twentieth century schools of psychological thought.

490. SPECIAL TOPICS IN PSYCHOLOGY
1-3 qtr hrs

494. SEMINAR IN PSYCHOLOGY
3 qtr hrs Open to seniors.

497. INDEPENDENT STUDY IN PSYCHOLOGY
1-3 qtr hrs Prerequisite: Approval of chairman.

Sociology
A major in sociology consists of the following requirements:
1. Sociology 000
2. Sociology 105
3. Sociology 251
4. Sociology 252
5. Sociology 446
6. Math 142
7. 30 hours of sociology electives

A minor in sociology consists of the following requirements:
1. Sociology 105
2. Sociology 251
3. Sociology 252
4. Sociology 446
5. Math 142
6. Additional sociology courses totaling 15 hours, selected in consultation with a member of the sociology faculty.

Sociology and the American Sociological Association
Outstanding students with sophomore or junior standing are encouraged to participate in this special program of independent study. In the first phase of the program, each student reads independently during the summer on a selected topic. In the second phase, the student attends the annual meeting of the American Sociological Association to hear reports of current research, to attend business sessions of the Association, and to learn about career opportunities in sociology. In the third phase, the student writes a paper on the topic of the summer reading and submits other reports on the activities at the annual meeting. Each student completing the program earns five hours of transferable credit from the University of Central Florida, the home
institution of the coordinators of the program. Further information and applications can be secured from the ONU sociology faculty.

**000. ORIENTATION 1 qtr hrs** Familiarization with the department, requirements for majors, planning program of courses, University catalog and library. Also listed as Psychology 000 and Social Work 000.

**105. SOCIOLOGY 3 qtr hrs** Introduction to the basic phenomena and processes of social life: culture, socialization, deviance, social institutions (family, polity, economy, education, religion, military), bureaucratization, social inequality, collective behavior, social movements, and population. Analysis of the interplay between the person and social groups.

**191. SPECIAL TOPICS IN SOCIOLOGY 1-3 qtr hrs**

**240. MARRIAGE AND THE FAMILY 3 qtr hrs** An institutional perspective on the family, patterns of courting, marital parental behavior, trends in the contemporary American family. Prerequisite: Sociology 105.

**241. SEX ROLE SOCIALIZATION 3 qtr hrs** Attention is focused on the roles of men and women in the society with particular emphasis on the social forces that shape boys and girls into adult men and women. Other major issues are also addressed. Prerequisite: Sociology 105.

**247. SOCIAL INEQUALITY 3 qtr hrs** The variety of stratification systems; status attainment, social mobility, and social immobility; detailed descriptions of life among the poor, rich and middle classes in America and elsewhere. Prerequisite: Sociology 105.

**248. MINORITY RELATIONS 3 qtr hrs** A study of the dynamics of minority-majority relations within American society, and of the characteristics, conditions, and problems of several minority groups, as defined by race, ethnicity, or sex. Prerequisite: Sociology 105. (Formerly 203).

**250. CULTURAL ANTHROPOLOGY 3 qtr hrs** An introduction to the major concepts and principles of cultural anthropology. Cultural anthropology emphasizes the understanding of the total configuration and interrelationships of culture traits, complexes, and social relationships in a particular geographic environment and historical context. Prerequisite: Sociology 105.

**251. QUANTITATIVE METHODS IN BEHAVIORAL RESEARCH 4 qtr hrs** Applications in the behavioral sciences of several sampling distributions (binomial, normal, Student's t, Chi square, F, and certain distributions used in "nonparametric tests") as well as correlation and regression. Major emphasis on testing behaviorally meaningful hypotheses. Prerequisite: Mathematics 142. Offered every 3 years; will be offered 1989-90.

**252. QUALITATIVE METHODS IN BEHAVIORAL RESEARCH 4 qtr hrs** Survey of major research techniques, including participant and non-participant observation, interview, questionnaire, use of available data, and experiment. Other topics include sampling and establishing causality in non-experimental research. Prerequisite: Sociology 105. Offered every 3 years; will be offered in 1990-91.

**255. COMPARATIVE MARRIAGE AND FAMILY SYSTEMS 3 qtr hrs** Comparative institutional perspective on patterns of mate selection and forms of marital, parental, and family behavior. This course parallels 133-240 (Marriage and Family) but focuses on non-Western societies. Some consideration of encounters between disparate societies. Prerequisite: Sociology 105.

**256. WORK IN NON-WESTERN SOCIETIES 3 qtr hrs** The work of hunters and gatherers, pastoralists, cultivators, as well as workers in some small industries in societies that have not undergone major industrialization. Focus on both the life at work and the relationships between work and other aspects of the social environment. Some attention to encounters between industrialized and non-industrialized societies. This course parallels 133-246 (Work and Occupations) which emphasizes industrialized societies. Prerequisite: Sociology 105.

**291. SPECIAL TOPICS IN SOCIOLOGY 1-3 qtr hrs**

**300. PRACTICUM IN TEACHING IN THE BEHAVIORAL SCIENCES 2 qtr hrs** Specialized teaching experiences in courses in the department, including tutoring, curriculum development and preparation of demonstrations. Prerequisite: Psychology 212 and approval of the chairman. May be repeated to 6 hours. The course does not apply to major requirements. Also listed as Psychology 300 and Social Work 300.
301. SOCIAL PSYCHOLOGY 4 qtr hrs
The effect of social and cultural forces upon the individual. The nature and development of attitudes, languages, and cognitive processes. Individual and group projects illustrative of the methodology of social psychology. Also listed as Psychology 301. Prerequisite: Sociology 105.

304. PRACTICUM IN RESEARCH IN THE BEHAVIORAL SCIENCES 1-3 qtr hrs
Assist and participate in ongoing research by faculty members within the department. Prerequisite: Sociology 202 and approval of the chairman. May be repeated up to 6 hours but repeated hours do not apply to major or graduation requirements. Also listed as Psychology 304 and Social Work 304.

341. POPULATION 3 qtr hrs
Size, composition, distribution and growth of human populations; theories of population growth and migrations; collection and use of U.S. Census and other censuses; population explosions, birth control and abortion. Prerequisite: Sociology 105.

342. GERONTOLOGY 3 qtr hrs
A study of the psychological, physiological and social aspects of the lives of our elderly citizens, with a special emphasis upon the environmental problems which confront them. Prerequisite: Sociology 105. (Formerly 302).

348. MEDICAL SOCIOLOGY 3 qtr hrs
Social interaction between patient and physicians, nurses, pharmacists, and other health-care personnel; social interaction among those personnel; social definition of illness; societal response to illness; social epidemiology; education and training of medical personnel. Prerequisite: Sociology 105.

391. SPECIAL TOPICS IN SOCIOLOGY 1-3 qtr hrs

446. SOCIAL THOUGHT 4 qtr hrs
Traces sociological theorizing from sociology's historical origins through the classical and contemporary periods. Important theorists covered include Karl Marx, Emile Durkeim, Max Weber, George Herbert Mead, Talcott Parsons. Emphasis is placed on comparing and contrasting the major theoretical perspectives which provide the foundation for a scientific study of social life. Prerequisite: Sociology 105. Offered every 3 years; will be offered 1988-89.

491. SPECIAL TOPICS IN SOCIOLOGY 1-3 qtr hrs
THE COLLEGE OF
Business Administration
Ken Cooper, Dean

Professors Cooper, Goldberg, Painter, Young; Associate Professors Meininger, D. Moore; Assistant Professors Ewing, Savino, Woods, Templeton (Leave); Instructors Lyons, Rogers, Schiefer, Schmitz.

On February 4, 1978, the Ohio Northern University Board of Trustees authorized a College of Business Administration and requested the President of the University to implement steps and procedures in establishing this new academic unit.

The College of Business Administration has as its nucleus the former Department of Business and Economics, which had existed for many decades as a segment of the College of Arts and Sciences. The new College of Business Administration became fully operational on September 1, 1978, and has been authorized to award the degree of Bachelor of Science in Business Administration.

The George Willard Patton Chair of Economics, endowed by the Richard King Mellon Charitable Trust of Pittsburgh, Pennsylvania, has been established beginning with the academic year 1973-74. The current year's recipient of this endowed professorship is Dr. Roger Goldberg, Professor of Economics.

Admissions Standards
Candidates seeking admission to the College of Business Administration are required to meet the general requirements for admission to the University. The College of Business Administration accepts high school graduates who have 16 acceptable units of high school credits. Twelve of these units are prescribed as follows: Four units of English; two units of mathematics (including algebra and geometry); six units in history, social studies, language, or natural science, or any combination thereof. Candidates are encouraged to pursue a foreign language while in high school. Acceptable scores on the American College Test or the College Entrance Examination Board Test are expected of all candidates.

High School seniors with proven superior ability and maturity may enroll for a limited amount of course work for credit on campus during their senior year, or during the summer preceding, if they have the written recommendation of their high school principal and the approval of the Academic Qualifica-
Specific Majors and Major Courses Required

**Accounting:** Intermediate Accounting 301, 302, 303; Cost Accounting 314, 315; plus 12 hours of upper division accounting electives; Management 330 and Marketing 351.

**Economics:** Mathematics 120, 122; Money and Banking 352; Intermediate Microeconomics and Macroeconomics 383 and 384; plus 18 hours of upper division economics electives.

**Finance:** Cost Accounting 314; Money and Banking 352; Business Law 323; Management 330; Marketing 351; Finance 354, 368, 374, 461, 463 and 421 (or nine hours of upper division CBA electives).

**Management:** Management 330; Marketing 351; Personnel Management 363; Business Policies and Central Management 485; one economics elective and 15 hours of upper division management electives.

**Marketing:** Marketing 351; Management 330; Salesmanship 371; Advertising 372; Logistics 373; Merchandising 375; Marketing Research 434; Advanced Marketing 451; one economics elective and six hours of upper division marketing electives.

**Dual Majors**

No course used to satisfy either a specific requirement or a discipline elective may be counted toward a dual major except as a general elective.

**Minors**

The minors shown below are available only to non-business majors. (A “C” grade or better is required in all courses.)

**Accounting Minor:** Accounting 131, 132, 133, 301, 302, 303, 314, 315 and an approved accounting elective.

**Economics Minor:** Economics 100, 202, 203, 383, 384 and 15 hours of approved economics electives.

**Finance Minor:** Accounting 131, 132, 133, 314, Economics 352, Finance 354, 362 and nine hours of approved finance electives.

**Management Minor:** Accounting 131, 132, 133, Business Law 322, Finance 362, Management 330, Economics 100 and 12 hours of approved management electives.

**Marketing Minor:** Accounting 131, 132, 133, Marketing 351, Finance 362, Business Law 322, Economics 100 and 12 hours of approved marketing electives.
Graduation Requirements
Bachelor of Science in Business Administration

It is the student's responsibility to assure that all of the graduation requirements for the degree and major(s) sought are satisfied:
1. The general education specific and elective courses in the College of Arts and Sciences.
2. The Business Administration requirements and electives.
3. The specific major requirements and electives.
4. Satisfactory completion and presentation of a minimum of 182 quarter hours of appropriate course work for the specific major(s).
5. A minimum 2.00 grade point average.
6. A letter grade of "C" or better in all courses specified in (2) and (3) above.

General Regulations of the College of Business Administration

1. A student may not register for more than 19 hours of academic course work without the dean's written approval. A normal program consists of 12 to 18 scheduled hours including physical education.
2. All freshmen in the College of Business Administration are required to take orientation, which is scheduled in the fall quarter.
3. A student indicates his/her major choice by completing a declaration of major form available in the Office of the Dean. Faculty advisers assist the student in the planning of his/her major.
4. Generally, 100-200-300- and 400-level courses are to be taken by freshmen, sophomores, juniors and seniors respectively.
5. Each student enrolled in the College of Business Administration is expected to make consistent progress toward completion of the degree requirements of his/her major(s).
6. With the written permission of the instructor and the dean, course prerequisites may be waived.
7. Except where noted in the course descriptions, credit hours earned in repeated courses may be counted only once in the total hours required for graduation.
8. A student not enrolled for one academic year (except on approved academic leave) must meet graduation requirements in the catalog effective for the academic year during which the student reentered.

