THE GEORGE FRANKLIN AND SARAH CATHERINE GETTY

college of liberal arts

BERNARD L. LINGER, Dean
Divisions and Departments

FINE ARTS: Art; Music; Speech and Theatre.
HUMANITIES: English; Foreign Languages; Philosophy and Religion.
MATHEMATICS AND NATURAL SCIENCES: Biology; Chemistry; Mathematics; Physics.
SOCIAL SCIENCES: Business Administration and Economics; History and Political Science; Psychology, Sociology and Social Work.
TEACHER EDUCATION: Education; Health and Physical Education; Industrial Arts.

Principles and Objectives

The Getty College of Liberal Arts 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 Liberal Arts instills in the student an appreciation for human values and a demonstration of personal commitments to ethical and religious ideals which are vital throughout life.

Admission Standards

Candidates seeking admission to the College of Liberal Arts are required to meet the general requirements for admission to the university. The College of Liberal Arts accepts graduates of high school and non-graduates who have 16 acceptable units and who are recommended by their high school principal. Twelve of these units are as follows: 4 units in English; 2 units in mathematics (including algebra and plane geometry); 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 College Entrance Examination Board tests or the American College Test are expected of all candidates. If a candidate takes the CEEB, the English Composition (EN) Achievement Test is required, and the mathematics level I achievement test is suggested for candidates interested in the sciences.

High school seniors with 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 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 first two years of study are usually devoted to the student's general education. 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 list is the prescribed general education courses required of all students. The list is by academic divisions; alternative subject disciplines within each division are indicated.

FINE ARTS
Art 100 or Music 100
Speech 100 or Theatre 105

SOCIAL SCIENCES
Psychology 100 or Sociology 105
History 100 or Political Science 105
Economics 100

HUMANITIES
English 100, 101, 102
Philosophy 100
Religion 105
Foreign Language 100, 101
or 102, 103 or 104, 105

MATHEMATICS AND NATURAL SCIENCES
Mathematics 100
Biology 100
Chemistry 100 or Physics 100

TEACHER EDUCATION
Education 100

In Depth Requirements: The College of Liberal Arts further requires that each student complete two additional courses (six credit hours) in each academic division. The purpose is to add depth to the general education courses. These two courses are required to be in the same subject discipline in which the student has completed his general education courses; however, the choice of the discipline belongs to the student. Students with departmental majors do not take additional course requirements in the Teacher Education Division. In the division in which the student has selected his major the two additional courses required are fulfilled as a normal part of his major curriculum.
Completing a Major: The degree candidate is required to complete in a logical sequence a major of not less than 45 quarter hours. The student faculty advisor 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 advisor.

The following major fields are offered toward the Bachelor of Arts degree in the College of Liberal Arts:

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<tr>
<th>Art</th>
<th>Music</th>
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<tr>
<td>Biology</td>
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<td>Business Administration</td>
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<td>Chemistry</td>
<td>Physical Education</td>
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<td>Economics</td>
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<td>Elementary Education</td>
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<td>History</td>
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<td>Industrial Arts</td>
<td>Spanish</td>
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<tr>
<td>Mathematics</td>
<td>Speech-Theatre</td>
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The Bachelor of Music and Bachelor of Fine Arts Degree Programs

The patterns of courses and the policies listed under the Bachelor of Arts Degree program are also applicable to the Bachelor of Music and Bachelor of Fine Arts Degree programs, except for the In-Depth requirement which is not applicable.

A candidate for the Bachelor of Music degree may major in music education, in performance, or in sacred music. A candidate for the Bachelor of Fine Arts degree may major in painting, printmaking, sculpture, or ceramics.

Teacher Certification

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

Students preparing to teach are required to make formal application to the Teacher Education Program by the end of their sophomore year. The student is required to maintain a 2.0 total accumulative average, a 2.25 quality point average in his major field, and to have completed three-fourths of his prescribed freshman and sophomore course work. The Teacher Education Committee, representing all divisions of the College of Liberal Arts, considers applications for admission to the program.

All students preparing to teach are assigned advisers in the Department of Education to assist them with the scheduling of professional education courses. The adviser in the student's major department continues to advise the student on the requirements for his major.

A grade of C or better is required in all professional education courses and in all courses in the major field. 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.

Liberal Arts Honors Programs

The purpose of the Liberal Arts Honors Program is to broaden the educational experiences and responsibilities of both students and faculty.

The program is designed to aid superior students in more fully realizing their academic potential. The program relaxes regular curricular requirements; plans a special academic program for the individual student's particular abilities and educational goals; and waives regulations or requirements of the general student body whenever it is in the student's best interests.

A student of outstanding academic potential who is not sufficiently challenged by the regular curriculum or who finds himself hampered by the traditional grading system should consider applying for admission to the honors program. The Honors Program Council determines whether a student has the requisite potential along with the motivation essential for success. The Honors Program Council bases its judgment on the student's application, on the recommendations of the student's teachers, and on one or more interviews with the student himself.
Preprofessional Programs

Medical Sciences Curricula

**Medical Sciences Programs.** A Medical Sciences Committee with representatives from biology, chemistry, math, physics, pharmacology, and a representative from outside the Division of Mathematics and Natural Science advises students in the areas of the medical sciences. 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 pre-professional education in the medical sciences, and to serve as a source of recommendations to professional schools in the medical sciences.

The committee meets with all students at summer orientation and regularly during their undergraduate careers. The committee provides a guideline and a time table 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 plans to apply. For further information contact Dr. Howard L. Haight, Chairman, Medical Sciences Advisory Committee.

**Arts-Medical Technology.** A student may be permitted to apply 45 quarter hours earned at any accredited professional school of medical technology toward a Bachelor of Arts degree. Of those 45 quarter hours, 15 quarter hours may be applied toward a major in biology. Contact the Department of Biology for additional information.

Pre-Theology

The recommendations of the American Association of Theological Schools are followed in counseling the pre-theological student in planning his 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 pre-theological student in planning his pre-professional program, along with a departmental adviser in his major, if the student elects a major outside the Department of Philosophy and Religion.
Pre-Law

The College of Liberal Arts in cooperation with the Ohio Northern University College of Law has developed a new prelaw program. The Dean of the College of Law believes that students who complete the prelaw program will be better prepared for law school, will find it easier to be admitted to good law schools, and will do better academic work as law school students.

Students in the prelaw program select a major and complete the necessary requirements as do other liberal arts students. However, elective courses of approximately 60 credit hours are carefully prescribed by categories. Examples of these categories are a broad historical area, law-oriented courses, analysis of evidence, writing ability, language and logical reasoning. These categories assure the student a broad liberal arts background recommended by law schools throughout the country.

Students who complete the four-year program with at least a 3.50 GPA are admitted automatically to the Ohio Northern College of Law. However, the law school admission test (LSAT) is required. Prelaw students with GPA’s between 3.00 and 3.49 are admitted to the Ohio Northern University College of Law on a preferred basis with lower LSAT scores required than for those candidates with comparable GPA’s applying from other colleges or for ONU graduates who choose not to complete the prelaw program.

The prelaw program is open to most students enrolled in academic departments in the College of Liberal Arts. It is also open to sophomore and junior transfer students from accredited four-year colleges and for students who hold an Associate of Arts Degree from an accredited junior college. Transfer students who enroll in the prelaw program and graduate with a 3.6 accumulative grade point average will automatically be admitted to the ONU College of Law. A student works with the prelaw adviser in his department in planning and implementing his academic program.

The dean and the faculty of the College of Liberal Arts believe that the prelaw program 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.

Additional information is available from Dr. David Saffell, Chairman of the Prelaw Advisory Committee, or from the department chairman of the student's major.

**Combination Curricula**

**Four and Five Year Combination Curricula**

Students pursuing a four-year dual major program in two departments within the College of Liberal Arts are required to meet each department's requirements for the major in that discipline. Students pay tuition at the College of Liberal Arts rate.

The Arts-Engineering, Arts-Pharmacy programs are five year curricula for the student challenged by the rewards of in-depth study in both the Liberal Arts and the professional fields of Engineering or Pharmacy. The student pursues degrees simultaneously in the College of Liberal Arts 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 Liberal Arts 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 College of Liberal Arts and College of Pharmacy are required to meet the three-year residency requirement to qualify for graduation from the College of Pharmacy. Students meet all requirements in each college in the same way as students graduating with one degree.

**The Interdisciplinary Major Program**

The interdisciplinary major allows the student to pursue three areas of study leading to a bachelor of arts degree. The student may develop several intellectual, artistic, or career interests and so broaden himself and his career opportunities.

The interdisciplinary major requires 33-38 quarter hours in each of
three areas of study. All the academic departments in the Getty College of Liberal Arts participate in this program. Teacher certification may be earned in most of the areas. The basic degree requirements for a bachelor of arts degree remain the same for those graduating with an interdisciplinary major.

A student may apply for the interdisciplinary major after he has successfully completed the first two quarters of his freshman year. Applications to the Interdisciplinary Committee are available from the Dean of the College of Liberal Arts.

**General Regulations**

1. A student may not register for more than 18 hours of academic work unless he has received a grade of "B" or better in the preceding quarter, in which case the dean may grant permission for extra hours. A normal program consists of 12 to 18 scheduled hours including physical education.

2. All new students in the College of Liberal Arts are required to take Freshman Orientation in their major field, normally in the fall quarter.

3. A student indicates his choice of a major field by filling out a declaration of major card available in the office of his department chairman. The faculty adviser assists a student in planning his major not later than the last quarter of his sophomore year.

4. No course for which a student has received a "D" is acceptable toward a major field or area of concentration.

5. A Senior student selecting "100" courses is required to consult his Department Chairman and the Dean of the College for permission.

6. A Sophomore student is not permitted to take 300/400 courses unless upon the recommendation of his adviser and approval in writing by the Chairman of the Department concerned.

7. Juniors and seniors are expected to schedule a majority of their courses from the "300" and "400" group.

8. With the permission of the Instructor and the Department Chairman, any course prerequisite may be waived.

9. Except where noted, credit hours earned in repeated courses may be counted only one time among the total hours required for graduation.
10. English 100, 101, 102 may be taken in any order. The student must schedule one of the three courses in English every quarter until he has received credit in all three. No more than one of the courses may be scheduled in any one quarter.

Classification of Students

For purpose of classification the minimum requirements for sophomore standing are 45 quarter hours of academic work; for junior standing, 90 hours with all freshman and sophomore requirements completed; for senior standing, 135 credit hours.

Academic Probation

A grade point average of 2.0 is required for graduation. If a student's accumulative grade point average falls below 2.0 within a given quarter, he is placed on probation and his participation in extra-curricular activities is reviewed by his adviser, by the vice-president of student affairs, and by the dean of his college.

Any student on probation whose work for the following quarter continues below a 2.0 may have his record reviewed by the Scholarship Committee of the College and may be recommended to the dean for suspension.

Senior Comprehensive Examination

The requirement of a Senior Comprehensive Examination is a matter of departmental policy. Each department has the authority to decide and to determine all policies regarding senior comprehensive examinations.

Students should consult the departmental sections of this bulletin and the department chairman in order to determine the existing policy for senior comprehensive examinations within the respective departments.
Graduation

To graduate with a Bachelor of Arts or a Bachelor of Fine Arts degree, a student is required to complete a minimum of 182 quarter hours which includes the prescribed 16 general education courses, 130 quarter hours of academic study (including 3 quarter hours in physical education), and have an accumulative qualitative point average of at least 2.0.

The Bachelor of Music requirements are available from the chairman of the music department.

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.
THE DEPARTMENTAL COURSES

ART
(Department 151)

Associate Professors Devore, Gordon (Chairman), West; Assistant Professor Chesser.

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 and 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 151, 152, 161, 162, 210 (6 hours), 255, 350, 265, 489, 6 hours selected from 270, 280, 370, 380, 9 hours selected from 250, 251, 355, 420, and 9 hours selected from 325, 335, 344, 345, 346, 347.

A candidate for the Bachelor of Fine Arts degree must complete 100 hours for the major including 151, 152, 161, 162, 210 (9 hours), 222, 255, 350, 265, 360, 489, 9 hours selected from 270, 280, 370, 380, 9 hours selected from 250, 251, 355, 12 hours selected from 325, 335, 344, 345, 346, 347. A minimum of 24 hours must be completed in the student’s major area of concentration.

Professional education requirements are listed by the Department of Education.

A comprehensive examination in art and a public exhibition of the student’s studio work are required for graduation with a major in art.

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

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

114-115. ART FOR ELEMENTARY TEACHERS. For prospective classroom teachers with emphasis on theory, media, and techniques. Open only to elementary education majors. 114, 3 hours. 115, 3 hours.

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

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

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

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

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

221. JEWELRY. 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. 3 hours.
222. LETTERING. Basic letter forms, emphasis on proportion, theory, rendering technique, and applications of lettering in commercial art. May repeat for credit once. Prerequisites: art 151 and 162. 3 hours.

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

251. PAINTING II. Techniques and modes of painting in oil. May repeat for credit to a total of six hours. Prerequisite: Painting I. 3 hours.

255. CERAMICS I. 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. 3 hours.

265. SCULPTURE I. 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. 3 hours.

270. RELIEF PRINTMAKING. Woodcut, linocut, wood engraving and other relief techniques. May repeat for total of six hours. 3 hours.

280. SERIGRAPHY. Methods and techniques. May repeat for total of six hours. 3 hours.

325. IMPRESSIONISM AND POST IMPRESSIONISM. Emphasis on developments in French Art between the Revolution of 1784 and 1900. Offered alternate years. 3 hours.

335. CONTEMPORARY TRENDS. Emphasis on appearances, and development of basic artistic movements from beginning of 20th century to the present. Offered alternate years. 3 hours.

344. ANCIENT ART. Art forms and styles from prehistoric times through the fall of Rome. Not available to students who have received credit for 305. Offered alternate years. 3 hours.

345. MEDIEVAL ART. Developments in European Art from the fall of Rome through the 14th century. Not available to students who have received credit for 305. Offered alternate years. 3 hours.

346. THE RENAISSANCE. The development of European Art and architecture during the 15th and 16th centuries. Not available to students who have received credit for 315. Offered alternate years. 3 hours.

347. BAROQUE. The historical development of the visual arts in the Western World from 1600 to 1784. Not available to students who have received credit for 315. Offered alternate years. 3 hours.

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

355. WATERCOLOR. Techniques and modes of painting in aqueous media. 3 hours.

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

370. LITHOGRAPHY. Methods and techniques. May repeat to total of six hours. Prerequisites: art 152, 162, and 210. 3 hours.

380. INTAGLIO PRINTMAKING. Methods and techniques of etching and engraving. May repeat to total of six hours. Prerequisites: art 152, 162, and 210. 3 hours.

410. ADVANCED CERAMICS. Directed study. May repeat to total of 12 hours. Prerequisite: nine hours of 350. 3 hours.

415. ADVANCED PRINTMAKING. Directed study. May repeat to total of 12 hours. Prerequisite: six hours of printmaking. 3 hours.

420. ADVANCED PAINTING. Directed study. May repeat to total of 12 hours. Prerequisite: six hours of 251. 3 hours.
425. ADVANCED SCULPTURE. Directed study. May repeat to total of 12 hours. Prerequisite: nine hours of art 360. 3 hours.

457. ART EDUCATION METHODS. Laboratory-seminar dealing with materials, techniques, and methods of secondary classroom instruction in art. Meets professional education requirement in methods area. 3 hours.

489. SENIOR THESIS. 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 major adviser and the department chairman. 1 hour.

490. SPECIAL TOPICS IN ART. 1-3 hours.

494. SEMINAR IN ART. 1-3 hours.

497. INDEPENDENT STUDY IN ART. 1-3 hours.

BIOLOGY
(Department 121)

Professors Bowden (Chairman), Butler, Dawson, Meyer; Associate Professors Laing, Nelson, Tipple; Assistant Professors Keiser, Moore; Assistant Instructor Smith; Lecturer Calvert, J. Moore.

The objectives of the department are to develop in each student an understanding of the nature and content of the sciences with biology as an example and an understanding of the relevance of biology to the society of which he is a citizen. Biology 100 is a course designed to attain these objectives. It also provides the generalizations by which the advanced courses can be related to one another and is therefore prerequisite to all other courses in the curriculum. Students desiring further knowledge of general biology may take biology 112 and 113 which develop an understanding of microbial, plant and animal life and inheritance. These courses also provide a firm foundation for advanced work in biology and the related applied sciences.

Additional requirements for majors are biology 112, 113, 195, 201 or 202, 223, 301, 331, 430, 431, 495 and 15 hours elected from 201, 202, 213, 234, 290, 297, 302, 303, 332, 333, 343, 350, 355, 423, 424, 490, 495, 497, and microbiology 361, 362 offered in the college of pharmacy; preparation in the related area of mathematics, statistics, chemistry and physics as determined by the department in consultation with the individual student. A minimum of 25 hours beyond the basic course requirements of the college of liberal arts are required including statistics and at least a one year sequence in chemistry.

Department advisers will aid students who have selected biology as a major in choosing relevant electives.

100. BIOLOGY. (4 + 1). Biological principles and concepts of plant and animal life, stressing their application to man, including life at the cellular level, organic evolution, man and his environment. Discussion in the presence of laboratory materials. 4 hours.

Alternate 100. BIOLOGY. Independent Study Program. The student's rate and method of study are given maximum independence under department supervision. Consult the chairman. 4 hours.

112. GENERAL BIOLOGY (4 + 1). Biological principles and concepts of plant and animal life, stressing their application to man, including our plant dependent world, the animal way of life. Discussion in the presence of laboratory materials. Prerequisite: biology 100. 4 hours.
113. GENERAL BIOLOGY (4 + 1). Biological principles and concepts of plant and animal life, stressing their application to man, including the systems of the human body, reproduction, genetics. Discussion in the presence of laboratory materials. Prerequisite: biology 100. 4 hours.

Alternate 112, 113. GENERAL BIOLOGY. Independent Study Program. The student's rate and method of study are given maximum independence under department supervision. Consult the chairman. Prerequisite: biology 100. 8 hours.

195. SEMINAR (1 + 0). Readings, discussions and reports on problems of historical and current interest in biology. Required of all prospective biology majors. Graded S or U. 1 hour.

201. DEVELOPMENT IN SEED PLANTS (2 + 4). A quantitative and developmental approach to the life history of the seed plant emphasizing the interactions of structures and processes. Prerequisite: general biology 112. 4 hours.

202. MAINTENANCE OF THE VASCULAR PLANT (2 + 4). The complementarity of structure and process in maintenance of the vascular land plant: mechanics; environmental exchange, formation and internal translocation of water, solutes and gases. Prerequisite: general biology 112. 4 hours.

213. NATURAL HISTORY (1 + 6). Recognition and identification of local biotic communities and their inhabitants. Field study emphasized. No prerequisite. 3 hours.

223. INVERTEBRATE ZOOLOGY (2 + 4). Invertebrate relationships including morphology, physiology, life cycles and taxonomy. Prerequisite: general biology 113. 4 hours.

231-232-233. ANATOMY AND PHYSIOLOGY (3 + 3). Basic principles of human body structure and function, including the physiology of exercise. Prerequisite: general biology 113. 12 hours.

234. THE ENVIRONMENT OF MAN (2 + 0). The interactions of man and his surroundings with emphasis on the problems arising from increasing human population. 2 hours.

290. SPECIAL TOPICS IN BIOLOGY. Graded S or U. 1-3 hours.

297. INTRODUCTION TO BIOLOGICAL INVESTIGATIONS. Minor investigations for qualified freshmen and sophomores. Graded S or U. 1 hour.

301-302-303. DEVELOPMENTAL ANATOMY (2 + 4). Biological principles involved in embryonic development, the structural changes and the resulting functional modifications of the vertebrates. Prerequisites: general biology 113. 12 hours.

331. PHYSIOLOGY (3 + 3). A structural and functional approach to the human body including physiological principles at the cellular, tissue and organ-system level. Prerequisites: general biology 113, one year of chemistry. 4 hours.

332-333. PHYSIOLOGY (3 + 3). A structural and functional approach to the human body including physiological principles at the cellular, tissue and organ-system level. Prerequisites: physiology 331, chemistry 233. 8 hours.

343. MICROTECHNIQUE (1 + 3). Principles and procedures used in the preparation of biological specimens for microscopic study. Open to juniors majoring in biology. Graded S or U. 2 hours.

350. RADIATION BIOLOGY (2 + 3). The common forms of ionizing radiation, their interaction with matter and their effect on living organisms. Prerequisite: two years of biology, one year of chemistry. 3 hours.

355. INTRODUCTION TO MARINE BIOLOGY. The various marine environments and the organisms that inhabit them. A field trip to a marine environment. May repeat for credit three times. Prerequisite: general biology 112. permission of instructor. 3 hours.

423. ECOLOGY (3 + 0). The distribution, abundance and productivity of organisms interacting among themselves and with their environment. Prerequisite: knowledge of the terms and symbols of calculus and descriptive statistics; comprehension of the concept of testing statistical hypotheses. 3 hours.
424. ECOLOGY FIELD STUDIES. Two
weekend field trips to study regional, eco-
system patterns in the Great Smoky Moun-
tains and in the Chicago Embayment of Lake
Michigan and pre-trip lecture attendance,
readings and map studies are required. Co-
requisite: biology 423. 1 hour.

430. GENETICS (3 + 0). The principles of
genetics as exemplified by microorganisms,
higher plants and animals. Mendelian, bio-
chemical, developmental and population
.genetics are considered. Prerequisite: biolo-
gy 113, one year of chemistry, statistics.
3 hours.

431. GENETICS LABORATORY (0 + 3).
Experiments which demonstrate genetic
phenomena. Drosophila, bacteria, micro-
scope slide and probability studies are em-
ployed. Corequisite: biology 430. 1 hour.

490. SPECIAL TOPICS IN BIOLOGY.
Graded S or U. 1-3 hours.

495. SEMINAR IN BIOLOGY. Graded S or
U. 1-3 hours.

497. INDEPENDENT STUDY IN BIOLOGY.
Graded S or U. 1-3 hours.

BUSINESS ADMINISTRATION AND ECONOMICS
(Department 131)

Professor Conklin; Associate Professor Young (Chairman); Assistant Pro-
fessors Kniffen (leave of absence), Goldberg; Instructors Meiningher, D.
Moore, Williamson; Lecturers DaPore, Gingrich.

The GEORGE WILLARD PATTON CHAIR OF ECONOMICS, endowed by the Richard King
Mellon Charitable Trusts of Pittsburgh, Pennsylvania, has been established beginning with
the academic year 1973-74. The 1975-76 recipient of this fully-endowed professorship is
Charles F. Conklin, professor of economics.

This department seeks to develop a basic understanding of the theories and principles
of economics and business administration as they apply to our modern economic system
and the organization and management of modern business enterprise.

The student entering this department has a choice of two major fields, business adminis-
tration and economics. In the field of business administration there are four areas of
concentration: accounting, finance, marketing, and management. Students whose major is
business administration must complete 330, 351 and 362. Students whose major is econom-
ics must complete 383 and 384 plus 9 hours of upper level economics courses.

A student majoring in the department must complete a minimum of 45 hours in the de-
partment including courses 131, 132, 133, 202, 203, 322, 352. In addition, students majoring
in business administration and economics are required to complete mathematics 142 and
143, probability and statistics.