S/U Grade Option Sophomores, juniors, seniors, and post graduate students in the College of Business Administration are given the opportunity to register for one course per quarter on an S/U option basis, with the following stipulations:
1. The student must be registered full-time in the College of Business Administration.
2. The student must have sophomore, junior, senior, or post graduate standing.
3. The requested course cannot be in the College of Business Administration except those specified as S/U in course descriptions.
4. The course cannot be a 100-level general education course.
5. The requested course cannot be a cognate.
6. The grade of "S" is to be equated with A, B, C, and the grade of "U" is equated with D or F. S/U grades are not computed in the accumulative grade point average.
7. The student cannot change the grading option after the second week of classes.

Classification of Students For purposes of classification, the minimum requirements for sophomore standing are 45 quarter hours of completed academic work; for junior standing 90 quarter hours; and for senior standing 135 quarter hours.

Academic Probation A grade point average of 2.00 is required for graduation. If a student's accumulative grade point average falls below 2.00, he/she is placed on academic probation and the student's participation in extra-curricular activities is reviewed by the Vice President of Student Affairs and by the dean of the college.

Any student on probation whose work for the following quarter continues below 2.00 will have his/her record reviewed by the Academic Qualifications and Scholarship Committee of the College and may be recommended to the dean for suspension or dismissal from the University.

Prelaw Program The College of Business Administration in cooperation with the Ohio Northern University College of Law has developed a unique prelaw program which offers an excellent opportunity for superior students preparing for a career in law. At the present time Ohio Northern is unaware of any other comparable program in the United States which prepares undergraduate students for law school and then guarantees them preferential treatment in admission to law school after they have successfully completed the program.

Students in the prelaw program select a
major and complete the necessary requirements as do other students. There is a "prelaw core" comprised of 36 hours of courses to be taken outside the major.

Applicants from the undergraduate colleges will be admitted automatically to the Petit College of Law if they: (1) take the prelaw series; (2) maintain an undergraduate grade point average of at least 3.0; and (3) score within the range of the 50th percentile on the LSAT.

Additional information is available through the Office of the Dean.

Small Business Institute and Internship Programs The College of Business Administration offers a number of enrollment spaces for upper-class students in both the Small Business Institute and Internship Program. These options are intended to expose selected students to contract case studies and approved academic internships for a maximum of 15 quarter hours of academic credit. Details of both programs are available through the Office of the Dean.

General Courses

000. ORIENTATION / CAREER DEVELOPMENT AND SEARCH 1 qtr hr Familiarization with the college, requirements of the majors, planning sequences of courses, university catalog and library, career investigation and guidance. Fall Quarter. Course graded S or U.

200. PERSONAL FINANCIAL MANAGEMENT 3 qtr hrs A systematic, goal-oriented framework for personal money management. Attention is given to the respective roles of budgeting, banking relationships, insurance programs, and investments in developing and maintaining the comprehensive financial plan. The application of sound decision models and accurate record keeping within the family unit is emphasized. Not open to Finance majors or students with credit in 500-362, 461 or 463. Course may not be counted as a CBA elective.

201. PERSONAL COMPUTER APPLICATIONS FOR BUSINESS 3 qtr hrs Business applications for microcomputers. Introductory level use of software for wordprocessing, file management, spreadsheets, and graphics. Prerequisite: 500-133.

322. BUSINESS LAW I 3 qtr hrs Introduction to the legal system, including criminal law, torts (civil liability), and contract law.

323. BUSINESS LAW II 3 qtr hrs Negotiable instruments, and business associations (the legal rights, responsibilities of agents, partnerships, and corporations). Prerequisite: 500-322

344. STATISTICAL TECHNIQUES IN ECONOMICS 3 qtr hrs Develops analytical tools in probability, and probability distributions, estimation and hypothesis testing. Bayesian analysis, game theory and sampling techniques, with appropriate examples. Prerequisite: 123-142 and 143. Offered alternate even-numbered years.

391. BUSINESS COMMUNICATIONS 3 qtr hrs The techniques of writing business letters and reports; efficient and accurate communication of economic and business facts, presentation of conclusions for management decision-making and further study of English for self-improvement. Prerequisites: 112-110 and 111.

475. SMALL BUSINESS INSTITUTE 3 qtr hrs A team of students is assigned to work with a small business. Supervision is provided by a faculty member. A confidential and professional relationship is maintained between the team and the client business. Course is graded S or U. May be repeated up to 9 hours. Restricted enrollment. Offered Fall and Spring quarters. Prerequisite: Permission of Director.

Accounting


132. PRINCIPLES OF ACCOUNTING II 3 qtr hrs Accounting reports for internal users of financial information. Methods of analysis underlying the provision of accounting information. Basic theory of the reporting model. Prerequisite: CBA majors a grade of C or better in Accounting 131.

133. PRINCIPLES OF ACCOUNTING III 3 qtr hrs Uses of accounting data to support management decision-making and control of business operations, determination of costs and cost behavior. Specialized application areas of accounting. Prerequisite: CBA majors a grade of C or better in Accounting 132.
292. SPECIAL TOPICS IN ACCOUNTING
1-3 qtr hrs

301. INTERMEDIATE ACCOUNTING I

302. INTERMEDIATE ACCOUNTING II
3 qtr hrs Plant assets, long-term liabilities, stockholder's equity, dilutive securities and investments. Prerequisite: 500-301.

303. INTERMEDIATE ACCOUNTING III

314. COST ACCOUNTING
1 4 qtr hrs Emphasis on accounting for manufacturing. Controls for material, labor and overhead cost. Job order and process costing systems. Standard costs and variance analysis. Prerequisite: 500-133. (Formerly 500-311 and 312).

315. COST ACCOUNTING
2 4 qtr hrs Flexible budgets and cost behavior pattern analysis. Direct costing and responsibility accounting for management reporting. Simulation program for managerial accounting. Prerequisite: 500-311. (Formerly 500-312 and 313).

387. TAXATION OF INDIVIDUALS
3 qtr hrs The federal income tax structure as related to individuals. Problems involving the Internal Revenue Code and Treasury Regulations pertaining to individual tax planning and reporting. Prerequisite: 500-133 or permission of instructor.

388. TAXATION OF PROPERTY TRANSACTIONS AND CORPORATIONS
3 qtr hrs The income tax consequences of various types of property transactions including sections 1231, 1245, and 1250. The federal income tax structure as related to C Corporations. Prerequisite: 500-387.

389. TAXATION OF S CORPORATIONS, PARTNERSHIPS, ESTATE & GIFTS
3 qtr hrs The income tax structure as related to S Corporations and Partnerships. Problems pertaining to tax planning using these tax entities. Overview of the federal estate tax and the federal gift tax. Basic tax research techniques used in a tax practice. Prerequisite: 500-388.

392. FUND ACCOUNTING
3 qtr hrs Accounting, budgeting, and financial reporting by units of government and institutional organizations. Authoritative standards relevant to not-for-profit entities. Prerequisite: 500-301.

393. BUSINESS COMBINATIONS
3 qtr hrs Accounting for mergers, consolidations, subsidiary acquisitions. Preparation of consolidated statements. Intercompany sales and debt; parent company investment accounting; subsidiary equity transactions. Prerequisite: 500-302.

403. AUDITING I
3 qtr hrs Systems used in the collection and processing of accounting information. Review and evaluation of internal control in an accounting system. The interface of accounting systems and computer technology and the techniques used in auditing such systems. Prerequisite: 500-303.

404. AUDITING II
3 qtr hrs Auditing procedures and practices of independent verification of financial records. Statistical sampling, audit ethics, audit reports, auditor's legal liabilities, and current issues and problems in auditing. Prerequisite: 500-403.

427. INTERNSHIP IN ACCOUNTING
1-15 qtr hrs Field experience in accounting. Consult advisor. Course graded S or U.

477. CPA PROBLEMS I
3 qtr hrs A comprehensive review of the application of accounting principles, using specific problems from CPA examinations, and the development of approaches to problem solving. Topics covered include working capital, inventory, plant assets, deferred taxes, stockholder's equity, present value, and inflation accounting. Prerequisite: 500-303. Course graded S or U.

478. CPA PROBLEMS II
3 qtr hrs Topics covered include partnerships, investments, consolidations, cost accounting, quantitative methods and non-profit accounting. Course graded S or U. Prerequisites: 500-303 and 313.

479. CPA PROBLEMS III
3 qtr hrs Similar to Accounting 477 and 478. Topics covered include auditing (professional responsibilities, internal control, evidence, reports, statistical sampling and EDP); income taxes (individual, transactions in property, and corporate); and current accounting literature. Course graded S or U. Prerequisites 500-303, 387 and 403.

492. SPECIAL TOPICS IN ACCOUNTING
1-3 qtr hrs
496. SEMINAR IN ACCOUNTING 1-3 qtr hrs

499. INDEPENDENT STUDY IN ACCOUNTING 1-3 qtr hrs An in depth exploration of a subject of special interest to both the student and the faculty member. Class hours by arrangement. Prerequisite: Junior standing and approval of the instructor. Restricted enrollment. Permission to enroll must be obtained in writing from the faculty-mentor and the Dean of the college prior to registration.

Economics

100. ECONOMICS 3 qtr hrs The origins, characteristics, and functions of our economic organization, current institutional arrangements, the use of appropriate tools of economic analysis; relevant economic and social goals.

202. PRINCIPLES OF MICROECONOMICS 3 qtr hrs Economics of the individual firm in the free market economy; competitive and monopolistic markets. How prices ration goods and services to users, and the principles on which the total product is divided among the owners of the factors of production. Actual cases from business. Prerequisite: for CBA majors a grade of C or better in 500-100.

203. PRINCIPLES OF MACROECONOMICS 3 qtr hrs Forces that determine the behavior of national income and output, unemployment, and the price level. Rudiments of money and banking, monetary and fiscal policy, growth and development. Selected issues of contemporary social relevance. Prerequisite: CBA majors a grade of C or better in 500-100.

273. ENERGY ECONOMICS 3 qtr hrs An analysis of the major issues of the energy problem: recent experiences, current problems, and future prospects for each energy source; demand restraints, energy conservation, tradeoffs between energy supply and environmental protection; energy research, and the development of major policy issues; points of view of producers, consumers, and government are presented. Prerequisite: 500-100.

290. SPECIAL TOPICS IN ECONOMICS 1-3 qtr hrs

341. LABOR ECONOMICS 3 qtr hrs Labor as a factor in production; labor mobility; theories of the determination of wages, and bar-

348. URBAN ECONOMICS 3 qtr hrs Topics covered will include definitions of urban places and regions; origins of cities; local public finance; economics of urban housing; urban transportation; economics of crime and pollution, poverty and discrimination. Prerequisites: 500-202 and 203. Offered alternate even-numbered years.

352. MONEY AND BANKING 3 qtr hrs Theories of money and credit; commercial banking practices; reserve banking; monetary and banking laws; money market; money and credit in the world economy. Prerequisites: 500-202 and 203.

383. INTERMEDIATE MICROECONOMIC THEORY 3 qtr hrs Special problems of pricing, production, and distribution under perfect competition, oligopoly, duopoly, and monopoly in the American economy. Prerequisites: 500-202 and 203.

384. INTERMEDIATE MACROECONOMIC THEORY 3 qtr hrs The principles, measurement, analysis, and control of aggregate economic activity; the role of consumption, investment, and saving in achieving full employment output, economic growth and price stability. Prerequisites: 500-202 and 203.

385. INTERNATIONAL ECONOMICS 3 qtr hrs Theories and current problems of trade between nations; governmental restrictions and controls; the importance of multilateral trade, balance of payments; scarce resources; population, and employment trends. Prerequisites: 500-202 and 203. Offered alternate odd-numbered years.

411. COMPARATIVE ECONOMIC SYSTEMS 3 qtr hrs A comparative study of capitalism, socialism, and communism with emphasis on the economics of pricing, production, and distribution under these systems. A specific and empirical examination of these systems in actual use as in the United States, Russia, Great Britain, and China. Prerequisites: 500-202 and 203. Offered alternate even-numbered years.

423. ECONOMICS OF THE PUBLIC SECTOR 3 qtr hrs Topics include the federal budget; public good analysis, public debt issues; evaluation of tax sources for the federal, state, and local government levels; and inter-governmental fiscal relationships. Prerequisites: 500-202 and 203.
426. INTERNSHIP IN ECONOMICS 1-15 qtr hrs Field experience in economics. Consult advisor. Course graded S or U.

442. ECONOMIC HISTORY OF THE UNITED STATES 3 qtr hrs Economic life in colonial America and the east-west migration; the development of modern business and industry in the United States; the corporation and its part in the nation's growth; the causes and consequences of the Great Depression. Prerequisites: 500-202 and 203. Offered alternate even-numbered years.

443. HISTORY OF ECONOMIC THOUGHT 3 qtr hrs The development of economic thought from Greek and Hebrew writers to modern economists; Adam Smith, Malthus, Ricardo, Marx, Marshall, Keynes, and modern economists. Prerequisites: 500-202 and 203.

480. SEMINAR IN ECONOMICS 1-3 qtr hrs

490. SPECIAL TOPICS IN ECONOMICS 1-3 qtr hrs

497. INDEPENDENT STUDY IN ECONOMICS 1-3 qtr hrs An in depth exploration of a subject of special interest to both the student and faculty member. Class hours by arrangement. Permission must be obtained in writing from the faculty-mentor and the Dean of the college prior to registration. Prerequisites: Junior standing and approval of the instructor. Restricted enrollment.

Finance

354. FINANCIAL INSTITUTIONS 3 qtr hrs Managerial policies and decision making concepts of commercial banks, savings and loan associations, mutual savings banks, and other financial institutions. Prerequisites: 500-133, 202 and 203.

362. MANAGERIAL FINANCE 3 qtr hrs An introduction to the basic finance functions in the business firm. Specific topics include financial analysis and planning, capital budgeting, capital structure, and the management of short-term funds. Both theory and techniques are presented. Prerequisite: 500-100 and 133.

368. FINANCIAL PLANNING AND WORKING CAPITAL MANAGEMENT 3 qtr hrs An advanced examination of planning and short term funds management within the firm. Specific topics include cash management, short-term investments, accounts receivable management, and short-term borrowing. The student is introduced to the use of the personal computer for spreadsheet analysis. Case analysis is used. Prerequisite: 500-362.

374. CAPITAL INVESTMENTS AND FINANCIAL DECISIONS 3 qtr hrs An advanced examination of long-term financial decisions. Capital budgeting and the Capital Asset Pricing Model are given special emphasis. Lease analysis, dividend policy, and debt policy are also covered. Case analysis is used. Prerequisite: 500-362.

421. INTERNSHIP IN FINANCE 1-15 qtr hrs Field experience in finance. Consult advisor. Course graded S or U.

461. INVESTMENTS 3 qtr hrs An examination of the vehicles, theories, and strategies of financial investment. In addition, capital markets, portfolio theory, and the Efficient Market Hypothesis receive special attention. The viewpoint of the individual investor as well as the institutional investor is considered. Prerequisite: 500-362.

463. RISK AND INSURANCE 3 qtr hrs An explanation of the effects of pure risks on the firm and the available techniques for dealing with pure risks. The use of insurance contracts in a business setting is emphasized. Prerequisite: 500-362 and junior standing.

494. SPECIAL TOPICS IN FINANCE 1-3 qtr hrs

500. INDEPENDENT STUDY IN FINANCE 1-3 qtr hrs An in depth exploration of a subject of special interest to both the student and the faculty member. Class hours by arrangement. Prerequisites: junior standing and approval of the faculty member. Restricted enrollment. Permission to enroll must be obtained in writing from the faculty-mentor and the Dean of the college prior to registration.

Management

291. SPECIAL TOPICS IN MANAGEMENT 1-3 qtr hrs

325. MANAGEMENT/LABOR-LAW 3 qtr hrs The relationship of management and labor under existing laws including such areas as labor organizational drives, union representation elections, strikes, boycotts, picketing, collective bargaining, arbitration,
330. PRINCIPLES OF MANAGEMENT
3 qtr hrs The organization of firms. Modern management methods, decision making processes, procedures, physical equipment and standards. Organization and managerial relationships of major industrial functions.

335. MANAGEMENT ORGANIZATIONAL BEHAVIOR 3 qtr hrs A study of the human factors in organizations. Emphasis placed on the contributions of the behavioral sciences to the inner workings of business firms. Topics covered are historical foundations, motivation, job satisfaction, bureaucratic structures, leadership and its development, group dynamics, social issues, communication, and international organizational behavior. Prerequisite: 500-330.

363. HUMAN RESOURCE MANAGEMENT 3 qtr hrs The study of the personnel field in the modern organization in dealing with the areas of recruitment, training, employee relations, compensation, health and safety and separation. In addition, the impact of government regulations and the demands of society will also be analyzed. Prerequisite: 500-330.

364. PRODUCTION AND OPERATIONS MANAGEMENT 3 qtr hrs An introduction to the major issues and analytical problem solving techniques existing in the field of production and operations management. Prerequisites: 500-362 and 330; 123-143 or 155; and junior standing.

365. HUMAN RELATIONS IN BUSINESS 3 qtr hrs A study of the importance of human relationships in business and the primary role of attitudes in determining the success or failure of an enterprise. Emphasis is given to case studies, supplemented with textual materials and visual presentations depicting contemporary work situations faced by workers and managers. Prerequisite: 500-330.

410. BUSINESS AND SOCIETY 3 qtr hrs Analysis of the complex and dynamic interrelationships between business and society through a study of the social, cultural, legal, ethical, economic and technological issues, philosophies and points of view which influence business. Topics discussed will include corporate responsibility, individual rights and multi-national business. Prerequisites: 500-330 and 363.

425. INTERNSHIP IN MANAGEMENT 1-15 qtr hrs Field experience in management. Consult advisor. Course graded S or U.

474. SMALL BUSINESS MANAGEMENT 3 qtr hrs A survey of the importance of small business, its current status, problems encountered and requirements for successful operations. Emphasis being given to problem solving techniques for small businesses. Prerequisites: 500-322,330,351, and 362; and 123-143 or 155.

485. BUSINESS POLICIES AND CENTRAL MANAGEMENT 3 qtr hrs Senior seminar designed to provide the student with a greater awareness of the business enterprise as a whole and of the total circumstances faced by management at all levels in a variety of types of firms. Presented on a case study basis and designed for the application of advanced analytical problems solving techniques. Prerequisites: 500-322,202,203,330,351, and 362.

491. SPECIAL TOPICS IN MANAGEMENT 1-3 qtr hrs

495. SEMINAR IN MANAGEMENT 3 qtr hrs

498. INDEPENDENT STUDY IN MANAGEMENT/MARKETING 1-3 qtr hrs An exploration in depth of a subject of special interest to both the student and the faculty member. Hours by arrangement. Prerequisites: Junior standing and approval of the instructor. Restricted enrollment. Permission to enroll must be obtained in writing from the faculty-mentor and the Dean of the college prior to registration.

Marketing

351. MARKETING 3 qtr hrs Management-oriented; concepts, processes, and problems of marketing; channels of distribution, marketing research, brands and price policies.

371. SALESMANSHIP 3 qtr hrs The principles, techniques and problems of salesmanship, sales management, recruiting, controlling and evaluating a sales force; marketing research techniques, pricing and contemporary channels of distribution. Prerequisite: 500-351.

372. ADVERTISING 3 qtr hrs Advertising as an integral part of the marketing process; selling appeals and types of advertising; consideration of copy and media; problems of publishing and broadcast advertising. Prerequisite: 500-351.

132 MARKETING
373. LOGISTICS 3 qtr hrs Water, railway, highway, pipeline and air transportation and their development in the U.S.; rates and their effect on location and development of industry; government regulations; and labor relations. Prerequisites: 500-330 and 351.

375. RETAIL MERCHANDISING 3 qtr hrs The principles of the specialized area of merchandising as compared to the general study of marketing. Store location, layout, pricing for profit, markups, markdowns, inventory control methods and the duties of a buyer will be investigated in detail. Prerequisite: 500-351.

376. INDUSTRIAL MARKETING 3 qtr hrs A study of the basic industrial marketing system as distinguished from consumer marketing. The demand for industrial goods and the nature of the consumer is analyzed in detail. Topics discussed will include characteristics of manufacturer's goods, channels of distribution, pricing, vendor and value analysis, industrial buying, industrial advertising and meeting product specifications. Prerequisite: 500-351.

420. INTERNSHIP IN MARKETING 1-15 qtr hrs Field experience in marketing. Consult advisor. Course graded S or U.

434. MARKETING RESEARCH 3 qtr hrs Research design, data collection methods, sampling techniques, tabulation and analysis of information concerning problems in marketing. Prerequisite: 500-351.

451. ADVANCED MARKETING 3 qtr hrs Marketing decision making, interacting with the various functions of marketing to better develop marketing strategies by defining target markets and constructing marketing mixes. Prerequisites: 500-351, 375, 434, 330, and 362; senior standing.

452. SEMINAR IN MARKETING 3 qtr hrs Readings in marketing pertaining to case histories and current situations. Prerequisite: 500-351.

493. SPECIAL TOPICS IN MARKETING 1-3 qtr hrs

498. INDEPENDENT STUDY IN MANAGEMENT/MARKETING 1-3 qtr hrs An exploration in depth of a subject of special interest to both the student and the faculty member. Hours by arrangement. Prerequisites: Junior standing and approval of the instructor. Restricted enrollment. Permission to enroll must be obtained in writing from the faculty-mentor and the Dean of the college prior to registration.
Academic Accreditation and Association
The Accreditation Board for Engineering and Technology (ABET), previously known as the Engineers’ Council for Professional Development, the only official accrediting agency for engineering curricula, has accredited all of the curricula in the College including the departments of civil, electrical, and mechanical engineering. The College is a member of the American Society for Engineering Education and is recognized by the Ohio Board of Registration for Professional Engineers and Surveyors.

Objectives
The College attempts to teach its students to think in a logical sequence given certain facts. The College follows the objectives of the University in developing the student as a whole individual who will be successful and creative in their profession as well as in their personal life. In the College students attain the highest undergraduate proficiency in subject matter basic to all engineering and in the essentials of their chosen branch of the engineering profession.

History and Tradition
In 1871 the first catalog of the University included a course in surveying. A department of Civil Engineering was organized in 1880 with its first graduate in 1882, Electrical Engineering in 1898, and Mechanical Engineering in 1904. Over 4,000 engineers have graduated from the Thomas Jefferson Smull College of Engineering in its 106-year history. These departments continue to meet the highest standards of engineering excellence. The tradition of the College is to treat each student as an individual, to keep class size at a minimum, and to maintain a close faculty-student relationship.

Herbert F. Alter Chair of Engineering Science established in 1983 by Mrs. Alter in memory of her late husband, class of 1911 in mechanical engineering. The 1987-88 recipient is Professor Dennis W. Herr, Assistant Professor of Electrical Engineering.

Engineering Alumni Chair established in 1983 by donations from engineering alumni and friends in celebration of the College’s Centennial year. The 1987-88 recipient of the chair is Professor Jonathan Smalley, Associate Professor of Civil Engineering.

Leroy H. Lytle Distinguished Chair of Mechanical Engineering established in 1983 from the estate of Leroy H. Lytle, 1923 graduate of ONU. The 1987-88 recipient of the chair is Professor John R. Smith, Associate Professor of Mechanical Engineering.

Dr. Merhyle F. Spotts Engineering Lecture Fund. Established by Dr. Merhyle F. Spotts, Engineering ME ‘23, DE ’81. The income from the fund is used each year to bring a prominent speaker to the campus to speak on engineering topics and/or on matters that might affect present and future engineers.
Admission Standards

Early application is advisable. As early as the junior year of high school the student interested in engineering is encouraged to obtain advice on program of study from the dean of the College and to request appropriate information and application materials from the Office of Admissions, Ohio Northern University, Ada, OH 45810.

In addition to the general requirements for admission to the University stated in this catalog, high school graduates and non-graduates must have 16 acceptable units of work and be of good moral character. Ten of these units are as follows: 4 units in English; 4 units in mathematics (2 units in algebra, 1 unit in geometry, and at least ½ unit in trigonometry or its equivalent); and 2 units in science (1 unit in physics and preferably 1 unit in chemistry). The College recommends but does not require that applicants have two units of a foreign language.