For students interested in a career in public service, a supplemental area of concentration
is available in the department in public administration. Such a student would enroll in
courses such as urban government, urban sociology, urban planning (Civil Engineering
Department) and public administration. The department also cooperates with the college
of law in its guaranteed admission prelaw program.

000. ORIENTATION. Familiarization with
the department, requirements for majors,
planning program of courses, university
catalog and library. Required of depart-
mental majors. 1 hour.

100. ECONOMICS. The origins, charac-
teristics, and functions of our economic
organization. Current institutional arrange-
ments, the use of appropriate tools of eco-
nomics analysis; relevant economic and
social goals. 3 hours.
127. MUNICIPAL FINANCIAL SYSTEMS. Introduction to fund accounting; budgetary operations; cash flow; definitions and definitions of bond funds. 3 hours.

131-132-133. PRINCIPLES OF ACCOUNTING. Basic concepts and standards in accounting; their application to service, trading, and manufacturing concerns. The periodic determination of income, preparation of working papers and financial statements, flow of financial data, and financial analysis. 9 hours.

202. PRINCIPLES OF MICROECONOMICS. 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 factors of production. Actual cases from business. Prerequisite: economics 100. 3 hours.

203. PRINCIPLES OF MACROECONOMICS. 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: economics 100. 3 hours.

301-302-303. INTERMEDIATE ACCOUNTING. Income measurement and recognition, the matching process, financial statement and actuarial mathematics as applied to accounting problems, pensions and leases, tax allocation, price-level effects, funds flow, accounting changes. Prerequisite: accounting 133. 9 hours.

311-312. COST ACCOUNTING. Job order, process, and standard cost systems. Controls for material, labor, and overhead. Methods of cost allocation. Joint and by-product costs. Flexible budgets and the development of cost parameters. Prerequisite: accounting 133. 6 hours.

322-323. BUSINESS LAW. Legal aspects of common business transactions, contracts, sales and commercial papers. Business associations, their legal rights and responsibilities in agency, partnerships and corporations; governmental regulations of these relationships. 6 hours.

330. PRINCIPLES OF MANAGEMENT. The organization of firms. Modern management methods, decision making processes, procedures, physical equipment and standards. Organization and managerial relationships of major industrial functions. 3 hours.

341. LABOR ECONOMICS. Labor as a factor in production; labor mobility; theories of the determination of wages, and bargaining theory; history and methods of labor unions, and government relations to labor. Prerequisites: economics 202-203. 3 hours.

344. STATISTICAL TECHNIQUES IN ECONOMICS AND BUSINESS. Develops analytical tools in probability and probability distributions, estimation and hypothesis testing, Bayesian analysis, game theory, and sampling techniques; with appropriate example. Prerequisites: math 142-143. 3 hours.

348. URBAN ECONOMICS. 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: economics 202-203. 3 hours.

351. MARKETING. Management-oriented; concepts, processes, and problems of marketing; channels of distribution, marketing research, brands and price policies. 3 hours.

352. MONEY AND BANKING. Theories of money and credit; commercial banking practices; reserve banking; monetary and banking laws; money market; money and credit in the world economy. Prerequisites: economics 202-203. 3 hours.

354. FINANCIAL INSTITUTIONS. Managerial policies and decision-making concepts of commercial banks, savings and loan associations, mutual savings banks, and other financial institutions. 3 hours.
362. CORPORATION FINANCE. Handling and flow of corporate funds; problems of fixed and working capital, income level, dividend policy and the use of borrowing; case analysis used. 3 hours.

363. PERSONNEL MANAGEMENT. The functions of the personnel department in industry. Case analysis of problems in selection, training and incentives; the human factor in industry. Prerequisite: principles of management 330. 3 hours.

371. SALESMANSHIP. The principles, techniques and problems of salesmanship; sales management, recruiting, controlling and evaluating the sales force; market research, channels of distribution and pricing. 3 hours.

372. ADVERTISING. Advertising as a phase of the marketing process; selling appeals and types of advertising; consideration of copy and media; problems of publishing and broadcast advertising. 3 hours.

373. TRANSPORTATION. Waterway, railway, highway, pipeline and air transportation and their development in the U.S.; rates and their effect on location and development of industry; government regulation; and labor relations. Prerequisites: economics 202-203. 3 hours.

375. MERCHANDISING. Retail store location and layout, merchandise assortment, promotion and price policies, research in management theory, cost and expense analysis. 3 hours.

381. INCOME TAX. The Federal Income Tax structure as related to individuals and corporations, problems involving the law and regulations; tax areas applicable to different forms of business organization. 3 hours.

383. INTERMEDIATE MICROECONOMIC THEORY. Special problems of pricing, production, and distribution under perfect competition, oligopoly, duopoly, and monopoly in the American economy. Prerequisites: economics 202-203. 3 hours.

384. INTERMEDIATE MACROECONOMIC THEORY. The principles, measurement, analysis, and control of aggregate economic activity; the role of consumption, investment and saving in achieving a full-employment output, economic growth, and price stability. Prerequisites: economics 202-203. 3 hours.

385. INTERNATIONAL ECONOMICS. 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: economics 202-203. 3 hours.

391. BUSINESS COMMUNICATIONS. The techniques of writing business letters and reports; efficient and accurate communication of economic and business facts and presentation of conclusions for management decision-making; further study of English for self-improvement. Course is graded S or U. 3 hours.

403-404. AUDITING. Auditing accounting records and statements, techniques of verifying financial statement items, preparation of working papers, and the writing of audit reports for complete audit. Prerequisite: intermediate accounting 303. 6 hours.

411. COMPARATIVE ECONOMIC SYSTEMS. 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: economics 202-203. 3 hours.

423. PUBLIC FINANCE. How the Federal government and local units of government finance themselves; taxation in its many forms, the securities issued by government units and the national debt of the United States. Prerequisites: economics 202-203. 3 hours.
432. ACCOUNTING INFORMATION SYSTEMS. Theory and procedure for designing, installing, and maintaining accounting information systems for collecting, recording, analyzing, and presenting financial data. Prerequisites: intermediate accounting 303. 3 hours.

433. DATA PROCESSING. To prepare managers to understand electronic data processing equipment and its uses. Prerequisites: management 330, accounting 133. 3 hours.

434. MARKETING RESEARCH. Research design, data collection methods, sampling techniques, tabulation and analysis of information concerning problems in marketing. Prerequisite: marketing 351. 3 hours.

442. ECONOMIC HISTORY OF THE UNITED STATES. 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. 3 hours.

443. HISTORY OF ECONOMIC THOUGHT. The development of economic thought from Greek and Hebrew writers to modern economists: Adam Smith, Malthus, Ricardo, Marx, Marshall, Keynes and modern economists. 3 hours.

461. INVESTMENTS. Problems of investment policy: types of investment risks, the analysis of investment requirements, and types of investment policies. Problems of both individuals and institutional investors. Prerequisite: corporation finance 362. 3 hours.

462. INSURANCE. Chief applications of insurance: life, health and disability, fire casualty and marine; corporate bonding, pensions and group insurance, actual insurance, actual insurance problems presented by experienced operatives. 3 hours.

472-473. CPA PROBLEMS. A comprehensive review of the application of accounting principles, using specific problem situations, and development of approaches to problem solving. Intensive preparation for CPA examination. Courses are graded S or U. Prerequisite: auditing 403. 6 hours.

490. SPECIAL TOPICS IN ECONOMICS. 1-3 hours.

491. SPECIAL TOPICS IN MANAGEMENT. 1-3 hours.

492. SPECIAL TOPICS IN ACCOUNTING. 1-3 hours.

494. SEMINAR IN ECONOMICS. 1-3 hours.

495. SEMINAR IN MANAGEMENT. 1-3 hours.

496. SEMINAR IN ACCOUNTING. 1-3 hours.

497. INDEPENDENT STUDY IN ECONOMICS. 1-2 hours.

498. INDEPENDENT STUDY IN MANAGEMENT. 1-2 hours.

499. INDEPENDENT STUDY IN ACCOUNTING. 1-2 hours.
CHEMISTRY
(Department 122)

Professors Bettinger, Wilhelm (Chairman); Associate Professors Haight, Hawbecker; Assistant Professors Crouse, Kurtz, Putnam; Instructor Gohar

The Department of Chemistry is on the list of departments approved by the American Chemical Society for the professional education of chemists.

The objectives of this department are to help serve the modern 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.

MAJOR IN CHEMISTRY

I. A program recommended for those who wish to become chemists or follow a preprofessional program such as premedicine, or intend to pursue graduate study includes the following courses: 182, 183, 241, 242, 243, 304, 324(3), 341, 342, 343, 351 and 494.

For the student who wishes to be certified as a professional chemist by the American Chemical Society, the following courses must be added: 324(4), 451, 462, 497 and two of the following units: I, chemistry 473; II, chemistry 474; III, chemistry 476; IV, chemistry 481-482-483; V, an advanced mathematics or physics course approved by the department.

II. A modified major is available for those who wish to prepare for related areas such as certain medical science areas, sales or management in the technical industries, patent law, scientific communication and information retrieval, environmental science, and so forth. This program provides an opportunity to elect more work in areas that support the student's chemistry-related career goal. The student is encouraged to assist in designing his program within the following framework: chemistry 182, 183, 241, 242, 243, 304, 324, 351, 494 and a minimum of 12 credit hours from 300-400 level courses in the Division of Mathematics and Natural Science or other 300-400 level courses acceptable to the department. In addition, two of the following three cognate units are required: I, physics 211-212-213 or 231-232-233; II, three mathematics courses beyond mathematics 100; III, biology 100, 112, 113.

A comprehensive examination must be taken during the senior year by all chemistry majors.

000. ORIENTATION. (1 + 0). Familiarization with the department, requirements for majors, planning program of courses, university catalog and library. Required of departmental majors. 1 hour.

100. CHEMISTRY. (3 + 1). Orientation to and understanding of the fundamental nature of chemistry; models and measurements. Chemistry 171 recommended for science majors. Both chemistry 100 and chemistry 171 may not be counted for credit. 3 hours.

101. ENVIRONMENTAL CHEMISTRY. (3 + 0). A topical study of chemicals in our environment, their origin, beneficial uses, harmful effects, and potential disposal methods. Prerequisite: chemistry 100 or chemistry 171. 3 hours.

102. CHEMICAL SYNTHETICS. (3 + 0). A topical study of the chemistry of the synthetic materials in common use, including plastics, cleaning agents, agricultural chemicals and medicinal chemicals. Prerequisite: chemistry 100 or chemistry 171. 3 hours.
171-172. INTRODUCTORY CHEMISTRY I AND II. (3 + 3 and 3 + 3). Fundamental principles and use of modern theories, models and periodic relationships to explain observable facts. The laboratory illustrates basic principles and includes the study of ions in aqueous solution. Both chemistry 100 and chemistry 171 may not be counted for credit. High school chemistry is desirable. 4 + 4 hours.

173. INTRODUCTORY CHEMISTRY III. (3 + 6). Includes elementary quantitative analysis. Prerequisite: chemistry 172. 5 hours.

181-182-183. INTRODUCTORY CHEMISTRY FOR MAJORS. (3 + 3, 3 + 3, 3 + 6). The same lecture and laboratory as chemistry 171, 172, and 173. 4 + 4 + 5 hours.

231-232-233. ORGANIC CHEMISTRY. (3 + 3). An application of the modern approach of bonding, structure, synthesis, and mechanisms to the chemistry of organic compounds. The laboratory program emphasizes special laboratory techniques and synthetic procedures, including modern methods of separation and identification. Prerequisite: chemistry 173 or chemistry 183. 4 + 4 + 4 hours.

241-242. ORGANIC CHEMISTRY FOR MAJORS. (3 + 3). The same lecture and laboratory as chemistry 231-232. Prerequisite: chemistry 173 or chemistry 183. 4 + 4 hours.

243. ORGANIC CHEMISTRY FOR MAJORS. (3 + 6). 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 chemistry 242. 5 hours.

297. INDEPENDENT STUDY IN CHEMISTRY. 1-3 hours.

304. ORGANIC SYNTHESIS. (2 + 6). Lecture emphasizes planning of organic synthetic sequences including use of the chemical literature in so doing. Laboratory stresses modern methods of organic synthesis, multi-step processes and more difficult synthetic procedures. Prerequisite: chemistry 233 or 243. 4 hours.

324. INTERMEDIATE INORGANIC CHEMISTRY. (2 + 3 or 2 + 6). Preparation, properties and reactions of elements and their compounds in terms of modern concepts. Laboratory involves application of fundamental techniques to the synthesis of compounds and the systematic study of their properties and reactions. Prerequisite: chemistry 233 or 243. 3 or 4 hours. (4 hours required for ACS certified program).

341. PHYSICAL CHEMISTRY I. (3 + 3). Fundamentals: primarily thermodynamics. Laboratory illustrates principles. Prerequisite: physics 231, 232, 233; mathematics 263; and chemistry 173 or 183. 4 hours.

342-343. PHYSICAL CHEMISTRY II AND III. (3 + 3 and 3 + 3). Fundamentals: kinetics, quantum theory and structure of matter. Laboratory illustrates principles. Prerequisite: chemistry 341. Corequisite: chemistry 351. 4 hours.

351. INTERMEDIATE QUANTITATIVE ANALYSIS. (2 + 6). Fundamental theory of separations and analysis including application to volumetric, gravimetric and instrumental procedures. Prerequisite: chemistry 233 or 243. 4 hours.

451. ADVANCED INORGANIC CHEMISTRY. (4 + 0). Chemical principles and bonding theory applied to the study of inorganic systems. Prerequisite: chemistry 324 and 343. 4 hours.

462. ADVANCED ANALYTICAL CHEMISTRY. (3 + 3). Theory and practice of instrumental analysis. Prerequisite: chemistry 324, 343 and 351. 4 hours.

473. ADVANCED TOPICS IN PHYSICAL CHEMISTRY. (3 + 0). Prerequisite: chemistry 343, mathematics 264 and reading knowledge of German. 3 hours.

474. THEORETICAL ORGANIC CHEMISTRY. (3 + 0). Deals at an advanced level with the relationship between structure and reactivity of organic compounds with an emphasis on reaction mechanisms. Prerequisite: chemistry 304 and 343 and a reading knowledge of German. 3 hours.
476. NUCLEAR CHEMISTRY. (2 + 3).
Fundamentals of radioactive transformation, nuclear reactions, chemical effects of ionizing radiation, chemical effects of nuclear reactions, chemical effects of ionizing radiation, chemical effects of nuclear transformations and use of radiotracers in chemical studies. Prerequisite: chemistry 304 and 324 and a reading knowledge of German. Corequisite: chemistry 343. 3 hours.

481-482-483. SENIOR RESEARCH I, II AND III. Prerequisite: chemistry 304, 324, 343, reading knowledge of German and approval of chairman. 2 + 2 + 1 hours.

490. SPECIAL TOPICS IN CHEMISTRY.
1-3 hours.

494. SEMINAR IN CHEMISTRY. Required of all senior chemistry majors. Course marked S or U. 1-3 hours.

497. INDEPENDENT STUDY IN CHEMISTRY. Prerequisite: approval of chairman. 1-3 hours.

EDUCATION
(Department 141)

Professors Hanson (on leave 74-75), Miller, Rubeck, Vayhinger (Chairman); Associate Professors Boger, Crider; Assistant Professors Haynes, Perry, Traxler; Instructor Ruck; Lecturer Lloyd.

The Teacher Education Program is designed to provide the prospective teacher with the general education, subject area concentration, and professional educational experiences that will enable him to enter the profession of teaching with competency.

A Provisional Certificate valid for four years is issued by the State of Ohio to students who earn the baccalaureate degree, including at least 32 credits for secondary certification or 48 credits for elementary certification, and are recommended by the college as having desirable personal qualities.

Students in teacher education are required to complete at least 300 hours of approved field and clinical experience prior to student teaching. Of the 300, at least 50 hours must be in clinical experience, and at least 150 hours in school-related experiences. Requirements are described in "The Field Experience Program", available in the department office.

**All students preparing to teach are required to:**

A. Make formal application for admission to the Teacher Education Program during the third quarter of their sophomore year.

B. Have for acceptance:
   1. An accumulative average of 2.25 in their major field, and 2.0 total average.
   2. Favorable recommendations from advisors, major department, Dean of Women or Men, and Health Department.
   3. Action by the Liberal Arts Committee on Teacher Education.
C. Meet the requirements in an area of concentration under the appropriate chairman.

1. ELEMENTARY EDUCATION

a. Provisional Elementary Certificate. Professional education requirements:
   - education 100 — education 3 hours
   - education 223 — child psychology 3 hours
   - education 250 — instructional media 3 hours
   - education 308 — teaching mathematics 3 hours
   - education 309 — teaching science 4 hours
   - education 310 — children’s literature 3 hours
   - education 311 — teaching social studies 4 hours
   - education 312 — teaching language arts 4 hours
   - education 314 — teaching reading 4 hours
   - education 381 — elementary school curriculum 3 hours
   - education 470-471 — student teaching 15 hours
   - elective in education 3 hours
   - total education 100 + 49 hours

b. Dual — Elementary Education with Special Education, EMR (Educable Mentally Retarded).
   Cooperative Program with Bowling Green State University. Student meets all Elementary Education requirements. Ohio Northern University components: psychology 423, education 410, education 415, education 471. Bowling Green State University components: EDSE 434, 435, 436, 437, 438 at Bowling Green; student teaching EDCO 381, 5 weeks in EMR.

c. Dual — Elementary Education with Special Education, LD/BD (Learning Disabilities/Behavior Disorders); Cooperative with Bowling Green State University.
   Student meets all Elementary Education requirements. Ohio Northern University components. Psychology 423, education 410, education 415, education 471. Bowling Green State University components: EDSE 443, 453, 454, 438 at Bowling Green; student teaching EDCO 382, 5 weeks in LD/BD.

d. Dual — Elementary Education with Kindergarten-Primary. Completion of education 329, 330, 331 — 9 hours.

e. Dual — Elementary Education with concentrations in: French for elementary grades; music for elementary grades; physical education for elementary grades; Spanish for elementary grades; and visual art for elementary grades. See departments listed for specific program.

f. Dual — Elementary Education with Teaching Field in Secondary Education. See departments for programs.

2. SPECIAL CERTIFICATION AREAS — ELEMENTARY AND SECONDARY, GRADES 1-12. For program of studies in the following areas, see the appropriate department chairman: art education; health education; music education; and physical education.

3. SECONDARY EDUCATION
   Requirements for certification in the various secondary teaching fields may be obtained from the Office of the Director of Teacher Education. Students preparing to teach in secondary schools are required to complete a minimum of 75 percent of a major in a subject matter department in the College of Liberal Arts, complete 300 hours of field experiences and have the endorsement of the department chairman before qualifying for student teaching.
Secondary Certification programs are offered in the following areas:

- Art, Visual
- Biological Science
- Bookkeeping-Basic Business
- Chemistry
- Comprehensive Social Studies
- Driver Education (Validation)
- Economics
- English
- General Science
- Health
- History
- Industrial Arts
- Languages: French, Spanish
- Mathematics
- Music
- Physical Education
- Physics
- Political Science
- Sales-Communication
- Social Psychology
- Sociology
- Speech
- Special Education (LD/BD)
  (with Bowling Green State University)

Professional Education requirements:

- education 100 — education 3 hours
- education 224 — adolescent psychology (Preq.: psych. 100) 3 hours
- education 375 — school, society and secondary curriculum 6 hours
- education 450 — secondary methods of teaching 3 hours
  OR a methods course in the major field:
  - education 452 English
  - education 453 social sciences
  - education 454 mathematics
  - education 456 science
  - education 456 foreign language
  - art 457
  - health 350
  - industrial arts 423
  - music 361-362
  - physical education 351
- education 480-481 — student teaching 15 hours
- elective in education selected from courses listed below: 2 hours
  - total 32 hours

Elective from the following courses:

- education 250 — instructional media with lab 3 hours
- education 251 — instructional media lab only 1 hour
- education 401 — history and philosophy of education 3 hours
- education 402 — school organization & administration 3 hours
- education 460 — evaluation and measurement 3 hours
- education 463 — educational psychology 3 hours
- education 465 — comparative education 3 hours
GENERAL COURSES

000. ORIENTATION. Familiarization with the department, requirements for majors, planning program of courses, university catalog and library. Required of departmental majors. 1 hour.

100. EDUCATION. Areas of competence essential for participation as a citizen in decision making for education: the changing role of the school, the learner and the learning process, values that give direction to education, current issues in education. 3 hours.

250. INSTRUCTIONAL MEDIA IN EDUCATION. Preparation, study and evaluation of instructional materials; their uses in the promotion of the learning process. Includes lab for development of competence in operating audio-visual equipment and preparing instructional materials. 3 hours.

251. INSTRUCTIONAL MEDIA LABORATORY. Development of competence in operating audio-visual equipment and preparing instructional materials. May be taken without education 250. 1 hour.

370. SCHOOL AND SOCIETY. Schools in relation to their supporting society; democracy in its relation to schools; the responsibilities of educators to the community and to the school; the nature, type and limitations of both the official and unofficial controls of schools. No prerequisite. 3 hours.

401. HISTORY AND PHILOSOPHY OF EDUCATION. Modern educational practice; historical changes in instructional processes and ideas; educational beliefs and points of view; the purpose of education in the United States democracy. 3 hours.

402. SCHOOL ADMINISTRATION AND ORGANIZATION. The United States public school system, its organization and administrative units, and other agencies through which it is managed. The teacher’s role in the organization of a school system. 3 hours.

420. CURRICULUM IMPROVEMENT. Individual and group problems growing out of students’ own school situations. 3 hours.

460. EVALUATION AND MEASUREMENT OF PUPIL PROGRESS. Evaluation and measurement as they apply to instruction. 3 hours.

463. EDUCATIONAL PSYCHOLOGY. The learner, the learning process, and conditions that promote learning. Application of psychological principles to teaching in the classroom. 3 hours.

465. COMPARATIVE EDUCATION. The development of education systems in representative countries of the world. A comparison of purposes, programs and structures of education. The interaction of different cultures with their education systems. 3 hours.

490. SPECIAL TOPICS IN EDUCATION. 1-3 hours.

494. SEMINAR IN EDUCATION. 1-3 hours.

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

ELEMENTARY EDUCATION COURSES

200. CHILD DEVELOPMENT PRACTICUM. Assignment as a regular assistant in the Child Development Center, working in the Nursery School. Registration with permission of the department chairman. 1 hour.

223. CHILD PSYCHOLOGY. Characteristics of the child at different levels of maturity; physical, mental and emotional growth; growth and organization of meanings; control of social and ethical behavior; development of personality. Includes Clinical Experience for Teacher Education students. Prerequisite: psychology 100. 3 hours.

308. TEACHING MATHEMATICS IN THE ELEMENTARY SCHOOL. Content, methods and materials reflecting the current emphasis in mathematics. Development of functional relationships with other curriculum areas. Prerequisite: 9 hours of college math, education 223. 3 hours.
309. TEACHING SCIENCE IN THE ELEMENTARY SCHOOL. The role of science in childhood education, the preparation of materials, and organization of learning activities for problem solving. Prerequisite: 10 hours of college science, education 223. 4 hours.

310. CHILDREN'S LITERATURE. Knowledge and appreciation of children's books. Audiovisual aids, up-to-date study, critical aids and enjoyment of representative selections. 3 hours.