Students who meet the admission standards of the University but are deficient in the mathematics or physics requirements of the College will be required to make up their deficiency. The College recommends that prospective students make up their high school deficiencies before entering as freshmen. An additional summer quarter or even a fifth year may be necessary for those students who do not meet this requirement before they enter as freshmen.

Transfer students from other accredited universities or colleges may be admitted with advance standing if they have an honorable dismissal and are eligible to return to the universities or colleges they previously attended. Transfer students who conceal their previous college attendance will have their admission to the College revoked. The College will not accept from transfer students more than 150 quarter hours or their equivalent. Transfer work must be "C" or better.

The dean admits special students who are non-degree candidates if, after a personal interview, it is determined that they are sufficiently prepared to pursue engineering courses successfully.

Academic Loads

Each department in the College lists quarter by quarter the standard course load for a student. The normal maximum load is that which is listed by the department for that quarter at that level or 19 hours whichever is largest. The dean, upon recommendation of the student's adviser, may permit a student to enroll for extra hours. The normal requirement is an accumulative average of at least 3.00/4.00. Each engineering student is responsible for fulfilling the requirements for the current year's catalog as they apply to that year of the program.

Academic Status

A student is in good academic standing when the accumulative grade point average is at least 2.00 or when it has been granted by the petition process.

A student is placed on academic probation the first time the accumulative grade point average falls below 2.00. Normally one quarter is given to raise the accumulative average to an acceptable level. Students may be on probation two successive quarters if conditions and evidence indicate that the student is improving academically.

Students who consistently attain a low accumulative average (below 2.00) or extremely low scholarship in a given quarter are subject to suspension, which implies the possibility of readmission at a later date, usually after three quarters.

Students having academic difficulty are required to meet frequently with their adviser. A student on probation is not eligible to participate in extra-curricular activities. The dean makes some exceptions based upon the recommendation of the student's adviser and the director of the activity. The dean treats each student on probation individually. It is the obligation of the student on probation to initiate the petition process for regaining eligibility to participate in extra-curricular activities.

Classification

The traditional designations of freshman, sophomore, junior, and senior are used by the College. The engineering curricula are vertical insofar as most courses are taken in sequence. The level at which a student is studying is far more consequential than the hours accumulated or the years spent in school. Each student is required to complete designated courses before advancing to the next student classification. In general, the classification doesn't change during the year once it has been determined at the start of the year.

Graduation and Degrees

A student qualifies for graduation by meeting specific course requirements as listed in the
catalog year by year for the specific program at specific levels and by earning a minimum of 200 academic hours. In addition, a student also needs a scholarship rating of at least two quality points for each credit hour scheduled with an accumulative grade point average of 2.00 in all engineering courses.

All degree candidates are required to spend their senior year in academic residence, taking at least 45 quarter hours of upper level engineering courses.

At commencement engineering students receive the bachelor of science degree in either civil, electrical, or mechanical engineering.

Registration as a Professional Engineer
Registration as a Professional Engineer by the state, necessary for professional practice, requires licensing examinations and four years of experience after completing the bachelor of science degree. The dean gives full information to students in their freshman and senior years. Students may also write the Secretary of the Board of Registration for Professional Engineers, 65 South Front Street, Room 302, Columbus, OH 43215.

Engineering Graduates and Law School
Graduating seniors of the Thomas Jefferson Smull College of Engineering who wish to enter the Pettit College of Law at Ohio Northern University are admitted automatically if they (1) take the prelaw series; (2) maintain an undergraduate grade point average of at least 3.0; and (3) score within the range of the 50th percentile on the LSAT.

The Robert W. Biggs Engineering Building
The College occupied its present facility in 1971. Located in this 1.8 million dollar structure are 91 rooms including classrooms, laboratories, computer center, and faculty offices. The addition of the Robert W. Biggs Engineering Building to the campus completed the science complex on what has come to be known as the West Campus.

Pre-Engineering Curricula
Since the first two years of any particular curriculum in engineering at many universities are practically the same, the College offers pre-engineering in most fields. The pre-engineering curricula are flexible enough to conform to the catalog requirements of the university the student has chosen to attend after completing the pre-engineering program. All pre-engineering students are enrolled in the College of Engineering and have an adviser in the engineering faculty.

Arts-Engineering Curricula
Superior students may qualify to pursue the arts-engineering program. Students are admitted to both the College of Arts and Sciences and the College of Engineering and may earn the appropriate bachelor’s degree from the College of Arts and Sciences and a bachelor of science degree in the appropriate branch of engineering from the College of Engineering. The attraction of the dual degree program is that a student is free to major in any arts and sciences area and in any branch of engineering. A student who desires to work in a foreign country or for an American company in a foreign country may major in the appropriate foreign language. The superior student enrolled in the arts-engineering program will come to understand more fully the role of the humanities and civilization in a scientific and engineering world, and his service to mankind will increase. He will also help create a broader image of the engineer in our age.

Cooperative Education Program
Cooperative education is a plan of educational development designed to integrate classroom study with planned and supervised work experiences. Engineering co-op students normally are employed in semi-professional capacities in research, development, manufacturing, and engineering departments of industrial companies, consulting firms, and in federal and state agencies. The employment sessions begin in the summer following the sophomore year and are alternated with study sessions until the student has completed his junior academic year. The program is optional and currently available for Electrical and Mechanical engineering students.

General Engineering
No sharp line of distinction is drawn in the fundamental education of civil, electrical, or mechanical engineers for the reason that the sciences basic to engineering—mathematics, physics, chemistry, and the engineering sciences—are essential in all branches of
engineering. Since certain courses in engineering are considered to be fundamental and deal with the basics of the several fields, they are used by all three departments in at least the first two years of the curriculum. Courses under General Engineering are taught by the engineering faculty and are required of all engineering students in at least two of the three departments.

**Interdisciplinary Programs**

In addition to the regular degree programs in civil, electrical, and mechanical engineering, three interdisciplinary programs have been developed. They are an Option in Business Administration, a Minor in Computer Science, and an Option in Environmental Engineering. The first two programs work equally well with any of the three degree programs while the third complements the Civil Engineering program.

This is accomplished by proper planning and judicious use of social science and technical electives. Further, it is accomplished without a sacrifice in the engineering content of the three degree programs. In order to avoid scheduling conflicts, it is essential that the student follow the program as designated. A copy of each of the interdisciplinary programs may be obtained from the respective departmental offices. Any student may select one of the programs as an adjunct to the engineering degree program with the approval of the appropriate chairman and the dean. In order for the student to continue on the program the accumulative average must be at least 2.50. A minimum of 30 hours in the minor or option is required for graduation. The diploma does not indicate the minor or option; however, the transcript does show the appropriate program designation.

Courses required for the Business Administration Option are Psychology, three courses in Economics, three courses in Accounting, Principles of Management, Business Law, Marketing, and Managerial Finance.

In the Computer Science Minor the courses required are Introduction to Programming, FORTRAN Programming, Intermediate Programming, Programming Environments, Assembly Language Programming, Computer Graphics, Introduction to File Processing and one upper level computer science elective.

The Environmental Option includes three courses in the biological sciences and six engineering courses which focus on various aspects of the environment.

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### ALL ENGINEERING—CLASS OF 1992

**Freshman 1988-89**

- Writing 1, 2, Humanities Elective (112110-1,......)
- Calculus 1, 2, 3 (123163-261-2)
- Freshman Seminar, Physics 1, 3
  (201120, 124231-3)
- FORTRAN for Engrs. 1, Social Science Electives
  (201130, ...... ......)
- Fund.-Engr. Drawing, Creative Design* (201101-3)
- Philosophy, Religion (115, ......)
- **Totals** 16 18 17

*Intro-Engr. Design (201102) may be substituted for Creative Design.

### ALL ENGINEERING—CLASS OF 1991

**Sophomore 1988-89**

- Calculus 4, Linear Algebra, Differential Equations (123263-272-361)
- Physics 2, Chemistry (124232, 122162-3, ......112204)
- Social Science Elective, Great Works
  (......,112204)
- Statics, Dynamics, Mech. of Mtts. 1
  (201311-2-3)
- P&A Circuits 1, 2, 3** (201321-2-3)
- Circuits Lab. 1, 2** (201332-3)
- **Totals** 18 16 18

**Circuits 3 and Circuits Lab 2 are required for students in Electrical Engineering and Mechanical Engineering; students in Civil Engineering should substitute Surveying.**
100. PRE-ENGINEERING MATHEMATICS REFRESHER 0 qtr hrs A review of those portions of high school mathematics necessary to start college mathematics. Topics included are algebra, geometry, trigonometry, and analytical geometry. Students who do not place sufficiently high in mathematics placement tests during the summer orientation are required to take this course to prepare to start calculus. Offered the two weeks prior to the opening of Fall Quarter.

101. FUNDAMENTALS OF ENGINEERING DRAWING (0+4) 2 qtr hrs An introduction to graphical communications and analysis. Use of projection theory to construct and read drawings of three-dimensional objects. Development of the ability to convey ideas and concepts using engineering drawings and sketches. Graphical representation of data and curve fitting.

102. INTRODUCTION TO ENGINEERING DESIGN (1+3) 2 qtr hrs Introduction to mechanical design applications. Emphasis on design layout, dimensioning, tolerancing and thread design. Introduction to computer-aided design, concluded with a comprehensive 3-week design project. Prerequisite: 201-101; concurrent with 201-122.

103. CREATIVE DESIGN (0+4) 2 qtr hrs Participation in student-generated group design projects, emphasizing engineering methodology, design, analysis, and communicative skills. Prerequisite: 201-101.

120. SEMINAR FOR ENGINEERING STUDENTS (1+0) 1 qtr hr Preparation of schedules, graduation requirements, study skills, library, Communication Skills Center are covered. Visiting lecturers provide insight into the engineering profession.

130. FORTRAN FOR ENGINEERS 1 (2+0) 2 qtr hrs Introduction to the computer. Engineering problem solving using the computer. Introduction to spreadsheets, data bases, word processing and FORTRAN 77 language.

230. FORTRAN FOR ENGINEERS 2 (2+0) 2 qtr hrs Concentrated study of the FORTRAN 77 language. Engineering application programs designed in FORTRAN 77. Prerequisite: 201-130.

291. INDEPENDENT STUDY AND PROJECTS 1-3 qtr hrs Independent planning of an engineering or engineering-related project or independent study at the freshman level on topics of particular interest to the student and approved by the faculty. Prerequisite: Permission of instructor.

292. INDEPENDENT STUDY AND PROJECTS 1-3 qtr hrs Continuation of 291.

293. INDEPENDENT STUDY AND PROJECTS 1-3 qtr hrs Continuation of 292.

300. ORIENTATION FOR CO-OP STUDENTS (1+0) 0 qtr hrs Introduction to the co-op program. Includes introduction to industry, the industrial work environment, resume writing and interviewing techniques. Designed to prepare the sophomore engineering student for the industrial experience. Prerequisite: sophomore status with cum GPA of 2.5.

311. STATICS (3+0) 3 qtr hrs Fundamental principles of statics with vector methods. Emphasis on free body diagrams and equations of equilibrium. Topics include: resultants of force systems, centroids and centers of gravity, equilibrium, friction and moment of inertia. Use of S.I. Prerequisites: 123-261; 124-231.

312. DYNAMICS (3+0) 3 qtr hrs Fundamental principles of mechanics with vector methods as applied to dynamics. Topics include: kinematics, absolute and relative motion; force, mass and acceleration; work and energy, and impulse and momentum. Use of S.I. Prerequisite: 201-311.

313. MECHANICS OF MATERIALS 1 (3+0) 3 qtr hrs Elastic analysis using concepts of stress and strain, tension, torsion, compression and flexure, development and application of Mohr's circle; analytical methods of determining stresses in members subjected to torsional and flexural loading; shear and moment diagrams. Prerequisite: 201-311.

321. PASSIVE AND ACTIVE CIRCUITS 1 (3+0) 3 qtr hrs Introductory concepts in circuit analysis. Solution of resistive circuits using Ohm's and Kirchhoff's Laws, mesh and nodal analysis, and network theorems. Prerequisites: 123-261; 124-233 or permission of instructor.
322. PASSIVE AND ACTIVE CIRCUITS 2 (3+0) 3 qtr hrs Analysis of transient and steady-state circuits. Phasor solutions, effective values of current and voltage, and instantaneous and average power. Prerequisite: 201-321.