311. TEACHING SOCIAL STUDIES IN THE ELEMENTARY SCHOOL. Objectives, trends, issues, and evaluation of the teaching of social studies relative to the concepts and principles underlying the disciplines of the social sciences. Prerequisite: education 223, 15 hours of college social sciences. 4 hours.

312. TEACHING LANGUAGE ARTS IN THE ELEMENTARY SCHOOL. Principles and methods of teaching language arts including listening, speaking, English, spelling, and creative experiences in relation to other subjects in the curriculum; the preparation and evaluation of language arts materials. Prerequisite: education 223, 18 hours of college English, 3 hours of speech. 4 hours.

314. TEACHING READING IN THE ELEMENTARY SCHOOL. Materials, principles, and problems underlying the teaching of reading including new concepts, preparation and evaluation of reading materials. Prerequisite: education 223, 312. 4 hours.

329. PRINCIPLES OF KINDERGARTEN EDUCATION. History, philosophy and current development of kindergarten education as a part of early childhood education. Introduction to field of early childhood education. Prerequisite: Education 223. 2 hours.

330. METHODS AND MATERIALS IN KINDERGARTEN. Curriculum planning and organization, teaching processes, development of materials. Observation and field experiences. Prerequisite: education 330. 3 hours.

331. PRACTICUM IN KINDERGARTEN EDUCATION. Supervised field experience on a sequential basis. Includes seminars. Prerequisite: Education 331. 4 hours.

381. ELEMENTARY SCHOOL CURRICULUM. An analysis of the elementary school with emphasis placed on problems, issues, and alternate proposals for humanizing school life. Prerequisite: 6 hours of elementary methods courses. 3 hours.

410. INTRODUCTION TO SPECIAL EDUCATION. Developmental growth and learning characteristics; etiology; diagnosis and differentiation; teacher and learner problems in education. Juniors, seniors and graduates. 3 hours.

411. LANGUAGE ARTS IN SPECIAL EDUCATION. Methods, materials for functional communication skills. Seniors and graduates. 3 hours.

412. MATHEMATICS AND SCIENCE IN SPECIAL EDUCATION. Methods, materials for basic mathematic and science concepts; practical application. Seniors and graduates. Not offered 1975-76. 3 hours.

413. SOCIAL STUDIES IN SPECIAL EDUCATION. Problems and deviations in civic, social and cultural behavior and adequacy. Seniors and graduates. Not offered 1975-76. 3 hours.

415. EDUCATION OF CHILDREN WITH LEARNING DISABILITIES (LD). Ways to promote learning with atypical children from mental, social and physical standpoints. Emphasis on children with classroom associated difficulties. Introductory for area. Prerequisite: education 223 or 224, 410, or permission of the instructor. 3 hours.

417. SPECIAL EDUCATION PROGRAM, BOWLING GREEN STATE UNIVERSITY. Courses provided by arrangement with BGSU; Fall. Prerequisites: education 223 or 224, 410, 415, psychology 423, permission of teacher education chairman. 5-15 hours.
418. SPECIAL EDUCATION PROGRAM, BOWLING GREEN STATE UNIVERSITY.
Courses provided by arrangement with BGSU, Winter. Prerequisites: education 223 or 224, 410, 415, psychology 423, permission of teacher education chairman. 5-15 hours.

419. SPECIAL EDUCATION PROGRAM, BOWLING GREEN STATE UNIVERSITY.
Courses provided by arrangement with BGSU, Spring. Prerequisites: education 223 or 224, 410, 415, psychology 423, permission of teacher education chairman. 5-15 hours.

441. ADVANCED READING METHODS AND MATERIALS. Advanced study of the reading process, comprehension and speed, skills; prevention and treatment of individual problems. Not offered 1975-76. Prerequisite: education 341. 3 hours.

470-471. STUDENT TEACHING IN THE ELEMENTARY GRADES. Planning and teaching under supervision in the elementary grades; weekly seminar on campus. Prerequisites: 2.0 total cumulative average; average of 2.25 with grade of “C” in all required education courses; education 308, 309, 311, 312, 314; at least 300 hours of approved field experiences; a desirable teaching personality including interest in teaching, social adaptability, the ability to get along with people, responsibility and high moral standards; effective communicative skills in speaking and writing; approved by the director of teacher education. 7, 8 or 15 hours.

472. STUDENT TEACHING — SPECIAL EDUCATION, ELEMENTARY, BGSU. Teaching under supervision in special education classrooms, elementary grades, with weekly seminars. Prerequisites: 2.0 total grade average; average of 2.25 in major and all required education courses; completion of education 223, 410, 415, psychology 423, BGSU courses; completion of 300 hours of approved field experiences; approval by teacher education chairman. 4-9 hours.

SECONDARY EDUCATION COURSES

224. ADOLESCENT PSYCHOLOGY. The adolescent, his physical, social, emotional, and intellectual development; in accordance with genetic constitution and environmental forces from birth. Includes clinical experience for teacher education students. Prerequisite: psychology 100. 3 hours.

342. DEVELOPMENTAL READING IN THE SECONDARY SCHOOL. Principles and materials that aid in developing reading abilities. Diagnosis of reading disabilities. Development of programs to help students improve reading skills. Open to English majors or by permission of the instructor. Prerequisite: education 224. 1-3 hours.

375. SCHOOL, SOCIETY AND THE SECONDARY CURRICULUM. The interrelation of society, school and the secondary curriculum; class and laboratory experiences provided in area schools. Schools in relation to their supporting society; democracy in its relation to schools; responsibilities of educators to the community; nature, type and limitations of official and unofficial controls. Secondary school curriculum standards, practices, instructional materials, curriculum development, functions, changes and trends. Prerequisite: education 224. 6 hours.

380. THE SECONDARY SCHOOL CURRICULUM. Secondary school curriculum standards, practices, instructional materials, curriculum development, functions, changes and trends. Prerequisite: education 224. 3 hours.

450. TEACHING METHODS IN THE SECONDARY SCHOOL. Methods, devices, and techniques which are most effective in directing learning in the various subject areas at the high school level; observations and participation in actual classroom situations. Prerequisite: education 224, and admission to teacher education. 4 hours.
452. TEACHING METHODS IN SECONDARY SCHOOL ENGLISH. Methods, devices and techniques which are most effective in directing learning in secondary classes in English; observation, participation and evaluation in actual classroom situations. (Taken 1 hour per quarter for 3 quarters.) Prerequisite: education 224. 1-3 hours.

453. TEACHING METHODS IN SECONDARY SCHOOL SOCIAL STUDIES. Similar to education 450. Prerequisite: education 224. 3 hours.

454. TEACHING METHODS IN SECONDARY SCHOOL MATHEMATICS. Similar to education 450. Prerequisite: education 224. 3 hours.

455. TEACHING METHODS IN SECONDARY SCHOOL SCIENCE. Similar to education 450. Prerequisite: education 224. 3 hours.

456. TEACHING METHODS IN SECONDARY SCHOOL FOREIGN LANGUAGE. Similar to education 450. Offered on demand. Prerequisite: education 224. 3 hours.

480-481. STUDENT TEACHING — JUNIOR AND SENIOR HIGH SCHOOL. Planning and teaching under supervision in the junior or senior high school full time five days per week in major teaching field; weekly seminar on campus. Prerequisite: senior rank; average of 2.25 or higher in major area plus education, with grade of "C" or better in all required education courses; 2.0 total cumulative average minimum; education, 224, 375, 450 or subject methods; at least 300 hours of approved field experiences, a desirable teaching personality, including interest in teaching, social adaptability, the ability to get along with people, responsibility and high moral standards; effective communication skills in speaking and writing; approved by the director of teaching education and the chairman of his major department. 8 (Special only), or 15 hours.

482. STUDENT TEACHING — SPECIAL EDUCATION, SECONDARY, BGsu. Teaching under supervision in special education classrooms, secondary grades, with weekly seminars. Prerequisites: 2.0 total grade average; average of 2.25 in major and all required education courses; completion of education 224, 410, 415, psychology 423, BGsu courses; completion of 300 hours of approved field experience; approval by teacher education chairman. 4-9 hours.

ENGLISH

(Department 112)

Professors C. Dornbusch (Chairman), Price; Visiting Professor Chang; Associate Professors Banks, Beck, Bennett, Oliver, R. Robinson; Assistant Professors Belch, E. Miller, Shafer.

OBJECTIVES:

The courses in English are designed to help the student demonstrate an awareness of style and the ability to express himself maturely, clearly, concisely; understand generally the symbolic process of language and particularly the structure and usage of the English language; read critically and creatively as a regenerating means of gathering, understanding, evaluating, and enjoying recorded human experience; comprehend the growth and continuity of Western ideas and confront the humanizing values of the Western World through the study of literature; be able to analyze a piece of literature by applying some of the techniques of the specialist; respect and understand the techniques of research and the
accomplishments of scholarship in the discipline of English; and recognize the relationship of language and literature to other areas of knowledge.

Advanced courses increasing the breadth and depth of the above objectives are offered as humanities electives and as part of the curriculum for majors who plan to teach in the public school or do graduate study in English.

Career opportunities are available to the English major who takes additional courses in other disciplines to go directly into business or into graduate work in law, medical arts, or business.

To meet the 45-hour minimum for a major in English, the following courses are required: 195 (counts as L.A. Orientation); 295, 305 or 306, 311 or 312 or 313; four of the following: 310, 314, 321, 322, 323, 324, 361, 362, 494 (two additional quarters of Shakespeare may count toward this requirement); two of the following: 337, 338, 339, 363, 495; 351-352, 381 (recommended to be taken in junior year); 410, 490 or 494 or 495 (may count as three hours toward the appropriate requirements above), and two free electives in English (journalism activities may not be counted).

Also required are one year of English history and either (1) intermediate foreign language at the college level or (2) three courses in philosophy beyond philosophy 100. The major is, however, strongly urged to take both the intermediate language and the three courses in philosophy.

100, 101, 102 do not count toward a major in English, nor does any course with a grade below "C". A senior comprehensive — namely, the Undergraduate Record Examination in Literature — is required.

English 100, 101, 102 may be taken in any order. The student must schedule one of the three courses in English every quarter until he has received credit in all three.

100. ENGLISH. Critical thinking and writing based upon studies in fiction. 3 hours.

101. ENGLISH. Critical thinking and writing based upon studies in drama. 3 hours.

102. ENGLISH. Critical thinking and writing based upon studies in poetry. 3 hours.

English 100, 101, 102 are prerequisites for all other courses in English (unless otherwise noted).

195. PROSEMINAR IN ENGLISH. Orientation to the college of liberal arts and to the department of English. Required of all freshmen and transfer majors in the fall quarter Counts as L.A. Orientation. 1 hour.

200. PROBLEMS IN CRITICISM. Definitions of art, literature, and genres; the language of critical statements; concepts of taste; literature in critical perspectives. 3 hours.

205. MAJOR WRITERS BEFORE 1700. Selected works of ancient classical writers, Chaucer, Shakespeare, and Milton. 3 hours.

206. MODERN MASTERS OF LITERATURE. Selected major writers from 1700 to the present. 3 hours.

241. NEWS WRITING. The discipline and technique of writing for a newspaper. 3 hours.

242. FEATURE AND EDITORIAL WRITING. The discipline and technique of writing newspaper feature stories and editorials. 3 hours.

250. JOURNALISM ACTIVITIES — NEWSPAPER.

251. JOURNALISM ACTIVITIES — MAGAZINE.
252. JOURNALISM ACTIVITIES — YEARBOOK.

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 three areas (250, 251, 252) may be counted toward graduation. Journalism activities do not count toward a major in English. No prerequisites. 1 hour.

290 SPECIAL TOPICS IN ENGLISH. 1-3 hours.

295. SEMINAR IN LITERARY THEORY AND APPROACHES. Definitions and functions of literature, critical approaches applied to specific works in the various genres, English bibliography. (Intended for sophomore and transfer majors, fall quarter). 3 hours.

297. INDEPENDENT STUDY IN ENGLISH. 1-3 hours.

305. ANCIENT AND MEDIEVAL CLASSICS. The major literary achievements of the ancient and medieval periods and their influence on Western thought and tradition. All works will be read in English translation. 3 hours.

306. CONTINENTAL RATIONALISM AND ROMANTICISM. European literary masterpieces from the Renaissance to the mid-twentieth century. All works will be read in English translation. 3 hours.

310. ENGLISH LITERATURE BEFORE 1500. Continuity in Anglo-Saxon attitudes and types from Beowulf to Chaucer. Epic, lyric, elegy, narrative with emphasis on medieval romance, and drama, all in translation. 3 hours.

311-312-313. SHAKESPEARE. Representative plays and poems with special consideration given to a major comedy, a history play, and two tragedies each quarter. The three courses are independent and complementary; each is designed to afford a cross section of Shakespeare’s dramatic art. 9 hours.

314. ENGLISH RENAISSANCE. Selected poetry, prose, and drama of the Elizabethan and Jacobean periods, with emphasis upon Sidney, Spenser, Donne, Marlowe, and Jonson. 3 hours.

321. MILTON. Milton’s major lyric poems, Paradise Lost, and Samson Agonistes. 3 hours.

322. RESTORATION AND THE EIGHTEENTH CENTURY. Major writers of the Neoclassical Period. 3 hours.

323. ENGLISH ROMANTICISM. Selected prose and poetry of Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats. 3 hours.

324. VICTORIAN PERIOD. Victorian attitudes, conflicts, and conditions as reflected in the major prose and poetry of the age. 3 hours.

325. MODERN POETRY. A survey of modern English and American poets with emphasis on one or two major figures such as Yeats and Frost. 3 hours.

333. MODERN WORLD DRAMA. The study of neoteric and contemporary drama, concentrating on major works and playwrights, including influences, movements and types. 3 hours.

337. AMERICAN LITERATURE: BEGINNINGS. Chronological study of the development of an American literature, including 17th-century colonial writings, Puritan thought and influence, 18th-century idealism and rationalism, and the beginnings of romanticism with Irving and Poe. 3 hours.

338. AMERICAN LITERATURE: MIDDLE PERIOD. Emerson, Thoreau, Hawthorne, Melville, Whitman, Dickinson, and their contemporaries. 3 hours.

339. AMERICAN REALISM AND NATURALISM (1865-1918). The decline of romanticism and the rise of realism and naturalism in American literature with emphasis on the works of such representative authors as Howells, Twain, James, Crane, and Dreiser. 3 hours.
341. POETRY WRITING. The discipline and technique of writing poetry. Prerequisite: a literature course above the freshman level. Graded S or U. May be continued as 498 (independent study in writing). 3 hours.

342. FICTION WRITING. The discipline and technique of writing fiction. Prerequisite: a literature course above the freshman level. Graded S or U. May be continued as 498 (independent study in writing). 3 hours.

343. FACTUAL WRITING. The theory, method, and practice of writing non-fictional prose, with particular emphasis on the development of effective style. Prerequisite: a literature course above freshman level. Graded S or U. May be continued as 498 (independent study in writing). 3 hours.

351-352. THE ENGLISH LANGUAGE. The historical development of the English language and an introduction to modern linguistics. 6 hours.

361. EARLY BRITISH NOVEL. Development of the novel as a literary form from Defoe to George Eliot. 3 hours.

362. MODERN BRITISH NOVEL. Development of the modern novel as a literary form from Hardy to the present. 3 hours.

363. MODERN AMERICAN FICTION. The development of the American novel after World War I with emphasis on the major novelists. 3 hours.

381. HISTORY OF LITERARY CRITICISM. Movements and major writers of literary criticism. 3 hours.

410. CHAUCER. A study of Chaucer with special emphasis on The Canterbury Tales, some reading of the chief literary forms of the Middle Ages, some skill in understanding and reading Middle English. 3 hours.

490. SPECIAL TOPICS IN ENGLISH. 1-3 hours.

494. SEMINAR IN ENGLISH LITERATURE. 3 or 6 hours.

495. SEMINAR IN AMERICAN LITERATURE. 3 or 6 hours.

497. INDEPENDENT STUDY IN LITERATURE. 1-3 hours.

498. INDEPENDENT STUDY IN WRITING. Graded S or U. 1-3 hours.

FOREIGN LANGUAGES
(Department 113)

Associate Professors Lippert (Chairman, leave of absence — 1973-75), Martinez, Sagonowsky; Assistant Professor Davey; Instructors Bandy, Minsky.

The foreign language program is designed to train students to speak, read and write a foreign language; to insure a strong background in the literature and culture of the people 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 language at the elementary and secondary levels. (See departmental brochure for descriptions of career opportunities.)

The new air conditioned University Audio Center provides the student with opportunities for language practice and extends his 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 are also available which give the student ample opportunity for aural comprehension, auditory-visual drill speaking, and self-correction.

Requirements for a major in a foreign language:

For a major in French or Spanish, 45 hours are required above the 100 level courses, to include 411-412-413 (French) or 441-442-443 (Spanish). Students develop individual programs of study with advisors. Ordinarily courses are taken in sequence through the conversation and composition courses. A comprehensive examination is required for graduation.

It is strongly recommended, although not required, that language majors take part in summer study abroad or junior year abroad programs. Faculty advisors 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.

000. ORIENTATION. 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. 1 hour.

100-101. ELEMENTARY FRENCH 1 AND 2. To develop the ability to understand, speak, read and write French; functional, rather than formal grammar, early and fluent speaking; elementary reading based on French life, customs, and manners. Four class periods and two hours of scheduled laboratory practice per week. 8 hours.

214-215. INTERMEDIATE FRENCH 1 AND 2. A review of fundamentals of grammar and pronunciation. Abundant conversational practice and composition based on short stories, plays, and poetry. Occasional lectures on French life, history, architecture, art, and civilization. Four class periods and two hours of scheduled laboratory practice per week. Prerequisite: 101 or proficiency established by placement examination. 8 hours.

290. SPECIAL TOPICS IN FRENCH. 1-3 hours.

297. INDEPENDENT STUDY IN FRENCH. 1-3 hours.

311-312-313. FRENCH CONVERSATION AND COMPOSITION. To develop a useful command of the language: readings, slides, recordings, current periodicals and realia are used to stimulate conversation. A study of grammatical and phonetic problems aimed at perfecting clarity and accuracy of expression. Three class periods and two hours of scheduled laboratory practice per week. Prerequisite: 214-215 or proficiency established by placement examination. 12 hours.

314-315-316. SURVEY OF FRENCH LITERATURE. A study of the main currents of French literature. Class discussions based on the reading of representative French masterpieces. Prerequisites: 214-215, 317-312-313. 9 hours.

317. ADVANCED FRENCH PHONETICS. Intended for teachers and prospective graduate students. Phonemic analysis and phonetic description of French. Problems of mute e and liaison; stress, its nature and place; intonation patterns in conversation and reading of prose and poetry. Prerequisite: 311-312-313. 3 hours.

318. THE FRENCH NOVEL. An historical survey of the development of French prose fiction from the Middle Ages to the present. Special emphasis on the literary "isms" and outstanding writers in the XIX century: Stendahl, Balzac, Flaubert, Zola.
319. FRENCH LYRIC POETRY. The middle ages: provencal poetry and "amour courtois" on one hand, Francois Villon the other. Marot, Du Bellay, and Ronsard in relation to the Renaissance. Influence of Malherbe and Boileau. The new tradition beginning with Romanticism: Hugo, Lamartine, Musset, Vigny, G de Nerval; Parnassianism: Theophile Gautier; Baudelaire; the Symbolists: Verlaine, Mallarme, Rimbaud. 3 hours.

411, 412, 413. CIVILISATION FRANCAISE. A survey of the history of France, its topography, industries, government, educational system, journalism. The course is required of all French majors. Prerequisite: 311-312-313. 9 hours.

416. THE FRENCH THEATRE. Medieval liturgical and non-liturgical dramatic forms. Development of the classical drama and its decline in the eighteenth century. The impact of Romantic drama: the ultimate triumph of the mixed genre. The well-made play and the thesis play at the turn of the twentieth century. Coming of the Theatre Libre, the new realism, and the Symbolist movement in the theatre. 3 hours.

418. FRENCH LITERATURE OF THE TWENTIETH CENTURY. The impact of Symbolism, Surrealism, Existentialism and two world wars. Anti-theatre, anti-hero, and anti-novel. The revival of classical themes, their re-interpretation for our times. 3 hours.

490. SPECIAL TOPICS IN FRENCH. 1-3 hours.

497. INDEPENDENT STUDY IN FRENCH. 1-3 hours.

GERMAN

102-103. ELEMENTARY GERMAN 1 AND 2. To develop the ability to understand, speak, read, and write German; functional, rather than formal grammar; early and fluent speaking; elementary reading based on German life, customs, and manners. Four class periods and two hours of scheduled laboratory practice per week. 8 hours.

224-225. INTERMEDIATE GERMAN 1 AND 2. Review of the fundamentals of grammar, pronunciation, vocabulary, and idioms; conversational practice and composition; German life, history, civilization, art, music, illustrated with slides, film strips, and motion pictures with German sound tracks. Four class periods and two hours of scheduled laboratory practice per week. Prerequisite: 103 or proficiency established by placement examination. 8 hours.

291. SPECIAL TOPICS IN GERMAN. 1-3 hours.

298. INDEPENDENT STUDY IN GERMAN. 1-3 hours.

321, 322, 323. GERMAN CONVERSATION AND COMPOSITION. To develop both a useful command of the German language and an appreciation of German civilization; recorded conversational dialogues on a variety of topics useful to the student or traveler in Germany, Austria, and Switzerland, films and slides, and current German periodicals are used. An advanced study of grammatical and phonetic problems aimed at perfecting clarity and accuracy of expression. Three class periods and two hours of scheduled laboratory practice per week. Prerequisite: 224-225 or proficiency established by placement examination. 12 hours.

491. SPECIAL TOPICS IN GERMAN. 1-3 hours.

498. INDEPENDENT STUDY IN GERMAN. 1-3 hours.

SPANISH

104-105. ELEMENTARY SPANISH. To develop the ability to understand, speak, read, and write Spanish; functional, rather than formal grammar; early and fluent speaking; elementary reading based on Spanish life, customs, and manners, using materials dealing with Spain, Mexico, and South America. Four class periods and two scheduled laboratory practices per week. 8 hours.
244-245. INTERMEDIATE SPANISH 1 AND 2. A review of grammar and pronunciation; conversational practice and composition; occasional lectures in Spanish on Spanish life, history, arts, crafts, and civilization; illustrated with film strips, slides, photographs, reproductions, and realia. Four class periods and two hours of scheduled laboratory practice per week. Prerequisite: 105 or proficiency established by placement examination. 8 hours.

292. SPECIAL TOPICS IN SPANISH. 1-3 hours.

299. INDEPENDENT STUDY IN SPANISH. 1-3 hours.

341-342-343. SPANISH CONVERSATION AND COMPOSITION. To develop a useful command of the language; recorded dialogues on a variety of topics; color slides, film strips, current periodicals and realia; study of commercial Spanish and practice in correspondence useful to students in business or commerce. A study of grammatical and phonetic problems aimed at perfecting clarity and accuracy of expression. Three class periods and two hours of scheduled laboratory practice per week. Prerequisite: 244-245 or proficiency established by placement examination. 12 hours.

344-345-346. SURVEY OF SPANISH LITERATURE. A study of the chief authors in the literature of Spain from the beginnings to the present. Prerequisite: 244-245, 341-342-343. 9 hours.

347-348-349. SPANISH-AMERICAN LITERATURE. Main currents of Spanish-American literature. Prerequisite: 244-245. 9 hours.

441-442-443. CIVILIZATION HISPANICA. This course integrates the political, economic, social, geographical, and cultural forces which have shaped Spain and Hispanic America. Required of all Spanish majors. Prerequisite: 341-342-343. 9 hours.

444. GOLDEN-AGE DRAMA. A study of the creation of national theatre by Lope de Vega and his followers, with attention to the development of preceding forms of religious and secular drama, Italian influences, and the crystallization of the spirit of the Spanish Counter Reformation. Prerequisite: 344, 345, 346. 3 hours.

445. SPANISH-AMERICAN FICTION. Romanticism, realism, modernism, regionalism, surrealism. Prerequisite: 347, 348, 349. 3 hours.

446. TWENTIETH CENTURY LITERATURE: THE GENERATION OF 1898. A survey and critical analysis of selected writings of Gavinet, Baroja, Unamuno, Azorin, Benavente, Valle-Inclan, and Antonio Machado. Prerequisite: 344, 345, 346. 3 hours.

447. MODERN SPANISH THEATER. Study and analysis of selected 20th-century Spanish plays. Benavente, Alvarez Quintero, Valle-Inclan, Martinez-Sierra, Garcia Lorca, Casona, and others. 3 hours.

492. SPECIAL TOPICS IN SPANISH. 1-3 hours.

496. SEMINAR IN SPANISH. 1-3 hours.

499. INDEPENDENT STUDY IN SPANISH. 1-3 hours.
HEALTH AND PHYSICAL EDUCATION
(Department 143)

Professor English (Chairman); Associate Professors Ludwig, Roberson; Assistant Professors Daugherty, Hood, Lauth, Miller, Strayer, Wallace; Instructors McCormick, Maher.

Some form of physical activity is required of all undergraduate students during their first year in the university. The nature and amount of work to be taken depends upon the physical condition as revealed by a physical examination. A program of elective and required activities is provided, which aims to achieve the optimum development of the physically, mentally, and socially integrated, and adjusted individual through guided instruction and participation in selected total body sports, rhythmic, and gymnastic activities conducted according to social and hygienic standards.

A student physically unable to participate in physical education classes, or a student 27 years of age, or over, may be excused. Information may be obtained from the chairman of the department of physical education.

REQUIRED PHYSICAL EDUCATION SERVICE COURSES

Physical Education, two hours per week. One credit each quarter for the first three quarters. Two of the three required hours must be taken in the gymnasium. However, the other one hour may be taken in the gymnasium or in McIntosh Center. These hours are not sequential and must be completed prior to senior status. None of the elective courses may be repeated. Additional laboratory fees are charged for bowling, billiards and co-ed archery.

The physical education courses are given out-of-doors, in McIntosh Center and the gymnasium. They are systematically graded and arranged to fit the needs and interest of the individual.

The following activity courses are offered: all carry one quarter hour credit; a maximum of six hours may be counted toward graduation.

007. IN SEASON VARSITY SPORT PARTICIPATION. (Maximum 3 quarter hours.)
008. FLASHBALL AND SPEEDBALL.
009. P.E. BASKETBALL (MEN)
010. P.E. BEGINNERS BOWLING (CO-ED).
020. HANDBALL AND BADMINTON (WOMEN).
021. WEIGHT TRAINING AND PHYSICAL CONDITIONING.
022. TUMBLING AND APPARATUS (MEN).
023. RECREATIONAL GAMES.
024. BEGINNERS GOLF.
025. SOCCER AND SOFTBALL.
026. TUMBLING AND TRAMPOLINE.
027. HANDBALL AND BADMINTON (MEN).
030. BEGINNERS SWIMMING.
031. BEGINNERS SWIMMING (WOMEN).
033. INTERMEDIATE SWIMMING.
035. SWIMMERS.
040. P.E. BILLIARDS.
050. SOCIAL DANCE.
051. PADDLE SPORTS.
060. ARCHERY.
072. GYMNASTICS, RHYTHM AND FREE EXERCISE.
076. BADMINTON (WOMEN).
077. BASKETBALL (WOMEN).

078. BADMINTON (MEN).
079. GYMNASTICS (WOMEN).
080. BEGINNING TENNIS.
081. ARCHERY AND RECREATIONAL GAMES.
083. SQUARE AND FOLK DANCE.
084. VOLLEYBALL (WOMEN)
085. INTERMEDIATE TENNIS.
086. VOLLEYBALL (MEN)

Intramural Sports. An intramural program offers activity for each university student. The following sports are offered for men: football, basketball, free throwing, baseball, speedball, swimming, handball, playground ball, volleyball, tennis, wrestling, boxing, track, touch football, golf, and horseshoes; for women: softball, volleyball, basketball, free throws, timed basketball shooting, badminton, swimming, table tennis, tennis, archery and track and field; coed: water polo, volleyball.

MAJOR IN HEALTH AND/OR PHYSICAL EDUCATION

A copy of the curricula for the six areas of certification the Health and Physical Education Department offers may be obtained from the chairman of the department. In addition to the requirements listed in the physical education major curriculum (K-12), a student majoring in physical education is required to be affiliated in some capacity with one of the major sports in the intercollegiate program. One quarter of aquatics is required prior to graduation.

The six areas of certification offered by the department are:

*K-12 Health; Physical Education (Dual) 7-12 Physical Education
*K-12 Physical Education 7-12 Health Education
*K-12 Health Education K-6 Elementary Physical Education

*The indicated areas of certification are the only areas that the department recognizes as a major. The other areas of certification require a college major in another discipline. For specific information concerning these areas of certification, contact the department chairman.

The following courses marked by an asterisk are required professional courses for the physical education major:

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

111. CURRENT PERSONAL HEALTH PROBLEMS (formerly Hygiene 110). The identification and study of timely health issues from a personal viewpoint. 3 hours.
112.* FIRST AID AND SAFETY EDUCATION. Lectures, discussion and practice in the giving of first aid in emergencies. The American Red Cross First Aid Certificate may be obtained by students who pass an examination. 3 hours.

114. LIFE SAVING. To develop knowledges and skills to aid in the prevention of aquatic accidents and an ability to give assistance to victims. The American Red Cross Senior Lifesaving certificate/emblem may be obtained by students passing an examination. Prerequisite: instructor approval. 2 quarter hours credit.

115. WATER SAFETY INSTRUCTION. Teaching of swimming and water safety skills, methods and techniques. Successful completion of the course will lead to American Red Cross Water Safety Instruction certification. Prerequisite: Current certification in senior life-saving. 3 quarter hours credit.

121.* COMMUNITY HEALTH. The study of those health matters involving virtually all citizens with focus on health problems amenable to community action, the benefits of which are channeled to individual citizens. 3 quarter hours.

141-142-143.* PHYSICAL EDUCATION FOR MAJORS (MEN). Physical education 141, 142, 143 are required of all students majoring or minoring in physical education. To assist the prospective physical educator in acquiring the fundamental skills and developing the methods of teaching in the following activities: 1 hour each.

141. SPEEDBALL, TOUCH FOOTBALL, GAMES OF LOW ORGANIZATION.

142. TUMBLING, WRESTLING.

143. TRAMPOLINE, TENNIS.

144, 145, 146.* PHYSICAL EDUCATION FOR MAJORS. (WOMEN). Team Sports. Required of all women physical education majors. To assist the prospective physical educator in acquiring the fundamental skills and developing the methods of teaching in the following activities: 144-field hockey and soccer; 145-basketball and volleyball; 146-track and field and softball. 1 hour each quarter.

147.* BASIC MOVEMENT (CO-ED). The principles and laws of motion as applied to basic human movement and performance. An introduction to the basic locomotor and axial movements possible in the human body and the utilization of these basic movements as they are combined in the efficient performance of complex tasks. 3 hours.

148, 149.* PHYSICAL EDUCATION FOR MAJORS (WOMEN). Individual Activities. Required of all women physical education majors. To assist the prospective physical educator in acquiring the fundamental skills and developing the methods of teaching in the following activities. 148-six tennis and trampoline; 149-tennis. 1 hour each quarter.

201-202-203.* PHYSICAL EDUCATION FOR MAJORS (MEN). Physical education 201, 202, 203 are required of all men students majoring in physical education. To assist the prospective physical educator in acquiring the fundamental skills and developing the methods of teaching in the following activities: 1 hour each.

201. SOCCER, FLASHBALL, GAMES OF LOW ORGANIZATION.

202. PARALLEL BARS, BADMINTON, WEIGHT LIFTING.

203. VOLLEYBALL, HORIZONTAL BAR.

204.* PHYSICAL EDUCATION FOR MAJORS (CO-ED) RHYTHMIC ACTIVITIES. Required of all physical education majors. To assist the prospective physical educator in acquiring the fundamental skills and developing the methods of teaching in Rhythmic fundamentals and exercise to music. 1 hour.

205.* PHYSICAL EDUCATION FOR MAJORS (WOMEN) RHYTHMIC ACTIVITIES. Required of all women physical education majors. To assist the prospective physical educator in acquiring the fundamental skills and developing the methods of teaching Modern and Social Dance. 1 hour.
206.* PHYSICAL EDUCATION FOR MAJORS (CO-ED) RHYTHMIC ACTIVITIES. Required of all physical education majors. To assist the prospective physical educator in acquiring the fundamental skills and developing the methods of teaching in Folk and Square Dance. 1 hour.

207, 208, 209.* PHYSICAL EDUCATION FOR MAJORS (WOMEN). Individual Activities. Required of all women physical education majors. To assist the prospective physical educator in acquiring the fundamental skills and developing the methods of teaching in the following activities; 207-archery and tumbling; 208-gymnastics, apparatus; 209-recreational games and golf. 1 hour each quarter.

222.* SCHOOL HEALTH. 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 knowledges conducive to good health. 3 hours.

223.* KINESIOLOGY. 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: physiology 231 and 232. 3 hours.

233.* PHYSICAL EDUCATION FOR THE ELEMENTARY SCHOOL. 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. 3 hours.

271.* MOTOR LEARNING. The study of principles and theories relating to relatively permanent change in performance on behavioral potential resulting from practice or past experience in the situation. 3 hours.

302.* HISTORY AND PRINCIPLES OF HEALTH AND PHYSICAL EDUCATION. A continuation of HPE 301. Includes a history of health and physical education. Prerequisite: 1 year of physical education for majors and junior status. 3 hours.

303.* ORGANIZATION AND ADMINISTRATION OF HEALTH AND PHYSICAL EDUCATION. Discussion and consideration of the basic problems in the organization and administration of health and physical education. Prerequisite: one year of physical education for majors and junior status. 3 hours.

304, 305, 306. PRACTICAL TECHNIQUES OF TEACHING AND ASSISTING IN HEALTH AND PHYSICAL EDUCATION. Two hours required of all physical education majors in their junior year. 1 hour each.

**Men physical education majors are required to complete 9 of the 12 hours.

308.** TECHNIQUES — COACHING VOLLEYBALL (CO-ED). To develop a basic expertise in the techniques and knowledges of coaching volleyball. To provide laboratory experiences in the practical application of techniques and knowledges of coaching volleyball. Prerequisite: 143-324 must be taken simultaneously with or prior to this course. 1 hour.

309.** TECHNIQUES — COACHING BASKETBALL (WOMEN). To develop a basic expertise in the techniques and knowledges of coaching basketball. To provide laboratory experiences in the practical application of techniques and knowledges of coaching basketball. Prerequisite: 143-324. 1 hour.

310.** TECHNIQUES — COACHING SOFTBALL (CO-ED). To develop a basic expertise in the knowledge and techniques of coaching softball. To provide laboratory experiences in the practical application of techniques and knowledges of coaching softball. Prerequisite: 143-324. 1 hour.
315.** OFFICIATING — VOLLEYBALL (CO-ED). Knowledge and techniques of officiating volleyball. National Federation rules. Laboratory experiences during intramural volleyball. Successful completion leads to an OHSAA temporary officials rating for both boys and girls volleyball. No prerequisite. 1 hour.

316.** OFFICIATING — BASKETBALL (CO-ED). Knowledge and techniques of officiating basketball. National Federation rules. Laboratory experiences during intramural basketball. Successful completion leads to an OHSAA temporary officials rating for both boys and girls basketball. No prerequisite. 1 hour.

317.** THEORY OF TRACK AND FIELD OFFICIATING (CO-ED). Knowledge and techniques of officiating track and field. National Federation rules. Laboratory experiences during intramural track and field. Successful completion leads to an OHSAA temporary officials rating for both boys and girls track and field. No prerequisite. 1 hour.

319. THE THEORY AND METHOD OF COACHING TRACK (CO-ED). Methods and forms for all of the events in track and field. Lectures, reports, demonstrations and practice. No prerequisite. 1 hour.

320.** THE THEORY OF COACHING AND OFFICIATING WRESTLING (MEN). Equipment, fundamentals of the art and skill of wrestling. Prerequisite for students seeking state certification in physical education, junior status. 3 hours.

321.** THE THEORY OF FOOTBALL COACHING (MEN). Equipment, fundamentals of the game, kicking, passing, handling the ball, tackling, blocking; individual position play; offensive and defensive formations; strategy and generalship. Prerequisite for students seeking state certification in physical education, junior status. 3 hours.

322.** THE THEORY OF COACHING BASKETBALL (MEN). 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. Prerequisite for students seeking state certification in physical education, junior status. 3 hours.

323.** THE THEORY OF COACHING BASEBALL. Individual position and team play in men’s baseball. Lectures, reports, demonstration, and practice. Prerequisite for students seeking state certification in physical education, junior status. 2 hours.

324. THE THEORY OF COACHING WOMEN (CO-ED). The cultural, emotional, psychological and sociological aspects of coaching girls and women. Player-coach relationship, understanding the female athlete, improving your coaching effectiveness. No prerequisite. 2 hours.

326.** CO-CURRICULAR ACTIVITIES (WOMEN). Theory and practice of the organization and administration of co-curricular activities commonly associated with the girls’ physical education program. 1 hour.

331-332-333. ADVANCE COACHING PRACTICE (MEN). To give men students who have had physical education 319-320-321-322 and 323 an opportunity to do actual coaching under supervision in all sports in season. Hours arranged. Six hours maximum toward graduation. 1-3 hours per quarter.

334-335-336. ADVANCED COACHING PRACTICE (WOMEN). To give women students who have courses 324-325-326 an opportunity to do actual coaching under supervision in all sports in season. Hours arranged. Six hours maximum toward graduation. 1-3 hours per quarter.

341. FOOTBALL OFFICIATING. This course includes the study of the football rules mechanics from the standpoint of the player, coach and official. 3 hours.

342. BASKETBALL OFFICIATING. The study of basketball rules from the standpoint of player, coach and official. 2 hours.
343. ATHLETIC TRAINING AND CONDITIONING. To meet the need of the high school coach; training procedures and conditioning of athletic teams for all sports; treatment of athletic injuries. 3 hours.

350. HEALTH METHODS AND EVALUATION. For the special teacher and supervisor of health; health problems arising in a school system; methods and materials for teaching health and evaluation. Prerequisites: two quarters of health and junior standing. 3 hours.

351. METHODS IN HEALTH AND PHYSICAL EDUCATION. 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. 3 hours.

402. ADAPTIVE AND CORRECTIVE PHYSICAL EDUCATION. For the teachers who are concerned with the education of the handicapped; to develop an understanding of the various handicapping conditions and to explore methods of adapting physical activities to meet the needs of the typical student in the physical education class. Prerequisite: 143; 223. 3 hours.

433. DRIVER EDUCATION. For those who plan to teach driving in the public schools. 3 hours.

434. ORGANIZATION AND ADMINISTRATION OF DRIVER AND TRAFFIC SAFETY. Organizational and administrative aspects of driver and traffic education as they relate to the total school and other specialized programs. Historical and philosophical aspects, evaluation, related professional organizations and occupational opportunities. Prerequisite: physical education 433. 3 hours.

490. SPECIAL TOPICS IN HEALTH AND PHYSICAL EDUCATION. 1-3 hours.

494. SEMINAR IN HEALTH AND PHYSICAL EDUCATION. 1-3 hours.

497. INDEPENDENT STUDY IN HEALTH AND PHYSICAL EDUCATION. 1-3 hours.

HISTORY AND POLITICAL SCIENCE
(Department 132)

Professors Darlington, Davis (Chairman); Associate Professors Hammond, Ludanyi, Saffell, Sobers; Assistant Professors Gilbreth, McKinsey.

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 1975-76 recipient of this fully-endowed professorship is MARY K. HAMMOND, associate professor of history and political science.

The KERNAN ROBSON CHAIR IN POLITICAL SCIENCE, inaugurated in 1972, has been made possible by a trust established by Kernan Robson, deceased. The 1975-76 recipient of this partially-endowed professorship is DAVID C. SAFFELL, associate professor of political science.

HISTORY

In addition to receiving a quality education in the time-honored liberal arts tradition, the major in history generally prepares for a career in teacher education, the law, journalism, government service or business. A more descriptive analysis of career opportunities for history majors may be obtained from the department chairman.
The history courses themselves stress the evolution of human institutions with a view of developing an informed appreciation of past events as well as an understanding of our present civilization. Students majoring in history are expected to take courses in both American and non-American history and electives in the allied social sciences: political science, sociology, geography and economics. In addition to the 48 hours required for the major in history, the student must complete nine hours in political science (201-202-203). It should be noted that human geography 400 and physical geography 433 do not count as part of the history major. For those majors who subsequently plan to attend graduate school, it is strongly recommended that an emphasis be placed on modern foreign languages, especially French and German. A senior comprehensive examination is not required.

Specific requirements for the history major:
(1) orientation 000
(2) history 100
(3) political science 201-202-203
(4) history 211-212-213
(5) six hours from among the following history courses: 221, 222, 223, 224, and 225
(6) history 303 or history 365
(7) history 321-322-323 or history 411-412-413
(8) history 494
(9) history electives: 15 hours: total = 48 hours + 9 hours cognate

000. ORIENTATION. 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. 1 hour.

100. HISTORY. Concepts and trends in world history. A conceptual and thematic approach to the meaning and content of history. 3 hours.

211. HISTORY OF THE UNITED STATES TO 1850. 3 hours.

212. HISTORY OF THE UNITED STATES: 1850 TO 1900. 3 hours.

213. HISTORY OF THE UNITED STATES: 1900 TO THE PRESENT TIME. The political, social and economic development of the United States from the colonial period to the present time. Open to freshmen. 3 hours.

221. CONTEMPORARY EUROPE. An examination of the political, socio-economic and intellectual development of Europe since the conclusion of the second World War. Also listed as political science 221. Open to freshmen. 3 hours.

222. CONTEMPORARY ASIA. An examination of the political, socio-economic and intellectual development of Asia since the conclusion of the second World War. Also listed as political science 222. Open to freshmen. 3 hours.

223. CONTEMPORARY AFRICA. An examination of the political, socio-economic and intellectual development of Africa since the conclusion of the second World War. Also listed as political science 223. Open to freshmen. 3 hours.

224. CONTEMPORARY MIDDLE EAST. An examination of the political, socio-economic and intellectual development of the Middle East since the conclusion of the second World War. Also listed as political science 224. Open to freshmen. 3 hours.

225. CONTEMPORARY LATIN AMERICA. An examination of the political, socio-economic and intellectual development of Latin America since the conclusion of the second World War. Also listed as political science 225. Open to freshmen. 3 hours.
303. HISTORY OF OHIO. The political and cultural evolution of the state from prehistoric times to the present. 3 hours.

321. ENGLISH HISTORY TO 1603. 3 hours.

322. ENGLISH HISTORY: 1603 TO 1837. 3 hours.

323. ENGLISH HISTORY: 1837 TO THE PRESENT TIME. The English people in their political, social and institutional development; the growth of the British Empire and the evolution of the British Commonwealth of Nations. 3 hours.

326. MEDIEVAL EUROPE. 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. 3 hours.

327. THE FRENCH REVOLUTIONARY ERA. The French Revolution and Napoleon, with the philosophical background and ideological development of the period, together with their effect on later history. Alternate years, 1975-76. 3 hours.

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

329. AGE OF EUROPEAN ABSOLUTISM. 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. Alternate years, 1975-76. 3 hours.

331-332-333. U. S. CONSTITUTIONAL DEVELOPMENT. An historical and legal approach to the interpretation of the constitution. Also listed as political science 331-332-333. Alternate years, 1975-76. 9 hours.

351. ANCIENT NEAR EAST AND GREECE. The political, socio-economic and cultural development of pre-Greek Oriental and Greek civilization during the ancient period. 3 hours.

352. ANCIENT ROME. The political, socio-economic and cultural development of Roman civilization during the ancient period. 3 hours.

362. RECENT AMERICAN HISTORY. An intensive study of the major factors in United States history since 1945. 3 hours.

365. AFRO-AMERICAN HISTORY. The essential facts, trends and interpretations in the history of the black American from his African beginnings down to the present time. Alternate years, 1976-77. 3 hours.

377. HISTORY OF MODERN GERMANY. A survey of German history from 1871 to 1945. Particular emphasis will be on the Bismarckian era, German involvement in the first World War, and the rise and fall of the Nazi regime. Alternate years, 1975-76. 3 hours.

378. HISTORY OF MODERN FRANCE. A survey of French history from 1871 to 1945. Alternate years, 1975-76. 3 hours.

381. THE WESTWARD MOVEMENT IN THE UNITED STATES. Territorial expansion from colonial times to the end of the nineteenth century, emphasizing Indian relations, land policies, transportation and trade, and the influence of the West on American ideals and institutions. 3 hours.

384. CLASSICAL AND MEDIEVAL POLITICAL THOUGHT. The theories of Plato, Aristotle, Cicero, Augustine and Aquinas concerning the needs of man and the objectives, characteristics and consequences of political order and change. Also listed as political science 384. 3 hours.

385. REFORMATION AND SECULAR POLITICAL THOUGHT. The theories of Machiavelli, Luther, Calvin, Hobbes, Locke, Rousseau, and Montesquieu concerning the sources and objectives of political authority. Also listed as political science 385. 3 hours.
386. MODERN AND IDEOLOGICAL POLITICAL THOUGHT. The theories of Burke, Tocqueville, Bentham, Mill, Hegel, Marx, Nietzsche and Lenin concerning man and his place in the political order. Also listed as political science 386. 3 hours.

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

411, 412, 413. RUSSIAN HISTORY. Russia from the medieval period to the present. Alternate years, 1976-77. 9 hours.

451. HISTORY OF LAW. 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. Alternate years, 1975-76. 3 hours.

452. AMERICAN FOREIGN RELATIONS. 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. Alternate years, 1975-76. 3 hours.

490. SPECIAL TOPICS IN HISTORY. 1-3 hours.

494. SEMINAR IN HISTORY. 1-3 hours.

497. INDEPENDENT STUDY IN HISTORY. Approval of department chairman required prior to registration. 1-3 hours.

POLITICAL SCIENCE

In addition to receiving a quality education in the time-honored liberal arts tradition, the major in political science generally prepares for graduate study in government, for the study of law, for entrance into the public or foreign service, or for effective participation in politics as a citizen. A more descriptive analysis of career opportunities for political science majors may be obtained from the department chairman.