323. PASSIVE AND ACTIVE CIRCUITS 3 (3+0) 3 qtr hrs Magnetically coupled circuits, polyphase circuits and Fourier analysis. Prerequisite: 201-322.

332. CIRCUITS LABORATORY 1 (0+2) 1 qtr hr A laboratory study of electric circuits. Prerequisite: Concurrent 201-322.

333. CIRCUITS LABORATORY 2 (0+2) 1 qtr hr Continuation of 332. Prerequisite: Concurrent 201-323.

391. INDEPENDENT STUDY AND/OR PROJECTS 1-3 qtr hrs Independent planning of an engineering or engineering-related project or independent study at the sophomore level on topics of particular interest to the student and approved by the faculty. Prerequisite: Permission of instructor.

392. INDEPENDENT STUDY AND/OR PROJECTS 1-3 qtr hrs Continuation of 391.

393. INDEPENDENT STUDY AND/OR PROJECTS 1-3 qtr hrs Continuation of 392.

401. PROBABILITY AND STATISTICS FOR ENGINEERS (3+0) 3 qtr hrs Probability and its application to engineering problems. Random processes in engineering, distributions, and regression analysis. Prerequisite: 123-262.

402. ENGINEERING MATERIAL SCIENCE (3+2) 4 qtr hrs A study of the fundamental chemical, physical and microstructural characteristics of materials and how these relate to their mechanical behavior. Evaluation of these properties for material selection. Metallurgical aspects of metals including equilibrium diagrams. Determination of physical properties, structure and equilibrium relations in the laboratory. Prerequisite: 122-162.

411. PROFESSIONAL PRACTICE 1 1 qtr hr Employment in a semiprofessional capacity in research, development, manufacturing or engineering department of an industrial company, a consulting firm or a governmental agency. A student report on the assignment and an employer's evaluation are required. Prerequisite: Junior status and successful completion of 201-300.

412. PROFESSIONAL PRACTICE 2 1 qtr hr Continuation of 201-411. Prerequisite: 201-411.

413. PROFESSIONAL PRACTICE 3 1 qtr hr Continuation of 201-412. Prerequisite: 201-412.

414. PROFESSIONAL PRACTICE 4 1 qtr hr Continuation of 201-413. Prerequisite: 201-413.

415. PROFESSIONAL PRACTICE 5 1 qtr hr Continuation of 201-414. Prerequisite: 201-414.

416. PROFESSIONAL PRACTICE 6 1 qtr hr Continuation of 201-415. Prerequisite: 201-415.

CIVIL ENGINEERING
(Department 202)

Professors Milks, Minich (Chairman), Shah; Associate Professors Smalley, Swart; Adjunct Professor Brewer.

Civil engineering deals with the design, construction, operation, and impacts of man's civil works. Consequently, the quality of its graduates is a major factor influencing the health, safety, and life quality enjoyed by the nation's citizenry. The practice of civil engineering requires a broad background in the biological, chemical, geological, mathematical, and physical sciences; understanding of social value systems, human behavior, and our cultural heritage; and in-depth education in the traditional civil engineering discipline.

Department facilities include instruments and equipment in functional laboratories. Laboratory work is offered in testing materials, concrete, soils, geology, fluid mechanics, environmental engineering, and hydraulics, as well as field work in surveying.

The courses which are shown with an asterisk (*) may have substitutions. The technical electives allow the student to have some flexibility to design a program to meet particular needs. Independent study is for students who have special interests which are not met by available courses. For those desiring to take independent study, a proposed contract must be submitted at the time of advance registration for the following quarter.

Students must demonstrate an ability in design. Civil Engineering design is the pro-
cess of devising a system, component, or process to meet desired needs. It is a decision making process (often iterative) in which the basic sciences, mathematics, and engineering sciences are applied to convert resources optimally to meet a stated objective. Among the fundamental elements of the process are the establishment of objectives and criteria, synthesis, analysis, construction, testing, and evaluation. The design process will be demonstrated in several courses, particularly in the senior year.

While there is not a formal Co-op program available, it is possible for a student to obtain valuable practical experience with a suitable summer position. It is also possible to work out an academic program for a student who is willing to take longer than the normal four academic years. It is also possible to obtain some academic credit for an appropriate work experience under the Internship program.

### CIVIL ENGINEERING—CLASS OF 1990

#### Junior 1988-89

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<th>Course Details</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
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<tr>
<td>Mechanics of Materials 2, Law &amp; Mgmt*</td>
<td>3</td>
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<td>4</td>
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<tr>
<td>Geology (202401-442-453)</td>
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<tr>
<td>Engr. Mtl. Sc., Str. Anal. 1, 2</td>
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<td>(201402, 202412-3)</td>
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<td>Urban Planning, Transportation, Numerical Analy.</td>
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<tr>
<td>(202436-435-411)</td>
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<tr>
<td>Prob. &amp; Stat. for Engrs., Fluid Mechanics,</td>
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<td>Hydraulics (201401, 202422-3)</td>
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<td>Elective (115...<em>...</em>...)</td>
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<td>TOTALS</td>
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### CIVIL ENGINEERING—CLASS OF 1989

#### Senior 1988-89

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<th>Course Details</th>
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<tr>
<td>Environmental Engineering 1, Environmental Science*</td>
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<tr>
<td>Environmental Engr. 2 (202514-473-516)</td>
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<td>Steel Design 1, 2, Finite Element Analy.</td>
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<td>(202547-8-555)</td>
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<td>Soils 1, 2, (202531-2)</td>
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<td>C.E. Design Proj. 1, 2, C.E. Seminar</td>
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<td>(202511-2-551)</td>
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<tr>
<td>Engr. Economy, Reinforced Concrete 1, 2</td>
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<td>(202541-525-6)</td>
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<td>TOTALS</td>
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301. SURVEYING (2+6) 4 qtr hrs Use of level, transit and tape, differential and profile leveling, traversing theory and practice, horizontal and vertical curves, and mapping. Prerequisite: Permission of instructor.

401. MECHANICS OF MATERIALS 2 (3+0) 3 qtr hrs Deflection, combined loadings, repeated loading, dynamic loading, formulation of statically indeterminate problems. Prerequisites: 201-312,313; 123-361.

411. NUMERICAL ANALYSIS (3+0) 3 qtr hrs Principles of numerical analysis used in solving civil engineering problems, numerical methods, linear programming, optimization and applications. Prerequisites: 202-401 and 123-272.

412. STRUCTURE ANALYSIS 1 (3+0) 3 qtr hrs Fundamentals of statically determinate structures, deflections, displacements, use of models to illustrate structural behavior, principle of superposition and study of elastic curve. Prerequisite: 202-401.

413. STRUCTURAL ANALYSIS 2 (3+3) 4 qtr hrs Fundamentals of statically indeterminate structures; classical and approximate methods of solution, computer aspects. Prerequisite: 202-412.
422. FLUID MECHANICS (2+3) 3 qtr hrs Engineering properties of fluids, fluid statics, fluid dynamics, fluid resistance, boundary layer theory, steady flow in pipes. Laboratory periods will be used for experiments, films and problem solving. Prerequisite: 201-312.

423. HYDRAULICS (3+3) 4 qtr hrs Hydraulic analysis of piping systems, steady flow in open channels, non-uniform flow in open channels, elements of hydrology, introduction to chemical quality of surface and subsurface waters, and design of water distribution systems. Field trips when appropriate. Laboratory periods will be used for experiments, films, project and problem solving. Prerequisite: 202-422.

435. TRANSPORTATION (3+0) 3 qtr hrs Principles of transportation systems; economics, finance, and planning; and design, construction and maintenance. Field trips when appropriate. Prerequisite: Permission of instructor.

436. URBAN PLANNING (3+0) 3 qtr hrs Principles of city and regional planning; land use, zoning, housing codes, subdivision regulations, metropolitan problems, and urban development. Field trips when appropriate. Prerequisite: Permission of instructor.

442. LAW AND MANAGEMENT (3+0) 3 qtr hrs Present and emerging legal issues concerning various aspects of the Civil Engineering profession. The organization, management and control of a business enterprise. Organization and management systems. Prerequisite: Junior standing.

453. GEOLOGY (3+3) 4 qtr hrs Principles of physical geology. Physical and chemical properties of minerals and rocks, geologic processes, earth materials, processes of erosion and deposition, terrain investigation, geological mapping, ground water hydrology. Field trips when appropriate. Prerequisite: Permission of instructor.

473. ENVIRONMENTAL SCIENCE (3+0) 3 qtr hrs Environmental pollution effects on society. Causes, controls and standards of water, air and land pollution. Hazardous wastes and control, possible solutions using interdisciplinary approach. Field trips when appropriate. Prerequisite: Permission of instructor.

474. SOLID WASTES (2+2) 3 qtr hrs Sources of solid wastes, collection, transportation and disposal. Selection of disposal sites and design of disposal facilities. Visits to area disposal facilities. Prerequisites: 121-112 and 122-163.

475. HAZARDOUS AND TOXIC WASTES (2+2) 3 qtr hrs Sources of wastes, their collection, transportation, and disposal. Methods of treatment and design of related facilities. Discussion of cases. Prerequisite: 202-474.

491. INDEPENDENT STUDY IN CIVIL ENGINEERING 1-3 qtr hrs

495. SPECIAL TOPICS IN CIVIL ENGINEERING 1-4 qtr hrs

511. C.E. DESIGN PROJECT 1 (3+0) 3 qtr hrs Philosophy of engineering design stressing relationship to society; definition of the design problem and evaluation of the problem economically, sociologically, and on an engineering basis. Selection of a project and beginning of its design under the guidance of a professor or professors. First of a three course sequence as a capstone design project.

512. C.E. DESIGN PROJECT 2 (3+0) 3 qtr hrs A continuation of CE Design Project 1 under the specific guidance of a faculty member.

514. ENVIRONMENTAL ENGINEERING 1 (2+3) 3 qtr hrs Development of sources of water supply; determination of quantity of storm water; design of physical processes in water and waste water treatment systems. Field trips when appropriate. Prerequisite: 202-423.

516. ENVIRONMENTAL ENGINEERING 2 (3+3) 4 qtr hrs Physical, chemical and biological processes in water and waste water treatment systems. Design of a treatment system. Land and air pollution; control and standards; interpretation of reports; inspection of local plants. Solid waste management. Field trips when appropriate. Prerequisite: 202-514.

525. REINFORCED CONCRETE 1 (3+3) 4 qtr hrs Strength design of structural elements, flexural reinforcement development, diagonal tension, axially and eccentrically loaded columns, torsion, walls, footings; application of codes and specifications to design. Field trips when appropriate. Prerequisite: 202-413.

526. REINFORCED CONCRETE 2 (2+3) 3 qtr hrs Continuity, slabs, deflections, and economic considerations. Hydraulic cement and asphaltic cement will be investigated in the laboratory. Field trips when appropriate. Prerequisite: 202-525.
531. SOILS 1 (3+3) 4 qtr hrs An introduction to soils engineering, physical properties of soils as affecting engineering design and construction, soil sampling, mechanics of soil masses, consolidation, settlement, and laboratory soil tests. Field trips when appropriate. Prerequisites: 202-423 and 202-453.

532. SOILS 2 (4+3) 5 qtr hrs Analysis of stress conditions imposed on the supporting soils by foundations. Design of foundations, retaining structures and slopes. Field trips when appropriate. Prerequisite: 202-531.

542. ENGINEERING ECONOMY (3+0) 3 qtr hrs Engineering decision-making, cash flow, equivalency, analysis by present worth, annual cash flow, rate of return and incremental; depreciation; taxes; replacement; inflation and deflation. Permission of instructor.

547. STEEL DESIGN 1 (3+3) 4 qtr hrs Structural steel properties. Design of members for tension, compression and flexure loads. Field trips when appropriate. Prerequisite: 202-413.

548. STEEL DESIGN 2 (3+0) 3 qtr hrs Theory of plastic design, load and resistance factor design, design of connections, plate girders, composite design, and fatigue. Prerequisite: 202-547.