Political science majors are advised to pursue courses in related social science disciplines such as history, sociology and economics. For those majors hoping to attend graduate school and for those planning on a career in the foreign service, extensive work in foreign languages, especially French and German, is strongly recommended. In addition to the 48 hours of political science required of the major, United States history 211-212-213 must be taken. It should be noted that human geography 400 and physical geography 433 are not applicable to the political science major. A senior comprehensive examination is not required.

Specific requirements for the political science major:
(1) orientation 000
(2) political science 105
(3) political science 201-202-203
(4) history 211-212-213
(5) six hours from among the following political science courses: 221, 222, 223, 224 and 225
(6) political science 384
(7) six hours from among the following political science courses: 385, 386 and 387
(8) political science 495
(9) political science electives: 18 hours: total = 48 hours + 9 hours cognate
000. ORIENTATION. Familiarization with the department, requirements for majors, planning program of courses, university catalog and library. Required of departmental majors. Also listed as history 000. 1 hour.

105. POLITICAL SCIENCE. Fundamental concepts of governmental systems, including the basic sources of governmental politics and the process of implementation. 3 hours.

201-202. AMERICAN NATIONAL GOVERNMENT. The origin, development, structure and functions of the national government in the United States. Open to freshmen. 6 hours.

203. AMERICAN STATE GOVERNMENT. The origin, development, structure and functions of state government in the United States. Open to freshmen. 3 hours.

221. CONTEMPORARY EUROPE. An examination of the political, socio-economic and intellectual development of Europe since the conclusion of the second World War. Also listed as history 221. Open to freshmen. 3 hours.

222. CONTEMPORARY ASIA. An examination of the political, socio-economic and intellectual development of Asia since the conclusion of the second World War. Also listed as history 222. Open to freshmen. 3 hours.

223. CONTEMPORARY AFRICA. An examination of the political, socio-economic and intellectual development of Africa since the conclusion of the second World War. Also listed as history 223. Open to freshmen. 3 hours.

224. CONTEMPORARY MIDDLE EAST. An examination of the political, socio-economic and intellectual development of the Middle East since the conclusion of the second World War. Also listed as history 224. Open to freshmen. 3 hours.

225. CONTEMPORARY LATIN AMERICA. An examination of the political, socio-economic and intellectual development of Latin America since the conclusion of the second World War. Also listed as history 225. Open to freshmen. 3 hours.

312. URBAN GOVERNMENT. Problems of urban, suburban and metropolitan government in the United States. Alternate years, 1975-76. 3 hours.

331-332-333. U. S. CONSTITUTIONAL DEVELOPMENT. An historical and legal approach to the interpretation of the constitution. Also listed as history 331-332-333. Alternate years, 1975-76. 9 hours.

334. WESTERN DEMOCRATIC POLITICAL SYSTEMS. A comparison of the politics of England, France and Germany, stressing the impact of political culture and the operations of governmental institutions, parties and interest groups in the process of public policy-making. Alternate years, 1976-77. 3 hours.

335. COMMUNIST POLITICAL SYSTEMS. A comparison of the politics of Yugoslavia, Hungary and Rumania, stressing the operations of the single-party control system, the role of governmental agencies and ideological orientations. Alternate years, 1976-77. 3 hours.

336. DEVELOPING POLITICAL SYSTEMS. A comparison of the politics of Mexico, Egypt and Burma, stressing the impact of cultural fragmentation, modernization, social unrest and rising expectations on the stability and effectiveness of governmental institutions and processes. Alternate years, 1976-77. 3 hours.

337. MAJOR ASIAN POLITICAL SYSTEMS. A comparison of the politics of China, India and Japan, with particular emphasis on the processes of leadership selection, interest identification and public decision making. Alternate years, 1975-76. 3 hours.

347. AMERICAN POLITICAL PARTIES. The leadership, organization, activities and role of the major political parties in the American political process. 3 hours.
357. PRESSURE GROUPS AND PUBLIC POLICY. The role of pressure groups in the formulation of American domestic and foreign policy. Alternate years, 1976-77. 3 hours.

358. PUBLIC OPINION AND POLLING TECHNIQUES. An examination of the formulation, characteristics and role of public opinion in American politics. An attempt will be made to provide first-hand polling experience in the field. Alternate years, 1976-77. 3 hours.

363-364. PUBLIC ADMINISTRATION AND ORGANIZATION. The nature and function of public organizations; structure, management and control. Alternate years, 1975-76. 6 hours.

371. INTERNATIONAL RELATIONS. The forces which determine the policies of nation-states and their organizations in the international setting. 3 hours.

372. INTERNATIONAL ORGANIZATION. The objectives, structures, agencies and procedures of international organization, with special emphasis on general-purpose institutions like the United Nations and regional-functional organizations like the European Common Market and the OAS. 3 hours.

373. INTERNATIONAL LAW. Development of the law governing the relationship among states; its nature, sources and applications, international agreements, state responsibilities and the laws of force and war. 3 hours.

384. CLASSICAL AND MEDIEVAL POLITICAL THOUGHT. The theories of Plato, Aristotle, Cicero, Augustine and Aquinas concerning the needs of man and the objectives, characteristics and consequences of political order and change. Also listed as history 384. 3 hours.

385. REFORMATION AND SECULAR POLITICAL THOUGHT. The theories of Machiavelli, Luther, Calvin, Hobbes, Locke, Rousseau and Montesquieu concerning the sources and objectives of political authority. Also listed as history 385. 3 hours.

386. MODERN AND IDEOLOGICAL POLITICAL THOUGHT. The theories of Burke, Tocqueville, Bentham, Mill, Hegel, Marx, Nietzsche and Lenin concerning man and his place in the political order. Also listed as history 386. 3 hours.

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

421. GOVERNMENT OF THE SOVIET UNION. Demographic, historical and ideological basis of Soviet rule. The social, political and governmental structure, religion, army, courts and the police. Alternate years, 1976-77. 3 hours.

422. FOREIGN POLICY OF THE SOVIET UNION. Factors in Russian foreign policy; the early years, as affected by Marxist ideology, internal conditions and foreign interference; limited cooperation with Western Powers; Second World War and aftermath. 3 hours.

424. THE AMERICAN EXECUTIVE. A detailed analysis of the institutions, functions and problems of the American Presidency and the federal executive branch of government. Subjects discussed will include presidential leadership, staffing, executive-legislative relations and policy formation. Additionally, comparative references to executive processes in other political systems will be made. Alternate years, 1976-77. 3 hours.

425. THE AMERICAN LEGISLATIVE PROCESS. An in-depth study of the organization and functioning of American legislative bodies, with particular attention to Congress and the state legislatures. Topics will include the function and membership of legislative bodies, committee systems, executive-legislative relations, pressure groups and lobbying. Alternate years, 1976-77. 3 hours.
426. THE AMERICAN LEGAL SYSTEM. The structure and function of the American legal system. Topics to be explored will include the role of the courts, the nature of jurisprudence, the origin of law, the concept of legality and the interrelationships of judges, lawyers, police, political officials, bureaucrats and the people. Alternate years, 1976-77. 3 hours.

427. THE SUPREME COURT AND CIVIL LIBERTIES. An examination of constitutional rights, due process and equal protection of the law in the United States. Particular emphasis on recent Supreme Court decisions regarding the rights of black Americans, freedom of expression and the rights of criminal defendants. Alternate years, 1975-76. 3 hours.

432. GOVERNMENT REGULATION OF BUSINESS. Development of governmental regulation of economic affairs in the United States, provisions of the U. S. Constitution, leading court opinions and the regulatory laws of recent years. Alternate years, 1975-76. 3 hours.

451. HISTORY OF LAW. 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. Alternate years, 1975-76. 3 hours.

452. AMERICAN FOREIGN RELATIONS. A conceptual review of the inception, development and contemporary interpretation of the major foreign policies of the United States. Also listed as history 452. Alternate years, 1975-76. 3 hours.

491. SPECIAL TOPICS IN POLITICAL SCIENCE. 1-3 hours.

495. SEMINAR IN POLITICAL SCIENCE. 1-3 hours.

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

DUAL MAJOR: HISTORY & POLITICAL SCIENCE

Many students, especially those interested in pre-graduate school or pre-law school studies, find it appropriate to major in both history and political science. For those interested in pursuing a dual major program in history and political science, the following curriculum is required.

(1) orientation 000
(2) history 100
(3) political science 105
(4) political science 201-202-203
(5) history 211-212-213
(6) political theory 384-385-386-387
(7) history 494
(8) political science 495
(9) twelve hours from among the following contemporary courses: 221, 222, 223, 224 and 225.
(10) twelve hours from among the following history courses: 303, 321, 322, 323, 326, 327, 328, 329, 351, 352, 362, 365, 377, 378, 381, 411, 412, 413, 490 and 497.
(12) twelve hours from among the following history and political science courses: 331, 332, 333, 341, 342, 451, and 452.

Grand total hours required: 90
DEPARTMENTAL ADVISING: PRELAW & TEACHER EDUCATION

In addition to a corps of regular academic advisors, the department also provides more specialized prelaw and teacher education advisement. Normally, history and political science majors interested in prelaw studies will be assigned to the departmental prelaw advisor, 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, history and political science majors interested in a teaching career will be assigned to the departmental teacher education advisor, who not only provides academic advice and guidance, but also supervises the departmental aspects of the student teaching program.

PRELAW PROGRAM

In addition to its emphasis upon prelaw advisement, the department also co-operates with the College of Law at Ohio Northern University relative to the formal “guaranteed admission” prelaw program.

Students who complete the four-year program with at least a 3.50 GPA will be admitted automatically to the Ohio Northern University College of Law (no Law School Aptitude Test required). For those whose GPA is between 3.00 and 3.49, admission to the Ohio Northern University College of Law will be on a preferred basis with lower LSAT scores required than for those with comparable GPA’s applying from other colleges or for ONU graduates who choose not to complete the Prelaw Program.

Specific curricular requirements are available from the departmental prelaw advisor or from the department chairman.

PUBLIC ADMINISTRATION

For those students interested in a career in public service, departmental advisors are equipped to assist interested majors in developing a supplemental area of concentration in public administration. For example, a political science major might be urged to enroll in such courses as urban economics, municipal financial systems and urban sociology in addition to those courses normally required for the major.

GEOGRAPHY

Although the geography courses do not count toward the completion of a history or a political science major, students are encouraged to take one or both of these courses as free electives. It should also be noted that neither geography 400 nor geography 433 can be used to complete the social science in-depth requirement in the College of Liberal Arts.

400. HUMAN GEOGRAPHY. The interaction of man and his physical environment. Does not apply to history or political science major requirements. 3 hours.

433. PHYSICAL GEOGRAPHY. A study and unification of the body of knowledge encompassing the earth sciences which give general insight into the nature of man’s physical environment. Does not apply to history or political science major requirements. 3 hours.
SOCIAL STUDIES COMPREHENSIVE CERTIFICATION

Although Ohio Northern University does not make provision for a social studies comprehensive major in its curriculum, the student may effectively utilize his free electives by taking the appropriate additional courses which will qualify him for teaching certification in social studies comprehensive by the state of Ohio.

HISTORY WITH EDUCATION MAJORS

In addition to completing the official history major (48 hours) and the appropriate teacher education courses, the student must take the following: political science 105, political science 201, political science 202, economics 100, economics 201, economics 202, geography 400 or 433, sociology 105, 3 elective hours in sociology, and social studies electives 14 hours*. Grand total hours: 90.

*The eight (8) hours of electives must all be taken in the same field (political science or economics or sociology).

POLITICAL SCIENCE WITH EDUCATION MAJORS

In addition to completing the official political science major (48 hours) and the appropriate teacher education courses, the student must take the following: history 100, history 211, history 212, history 213, economics 100, economics 201, economics 202, sociology 105, 3 elective hours in sociology, geography 400 or 433, history electives 12 hours. Grand total hours: 91.

The student should be aware of the fact that an additional quarter of work, especially in the case of political science with education, may be necessary to complete the entire social studies comprehensive program.

INDUSTRIAL ARTS
(Department 142)

Professor Kain (Chairman); Associate Professor Rex; Instructor Deslich.

The principal objective of the department of industrial arts is to provide a foundation in applied arts and sciences through an understanding of design, construction, manufacturing, production and consumption, utilizing a variety of materials. Classroom and laboratory activities include numerous operations, procedures, and processes.

In the course areas attention is directed toward researching, experimenting, designing, and creative endeavors. Problem solving situations involved are derived from both theory and practice of the arts and sciences. The courses are organized to provide a basic professional-technical education for persons who wish to assume industrial positions, or those who are preparing to teach the arts of industry in public schools.

A major in industrial arts requires the successful completion of 74 quarter hours of credit in departmental courses, including: 110, 111, 112, 113, 213, 313, 321, 322, 331, 332,
343, 402, 412, 423, 450, 451, 460, 494, and art 255. Four years of study in these courses, and in addition, the courses in liberal arts and professional teacher education, qualify students for the four-year provisional special certificate required for teacher certification. For those who elect the industrial technology objective, individual career objectives are taken into consideration in developing a program schedule for each student.

Prospective teachers who do not wish to concentrate in industrial arts as a major teaching field but desire to meet minimum certification requirements are required to complete a minimum of (47) quarter hours: industrial arts 110, 111, 113, 200, 213, 322, 330, 332, 343, 402, 423, 450, 460. Careful scheduling of these courses is necessary in order that proper sequence can be attained and that sufficient time made available to complete the total credit-hour requirement. Fulfillment of these requirements and those in the major field of concentration leads to qualification for the four-year provisional teaching certificate.

An orientation course (110) taken during the freshman year is designed to assist students in adjusting to college life and to promote the development of an understanding of the profession. This course is required of all students seeking a major or minor in industrial arts.

The department has developed an extensive program of visits to museums, manufacturing centers, and schools. Industrial arts students are required to participate in these excursions and are encouraged to participate in a variety of organized professional activities.

A departmental comprehensive exam, which includes a major project exhibition, is required of all students concentrating in industrial arts.

A detailed curriculum outline for students majoring or minoring in the department can be obtained from the department chairman.

110. INDUSTRIAL ARTS ORIENTATION. Orientation and adjustment to college life. An introduction to industrial arts; philosophical origins and contemporary practices. The fundamental procedures, operations, and special equipment for each of the several areas of industrial arts are briefly explored. Public school visitations. 3 hours.

111. TECHNICAL DRAWING I. Use of instruments, applied geometry, lettering, orthographic projection, and pictorial drawing. 3 hours.

112. TECHNICAL DRAWING II. Continuation of 111. Drawing Developments, intersection, and working drawings. Projects in the main fields of engineering are used. Architectural drawing project. Prerequisites: technical drawing 111. 3 hours.

113. DRAWING. Emphasis on an awareness of design as it is applied to fabrication and construction, using typical industrial materials. Selected exercises in the development of design as applied to a particular function and material. Study and practice in relating good design to furniture, architecture, interiors, graphics, crafts, and to its application in the manufacture of industrial products; design model construction. 3 hours.

200. ARTS AND CRAFTS. Laboratory experiences in working with craft materials: art metals, wood, plastics, leather, graphic arts, ceramics and others. 3 hours.

213. WOOD TECHNOLOGY. The nature of wood, and its present day applications; forestry, lumbering, grading, preserving, and utilization of wood products and by-products; the identification of common commercial lumbers, strength analysis, control of shrinkage, methods of preservation and beautification; wood fabrication and joining techniques. The study of mass-production as applied to wood fabrication and joining techniques. 3 hours.
310. INDUSTRIAL ARTS IN THE ELEMENTARY SCHOOL. To assist elementary school teachers in directing constructional activities which will enable elementary school students to gain meaningful learning experiences. A demonstration of method in using industrial arts activities to encourage children to learn more effectively; to discover new interests and talents. A presentation of rationale, related materials, manipulative activities, organizing the learning environment, and typical unit problems. Prerequisite: education 223, child psychology. 3 hours.

311. GRAPHIC ARTS. The manipulation processes of duplicating written communications: process printing, diazo, block printing, etching, letterpress and offset printing. Photographic processes. 3 hours.

313. METAL CASTING. Foundry pattern design and construction; the study of molding materials and equipment; operations and procedures in the construction of sand molds; core construction; melting, pouring and casting of non-ferrous metals. Properties of metals and their alloys. Prerequisite: wood technology 213. 3 hours.

321. METALWORK TECHNOLOGY. Fundamentals of general metalwork; layout and pattern drafting, bending, forming, seaming, soldering, resistance and oxyacetylene welding and machining; wrought iron work; construction of fixtures, tools, ornaments, and furniture. 5 hours.

322. PRINTING. A historical study of printing with typical exercises in composition, typography, imposition, principles of display. Platen press, cylinder press, offset press operations, photographic processes. 3 hours.

323. LAPIRARY AND JEWELRY. The fundamentals of the art of lapidary; working with natural and synthetic stones including the sawing, shaping, polishing and mounting of jewelry stones, applied art metal fabrication. 3 hours.

330. PHOTOGRAPHY. Techniques of photographic composition, camera types and accessories, photographic optics, and laboratory methods and materials; dark room developing and printing of negatives; color photography, color processing and printing. 3 hours.

331. FURNITURE DESIGN AND CONSTRUCTION. Advanced cabinetry procedures; techniques in joinery and decorative treatments such as carving, turning, veneering, inlaying, fluting, and associated styling elements. One major project is required. Prerequisites: industrial arts 110, 213. 3 hours.

332. METAL MACHINING AND MANUFACTURING. Production practice and metalwork technology. The engine lathe, shaper, milling machine, grinder, and power hacksaw; machining of bar stock and castings. Prerequisite: metalwork technology 321. 5 hours.

341. FINISHING METHODS AND MATERIALS. Finishing materials, their composition, qualities, and characteristics; protective agents and preservatives; mixing and matching colors; interior floor and wall treatments and finishes; the application of various finishes to wood and metal. 3 hours.

343. WELDING THEORY AND PRACTICE. Welding theory, and weld types; welding metallurgy; electrical resistance and arc welding, oxyacetylene welding, brazing, and burning; welded metal fabrications. 5 hours.

350. CERAMICS. (See department of art, ceramics 255)

353. CARPENTRY AND WOOD STRUCTURES. The utilization of efficient construction practices in the building of modern wood structures; use of carpentry tools and power equipment. Prerequisite: technical drawing 111, industrial arts 110. 3 hours.
402. FUNDAMENTALS OF ELECTRICITY AND ELECTRONICS. The principles of electricity and their application to laboratory experiments and to the construction of a variety of electrical devices; introduction to electronics; vacuum tubes, transistors, rectifiers, power supplies, amplifiers, oscillators, transmitters, and receivers. 5 hours.

412. LABORATORY PLANNING AND EQUIPMENT SELECTION. Principles of laboratory planning. Architectural features, laboratory designs. Selection, arrangement, and maintenance of equipment in the modern industrial arts laboratory. Prerequisite: Same as 423. Industrial arts organization and methods. 3 hours.

423. INDUSTRIAL ARTS ORGANIZATION AND METHODS. A professional course in the methods of teaching industrial arts: objectives, preparing lesson plans, organizing courses, laboratory procedures, instructional materials; and administrative practices, visitations to representative high school laboratories. Open to students having 30 hours or more of industrial arts courses. 5 hours.

450. INDUSTRIAL PLASTICS. A general overview of the plastics and synthetics industries. The course examines the processes; the associated application of procedures, materials, equipment and current practices of the industry. Laboratory experiments and production projects are required. 3 hours.


460. INDUSTRIAL MATERIALS AND PROCESSES. A study of the basic concepts of materials science. Electrical, electronic, chemical and mechanical properties of materials. Metals. Organic materials. The manufacturing processes involved in industrial production; classroom discussions, technical motion pictures, and field trips to refineries, mines, quarries, mills, kilns, foundries, factories and other manufacturing firms. 5 hours.

480. STUDENT TEACHING IN INDUSTRIAL ARTS EDUCATION. See education 480. 15 hours.

490. SPECIAL TOPICS IN INDUSTRIAL ARTS. 1-3 hours.

494. SEMINAR IN INDUSTRIAL ARTS. 1-3 hours.

497. INDEPENDENT STUDY IN INDUSTRIAL ARTS. 1-3 hours.

MATHEMATICS
(Department 123)

Professors Berton (Chairman), Stright; Associate Professors K. Kuhns, Lhamon, Pillai; Assistant Professors Carpenter, Daly, Evans, C. Roider.

The department offers courses designed to complement almost all disciplines in the university. Students should check the departmental curriculum in which they are considering majoring to determine the best choice of mathematics courses.

In general, the sequence 100-172-173 is designed for prospective elementary school teachers; the sequences 100-142-143-147-148 and 100-147-148-142-143 are designed for prospective social and life scientists, and the calculus sequence 161-162-163-261-262-263-264 is designed for prospective engineers, mathematicians and physical scientists.
The beginning course of the calculus sequence for each individual freshman will be determined on the basis of the student's achievement in high school and on the basis of the college entrance examinations, especially the mathematics achievement examination. Advanced placement is encouraged.

Students majoring in mathematics must complete 45 credit hours in mathematics. They must complete mathematics 264 and then complete at least 25 credit hours in mathematics courses at the 300/400 level including 311, 321, and 361. Physics 231-232-233 are also required as part of the mathematics major. All mathematics courses to be counted toward the major must have been completed with a grade of C or better.

All mathematics majors are encouraged to take digital computer 101 in the College of Engineering early in their program.

000. ORIENTATION. Familiarization with the department, requirements for majors, planning programs of courses, university catalog and library. Required of departmental majors. 1 hour.

100. MATHEMATICS. Mathematical logic, set theory, the essence of a proof, permutations and combinations. 3 hours.

142. PROBABILITY AND STATISTICS 1. Set operations, permutations and combinations, sample-space, random variable, and probability, sample and population averages, frequency distribution and probability functions, binomial and normal distribution. Prerequisite: mathematics 100, or 162 or its equivalent in high school work. 3 hours.

143. PROBABILITY AND STATISTICS 2. Sampling distributions, estimation, testing hypothesis, regression and correlation. Prerequisite: mathematics 142. 3 hours.

147. INTRODUCTORY CALCULUS 1. Cartesian coordinates, functions, continuity, limits, differentiation, extrema, graphing, and applications of differentiation. Prerequisite: mathematics 100 or 161, or the equivalent in high school work. 3 hours.

148. INTRODUCTORY CALCULUS 2. Differentials, Riemann integral, fundamental theorem of calculus, indefinite integral with applications, integration techniques, Simpson's rule, improper integrals, logarithmic and exponential functions, differential equations, functions of two variables, partial derivatives. Prerequisite: mathematics 147. 3 hours.

161. ELEMENTARY FUNCTIONS 1. The real number system, algebraic expressions, equations and inequalities, functions and graphs, exponential and logarithmic functions. 3 hours.

162. ELEMENTARY FUNCTIONS 2. Trigonometric functions, trigonometric identities and formulas, solutions of triangles, systems of equations and inequalities, complex numbers, polynomials and their zeroes, sequences. Prerequisite: mathematics 161 or its equivalent in high school work. 3 hours.

163. ANALYTIC GEOMETRY. Rate of change of a function, slope of a curve, limits, derivatives of algebraic functions, chain rule, continuity, related rates, curve plotting, extrema, mean value theorem, indefinite integration and applications. Prerequisite: mathematics 162 or its equivalent in high school work. 5 hours.

172. FUNDAMENTAL MATHEMATICS 1. Theory of arithmetic, systems of numeration, relations, algorithms, whole numbers, integers, rational numbers, real numbers, patterns of proof. Prerequisite: mathematics 100. 3 hours.

173. FUNDAMENTAL MATHEMATICS 2. Geometric figures, transformations on the plane, congruences of geometric figures, symmetry, similarity. Prerequisite: mathematics 100. 3 hours.
245. HISTORY OF MATHEMATICS. An introduction to the history and origin of mathematics, restricted principally to mathematics through elementary calculus, a chronologically study of some mathematicians and their contributions to mathematical thought. To be offered alternate years 1975-76. 3 hours.

261. CALCULUS 1. Fundamental theorem, applications of integration, calculus of transcendental functions, differential equations of growth. Prerequisite: mathematics 163. 4 hours.

262. CALCULUS 2. Integration techniques, improper integrals, numerical methods of integration, analytic geometry, polar coordinates, vectors, parametric equations. Prerequisite: mathematics 261. 4 hours.

263. CALCULUS 3. Linear algebra, vector functions and their derivatives, partial differentiation, double integrals. Prerequisite: mathematics 262. 4 hours.

264. CALCULUS 4. Triple integrals, cylindrical and spherical coordinates, vector analysis, Green’s and Stokes’ theorems, infinite series. Prerequisite: mathematics 263. 3 hours.

291-292-293. CALCULUS THEORY SEMINAR 1, 2, 3. A theoretical treatment of the calculus to be taken concurrently with 263, 264 and 361. Including continuity, uniform continuity, convergence and uniform convergence. Prerequisite: mathematics 261. 3 hours.

311, 312, 313. ABSTRACT ALGEBRA. Rings, fields, vector spaces, systems of linear equations, matrices, determinants, polynomials, eigenvalues and eigenvectors, inner products, and orthogonal spaces. To be offered alternate years 1975-76. Prerequisite: mathematics 264. 9 hours.

321. INTRODUCTION TO TOPOLOGY AND ANALYSIS. Set theory, composition, inverses, restriction and extension of functions, metric spaces, continuity, open and closed sets, limits, products, subspaces, and equivalence of metric spaces. To be offered alternate years 1975-76. Prerequisite: mathematics 264. 3 hours.

361. DIFFERENTIAL EQUATIONS. First order differential equations with applications, second order linear differential equations with applications, Laplace transforms, systems of first order equations. Prerequisite: mathematics 263. (Mathematics 264 is highly recommended as an additional prerequisite.) 5 hours.

362. PARTIAL DIFFERENTIAL EQUATIONS. Fourier series, partial differential equations, Bessel functions, Legendre polynomials, non-linear differential equations. To be offered alternate years 1976-77. Prerequisite: mathematics 361. 4 hours.

363. COMPLEX VARIABLES. Complex algebra, complex calculus, analytic functions, infinite series over the complex plane, theory of residues, conformal mapping. To be offered alternate years 1976-77. Prerequisite: mathematics 264. 4 hours.

381-382. STATISTICS 1 AND 2. Probability models, random variables, sampling estimation, testing hypothesis, non-parametric procedures, regression and correlation. Prerequisite: mathematics 264. 6 hours.

421-422. FOUNDATIONS OF GEOMETRY 1 AND 2. Incidence, ordering, separation and congruence, as they are involved in non-Euclidean, incidence, affine and Euclidean geometrics. To be offered alternate years 1975-76. Prerequisite: mathematics 264. 6 hours.

423. PROJECTIVE GEOMETRY. Projectivities, perspectivities, perspective triangles, quadrangular sets, harmonic sets, duality, fundamental theorem and Pappus’ Theorem, polarities, the conic, finite projective plane, parallelism, coordinates. To be offered alternate years 1975-76. Prerequisite: mathematics 264. 3 hours.
452-453. REAL ANALYSIS 1 AND 2. Elements of point set theory, limits, sequences, continuity, partial differentiation, implicit functions, Riemann integrals including improper integrals, convergence and uniform convergence of infinite series. To be offered alternate years, 1975-76. Prerequisite: mathematics 361. 6 hours.

461-462. NUMERICAL ANALYSIS 1 AND 2. Review of Fortran, linear systems of equations, approximations, finite differences, differential equations, eigenvalue problems, numerical solutions of equations, linear programming. To be offered alternate years, 1976-77. Prerequisite: mathematics 361. 6 hours.

490. SPECIAL TOPICS IN MATHEMATICS. 1-3 hours.

494. SEMINAR IN MATHEMATICS. 1-3 hours.

497. INDEPENDENT STUDY IN MATHEMATICS. 1-3 hours.

MUSIC (Department 152)

Professors Drake (Chairman), Linger, Roider;
Associate Professor Sonntag;
Assistant Professors Forsythe (on leave), J. Peterson;
Instructors Kratzer, Ogletree, E. Williams;
Lecturers Darst, Laukhuf, S. Peterson, Sherrick, R. Williams.

The Department of Music offers a full course of music and music education studies for the aspiring music educator or professional 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 cultural life and atmosphere of the university. Ohio Northern University is an associate member of the National Association of Schools of Music.

The music major is given a variety of courses and experiences to help him gain the knowledge and proficiency in breadth and depth which will help him achieve future success in his chosen area of endeavor in the music field. Special topics and studies may be undertaken to enrich the basic course offerings.

In addition to the bachelor of arts degree with a music major, the bachelor of arts degree can be earned with teacher certification in music, grades K-12. A bachelor of music degree recently received approval of the university's Board of Trustees and has been submitted to the National Association of Schools of Music for approval. Music education, performance, and sacred music are the three areas of concentration within the bachelor of music degree. Contact the chairman of the music department for specific course requirements for the degree options and for departmental policies regarding music majors.

Students wishing to earn a double major in music and another field or who wish a special pre-law program, should contact the department chairman for further information. Music can also be taken as part of the inter-disciplinary degree in liberal arts.

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.

10. Voice  
   — Class  
15. Voice  
   — Individual  
20. Piano  
   — Class  
21. Piano  
   — Class (Majors)  
25. Piano  
   — Individual  
30. Organ  
   — Class  
35. Organ  
   — Individual  
40. Strings  
   — Class  
41. Violin-Viola  
   — Class  
42. Cello-Bass  
   — Class  
43. Elementary Guitar  
   — Class  
44. Intermediate Guitar  
   — Class  
45. Strings  
   — Individual  
50. Woodwinds  
   — Class  
55. Flute  
   — Individual  
56. Oboe  
   — Individual  
57. Clarinet  
   — Individual  
58. Bassoon  
   — Individual  
59. Saxophone  
   — Individual  
60. Brasses  
   — Class  
65. Trumpet  
   — Individual  
66. French Horn  
   — Individual  
67. Trombone  
   — Individual  
68. Euphonium  
   — Individual  
69. Tuba  
   — Individual  
69. Tuba  
   — Individual  
70. Percussion  
   — Class  
75. Percussion  
   — Individual

Note: 1) All class instruction carries one hour credit per quarter. The amount of instruction depends upon the size of the class, but is no 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 weekly of individual instruction is given for each hour of credit taken.

**MUSIC PERFORMING GROUPS**

Membership in performing groups is open to all university students, and they are encouraged to participate. A maximum of six hours of credit is allowed non-music majors toward basic graduation requirements, but students may enroll every year until graduation. In-depth requirements in fine arts may be satisfied by two to four years of membership in a major performing group.
80. CHORUS. All qualified students are given the opportunity to sing in the University Chorus. Music of all types, accompanied and a cappella, is studied and performed throughout the year in concerts and performances on and off campus. 1 hour per quarter.

81. CHAPEL CHOIR. A choral group open to all students for the study and performance of religious music. The Chapel Choir rehearses once weekly and sings at all chapel services. 1 hour per quarter.

82. VOCAL ENSEMBLE. Selected ensembles of vocalists for the study and performance of characteristic literature. 1 hour per quarter.

83. UNIVERSITY SINGERS. 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. Membership by audition only. 1 hour per quarter.

84. CONCERT BAND. All qualified students who play band instruments are given the opportunity to play in the University Concert Band. The finest band literature of all types is studied and performed in regular campus concerts and tours. 1 hour per quarter.

85. SYMPHONIC WIND ENSEMBLE. A select group of wind and percussion instrumentalists designed to perform the finest band literature with the highest musical standards. Performances include concerts and programs on and off campus. Membership by audition only. 1 hour per quarter.

86. PEP BAND. A band specially organized to provide music for athletic events. Members must be enrolled in Concert Band. 1 hour per quarter.

88. JAZZ ENSEMBLE. A selected ensemble for the study and performance of modern characteristic literature for the medium. Performances on and off campus are scheduled throughout the year. Members are expected to be enrolled in Concert Band. 1 hour per quarter.

92. WOODWIND ENSEMBLE. Selected ensembles of woodwind instrumentalists for the study and performance of characteristic literature. 1 hour per quarter.

94. BRASS ENSEMBLE. Selected ensembles of brass and percussion instrumentalists for the study and performance of characteristic literature. 1 hour per quarter.

95. PERCUSSION ENSEMBLE. Selected ensembles of percussion players for the study and performance of characteristic literature. 1 hour per quarter.

96. ORCHESTRA. Membership in the Lima Symphony Orchestra is available to qualified students who perform orchestral instruments. Audition is required. 1 hour per quarter.

98. STRING ENSEMBLE. Ensembles of string instrumentalists for the study and performance of characteristic literature. 1 hour per quarter.

COURSES IN MUSIC

000. ORIENTATION. Familiarization with the department, requirements for majors, planning programs of courses, university catalog and library. Required of departmental majors. 1 hour.

100. MUSIC. A basic course in the nature, forms, styles, and media of music of all types and periods. Emphasis upon listening and understanding. Laboratory listening and concert attendance, knowledge of fundamentals, recognition of composers and representative literature expected. 3 hours.

101. MUSIC. The basic music 100 course for music majors only. 3 hours.

110. FUNDAMENTALS OF MUSIC FOR THE NON-MUSIC MAJOR. A basic course in the theory of music designed to give the non-music major a background in the perception and reading of musical symbols. Especially recommended for elementary education majors. 3 hours.
112. MUSIC FOR THE CLASSROOM TEACHER. Music activities, materials, literature, unit planning, teaching methods and skills for the classroom teacher — grades K-6. Prerequisites: music 100 and music 110 or proven knowledge of music fundamentals. 3 hours.

121-122-123. THEORY OF MUSIC. Basic music theory and harmony. Scales, intervals, chords, ear training, sight-singing, part-writing, functional music, creative projects in composition and arranging. Required of all freshmen music majors. Must be taken in sequence. 4 hours per quarter.

210. JAZZ HISTORY AND LITERATURE. An in-depth study of modern jazz, from its roots in African tribal music through the gradual evolution of this American art form as it appears today. 3 hours.

221-222-223. ADVANCED THEORY OF MUSIC. Counterpoint, form and analysis, contemporary theory, harmonic dictation, orchestration, arranging, creative projects in composition. Must be taken in sequence. Prerequisite: music 123. 4 hours per quarter.

261. LATIN AND ITALIAN DICTION FOR SINGERS. A course designed to acquaint vocalists with the proper pronunciation of vocal and choral texts in Latin and Italian. Required of all vocal music majors. 1 hour.

262. FRENCH DICTION FOR SINGERS. Continuation of 261 in French. 1 hour.

263. GERMAN DICTION FOR SINGERS. Continuation of 261-262 in German. 1 hour.

310. AMERICAN MUSIC. 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. 3 hours.

321-322-323. MUSIC HISTORY AND LITERATURE. The historical development of music literature. Study of representative literature and composers: Ancient, Medieval, Renaissance, Baroque, Classical, Romantic, and Twentieth Century periods. Prerequisite: music 100. 3 hours per quarter.

334. WOODWIND METHODS. Study, elementary performance skills, pedagogy, and material of the woodwind instruments. Designed for the future public school music teacher. 2 hours.

336. BRASS METHODS. Study, elementary performance skills, pedagogy, and materials of the brass instruments. 2 hours.

338. PERCUSSION METHODS. Study, elementary performance skills, pedagogy, and materials of the percussion instruments. 2 hours.

339. STRING METHODS. Study, elementary performance skills, pedagogy, and materials of the orchestral stringed instruments. 2 hours.

361. ELEMENTARY MUSIC METHODS. (music education majors). Philosophy, techniques, materials, curriculum planning for the elementary music teacher and supervisor. 2 hours.

362. SECONDARY MUSIC METHODS. (music education majors). Philosophy, techniques, materials, curriculum planning for the secondary music program — general, vocal, and instrumental. 2 hours.

363. ORGANIZATION AND SUPERVISION OF SCHOOL MUSIC PROGRAMS. Organizational techniques for the music performing group director. Library, personnel, equipment, office files and procedure, facility planning, publicity and public relations, and other practical topics. 2 hours.

371-372-373. APPLIED FIELD LITERATURE. Study of the professional and educational literature in a specific applied field. 1 hour per quarter.

421. BASIC CONDUCTING. General conducting techniques and principles of score study. Laboratory experiences. Prerequisite: music 223. 2 hours.

422. INSTRUMENTAL CONDUCTING. Conducting and rehearsal techniques related to instrumental conducting. Application of study to representative band, orchestra, and ensemble literature. Prerequisite: music 421. 2 hours.
423. CHORAL CONDUCTING. Conducting and rehearsal techniques related to choral conducting. Application of study to representative choral literature. Prerequisite: music 421. 2 hours.

461. CONCERT CHORAL METHODS AND TECHNIQUES. Procedures in the development and direction of school choral groups, including choral literature of all types. 3 hours.

462. CONCERT INSTRUMENTAL METHODS AND TECHNIQUES. Procedures in the development and direction of school bands and orchestras, including band literature of all types. 2 hours.

463. MARCHING BAND METHODS AND TECHNIQUES. 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. Laboratory experiences. 1 hour.

480. SENIOR RECITAL. 0 hours.

490. SPECIAL TOPICS IN MUSIC. Group study of approved specialized topics not offered in catalog. 1-3 hours.

494. SEMINAR IN MUSIC. 1-3 hours.

497. INDEPENDENT STUDY IN MUSIC. A wide variety of specialized musical subjects are available through individual study with a faculty member. 1-3 hours.

PHILOSOPHY AND RELIGION
(Department 115)

Professor Hinderliter (Chairman);
Associate Professors Benson, Whipple;
Instructor McLean.

MAJOR PROGRAMS

PHILOSOPHY

The major in philosophy requires a minimum of 45 quarter hours beyond philosophy 100, and must include either seminar 494 or independent study 497. A maximum of three courses in religion may be applied to the philosophy major. A senior comprehensive exam is not required.

RELIGION

The major in religion requires a minimum of 45 quarter hours beyond religion 105, and must include either seminar 495 or independent study 498. A maximum of three courses in philosophy may be applied towards the religion major. A senior comprehensive exam is not required.

PHILOSOPHY AND RELIGION

The major in philosophy and religion requires a minimum of 45 quarter hours beyond philosophy 100 and religion 105, with the selection of courses subject to approval by the department. 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.
PHILOSOPHY

Philosophy is a quest for a comprehensive understanding of human existence. Philosophical activity endeavors to examine the rational justification for 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.

000. ORIENTATION. Familiarization with the department, requirements for majors, planning program of courses, university catalog and library. Also listed as religion 000. Required of departmental majors. 1 hour.

100. PHILOSOPHY. An introduction to philosophical inquiry, its scope and methodology, through a study of representative philosophical problems such as the nature of ethical values, principles of correct reasoning, the possibility and limits of knowledge, and the distinction between appearance and reality. 3 hours.

234. LOGIC. A consideration of the role of language in reasoning. An understanding of formal logical methods and their application in the analysis of deductive arguments. 3 hours.

Most of the following courses are offered in alternate years or on demand.

237. KNOWLEDGE AND TRUTH. An examination of the scope and justification of knowledge with reference to problems such as skepticism, sense perception, reason, belief, and truth. 3 hours.

238. PHILOSOPHICAL ETHICS. The meaning of ethical statements and criteria by means of which ethical claims are justified rationally, including a critical examination of ethical theories through the study of selected philosophical essays. 3 hours.

290. SPECIAL TOPICS IN PHILOSOPHY. 1-3 hours.

294. SEMINAR IN PHILOSOPHY. 1-3 hours.

331. THE CLASSICAL GREEK AND ROMAN PHILOSOPHERS. The Pre-Socratics, Plato, Aristotle, and Hellenistic philosophy through Neo-Platonism. 3 hours.

332. MEDIEVAL AND RENAISSANCE PHILOSOPHY. The development of philosophy from St. Augustine to Francis Bacon. 3 hours.

333. MODERN PHILOSOPHY. The study of philosophy beginning with Descartes through the nineteenth century. 3 hours.

334. SYMBOLIC LOGIC. The evaluation of deductive arguments by means of the formal procedures of modern symbolic logic. Prerequisite: 234. 3 hours.

341. AESTHETICS. The theories relating to the creation, appreciation and critical evaluation of the various fine arts, and of the various theories of beauty and the related aesthetic experience. Previously offered as 241. 3 hours.

345. EXISTENTIALISM. The historical roots of existentialism in Kierkegaard and Nietzsche and the thought of Heidegger, Sartre, and other representative figures. Previously offered as 245. 3 hours.

433. PHILOSOPHY OF HISTORY. Leading theories of history as reflected in the writings of philosophers from ancient times to the present; the nature of history and historical knowledge. 3 hours.

441. PHILOSOPHY OF SCIENCE. The concepts and assumptions of the scientific method, the relations of philosophy and science, the impact of modern scientific developments on metaphysical speculations. 3 hours.

444. AMERICAN PHILOSOPHY I. The development of philosophy in early America through a study of representative thinkers of Puritan idealism, the American enlightenment and transcendentalism. 3 hours.
445. AMERICAN PHILOSOPHY II. Main currents in modern American philosophy expressed through the writings of Peirce, James, Royce, Santayana and Dewey. 3 hours.

452. PHILOSOPHY OF RELIGION. The religious concepts of God, soul, freedom, prayer, destiny, evil, and immortality and the underlying metaphysical assumptions. 3 hours.

RELGION

Religion is an integral part of human life and culture. It includes the ultimate commitments, attitudes, beliefs and forms of worship by which men 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 man's existence and destiny. The approach to the study is ecumenical and makes use of current scholarly methods of research and findings.

000. ORIENTATION. Familiarization with the department, requirements for majors, planning program of courses, university catalog and library. Also listed as philosophy 000. Required of departmental majors. 1 hour.

105. RELIGION. A non-sectarian study of religion, and its nature and function in the modern Western world. Illustrations of basic concepts and principles of religion are taken mainly from Judaism and Christianity, the chief religions of our western culture. 3 hours.

Most of the following courses are offered in alternate years or on demand.

254. THE BEGINNINGS OF ISRAEL. The development of the history and religious thought of the ancient Hebrews from Abraham through the fall of Jerusalem and the work of Jeremiah. 3 hours.

255. THE LATER OLD TESTAMENT COMMUNITY. Religious and historical developments beginning with Ezekiel through the Roman period, with special attention to the Qumran community and the Dead Sea Scrolls. 3 hours.

256. THE BEGINNINGS OF CHRISTIANITY. The events and interpretations surrounding the lives of Jesus, Paul, and the other Christian leaders of the first century. 3 hours.

261. ARCHAEOLOGY AND THE BIBLE. The methods and conclusions of archaeological studies in the Middle East as related to the Bible. 3 hours.

262. CHRISTIANITY AND CULTURE. 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. 3 hours.

263. CHRISTIAN ETHICS. 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. 3 hours.

267. ASIAN RELIGIONS. The major living religions of the Orient. 3 hours.

291. SPECIAL TOPICS IN RELIGION. 1-3 hours.
295. SEMINAR IN RELIGION. 1-3 hours.

352. CHRISTIAN LIFE AND THOUGHT I. Christianity from the time following the New Testament period to the eve of the Reformation with emphasis upon the development of the Christian faith and the conflict between church and state. 3 hours.

353. CHRISTIAN LIFE AND THOUGHT II. The Protestant-Catholic conflict and the impact of modern secular thought on Christianity from the Reformation through the nineteenth century. 3 hours.

361. CONTEMPORARY CHRISTIAN THOUGHT. Basic issues, major theological positions, and representative theologians of twentieth century Christian thought. 3 hours.

PHILOSOPHY OF RELIGION. (See Philosophy 452). 3 hours.

461. LIFE AND TEACHINGS OF JESUS. An approach to the understanding of Jesus through Matthew, Mark and Luke with contemporary theories about the Gospels. 3 hours.

463. LIFE AND TEACHINGS OF ST. PAUL. The insights of the most influential thinker and apostle in the early church. 3 hours.

491. SPECIAL TOPICS IN RELIGION. 1-3 hours.

495. SEMINAR IN RELIGION. 1-3 hours.

498. INDEPENDENT STUDY IN RELIGION. 1-3 hours.

PHYSICS
(Department 124)

Professor Gangemi (Chairman); Associate Professors, Messick, Weimer, 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.

The physics major must complete 57 hours in his major field, should follow the sequence and obtain the prerequisites for the advanced courses as determined by the department. Physics majors in education must complete 45 hours in their major field. A senior comprehensive exam is not required.

The basic curriculum for concentration in physics can be obtained from the department chairman.

000. ORIENTATION. Familiarization with the department, requirements for majors, planning program of courses, university catalog and library. Required of departmental majors. 1 hour.

100. PHYSICS. Intended for liberal arts students. This course presents 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 also be considered. 3 hours.
190. SEMINAR. Reading, discussion and reports on problems of historical and current interest in physics. 1 hour.

Physics 211, 212, and 213 are the non-calculus, general physics courses intended primarily for pre-pharmacy and secondary education students. Prerequisite: mathematics 161, 162 or equivalent.

211. GENERAL PHYSICS: MECHANICS OF SOLIDS AND FLUIDS (3 + 2). Physics 224 Laboratory must be taken concurrently. 4 hours.

212. GENERAL PHYSICS: SOUND, HEAT AND LIGHT (3 + 2). Physics 225 Laboratory must be taken concurrently. 4 hours.

213. GENERAL PHYSICS: ELECTRICITY AND MAGNETISM (3 + 2). Physics 226 Laboratory must be taken concurrently. 4 hours.

Physics 231, 232 and 233 are the calculus general physics courses designed for physics and engineering students. Physics 231 should precede 232 and 233. Prerequisite: calculus 261 which may be taken concurrently or equivalent.

231. PHYSICS: MECHANICS OF SOLID AND FLUIDS (4 + 2). Physics 224 Laboratory must be taken concurrently. 5 hours.

232. PHYSICS: SOUND, HEAT AND LIGHT (4 + 2). Physics 225 Laboratory must be taken concurrently. 5 hours.

233. PHYSICS: ELECTRICITY AND MAGNETISM (4 + 2). Physics 226 Laboratory must be taken concurrently. 5 hours.

250. ASTRONOMY I. 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. 3 hours.

251. ASTRONOMY II. The structure and evolution of stars and stellar systems. Cosmology. Prerequisite: astronomy 250. 3 hours.

303. MODERN PHYSICS. The concepts of relativity, quantum and wave mechanics, atomic structure and absorption and emission processes. Prerequisites: calculus 264 and physics 233. 3 hours.