551. CIVIL ENGINEERING SEMINAR (3+0) 3 qtr hrs Oral presentation of project completed in C.E. Design Projects 1 and 2. Active participation in class discussion required. Field trips when appropriate. Current topics of general Civil Engineering interest not covered in curriculum. Prerequisite: 202-511 and 512.

555. FINITE ELEMENT ANALYSIS (3+0) 3 qtr hrs Development of the finite element method as applied to various topics from continuum mechanics. Areas covered include plane, axisymmetric, curved plate, shell brick elements, 3-dimensional problems, seepage, heat transfer, fluid mechanics, transient problems and geometric and material nonlinearity. Solution algorithms for linear and nonlinear static and dynamic analysis. Use of large scale production computer programs. Prerequisite: Permission of instructor.

590. CIVIL ENGINEERING INTERNSHIP 3 qtr hrs Practical experience with engineers and engineering firms.

591. INDEPENDENT STUDY IN CIVIL ENGINEERING 1-3 qtr hrs

ELECTRICAL ENGINEERING (Department 203)

Professors: Carmean, Johansen (Chairman), Klingenerger, Stahl; Associate Professor Thede; Assistant Professor Herr. Electrical engineers have long pioneered the fields of power, automatic control, communications, and computers. Without controlled electricity, industry as we know it today could not exist. The ever expanding use of electrical means for measurement, control, and computation has resulted in the need for electrical engineers in a variety of diverse and rapidly expanding areas—research institutes, developmental laboratories, manufacturing facilities, government service, medical facilities, computing centers, utility companies, consulting firms, etc.

The electrical engineering curriculum coordinates scientific background with technical knowledge. This curriculum is designed to provide a background for students who intend to pursue employment in the above mentioned areas or to pursue specialized work in graduate school.

Classroom activities are supplemented by work in well-equipped laboratories. Problem solving and laboratory experience are emphasized.
### ELECTRICAL ENGINEERING—CLASS OF 1989

**Senior 1988-89**

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* Electives approved by the Department Chairman.

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401. **ENGINEERING ANALYSIS (4+0)**

4 qtr hrs Selected analytical methods with engineering applications. Emphasis is on methods using complex variables and vector calculus. Prerequisite: 123-361.

412. **FIELDS 1 (4+0) 4 qtr hrs**

Electromagnetic field theory with applications relevant to electrical engineering including vector relations, static electric fields, conductors, dielectrics, boundary values. Prerequisite: 203-401.

413. **FIELDS 2 (3+0) 3 qtr hrs**

Continuation of 412 including magnetic fields, material properties, time varying fields, Maxwell’s Equations, uniform plane waves. Prerequisite: 203-412.

424. **ELECTRONICS 1 (4+0) 4 qtr hrs**

Operating principles of electronic devices (diodes, BJT’s and FET’s), models representing these devices and their use in simple circuits. Prerequisite: 201-323.

425. **ELECTRONICS 2 (4+0) 4 qtr hrs**

Large and small signal amplifiers, frequency response of amplifiers and oscillators. Prerequisite: 203-424.

426. **ELECTRONICS 3 (3+0) 3 qtr hrs**

Introduction to the features of the design and performance of digital I.C.’s and their use in implementing logic designs. Prerequisite: 203-425.

433. **ENERGY CONVERSION 1 (3+0) 3 qtr hrs**

The underlying principles of energy conversion. Prerequisite: 203-412; concurrent 203-413.

442. **LINEAR SYSTEMS 1 (3+0) 3 qtr hrs**

Analysis of linear signals and systems including time domain and Laplace Transform techniques. Prerequisites: 201-323 and 203-401.

443. **LINEAR SYSTEMS 2 (3+0) 3 qtr hrs**

A continuation of 442. Analysis of continuous...
and discrete signals and systems using frequency domain and discrete domain methods. Prerequisite: 203-442.

453. ANALOG ELECTRONICS (3+0) 3 qtr hrs The study of feedback amplifiers and specialized linear integrated circuits such as timers, phase locked loops and voltage regulators. Prerequisite: 203-425.

471. ELECTRICAL LABORATORY 1 (0+3) 1 qtr hr Instrumentation and measurement circuits and techniques. Prerequisite: Concurrent 201-323.

481. ELECTRICAL LABORATORY 2 (0+3) 1 qtr hr (Formerly 452). Study of active devices and their associated circuits. Prerequisite: Concurrent 203-424.

482. ELECTRICAL LABORATORY 3 (0+3) 1 qtr hr Continuation of 481. Prerequisite: Concurrent 203-425.

483. ELECTRICAL LABORATORY 4 (0+3) 1 qtr hr Laboratory study of digital I.C.'s. Prerequisite: Concurrent 203-425.

502. ENGINEERING METHODS 1 (3+0) 3 qtr hrs The basic fundamentals of engineering economics with application to electrical systems. Prerequisite: EE senior status.

503. ENGINEERING METHODS 2 (3+0) 3 qtr hrs The professional method of dealing with engineering problems. The design-analysis-synthesis of a problem using this process. Prerequisite: 203-502.

511. MICROWAVES (3+0) 3 qtr hrs A study of transmission line characteristics and design. Analysis and design of distributed parameter for impedance matching in high frequency systems. Prerequisite: 203-413.

513. CIRCUIT SYNTHESIS (3+0) 3 qtr hrs Introduction to the principles of modern circuit synthesis. Prerequisite: 203-443.

524. ELECTRONICS 4 (2+3) 3 qtr hrs Continuation of 426 with emphasis on sequential circuits and state machine design. Prerequisite: 203-426.

525. ELECTRONICS 5 (2+3) 3 qtr hrs Continuation of 524 with emphasis on microprocessor implementation of logic design. Prerequisite: 203-524.

531. ENERGY CONVERSION 2 (3+0) 3 qtr hrs Continuation of 433 with emphasis on direct current and alternating current machinery. Prerequisite: 203-433.

532. ENERGY CONVERSION 3 (3+0) 3 qtr hrs An introduction to power systems analysis with load flow, faults and stability topics. Prerequisite: 203-531.

541. CONTROL SYSTEMS 1 (3+0) 3 qtr hrs Theory of classical feedback control systems including transfer function formulation, characteristics, frequency response and root locus. Computer-aided analysis and design. Prerequisite: 203-443.

542. CONTROL SYSTEMS 2 (3+0) 3 qtr hrs Analysis and design of linear control systems with emphasis on compensation. Prerequisite: 203-541.

543. CONTROL SYSTEMS 3 (3+0) 3 qtr hrs Discrete systems and the z-transform method. State-space analysis of control systems. Prerequisite: 203-542.

553. LINEAR INTEGRATED CIRCUITS (3+0) 3 qtr hrs Internal circuit design of linear integrated circuits and their applications. Prerequisite: 203-426.

561. ELECTRICAL LABORATORY 5 (0+3) 1 qtr hr Laboratory study of feedback control systems. Prerequisite: Concurrent 203-541.

564. SENIOR ELECTRICAL DESIGN 1 (3+0) 3 qtr hrs Initiation of a comprehensive design project relevant to electrical engineering. Prerequisite: senior standing in electrical engineering.

565. SENIOR ELECTRICAL DESIGN 2 (3+0) 3 qtr hrs Continuation of comprehensive design project. Prerequisite: 203-564.

566. SENIOR ELECTRICAL DESIGN 3 (3+0) 3 qtr hrs Completion of a comprehensive design project. Prerequisite: 203-565.

571. ELECTRICAL LABORATORY 6 (0+3) 1 qtr hr (Formerly 552). Laboratory study of transmission line and microwave circuits. Prerequisite: Concurrent 203-511.

572. ELECTRICAL LABORATORY 7 (0+3) 1 qtr hr (formerly 562). Study of the generalized machine and other DC, synchronous, and induction machines. Prerequisite: 203-531.

582. COMMUNICATION THEORY 1 (3+0) 3 qtr hrs (Formerly 572). An introduction to the principles of communication theory. Prerequisite: 203-443.

583. COMMUNICATION THEORY 2 (3+0) 3 qtr hrs A continuation of 203-582. Design of time division multiplexers, analog and digital modulation and detection techniques. Prerequisite: 203-582.
590. PROJECTS 1-3 qtr hrs Independent planning and conduct of an engineering design, or development project in electrical engineering. Prerequisite: Permission of instructor.

591. INDEPENDENT STUDY 1-3 qtr hrs Individual study of a topic of particular interest to the student in electrical engineering. Prerequisite: Permission of instructor.

592. SPECIAL TOPICS 1-3 qtr hrs A study of selected topics of current interest in electrical engineering. Prerequisite: Permission of instructor.

MECHANICAL ENGINEERING
(Department 204)
Professor Maier, Associate Professors Rider, J. Smith (Chairman); Whisler; Assistant Professor R. Cowan.

MECHANICAL ENGINEERING—CLASS OF 1990

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*Acceptable technical electives: Production Engineering 204556, Operations Research 123332, Modern Physics 124303

**Acceptable science electives: Modern Physics 124303, Geology 202453.

401. MECHANICS OF MATERIALS 2
(3+3) 4 qtr hrs Beam deflection-determinate and indeterminate. Three-dimensional stress and strain, reversed loading, column stability and dynamic loading. Use of SI. The measurement of material properties and the use of stress analysis techniques. Prerequisite: 201-313.

403. MANUFACTURING PROCESSES
(2+2) 3 qtr hrs Introduction to contemporary material processing including molding, machining, hot and cold working. A detailed study of these processing methods using
new situations in terms of fundamental principles. Prerequisite: 123-361.

443. NON-ME COMPUTER GRAPHICS (3+0) 3 qtr hrs Practical studies involving the applications of computer graphics. Emphasis on "software" required for computer graphics with some considerations of "hardware." Programming problems oriented toward non-engineering applications. Prerequisite: 123-230 or 201-122.

444. COMPUTER GRAPHICS (3+3) 3 qtr hrs Practical studies involving the application of computer graphics in industry. Studies of hardware configurations and supportive software packages. Prerequisites: 201-122 and ME junior status. 4 qtr hr

445. FINITE ELEMENT ANALYSIS (3+0) 3 qtr hrs The finite element techniques are studied. Stress-deformation problems are solved. Modeling strategies are presented. The ANSYS computer program is used. Prerequisites: 204-401 and 424.

511. MECHANICAL DESIGN 1 (3+3) 4 qtr hrs Fatigue analysis, fracture mechanics, and statistical considerations in design. Analysis and synthesis of various machine parts. Introductory design problem given. Initiation of comprehensive design project. Use of S.I. and CAD. Prerequisites: 204-403 and 406.

512. MECHANICAL DESIGN 2 (3+3) 4 qtr hrs Analysis and synthesis of various machine parts. Design problem given. Continuation of comprehensive design project. Use of S.I. and CAD. Prerequisite: 204-511.

513. MECHANICAL DESIGN 3 (1+6) 3 qtr hrs Completion of the comprehensive design project of 204-511,512. Product liability, legal problems, and ethics studied. Introduction to designing with plastics and optimization. Use of CAD. Prerequisite: 204-512.

521. HEAT TRANSFER 1 (3+0) 3 qtr hrs Heat conduction in steady and nonsteady state in one and two dimensions; thermal radiation concepts and heat exchange. Graphical, numerical and electrical analog methods of solutions. Prerequisite: 124-232.

522. HEAT TRANSFER 2 (3+2) 4 qtr hrs Thermal radiation. Fundamentals of convection; empirical correlations; free and forced convection. Application to design. Laboratory reinforced study of conduction, convection, radiation and design. Prerequisite: 204-521.

526. ENERGY SYSTEMS (3+2) 4 qtr hrs Heat power systems utilizing concepts of
thermodynamics, fluid mechanics, and heat transfer. Examples such as solar energy and energy recuperation systems are studied along with optimization techniques. Laboratory involves energy related projects. Prerequisites: 204-416, 522 and 534.

534. FLUID MECHANICS 2 (3+2) 4 qtr hrs
Elements of potential flow and boundary layer theory. Applications to piping systems, aerodynamics, flow measurement and turbulence. Concurrent laboratory experience with flow patterns, pressure and velocity profiles, pumps, fans, and turbines. Prerequisite: 204-426.

541. VIBRATION ANALYSIS (3+0) 3 qtr hrs
Fundamentals of linear and nonlinear vibration of single degree of freedom, multidegree of freedom, and continuous systems. Prerequisite: 204-406.

542. CONTROL SYSTEMS (4+2) 5 qtr hrs
Modeling, analysis and design of linear feedback control systems. Laplace transforms, transfer functions and frequency response. Introduction to digital controls and logic. Laboratory work in analog simulations, digital logic design, and performance studies of real systems. Prerequisites: 204-424 and 541.

556. PRODUCTION ENGINEERING (3+0)
3 qtr hrs An introduction to scientific organizing, standardizing, and operating principles in production engineering. Capabilities of manufacturing processes. Fundamentals of time and motion study, engineering economy, statistical quality control, location and material flow for a manufacturing enterprise. Prerequisite: 204-403.

590. MECHANICAL ENGINEERING PROJECT 1-5 qtr hrs Practical studies of investigations involving the application of original thought, the determination of new information and/or new application of known information or equipment. Prerequisite: ME senior status.
The Raabe College of Pharmacy at Ohio Northern University endeavors today, as in the past, to meet the high standards of education demanded by the health professions. Currently the college occupies a modern building designed and equipped to provide the facilities required for programs in the health sciences.

Throughout its 104-year history, the Ohio Northern University College of Pharmacy has played an important role in pharmaceutical education. Its position in pharmaceutical education in Ohio is particularly significant. Over 3,000 pharmacists have been graduated by this institution and its graduates are particularly active in local, state, and national health-related organizations.

The Raabe College of Pharmacy is an integral part of Ohio Northern University. It is recognized by the Board of Pharmacy of the State of Ohio. It is a member of the American Association of Colleges of Pharmacy and is accredited by the American Council on Pharmaceutical Education.

Aims and Objectives
In addition to the general objectives set forth by the University, the College of Pharmacy includes the following among its aims and purposes:

- Preparing students to meet satisfactorily the professional and cultural standards expected of health care professionals and to carry their share of the responsibility for improvement of the quality of the health, welfare and educational services to their communities.
- Counseling students in the development of self-reliance, character and ethical concepts to the end that they will render safe and efficient health care services.
- Acquainting students with the value of membership in local, state and national health associations and in civic, social and religious bodies of the communities in which they live.

To accomplish these scholastic, professional, and social goals, faculty counselors are available to advise students concerning their plans of study, and every encouragement is offered to maintain high standards of scholarship. Participation in a reasonable number of campus activities is encouraged in the belief that such activities, properly adjusted to opportunity and ability to carry them, will broaden the student’s outlook, enrich the college experience, and add much to the preparation for life.

Bachelor of Science Degree in Pharmacy
The Bachelor of Science Degree in Pharmacy is a five year curriculum that provides a foundation in the basic sciences of pharmacy as well as a comprehensive understanding of the health care system. The curriculum includes a broad range of courses in the social sciences, physical sciences, and the humanities. Additionally there is experiential work in clinical settings as well as a structured externship in acute care institutions, community pharmacies and other health care settings.
For the purpose of administration the pharmacy program is divided into two major divisions: the Lower Division, consisting of the first two years (P-1 and P-2), and the Upper Division, consisting of the last three years (P-3, P-4, and P-5).

Admission Standards
Persons seeking admission to the College must provide the necessary information and meet the general requirements for admission to the University as listed in that section of this catalog.

Students who qualify under those standards are reviewed for final approval for admission by the Dean of the College.

High School Graduates It is recommended that high school graduates should have completed the college preparatory course including four years of English, three years of mathematics (algebra I and II and plane geometry) and three years of science (including biology and chemistry). Priority may be granted to students with additional credits. Students found to be deficient in these areas may be required to pursue remedial work prior to being scheduled in the regular course of study.

Transfer Students A student desiring to transfer from another accredited college or university must present a transcript of all work at that institution and a copy of its current catalog. Approval for admission and advanced placement will be determined upon review of the student's previous record. Full credit will be given for all work satisfactorily completed in other recognized institutions of higher learning provided such work is parallel to the requirements for graduation from this institution. Credit will not be allowed for any course in which a grade below C was received.

To enter the regular course of study, the candidate must prepare a schedule of studies with the aid of an adviser and approval of the Dean, and pay tuition and fees as stated elsewhere in this catalog. Students entitled to advanced standing may enter at the time approved by the Dean.

Classification of Students
Students enrolled in the Pharmacy program are classified as P-1 students until they have earned a minimum of forty-five quarter hours credit and have completed the introductory chemistry series, at which point they are advanced to P-2 standing. In order to gain admission to the Upper Division and P-3 status, a student must have completed a minimum of 90 quarter hours of academic work and all of the Lower Division courses that are prerequisite to the regular third year schedule. P-4 or P-5 standing is gained when a majority of the required course work in the previous year has been completed and a minimum of 135 and 180 quarter hours of academic credit, respectively, has been earned. All required courses in the Lower Division must be completed before the student is permitted to enter the second year of the Upper Division.

Dual-Degree Program
Superior students may elect to earn an additional degree from the College of Arts and Sciences or from the College of Business Administration concurrently with the Bachelor of Science degree in Pharmacy. The student following this option pursues both degrees simultaneously under the supervision of an adviser from the College of Pharmacy and an adviser selected from the department of the chosen major in that College. Tuition is charged at the College of Pharmacy rate and the student receives the appropriate degree in each college upon completion of all requirements.

A student taking the dual degree program must meet all of the requirements established for each degree. Certification of completion of these requirements is made by the college granting the degree.

Information relative to the procedure for declaring a dual degree program is available in the office of the Dean of the College of Pharmacy.

Standards of Scholarship
A student who fails to maintain the prescribed standards of scholarship will be subject to one of the following actions, namely: 1) being placed on probation, 2) being suspended from the College, or 3) being dismissed from the College.

If a student's cumulative grade point average falls below 2.00, the student will be placed on probation. If a student on probation does not restore the grade point average during the following or any subsequent quarter, the student will be subject to further academic action. A detailed procedural guide for academic action is available for the student's perusal.

Any student with an unusually low grade
point average for any quarter may be placed on probation.

If action is taken to suspend a student, the suspension may be for a definite period of time after which the student will be eligible to apply for readmission. It may be for an indefinite period of time in which case the student’s request for readmission is considered on a low priority basis. When readmission is granted the faculty may establish certain conditions of academic performance in order for the student to remain enrolled in the College of Pharmacy.

If action is taken to dismiss a student, it is to be regarded as a terminal action; and the student is not eligible for readmission to the College of Pharmacy at any time thereafter.

Requirements for Graduation
Each candidate for a degree:
1. Must be of good moral character.
2. Must have completed the required curriculum of 258 hours.
3. Must have earned a cumulative grade point average of 2.00 in all course work.
4. Must have a “C” or better in all required professional courses.
5. Must satisfy a minimum residency requirement as established by the Dean of the College.
6. Must be recommended for the degree by a majority vote of the faculty of the University.
7. Must meet such other qualifications as the faculty may determine.

Library
The facilities of the main library of the University are at the disposal of the pharmacy students. Many of the current books and classics contributing to an appreciation of the arts and sciences are to be found there along with books, periodicals, and journals pertaining to pharmacy, medicine, and related professions. Additional printed and visual materials are available in the drug information center of the College of Pharmacy.

Community Health Services
The College of Pharmacy offers a continuum of health-care services to the community at large. Included in these services are continuing education programs for pharmacists, nurses and other health care professionals; community health education programs, especially in the area of drug abuse; medical care research services; and health planning resources. Further information can be obtained by contacting the Dean of the College.

Special Notice
Because of rapid developments in the health professions, the curriculum of the College is constantly being reviewed by the faculty. The College reserves the right, without advance notice, to change the content, duration and sequence of any course included in the curriculum leading to the degree. A separate catalog or bulletin covering course content and other pertinent matters is issued periodically. Please address requests for copies to the Dean of Pharmacy, Ohio Northern University, Ada, OH 45810.

Program of Study Leading to the Degree of Bachelor of Science in Pharmacy
Curriculum
First Year
Introductory Chemistry 171, 172, 173
15 hours
Biology 100 4 hours
General Biology 112, 113 8 hours
Calculus & Probability 154, 155 8 hours
Introduction to Data Analysis 156 4 hours
Pharmacy Orientation 101 1 hour
The Profession of Pharmacy 102, 103 2 hours
Writing 110, 111 6 hours
General Education* 3 hours
TOTAL 51 hours
Second Year
Organic Chemistry 231, 232, 233 12 hours
Physiology 331, 332, 333 12 hours
Speech Communication 100 3 hours
Introduction to Pharmacy Practice 212 3 hours
Great Works of Literature 204 3 hours
General Education* 18 hours
TOTAL 51
Third Year
Pharmaceutics 321, 322, 323 12 hours
Biochemistry 341, 342 8 hours
Biopharmaceutics and Introductory Pharmacokinetics 343 3 hours
Medicinal Chemistry 371 5 hours
Immunology and Biologials 372 2 hours
Microbiology 361 4 hours
Principles of Disease 373 3 hours
General Education* 3 hours
Electives 2 hours
TOTAL 51 hours
Fourth Year
Pharmacy Practice 461, 462 6 hours
Pharmacy Practice Laboratory 463 1 hour
Sterile Products 464 2 hours
Prescription Products in Practice 465 1 hour
Introductory and Autonomic Pharmacology 491 4 hours
Pathology and Pharmacology of the Central Nervous System 492 4 hours
Pathology and Pharmacology of the Cardiovascular and Endocrine System 493 5 hours
Laboratory in Biomedical Sciences 494, 495, 496 3 hours
Chemotherapy of Infectious Disease 421 4 hours
Electives 24 hours
TOTAL 54 hours

Fifth Year
Toxicology 521 3 hours
Pharmaceutical Law 551 4 hours
Pharmaceutical Marketing 552 3 hours
Pharmaceutical Management 553 4 hours
Health Care Systems 554 4 hours
Clinical Pharmacy 560 6 hours
Therapeutics 562 4 hours
Introduction to Drug Information 563 2 hours
Structured Externship 580 15 hours
Electives 6 hours
TOTAL 51 hours

*General education courses are selected from among the following:

**Humanities** 3 hours selected from Philosophy 100, Great Philosophers 102, Logic 234, Knowledge and Truth 237, Ethics 238 or Bioethics 338. 3 hours selected from Introduction to Religion 105, Introduction to the Bible 106, Religion East and West 107, or Introduction to Christianity 108.

**Social Science** 6 hours selected from Psychology 100, Sociology 105, or any course in department 133 at the 200 level or above. 6 hours selected from Political Science 201, 202, 203; or recent American History 361, 362.

**Fine Arts** 3 hours of non-performance fine arts selected from Art 100, Music 100, Theatre 105 or any 200 level non-performance course in department 151, 152, or 153.

**Business Administration** 6 hours selected from Accounting 131, 132, 133; Economics 100, 202, 203; or Business Law 322, 323, 324.

**In-depth General Education** 6 hours selected from any English course at the 200 level or above (excluding performance courses), any philosophy and religion course at the 200 level or above (in addition to the course used to satisfy the humanities requirement), any foreign language, any sociology, psychology or social welfare course at the 200 level or above (in addition to the courses used to satisfy the social science requirement), any course in business administration at the 300 level or above, or any course in political science and history at the 300 level or above.

For descriptions of the lower division courses and general education courses turn to the listing of the courses offered in the College of Arts and Sciences and the College of Business Administration.

First number in parentheses is lecture hours per week, second number is laboratory hours per week.

DEPARTMENT OF PHARMACY AND HEALTH CARE ADMINISTRATION
(Section 311)

Professors Henderson, Hoag, Stansiloski (Chairman), Previte, Theodore, Volter; Associate Professors Goldberg, Reisman, Shuemaker; Assistant Professors Earle, Holtz, Hussain, Jones, K. Kier, Lucas (part-time), Stanovich; Instructors T. Kier, J. Turner; Assistant Instructor M. Turner.

101. PHARMACY ORIENTATION (1+0)
1 qtr hr A general orientation to the University.

102. THE PROFESSION OF PHARMACY
I (1+0) 1 qtr hr The profession of pharmacy, its development, its educational requirements, the role of the pharmacist and the challenges.