310. THEORY AND ADVANCED LABORATORY: MECHANICS. 1-3 hours.

320. THEORY AND ADVANCED LABORATORY: LIGHT, HEAT, SOUND. 1-3 hours.

330. THEORY AND ADVANCED LABORATORY: ELECTRICITY. 1-3 hours.

340. THEORY AND ADVANCED LAB: NUCLEAR PHYSICS AND SOLID STATE. Credit is given in courses 310, 320, 330 and 340 according to the work done. Offered every quarter. Prerequisite: physics one year. 1-3 hours.

351. ANALYTICAL MECHANICS I. Vector analysis, kinematics, conservative forces, planetary motion, pendulum, free and forced oscillations, coupled systems and normal coordinates, angular momentum, rigid bodies. Prerequisites: calculus and physics 233. 3 hours.

352. ANALYTICAL MECHANICS II. LaGrange equations, canonical formulation, principle of least action, normal coordinates, rigid bodies, special relativity, mathematical methods. Prerequisites: mathematics 352 or 362 and physics 351. 3 hours.

353. NUCLEAR PHYSICS. 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. Prerequisite: physics 231, 232, 233. 3 hours.

361. ELECTRONICS. Electron ballistics, vacuum tubes, rectifiers, amplifiers, oscillators, modulators, electron tube instruments. Prerequisite: physics 213 or 233. 3 hours.
362. GEOMETRICAL OPTICS. The laws of geometrical optics, image formation by mirrors and lenses, optical aberrations and optical instruments. Prerequisites: physics 232. 2 hours.

411. ELECTRICITY AND MAGNETISM I. 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 264 and physics 233. 3 hours.

412. ELECTRICITY AND MAGNETISM II. Advanced electric and magnetic fields; electric and magnetic properties of solids, electromagnetic radiation. Prerequisites: mathematics 362 and physics 411. 3 hours.

413. SOLID STATE. A lecture and problem 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: 303. 3 hours.


433. THEORETICAL PHYSICS. 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. 4 hours.

463. PHYSICAL OPTICS. The law of physical optics, interference, diffraction and polarization and instrumentation. Prerequisite: physics 363. 3 hours.

490. SPECIAL TOPICS IN PHYSICS. 1-3 hours.

494. SEMINAR IN PHYSICS. 1-3 hours.

PSYCHOLOGY, SOCIOLOGY, AND SOCIAL WORK
(Department 133)

Professor Wildman (Chairman); Associate Professors Cohoe, Occhetti; Instructors Compton (leave of absence), Gaskins, O'Reilly, H. Travers; Lecturers R. Travers, N. Dapone

The objectives of this 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.

A major in psychology includes the successful completion of forty-six hours in psychology in addition to psychology 100. The following courses are required: psychology 000, 110, 112, 250, 311, 319, 333, 351, 420, 431, 494; biology 100, 113, 231.

A major in sociology includes the successful completion of 46 hours in sociology in addition to sociology 105. The following courses are required: sociology 000, 250, 319, 320, 418, 426.
A major in social work includes the successful completion of the following courses: social work 000, 241, 342, 343, 344, 344, 442, 444, 496; psychology 100, 215, 311, 420; sociology 105, 204, 205, 306, 403; biology 100, 113, 231; history 365; political science 105; speech 100, 360.

Secondary teacher certification programs are offered in social psychology and sociology comprehensive social studies.

PSYCHOLOGY

000. ORIENTATION. 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. 1 hour.

100. PSYCHOLOGY. General research and concepts in human behavior. Lectures, demonstrations, and observations. 4 hours.

110. GENERAL PSYCHOLOGY I. Scientific study of behavior with an emphasis on physiological processes, sensation, and perception. Also included are laboratory exercises which stress research methodology. Prerequisite: psychology 100. 4 hours.

112. GENERAL PSYCHOLOGY II. Scientific study of behavior with an emphasis on arousal, emotion and motivation. Also included are laboratory exercises which stress research methodology. Prerequisite: psychology 110. 4 hours.

200. PRACTICUM IN CHILD DEVELOPMENT. Work with children in the department's Child Development Center under supervision of instructor and nursery school teacher. Practical experience in behavior management. Prerequisite: psychology 333, approval of chairman. 1 hour.

215. DEVELOPMENTAL PSYCHOLOGY. Basic theories in human development from conception through old age; contemporary research at each age level. Prerequisite: psychology 100. 3 hours.

250. SOCIAL STATISTICS. Descriptive statistics, graphing, normal curve, sampling, hypothesis testing, inferential statistics, t and chi square tests. Emphasis is on the use of statistics in the interpretation of data. Also listed as sociology 250. 4 hours.

265. PSYCHOLOGICAL ASSESSMENT. 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. 4 hours.

311. PSYCHOLOGY OF PERSONALITY. The major theories of personality from Freud to contemporary theoretical approaches. Prerequisite: psychology 100. 4 hours.

319. METHODS IN SOCIAL RESEARCH. Review and practice of major methodological techniques in social research through critical analysis of selected professional monographs and/or articles; construction and analysis of questionnaires; interpretation and presentation of data; use of the computer in social research. Also listed as sociology 319. Prerequisite: psychology 250. 3 hours.

320. SOCIAL RESEARCH METHODS: PRACTICE. The student conducts a research project. Includes: formulation and design; collection, analysis, and interpretation of data; and reporting of results. Prerequisite: 319. 3 hours.

333. PSYCHOLOGY OF LEARNING. The theoretical frames of reference and supporting research which underlie current conceptualizations of behavior modification in terms of the process of learning; conditioning and reinforcement theories. Prerequisite: psychology 100. 3 hours.
351. SOCIAL PSYCHOLOGY. 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 351. Prerequisite: psychology 100. 4 hours.

353. PSYCHOLOGY OF BUSINESS AND INDUSTRY. Psychology as used in business, industry, and personnel work. Prerequisite: psychology 100. 3 hours.

411. COUNSELING PSYCHOLOGY. The basic psychological principles involved in the counseling situation; techniques of interviewing. Open to seniors. Prerequisite: psychology 100. 3 hours.

412. GROUP DYNAMICS. A participation approach to increasing sensitivity, diagnostic and action skills. Intensive small group experiences are supplemented by theory presentations. Focus is upon the properties of groups, awareness of personal factors in group interaction, dimensions of trainer behavior in achieving group effectiveness, and the dynamics of change. Prerequisite: approval of instructor. 3 hours.

420. ABNORMAL PSYCHOLOGY I. A review of the historical background of the development of modern approaches to abnormal behavior; a study of the psychological, biological, and sociological factors in the development of abnormal behavior; the diagnosis and treatment of transient situational reactions, neuroses, psychophysiological reactions, and mental deficiencies. Prerequisite: psychology 100. 3 hours.

421. ABNORMAL PSYCHOLOGY II. A review of the causes, diagnoses, and treatment of sociopathic reactions, sexual deviant reactions, personality pattern and trait disorders, functional and organic psychoses; a survey of diagnostic procedures and therapeutic approaches used in clinical psychology. Prerequisite: psychology 100. 3 hours.

423. PSYCHOLOGY OF THE EXCEPTIONAL CHILD. The classification of the non-typical child; the use of the school and other sources for meeting his needs. Prerequisite: psychology 100. 3 hours.

425. PSYCHOLOGICAL FACTORS IN DRIVING. 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. Offered in summer. Prerequisite: psychology 100. 3 hours.

431. EXPERIMENTAL PSYCHOLOGY. Methods of experimental psychology; report writing, terminology, and relevant background materials. Prerequisite: psychology 319. 4 hours.

434. HISTORY AND SYSTEMS OF PSYCHOLOGY. Lines of thinking which influence the field of psychology. Systems of psychological thought and theoretical views. Alternate years 1975-1976. Prerequisite: psychology 100. 3 hours.

436. READINGS IN PSYCHOLOGICAL RESEARCH. Current research and theory in psychological literature. 3 hours.

437. PRACTICUM IN PSYCHOLOGY. 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. 3 hours.

490. SPECIAL TOPICS IN PSYCHOLOGY. 1-3 hours.

494. SEMINAR IN PSYCHOLOGY. Open to seniors. 3 hours.

497. INDEPENDENT STUDY IN PSYCHOLOGY. Prerequisite: approval of chairman. 1-3 hours.
SOCIOMETRY

000. ORIENTATION. Familiarization with the department, requirements for majors, planning program of courses, university catalog and library. Also listed as psychology 000 and social work 000. 1 hour.

105. SOCIOLOGY. Basic sociological concepts most needed for understanding and analyzing modern social structure and the process of social change. 4 hours.

204. MARRIAGE AND THE FAMILY. An institutional perspective on the family; patterns of courting, marital and parental behavior; trends in the contemporary American family. Prerequisite: sociology 105. 3 hours.

205. COMPLEX ORGANIZATIONS. Introduction to major theories, methods, and data in the sociological analysis of complex organizations (corporations, social agencies, mental hospitals, professional associations, churches, colleges, armies, stores, labor unions, prisons, etc). Includes consideration of practical implications of analytic principles and attention to interdependence between organizations and their social-structural milieu. Prerequisite: sociology 105. 3 hours.

206. SOCIAL PROBLEMS. Sociological analysis of social problems in contemporary American society; the structure of American social life, the major institutions of American society, and the sources of social change in American society. Prerequisite: sociology 105. 3 hours.

250. SOCIAL STATISTICS. Descriptive statistics, graphing, normal curve, sampling, hypothesis testing, inferential statistics, t and chi square tests. Emphasis is on the use of statistics in the interpretation of data. Also listed as psychology 250. 4 hours.

305. SOCIAL DEVIANCE. Sociological perspectives on the processes of individual and group deviance: a discussion of selected major problems of deviance in industrial societies, their social causes, consequences, and solutions. Prerequisite: sociology 105. 3 hours.

306. SOCIAL CHANGE. A structural analysis of change in complex societies; the systematic strains and inconsistencies which generate societal problems; consideration of measurement of social change. Prerequisite: sociology 105. 3 hours.

307. POPULATION ANALYSIS. Size, composition, distribution and growth of human populations; theories of population growth and migration; problems in social policy in over-population and economic development. Prerequisite: sociology 105. 3 hours.

319. METHODS IN SOCIAL RESEARCH: PRINCIPLES. Review and practice of major methodological techniques in social research through critical analysis of selected professional monographs and/or articles; construction and analysis of questionnaires; interpretation and presentation of data. Also listed as psychology 319. Prerequisite: sociology 105 and 250. 3 hours.

320. METHODS IN SOCIAL RESEARCH: PRACTICE. The student conducts a research project. Includes: formulation and design; collection, analysis, and interpretation of data; and reporting of results. Also listed as psychology 320. Prerequisite: 319. 3 hours.

323. CRIME AND DELINQUENCY. Sociological analysis of major forms of crime and juvenile delinquency; theories, research methods, date and implications for control. Prerequisite: 105. 3 hours.

330. CULTURAL ANTHROPOLOGY. An introduction to major concepts and principles of cultural anthropology, with attention to relevant aspects of physical anthropology. Includes a treatment of the growth of anthropology as a scientific discipline; an overview of major institutions (economy, kinship, polity, and religion); and a consideration of practical application of cultural anthropology. Prerequisite: sociology 105. 3 hours.
351. SOCIAL PSYCHOLOGY. The effect of social and cultural forces upon the individual. The nature and development of attitudes, language, and cognitive processes. Individual and group projects illustrative of the methodology of social psychology. Also listed as psychology 351. Prerequisite: sociology 105. 4 hours.

403. SOCIOLOGY OF MINORITIES. The analysis of the sociological aspects of dominant-minority relationships. Prerequisite: sociology 105. 3 hours.

405. SOCIOLOGY OF RELIGION. The major contributions of social scientists to the study of religious institutions; the various forms and social functions of religion, the structure of religious behavior and organization; the relations between religion and other social institutions. Prerequisite: sociology 105. 3 hours.

414. URBAN SOCIOLOGY. A comparative study of the organization, social processes, problems, and interrelationships of rural and urban communities. Prerequisite: sociology 105. 3 hours.

415. MASS COMMUNICATIONS. The social structure of mass communications and its audiences; the social consequences of the media employed; content analysis; the effect of mass communications on its audience. Alternate years 1975-1976. Prerequisite: sociology 105. 3 hours.

416. COLLECTIVE BEHAVIOR. Theory and research in the sociological study of crowds, publics, social movements and revolutions; the study of the origins, development and structure on noninstitutionalized social behavior and of social attempts to accomplish social change. Prerequisite: sociology 105. 3 hours.

418. CLASSICAL SOCIOLOGICAL THEORY. Systematic consideration of the works of leading classical sociological theorists from Comte to Mannheim; the socio-historical contexts of their ideas and major trends and issues in the development of sociological thought. Prerequisite: 105. 3 hours.

426. CONTEMPORARY SOCIOLOGICAL THEORY. An examination of contemporary sociological theories including detailed analysis of major theoretical works, types, and schools; theory building; and the relation between theory and data in modern sociology. Prerequisite: 105. 3 hours.

428. SOCIAL STRATIFICATION. Comparative analysis of the sources patterns, and consequences of class, caste and estate. Includes examination of power and wealth, minorities (e.g., racial ethnic, women), individual correlates (e.g., intelligence, educational performance, physical and mental illness), conflict, social mobility, etc. Prerequisite: 105. 3 hours.

491. SPECIAL TOPICS IN SOCIOLOGY. 1-3 hours.

498. INDEPENDENT STUDY IN SOCIOLOGY. Prerequisite: approval of chairman. 1-3 hours.

SOCIAL WORK

000. ORIENTATION. Familiarization with the department, requirements for majors, planning program of courses, university catalog and library. Also listed as psychology 000 and sociology 000. 1 hour.

241. INTRODUCTION TO SOCIAL WELFARE. The historical development of health and welfare services, public and voluntary, from English and early American background to the present. 3 hours.

342. SOCIAL WELFARE NEEDS AND RESOURCES. The programs of governmental, private and voluntary agencies, in meeting the problems of the aged, unemployed, disabled, handicapped, children and other special groups. 3 hours.

343. SOCIAL WORK CONCEPTS AND METHODS I. Basic processes used in social work practice with special focus on social casework. Prerequisite: 241 or 342. 3 hours.
344. SOCIAL WORK CONCEPTS AND METHODS II. Exploration of social group work methodology and community organization approaches. Prerequisite: 241 or 342. 3 hours.

349. GERONTOLOGY. A study of the psychological, physiological and sociological aspects of the lives of our elderly citizens, with a special emphasis upon the environmental problems which confront them. Prerequisite: 100 or 105. 3 hours.

441. SOCIAL WELFARE INVESTIGATION. Observation of the community agencies and an investigation as to the services that are provided, both in the governmental and voluntary sector. Prerequisite: social work 343. 3 hours.

442. FIELD EXPERIENCE IN SOCIAL WORK. Placement in a social agency five days each week (thirty-eight hours) throughout the quarter to provide experience in social work practice under qualified agency instruction-supervision including responsibility for direct social work services to clients. Emphasis is on application of theory and knowledge in developing professional practice skills in the helping process with individuals, families, and client and community groups. Campus seminars are held concurrently to assist the student to integrate field work with classroom learning. To be taken concurrently with social work 496. Prerequisite: social work 441. 15 hours.

444. INTRODUCTION TO LAW FOR SOCIAL WORKERS. Summary of nature and function of legal rules and the court system. Speakers from the legal and law enforcement professions, representing areas of interest to social work majors, supplement lectures and discussion. Prerequisite: social work 441. 3 hours.

492. SPECIAL TOPICS IN SOCIAL WORK. 1-3 hours.

496. SEMINAR IN SOCIAL WORK. To be taken concurrently with social work 442. 2 hours.

499. INDEPENDENT STUDY IN SOCIAL WORK. Prerequisite: approval of chairman. 1-3 hours.

SPEECH AND THEATRE
(Department 153)

Associate Professor Ladwig (Chairman);
Instructors Bayliss, Berg, Roberts, Whiting;
Lecturers Davis, J. Dornbusch.

The Department of Speech and Theatre provides a concentrated and/or combination program which serves both the student and the community.

Speech courses are designed to provide the student with a basic knowledge in the art and skill of effective social communication. Beginning courses strive to provide meaningful integration of logical composition and effective delivery of structured, organized, and meaningful oral discourse; advanced courses investigate the theories, developments, and practices of this discipline. Beginning courses in Theatre seek to develop an understanding of the function of the dramatic art form in society, to foster appreciation of dramatic aesthetics, and to provide theatrical experiences to the community as a whole.

The programs in forensics and production are open to all students; such activities involve local, state and national tournaments, and participation in theatrical events through University Theatre productions, the Children's Theatre Tour, the Lab Theatre, or the Polar Bear Puppet tour. In addition to the cultural and service functions of the Department, a
full course of speech and theatre education studies leading to teacher certification is provided, and a major may concentrate beyond his basic departmental requirements, on taking elective courses which will give him/her advanced studies in speech communication, directing, acting, or technical theatre.

The major in Speech-Theatre requires a minimum of 45 hours beyond speech 100 and theatre 105, and must include the following from both areas:

**SPEECH:**
- 110 argumentation
- 254 voice and diction I
- 262 oral interpretation
- 272 public speaking
- 370 speech methods*
- 360 parliamentary procedure
  
  **3 hours**
  
  **3 hours**
  
  **3 hours**
  
  **2 hours**
  
  **17 hours + speech 100**

**THEATRE:**
- 231 stagecraft
- 241 or 242 or 243 theatre history
- 282 and 283 acting techniques
- 331 makeup
- 386 directing I

  **3 hours**
  
  **3 hours**
  
  **2 hours**
  
  **3 hours**
  
  **17 hours + theatre 105**

Therefore: Speech = **17 hours + speech 100**

Theatre = **17 hours + theatre 105**

**34 hours + speech 100 and theatre 105**

**+ 1-3 hours in either speech 497 or theatre 498**

**(independent study)**

**35-37 hours total required + speech 100 and theatre 105**

*Non-certification majors may substitute an elective.

The additional hours shall be elected from within the department to complete the minimum major requirement of 45 hours. Area of concentration may be obtained by electing either advanced speech or theatre courses. Speech 100 and/or theatre 105 are prerequisites for all advanced courses in the areas.

**SPEECH**

**000. ORIENTATION.** Familiarization with the departmental requirements for majors, planning program of courses, university catalog and library. Also listed as theatre 000. Required of departmental majors. 1 hour.

**100. SPEECH.** Basic principles of oral communication with emphasis on individual needs. 3 hours.

**110. ARGUMENTATION.** Basic argumentative speaking and debate; proposition analysis; use of evidence, elementary logic, and case construction. Emphasis on simulated activities, such as courtroom trials. 3 hours.

**254-255. VOICE AND DICTION I AND II.** 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. 6 hours.

**260. SPEECH CORRECTION IN THE SCHOOLS.** The recognition of speech disorders, and speech and listening activities for the normal school child. 3 hours.
262. ORAL INTERPRETATION. Analysis and oral interpretation of the logical, emotional and aesthetic experience in poetry, prose, and dramatic dialogue, with emphasis on individual preparation and performance. 3 hours.

270. SPEECH ACTIVITIES. Extra-curricular debate and/or individual speech activities. May be repeated for graduation credit by non-majors up to a maximum of six hours. S/U credit. 1-3 hours.

272. PUBLIC SPEAKING. Extensive application of basic principles of oral communication in the composition and delivery of original speeches. 3 hours.


274. HISTORY OF PUBLIC ADDRESS II. Studies in the development of rhetorical theory and oratory from the Renaissance to the present. Alternate years: offered 1975-1976. 3 hours.

360. PARLIAMENTARY PROCEDURE. Methodology of conducting formal meetings by parliamentary rules. 2 hours.

363. ADVANCED ORAL INTERPRETATION. Analysis and communication of significant forms of literature. Experimentation with various methods of oral interpretation, with emphasis on advanced, individual work. Prerequisite: speech 262. 3 hours.

365. READER'S THEATRE. Individual and group performance in the dramatic interpretation of the novel, short story, drama, and poetic forms; lab rehearsals for University performance. Alternate years: offered 1976-1977. Prerequisite: speech 262 or 363. 3 hours.

370. SPEECH METHODS. Investigation, survey, readings, methods, and application of teaching techniques in speech, theatre, and audiology and pathology. Includes participatory field experience. Required of all majors seeking certification. Prerequisite: acceptance into teacher education program. 3 hours.

371. GROUP COMMUNICATION. The process of group discussion and problem-solving techniques; opportunities to participate in and lead discussions. 3 hours.

373. PERSUASIVE SPEAKING. A description and evaluation of modern persuasive theory and technics. Development of case presentations based upon contemporary problems via role playing in the interview situation. Prerequisite: speech 100. 3 hours.

490. SPECIAL TOPICS IN SPEECH. 1-3 hours.

494. SEMINAR IN SPEECH. 1-3 hours.

497. INDEPENDENT STUDY IN SPEECH. 1-3 hours.

THEATRE

000. ORIENTATION. Familiarization with departmental requirements for majors, planning program of courses, university catalog and library. Also listed as speech 000. Required of departmental majors. 1 hour.

105. THEATRE. General survey of the theatrical art form. Emphasis includes dramatic literature, acting, directing, stage managing, scene design, lighting design and costume design. Required lab work. 3 hours.

231. STAGECRAFT I. Introduction to theoretical and practical work in the fundamentals of theatre production. Required lab work. 3 hours.

232. STAGECRAFT II. Advanced practical work and applied theory in the fundamentals of theatre production. Required lab work. Prerequisite: theatre 231. 3 hours.
241. THEATRE HISTORY I. History of the theatre from the beginnings to 1500. 3 hours.

242. THEATRE HISTORY II. History of the theatre from 1500 to 1850. 3 hours.

243. THEATRE HISTORY III. History of the theatre from 1850 to the present. 3 hours.

250. PRODUCTION. Open only to those students who have auditioned for and have been awarded roles in major University Theatre or Lab Theatre productions; 1-3 hours of S/U credit, depending on role. May be repeated by non-majors for graduation credit up to a maximum of 6 hours. Prerequisite: permission of director.

280. THEATRE ACTIVITIES. Participation in technical/productional aspects of University and/or Lab Theatre productions. A maximum of six hours may be taken by non-majors for graduation credit. S/U credit. 1-3 hours.

282. ACTING TECHNIQUES: MOVEMENT. Exercises, improvisations, studies, pantomimes, etc., to develop acting skills with emphasis on physical interpretation of characters. Enrollment in theatre 282 may not be concurrent. Prerequisite: speech 262. 3 hours.

283. ACTING TECHNIQUES: CHARACTERIZATION. Advanced work leading to the presentation of character via performance. Prerequisite: 282. 3 hours.

331. MAKEUP. Methodology and practice in the creation and application of stage makeup. Students compose makeup crews for University Theatre productions. Offered each quarter. 2 hours.

351. CHILDREN'S THEATRE I. Methods of acting, producing, writing and directing plays for young audiences with an understanding of the role of children's theatre in modern society; readings in children's dramatic literature. 3 hours.

352. CHILDREN'S THEATRE II. Selection, construction, costumes, rehearsal/preparation, etc. for Children's Theatre Tour. Prerequisite: theatre 351 and/or permission of director. 3 hours.

353. CHILDREN'S THEATRE III. Actual tour and performances of Children's Theatre Touring Company. Prerequisite: permission of director. 3 hours.