103. THE PROFESSION OF PHARMACY
II (1+0) 1 qtr hr Continuation of 102.

212. INTRODUCTION TO PHARMACY PRACTICE 3 qtr hrs An introduction to the practice of pharmacy which includes practical principles of law as they pertain to pharmacy interns, Third Party Payment practices, and patient profiles. A major emphasis is placed on mathematics as applied to pharmacy practice including the prescription, Latin symbols, metrology, reducing and enlarging formulae, dilution and concentration, isotonic solutions and electrolyte solutions.
321. PHARMACEUTICS I (3+3) 4 qtr hrs A study of solid dosage forms, including their preparation, characteristics, and the physical and chemical phenomena affecting the availability of the active ingredient from these dosage forms. In the laboratory, solid dosage forms are prepared, both according to the laboratory text, and extemporaneously. Prerequisite: P-3 standing. Corequisite: 311-212.

322. PHARMACEUTICS II (3+3) 4 qtr hrs A study of the various types of solution dosage forms and related physical and chemical phenomena. These include solubility characteristics, pH considerations and their effect on solubility, stability, and compatibility. These principles are applied in the laboratory, in the preparation of homogeneous dosage forms. Prerequisites: 311-212 and 321.

323. PHARMACEUTICS III (3+3) 4 qtr hrs A study of heterogeneous dosage forms including suspensions, ointments, emulsions and suppositories. In the laboratory, the theoretical aspects of dispersion, interfacial phenomena, and rheology are applied in the preparation of these dosage forms. Prerequisite: 311-322.

343. BIOPHARMACEUTICS AND INTRODUCTORY PHARMACOKINETICS (3+0) 3 qtr hrs The characteristics, time course, factors influencing and the mathematical models of drug absorption, distribution, metabolism and excretion. Corequisites: 121-323 and 311-323.

421. INTRODUCTION TO HOSPITAL PHARMACY (3+0) 3 qtr hrs An introductory presentation of material on the history and organization of hospitals and hospital pharmacy departments. Special emphasis is placed on the responsibilities and professional activities of pharmacists within the hospital environment. Prerequisite: P-3 standing or permission of instructor.

422. PHARMACY SERVICE TO NURSING HOMES (1+0) 1 qtr hr The pharmacist's opportunities and responsibilities in nursing home practice. Main emphasis on consulting and distribution functions which include selecting a drug distribution system, conducting a drug regimen review and establishing a drug utilization review system. The relationship of pharmacy to nursing home management, patients and personnel is also discussed. Prerequisite: P-4 standing.

431. HISTORY OF PHARMACY (3+0) 3 qtr hrs The educational, organizational and professional growth and development of pharmacy in the United States. Prerequisite: P-4 standing.

441. INTRODUCTION TO RADIOACTIVE PHARMACEUTICALS (3+0) 3 qtr hrs A survey course in the types of radiation, methods of detection and measurement and the application of radioisotopes to modern health care. Prerequisite: Permission of instructor.

461. PHARMACY PRACTICE I (3+0) 3 qtr hrs A study of the contemporary filling of physician orders. Topics include patient counseling, drug interactions, patient profile systems and dispensing systems. Prerequisites: 311-323 and 343.

462. PHARMACY PRACTICE II (3+0) 3 qtr hrs A study of the appropriate use of non-prescription drugs, products and devices. Prerequisites: 312-361, 373, and 492. Corequisite: 312-493.

463. PHARMACY PRACTICE LABORATORY (0+3) 1 qtr hr Pharmacy Practice Laboratory is intended to give the student experience in solving pharmaceutical problems, using the community pharmacy as the simulated site. Emphasis is placed on solutions utilizing patient profiles, patient counseling, aiding the physician in making therapeutic decisions and interactions with patients. Both traditional and computerized dispensing systems will be used. Prerequisite: 311-461.

464. STERILE PRODUCTS (2+0) 2 qtr hrs The basic principles, equipment and techniques involved in the preparation, manipulation, and administration of parenteral products and other sterile dosage forms. Prerequisite: 311-323.

465. PRESCRIPTION PRODUCTS IN PRACTICE (1+0) 1 qtr hr A survey of pertinent information concerning the most common prescription drugs. Prerequisites: 311-323, 343, 461 and 312-492. Corequisite: 312-493.

471. SEMINAR IN IV THERAPY (2+0) 2 qtr hrs The seminar discusses in detail various aspects of IV therapy. Topics may include complications of specific types of IV therapy and fluid therapy. Prerequisite: 311-464 or permission of the instructor.
472. SEMINAR IN CANCER (2+0) 2 qtr hrs Cancer etiology and epidemiology. Students learn by researching an area of their interest and presenting it to the class. Concepts discussed include “survival,” physical and mental consequences of therapy, death and dying, and the care of the terminally ill. Prerequisite: P-4 standing or permission of instructor.

473. THIRD PARTY REIMBURSEMENT SYSTEMS (3+0) 3 qtr hrs The history and development of Third Party Programs including types of benefits, forms used, methods of payment, limitations, proposed methods of solving problems and surveillance and utilization review. Prerequisite: P-4 standing.

474. DOSAGE FORM DESIGN (2+0) 2 qtr hrs The design and formulation of various dosage forms, with particular emphasis on the effect that the various formulation factors have on the bioavailability of active ingredients. The dosage form is discussed and viewed as a drug delivery system. Prerequisite: 311-323.

475. PARENTERAL PRODUCTS SEMINAR (2+0) 2 qtr hrs Various aspects of parenteral medication. Includes, but is not limited to, their characteristics, formulation, preparation, administration and biopharmaceutical behavior. Prerequisite: 311-464 or permission of instructor.

476. INFECTIOUS DISEASES (3+0) 3 qtr hrs Seminar discussions of various infectious diseases. The student will research one new area of interest in infectious diseases and present it to the class. Prerequisites: 312-473 and 421.

477. OUTPATIENT CLINICAL PHARMACY 1 qtr hr Methods of providing clinical services in the outpatient environment. Students learn by researching a topic of their interest and presenting it to the class. Prerequisite: Permission of instructor.

478. OUTPATIENT PHARMACY SERVICE (0+3) 1 qtr hr Laboratory course that serves the needs of the Health Center through the operation of the Model Pharmacy. Specific components include: the dispensing of prescriptions, patient counseling and patient profile maintenance. For students with limited or no internship experience. Prerequisites: Valid Ohio intern license.

510. COSMETIC SCIENCE (3+0) 3 qtr hrs An overview of various types of cosmetics; how they are prepared and the rationale for their formulation. Prerequisite: Permission of instructor.

515. COSMETIC TECHNOLOGY (0+3) 1 qtr hr An optional laboratory for Cosmetic Science 510. A literature search on cosmetic formulation is required. The laboratory session will consist of compounding the cosmetic preparation that the student had previously investigated. Prerequisite: Permission of instructor.

530. MANUFACTURING PHARMACY (1+6) 3 qtr hrs The formulation and fabrication by mechanized methods of a variety of pharmaceutical dosage forms. Prerequisite: Permission of instructor. Graded S-U.

551. PHARMACEUTICAL LAW (4+0) 4 qtr hrs A study of professional ethics and the philosophy, requirements, administration, and enforcement of local, state and federal laws related to the practice of the profession of pharmacy.

552. PHARMACEUTICAL MARKETING (3+0) 3 qtr hrs Facts, considerations, and principles which underlie the flow of drug products, and the availability or use of pharmaceutical and other professional services from production to consumption. Principal economic, legislative, and social forces affecting the health care industry are discussed, and resulting policies and procedures are appraised.

553. PHARMACEUTICAL MANAGEMENT (4+0) 4 qtr hrs This course is designed to introduce management science as it applies to the practice of pharmacy as both a profession and a business. Included are discussions dealing with the internal and external economic forces that influence day to day operations. Special emphasis on financial report analysis and decision making.

554. HEALTH CARE SYSTEMS (4+0) 4 qtr hrs A study of the development of the health care system and its present status. Contemporary issues in health care will be examined from a systems viewpoint.

560. CLINICAL PHARMACY (3+17) 6 qtr hrs An experience in contemporary clinical pharmacy. Taught in area hospitals. The student is asked to apply pharmaceutical principles to the study of the relationship among drugs, diseases and patients. Transportation is arranged by the student. Must be taken with 311-562 and 563. Prerequisites: 311-462, 463, 464, 465; 312-421; P5 standing and a valid Ohio intern license.
561. CLINICAL CLERKSHIP (0+9) 3 qtr hrs Experience in area hospitals, with a view to expanding the student's knowledge of health care delivery and drug disease relationships. An in-depth experience in specific disease states. Prerequisites: 311-560 and permission of the department chairman.

562. THERAPEUTICS I (4+0) 4 qtr hrs This course is designed to introduce the student to the process of therapeutic decision-making. The course is taught on a problem-oriented record model. A variety of disease states is covered. Must be taken with 311-560 and 563. Prerequisites: 311-462,463,464 and 465; 312-421; P-5 standing.

563. INTRODUCTION TO DRUG INFORMATION (1+3) 2 qtr hrs An introduction to the field of drug information. Special emphasis is placed on retrieval and evaluation of drug literature, dissemination and communication of non-biased drug information and the organization and development of a drug information center. Must be taken with 311-560 and 562. Prerequisites: 311-462,463,464 and 465; 312-421; P-5 standing.

564. APPLIED PHARMACOKINETICS (3+0) 3 qtr hrs The application of pharmacokinetics to institutional and community practice. Especially emphasized are drug concentrations in body fluid, laboratory data, disease states and drug interactions as related to dose regimen for therapeutic management of individual patients. Prerequisites: 311-323 and 343.

580. STRUCTURED EXTERNSHIP (0+45) 15 qtr hrs A program of structured experiences in various health care centers. Provides the student with experience in the actual application of material learned in didactic subjects. Prerequisites: P-5 standing; 311-462,463,464 and 465; 312-421 and a valid Ohio Intern License.

590. SPECIAL TOPICS IN PHARMACY AND HEALTH CARE ADMINISTRATION 1-3 qtr hrs Prerequisite: Permission of the instructor.

594. SEMINAR IN PHARMACY AND HEALTH CARE ADMINISTRATION 1-3 qtr hrs Prerequisite: Permission of the instructor.

597. INDEPENDENT STUDY-PHARMACY AND HEALTH CARE ADMINISTRATION 1-3 qtr hrs Prerequisites: Permission of the department chairman and a 2.50 accumulative point average.

DEPARTMENT OF PHARMACOLOGY AND BIOMEDICAL SCIENCES
(Department 312)
Professors Awad, Bhattacharya, Faulkner, Gossel (Chairman), Mallin, L. Smith, Stewart; Associate Professor M. Milks.

301. SEMINAR IN PHARMACY COMMUNICATIONS (3+0) 3 qtr hrs Basic elements of communication between health care personnel. Didactic presentation and role-playing to gain experience in communication skills. Prerequisite: P3 standing or permission of instructor.

302. MEDICAL TERMINOLOGY (3+0) 3 qtr hrs An introductory course in medical terminology specifically, and scientific terminology in general. Emphasis on root words and affixes which have general and frequent occurrence in the communication of medicine, pharmacy, biology, chemistry, and related areas.

341. BIOCHEMISTRY I (4+0) 4 qtr hrs An introduction to the chemistry of living organisms with emphasis on the human system. Topics include acid-base balance, buffers, the chemistry of amino acids, proteins, enzymes, carbohydrates, lipids, vitamins, nucleic acids and porphyrins. Prerequisite: 122-233.

342. BIOCHEMISTRY II (4+0) 4 qtr hrs A description of the major metabolic processes that are essential for human life, including biochemical energetics, the electron transport system, Kreb's cycle, the metabolism of carbohydrates, lipids and amino acids, and the biosynthesis of purines, pyrimidines, nucleic acids and proteins. Biochemical genetics and genetic disorders are also covered. Prerequisite: 312-341.

350. BASIC NUTRITION (3+0) 3 qtr hrs An introduction to basic principles of nutrition for nonpharmacy students. Topics include a description of essential nutrients, methods of evaluating individual dietary adequacy, and dietary methods for weight control.

351. CLINICAL BIOCHEMISTRY (3+0) 3 qtr hrs An introduction to the use of biochemical tests as agents for the diagnosis of human disease states. The theory, methodology, utility, significance, and reliability of such