386. DIRECTING I. Methods and theories of directing. Prerequisites: 3 hours of stagecraft plus 3 hours of acting techniques. 3 hours.

387. DIRECTING II. Exercises and practices in directorial concepts; production of scenes and/or one-acts in Lab Theatre. Enrollment in theatre 282 may not be concurrent. Prerequisite: theatre 386. 3 hours.

441. SCENE DESIGN. Methodology and practice in the arts of scene design; application via University Theatre, Children's Theatre, and/or Lab Theatre productions. Alternate years: offered 1976-1977. Prerequisite: theatre 231. 3 hours.

442. LIGHTING DESIGN. Methodology and practice in the arts of lighting design; application via University Theatre, Children's Theatre, and/or Lab Theatre productions. Offered each year. Prerequisite: theatre 231. 3 hours.

443. COSTUME DESIGN. Methodology and practice in costume design and construction; application via University Theatre, Children's Theatre, and/or Lab Theatre productions. Required lab work. 3 hours.

491. SPECIAL TOPICS IN THEATRE. 1-3 hours.

495. SEMINAR IN THEATRE. 1-3 hours.

498. INDEPENDENT STUDY IN THEATRE. 1-3 hours.
Academic Accreditation and Association

The Engineers' Council for Professional Development, the only official accrediting agency for engineering curricula, has accredited all of the curricula in the College of Engineering including the departments of civil, electrical, and mechanical engineering. The College of Engineering 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 of Engineering attempts to teach its students to think in a logical sequence given certain facts. The College of Engineering follows the objectives of the university in developing the student as a whole individual who will be successful and creative in his profession as well as in his personal life. In the College of Engineering each student attains the highest undergraduate proficiency in subject matter basic to all engineering and in the essentials of his chosen branch of the engineering profession.
History and Tradition

More than 3,000 engineers have graduated from the College of Engineering during its 94-year history. The civil engineering department had its first class in 1882; electrical engineering in 1898; and mechanical engineering in 1904. These departments continue to meet the highest standards of engineering excellence.

The tradition of the College of Engineering is to treat each student as an individual, keep class size at a minimum, and maintain a close faculty-student relationship.

Admission Standards

Early application is advisable. As early as the junior year of high school the student interested in engineering is encouraged to obtain the advice of the dean of the college of engineering and to request appropriate information and application materials from the Office of Admissions, Ohio Northern University, Ada, Ohio 45810.

In addition to the general requirements for admission to the university stated in this bulletin, the College of Engineering accepts high school graduates and non-graduates who have 16 acceptable units of work and who are 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 $\frac{1}{2}$ unit in trigonometry or its equivalent; and 2 units in science (1 unit in physics and preferably 1 unit in chemistry). The College of Engineering 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 of Engineering will be required to make up their deficiency. The College of Engineering recommends prospective students to 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. Any transfer student who conceals his previous college attendance will have his admission to the College of Engineering revoked. The College of Engineering will not accept from transfer students more than
150 quarter hours or their equivalent. The work must be "C" or better.

The dean admits special students who are non-degree candidates if, after a personal interview, he is satisfied that they are sufficiently prepared to pursue engineering courses successfully. Special students who satisfactorily complete their work are awarded a certificate indicating the course of study pursued and the amount of work covered.

Academic Credit Hours by Quarter

Each department in the College of Engineering lists quarter by quarter the standard course load for a student. The dean, upon recommendation of the student’s adviser, permits a student to enroll for extra hours if he maintains at least a "B" average. Engineering students are responsible to fulfill the requirements of the current year’s catalog as they apply to that year of his program.

Academic Status

A student is in good standing when his accumulative grade point average is at least 2.0 or he has been awarded good standing through the petition process.

A student is on probation the first time his accumulative grade point average falls below 2.0. He then has one quarter to raise his accumulative average to an acceptable level. A student may be on probation two successive quarters if conditions and evidence indicate that he will improve academically.

A student who consistently attains a low accumulative average (below 2.0) or extremely low scholarship in a given quarter is subject to suspension, which implies the possibility of readmission at a later date, usually after three quarters.

A student having academic difficulty is required to meet frequently with his 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 Dean of Men or the Dean of Women. 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 of Engineering. The engineering curricula is 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. A student is required to complete designated courses before advancing to the next student classification.

Graduation and Degrees

A student qualifies for graduation by meeting specific course requirements and by earning a minimum of 200 academic hours. 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 2.0 in all engineering courses. A student may earn only one degree at a time with the exception of the Arts-Engineering program.

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, 180 East Broad Street, Suite 1014, Columbus, Ohio 43215.

The Robert W. Biggs Engineering Building

The College of Engineering occupied its new facility in the summer of 1971. It is a completely new 1.8 million dollar structure. Included in this 91 room engineering building are classrooms, laboratories, and faculty offices. The addition of the Robert W. Biggs Engineering Building to the campus completes the science complex on the new one hundred acre campus.
Computer Center

Today, with the rapid advancement of science and technology, more and more use is being made of computers by scientists and engineers. Since nearly all firms that employ engineers have access to a computer, the engineer needs an educational background in their use.

The Computer Center is an integral part of the student’s engineering education. The freshman acquires skill in computers by completing two required engineering courses. Students using the Computer Center have the option of operating the computer themselves during prescribed time periods or having their programs run by student operators employed by the university. All computer input is keypunched by individual students.

The Computer Center is in the engineering building and contains an IBM 1620 Model II Digital Computer, a 1622 Card Reader Punch, four 1311 Random Access Disk files, a 1443 Printer, and needed support equipment. Two minicomputers are also available on campus.

Pre-Engineering Curricula

Since the first two years of any particular curriculum in engineering at any university are practically the same, the College of Engineering offers pre-engineering in all fields. The pre-engineering curricula is 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.

Arts-Engineering Curricula

A superior student may qualify to pursue the arts-engineering program. A student is admitted to both the College of Liberal Arts and the College of Engineering and in five academic years two degrees, a bachelor of arts degree from the College of Liberal Arts and a bachelor of science degree in the appropriate branch of engineering from the College of Engineering, are earned. The attraction of the dual degree program is that a student is free to major in any liberal arts 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.
## ARTS-ENGINEERING PROGRAM

### FIRST YEAR
- English (112100-1-2)*: 3 F 3 W 3 S
- Chemistry (122171-2-3): 4 F 4 W 5 S
- Anal. geom., calculus 1, 2 (123163, 261-2): 5 F 4 W 4 S
- Language (second year): 4 F 4 W 4 S
- Social science elective: 3 F 3 W 3 S
- Freshman seminar (201120): 1 F
- Physical education (143001-1-3): 1 F 1 W 1 S
- **Totals:** 21 F 19 W 20 S

### SECOND YEAR
- Calculus, 3, 4 diff. eqs. (123263-4, 361): 4 F 3 W 5 S
- Physics 1, 2, 3 (124231-2-3): 5 F 5 W 5 S
- Digital comp. 1, 2, elective (201101-2): 2 F 2 W 3 S
- Liberal arts major: 5 F 5 W 5 S
- Fine arts: 3 F 3 W 3 S
- **Totals:** 19 F 18 W 21 S

### THIRD YEAR
- Philosophy, religion, social science elective: 3 F 3 W 3 S
- Humanities elective: 3 F 3 W 3 S
- Liberal arts major: 3 F 3 W 3 S
- Fine arts, graph. anal., creative design (201112-4): 3 F 2 W 2 S
- Engnr. mechanics 1, 2, 3 (201311-2-3): 3 F 3 W 3 S
- P + A circuits 1, 2, 3 (201321-2-3): 3 F 3 W 3 S
- Circuits lab. 1, 2 (201332-3): 1 F 1 W 1 S
- **Totals:** 18 F 18 W 18 S

### FOURTH YEAR
- Liberal arts major: 3 F 3 W 3 S
- Plus junior courses from appropriate engineering department

### FIFTH YEAR
- Liberal arts major: 3 F 3 W 3 S
- Plus senior courses from appropriate engineering department

*Must be taken each quarter until completed.
Basic 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.

The basic courses are taught by the engineering faculty and are required of all engineering students.

BASIC ENGINEERING: DESCRIPTIONS
(Department 201)

100. PRE-ENGINEERING MATHEMATICS REFRESHER. For a period of two weeks, six days per week, eight hours per day, a review of those portions of high school mathematics that are necessary to start college mathematics is offered previous to the opening of the fall quarter. All first year students find the systematic review of value. Topics included are algebra, geometry, trigonometry, and analytical geometry. Students who do not place sufficiently high in mathematics placement tests during summer orientation are required to take this course to prepare to start the calculus. No credit.

101-102. DIGITAL COMPUTER 1 AND 2 (2 + 1).* An introduction to digital computation. Organization and function of digital computers. Programming principles and practice. Prerequisite: Math 163 or concurrently. 4 hours.

103. DIGITAL COMPUTATION (2 + 3). An introduction to digital computation for non-engineering students, primarily for economics, business, and education students. Organization and functions of digital computer with programming principles and practice. 3 hours.

112. GRAPHICAL ANALYSIS (1 + 3). An introduction to graphical communications, analysis, and design, including: the development of the ability to convey ideas by the use of engineering sketches; the construction of professional drawings; graphical representation of data; and graphical vector analysis. 2 hours.

114. CREATIVE DESIGN (1 + 3). Participation in student-generated group design projects emphasizing engineering methodology, design, analysis and communicative skills. Prerequisite: 112. 2 hours.

*(2 + 1) indicates the student contact hours per week. The first number gives the lecture hours while the second, shows the laboratory hours.
### ALL ENGINEERING — CLASS OF 1979

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<th>Course Description</th>
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### ALL ENGINEERING — CLASS OF 1978

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<td>P + A circuits 1, 2, 3 (201321-2-3)</td>
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<td><strong>Totals</strong></td>
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*Must be taken each quarter until completed.

**Acceptable science electives: chemistry 172-3, biology 100-12-13, nuclear physics, modern physics.

120. FRESHMAN SEMINAR FOR ENGINEERING STUDENTS (1 + 0). Schedules, irregularities in schedules, graduation requirements, class preparations, problem solutions, taking of tests, slide rule, background of various branches of engineering, technical and professional organizations and professionalism are covered. Designed to help the student to make the transition to college, as well as, properly orient the student in the profession. 1 hour.

311. ENGINEERING MECHANICS 1 (3 + 0). Fundamental principles of statics with vector methods. Emphasis on free body diagrams and equations of equilibrium. Includes resultants of force systems, centroids and centers of gravity, equilibrium, friction, and moments of inertia. One section is taught as Individualized Instruction. Prerequisite: math 262, physics 211 or 231. 3 hours.
312. ENGINEERING MECHANICS 2 (3 + 0). Fundamental principles of mechanics with vector methods as applied to dynamics. Includes absolute and relative motion; force, mass and acceleration; work and energy; and impulse and momentum. Prerequisite: 311. 3 hours.

313. ENGINEERING MECHANICS 3 (3 + 0). Elastic analysis through concepts of stress and strain, tension, torsion, compression, and flexure. Development and application of Mohr’s circle construction; analytical methods of determining shear stresses in beams subjected to torsional and flexural loadings, and shear and moment diagrams. One section is taught as Individualized Instruction. Prerequisite: 311. 3 hours.

321. PASSIVE AND ACTIVE CIRCUITS 1 (3 + 0). Introductory concepts in circuit analysis. Solution of resistive circuits using Ohm’s and Kirchhoff’s Laws, mesh and nodal analysis, and network theorems. Prerequisite: physics 233, math 262. 3 hours.

322. PASSIVE AND ACTIVE CIRCUITS 2 (3 + 0). Analysis of circuits in the sinusoidal steady-state. Phasor solution, effective values of current and voltage, instantaneous and average power, polyphase circuits, series and parallel resonance. Prerequisite: 321. 3 hours.

323. PASSIVE AND ACTIVE CIRCUITS 3 (3 + 0). Magnetically coupled circuits, two-port networks and Fourier analysis. Prerequisite: 322. 3 hours.

332-333. CIRCUITS LABORATORY 1 AND 2 (0 + 3). A laboratory study of electric circuits. Prerequisite: 322-323 concurrently. 2 hours.

401. APPLIED RANDOM PROCESSES (3 + 0). Probability and its application to engineering problems. Random processes in engineering, distributions, and regression analysis. Prerequisite: math 263. 3 hours.

CIVIL ENGINEERING DEPARTMENT

Professors Keyser, Milks (Chairman), Shah; Associate Professor Koehn

The civil engineer is action-oriented. He creates bridges to cross rivers; he collects, transports, purifies, and delivers water to drink, and he renders our waste products harmless. He creates facilities for moving people and goods — highways, railways, airports and pipelines. He makes society as we know it possible. Increasingly, he is recognized as the man to save the environment, not by stopping civilization, but by accommodating it to nature.

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.

Engineering education instills within the student the ability to know how, to know why, and to do the best engineering job possible for his client for the least amount of money in keeping with the Code of Ethics of the Professional Engineer.
CIVIL ENGINEERING — CLASS OF 1977

JUNIOR, 1975-76

mechanics of materials, engineering
  law & management,
  geology (202401, 442, 453)               3...... 3...... 4......
computer aided design, structural
  systems analysis 1, 2 (202411-2-3)     4...... 4...... 4......
applied random processes, fluid mechanics,
  hydraulics (201401, 202422-3)           3...... 3...... 3......
urban planning, transportation,
  materials science (202434-5, 456)       4...... 3...... 3......
philosophy, religion,
  surveying¹ (..........., 202303)          3...... 3...... 4......
totals                                    17     16     18

¹The student is encouraged to discuss with his advisor the possibility of taking surveying during an earlier year.

CIVIL ENGINEERING — CLASS OF 1976

SENIOR, 1975-76

environmental engineering 1, 2 (202514-6)     3...... 3......
structural design 1, 2, structural
  systems design* (202547-8, 523)            4...... 3...... 3......
soils 1, 2, construction systems* (202531-2-3) 4...... 5...... 3......
reinforced concrete 1, 2 (202525-6)           4...... 3......
CE seminar*, structural
  systems analysis 3* (202551, 555)          3...... 3......
humanities, or social science,
  technical elective*,
  elective (............, .........)           3...... 3...... 3......
totals                                      17     18     15

*These technical electives may have substitutions including environmental science 202473 or any engineering or science course which in the opinion of the civil engineering faculty does not duplicate the content of a course already taken.
CIVIL ENGINEERING: DESCRIPTIONS
(Department 202)

Civil Engineering courses use laboratory facilities as needed. The number of recitations and laboratory hours per week is an approximate average over the quarter and will vary with immediate class content.

303. SURVEYING (2 + 6). Use of level and transit, differential and profile leveling, traversing, theory and practice with horizontal and vertical curves, fundamentals of aerial photography. Prerequisite: departmental permission. 4 hours.

401. MECHANICS OF MATERIALS (3 + 0). Deflection, combined loadings, repeated loading, dynamic loading, connections, formulation of statically indeterminate problems. One section is taught as Individualized Instruction. Prerequisite: 201313. 3 hours.

411. COMPUTER AIDED DESIGN 1 (3 + 3). Principles of numerical analysis used in solving structural problems, numerical methods, linear programming, dynamic programming, optimization, finite element, finite differences, and applications. Prerequisite: math 361 concurrently 202401. 4 hours.

412. STRUCTURAL SYSTEMS ANALYSIS 1 (3 + 3). Fundamentals of statically determinate structures; deflections, displacements, use of models to illustrate structural behavior, principle of superposition and study of elastic curve, computer methods. Prerequisite: 411. 4 hours.

413. STRUCTURAL SYSTEMS ANALYSIS 2 (3 + 3). Fundamentals of statically indeterminate structures; classical and approximate methods of solution, computer aspects. Prerequisite: 412. 4 hours.

422. FLUID MECHANICS (2 + 3). Engineering properties of fluids, fluid statics, fluid dynamics, fluid resistance, boundary layer theory, steady flow in closed circuits and the introduction of flow through porous media. Prerequisite: 201312. 3 hours.

423. HYDRAULICS (2 + 3). Hydraulic analysis of piping systems, steady flow in open channels, non-uniform flow in open channels, elements of Hydrology, introduction to chemical quality control of surface and subsurface waters. Prerequisite: 422. 3 hours.

434. URBAN PLANNING (3 + 3). Principles of city and regional planning; land use, zoning, housing codes, subdivision regulations, metropolitan problems, and urban development. Prerequisite: permission of instructor. 4 hours.

435. TRANSPORTATION (3 + 0). Principles of transportation systems; economics, finance, and planning; and design, construction and maintenance. Prerequisite: 434. 3 hours.

442. ENGINEERING LAW AND MANAGEMENT (3 + 0). 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. 3 hours.

453. GEOLOGY (3 + 3). Principles of physical geology. Physical and chemical properties of minerals and rocks, geologic processes, earth materials, processes of erosion and deposition, crustal deformations, ground water hydrology. Prerequisite: permission of instructor. 4 hours.

456. MATERIALS SCIENCE (3 + 0). A study of the fundamental physical and chemical properties of engineering materials and how they relate to mechanical behavior. Prerequisite: 201313. 3 hours.
473. ENVIRONMENTAL SCIENCE (3 + 0). Microbiological and chemical aspects of water and waste treatment. Air pollution controls and standards. Solid waste disposal practices. Prerequisite: permission of instructor. 3 hours.

491-492-493. INDEPENDENT STUDY. The independent planning of an engineering design project by individual study of a topic of particular interest to the student. Prerequisite: junior status and departmental permission. 1-3 hours.

514. ENVIRONMENTAL ENGINEERING 1 (2 + 3). Development of sources of water supply; determination of quantity of storm water; design of water distribution systems, storm water sewers, and sanitary sewers; hydraulic design of water and sewage treatment plants. Prerequisite: 423. 3 hours.

516. ENVIRONMENTAL ENGINEERING 2 (2 + 3). Principles and methods of water purification, sewage treatment, and disposal; control tests and correlation of results with treatment plant operations; interpretation of reports; inspection of local plants. Solid waste management. Prerequisite: 514. 3 hours.

523. STRUCTURAL SYSTEMS DESIGN (2 + 3). Design of structural systems emphasizing optimization, creativity, and decision making. Prerequisites: 526, 547. 3 hours.

525. REINFORCED CONCRETE 1 (3 + 3). Elastic design and ultimate strength of structural elements, beams in bending, bond, shear; diagonal tension in beams, axially and eccentrically loaded columns, torsion, walls, footings; and application of codes and specifications to design. Prerequisite: 413. 4 hours.

526. REINFORCED CONCRETE 2 (2 + 3). Continuity, slabs, deflections, and economic considerations. Prerequisite: 525. 3 hours.

531. SOILS 1 (3 + 3). 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. Prerequisites: 423, 453. 4 hours.

532. SOILS 2 (4 + 3). Analysis of stress conditions imposed on the supporting soils by foundations. Design of foundations, retaining structures and piles. Prerequisite: 531. 5 hours.

533. CONSTRUCTION SYSTEMS (2 + 3). Specifications, economical construction methods, determination of critical path, fundamentals of PERT, engineering economics as applied to various engineering projects. Prerequisite: departmental permission. 3 hours.

547. STRUCTURAL DESIGN 1 (3 + 3). The design of beams, columns, built-up members, and connections as applied to structural steel. Use of influence lines and various other techniques for determining maximum loadings. Prerequisite: 413. 4 hours.

548. STRUCTURAL DESIGN 2 (2 + 3). Theory of plastic design, analysis of ultimate load, design of connections, determination of deflections using plastic design, and comparison to elastic design. Mathematical simulation and optimization. Prerequisite: 547. 3 hours.

551. CIVIL ENGINEERING SEMINAR (3 + 0). Current topics for 1975-76 to include: solid waste disposal practices, atmospheric pollution, history of bridges and photoelasticity. Field trips will be used when appropriate. Prerequisite: departmental permission. 3 hours.

555. STRUCTURAL SYSTEMS ANALYSIS 3 (3 + 0). Study of selected topics in advanced structural mechanics. Prerequisite: 413. 3 hours.

591-592-593. INDEPENDENT STUDY. The independent planning of an engineering design project or the individual study of a topic of particular interest to the student. Prerequisite: senior status and departmental permission. 1-3 hours.
ELECTRICAL ENGINEERING DEPARTMENT

Professors Klingenger (Chairman); Carmean; Associate Professors Johansen, Stahl; Assistant Professor Guentzler

Electrical engineers have long pioneered the fields of power, automatic control, and communication. Without controlled electricity, industry as we know it today could not exist. The ever expanding use, in the non-industrial as well as the industrial world, 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. They become involved in a great diversity of problems, some quite remote from the physics of electricity and many of great social importance.

The electrical engineering curriculum coordinates theoretical background with scientific working knowledge. This curriculum is designed to provide an excellent background for students who intend to pursue employment in the above mentioned areas immediately upon graduation or who intend to pursue specialized work in graduate school.

Classroom activities are supplemented by work in well equipped laboratories. Problem solving is emphasized and particular attention is placed upon the use of the analog and digital computers which are readily available in the engineering building.

ELECTRICAL ENGINEERING — CLASS OF 1977

JUNIOR, 1975-76
prof. methods, fields + waves 1, 2
(203411-2-3)
3...... 4...... 3......
solid state electronics, electronics 1, 2
(203421-2-3)
3...... 5...... 3......
energy conversion 1 (203433)
3......
engr. anal. 1, linear systems 1, 2
(203441-2-3)
4...... 3...... 3......
electrical engr. lab. 1, 2, 3 (203451-2-3)
1...... 1...... 1......
app. random processes, dig. comp. tech.,
anal. comp. tech. (201401, 203462-3)
3...... 2...... 2......
philosophy, religion, tech. elective
(....................)
3...... 3...... 3......
totals
17 18 18
### ELECTRICAL ENGINEERING — CLASS OF 1976

**SENIOR, 1975-76**

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### ELECTRICAL ENGINEERING: DESCRIPTIONS

(Edward 203)

**404. ELECTRIC MACHINERY (3 + 0).** A course for the non-electrical engineering student in the theory and application of electric machinery. *Prerequisite: 201323-333. 3 hours.*

**411. PROFESSIONAL METHOD (3 + 0).** This course is focused on the professional method of dealing with problems, the orderly mental processes the professional engineer uses in practice. *Prerequisite: math 361. 3 hours.*

**412-413. FIELDS AND WAVES 1 AND 2 (4 + 0, 3 + 0).** Electrical phenomena from the viewpoint of field theory. Vector analysis used throughout. *Prerequisite: 441. 7 hours.*

**421. SOLID STATE ELECTRONICS (3 + 0).** The basic physical principles of the internal operations of electronic devices are studied. *Prerequisite: 201323. 3 hours.*

**422. ELECTRONICS 1 (5 + 0).** Operating principles of electronic devices (diodes, BJT's, and FET's), models representing these devices, and their use in simple circuitry. *Prerequisite: or consent. 5 hours.*

**423. ELECTRONICS 2 (3 + 0).** Large and small signal amplifiers, frequency response of amplifiers, and oscillators. *Prerequisite: 422. 3 hours.*

**433. ENERGY CONVERSION 1 (3 + 0).** The underlying principles of energy conversion. *Prerequisite: 412. 3 hours.*

**441. ENGINEERING ANALYSIS 1 (4 + 0).** Selected analytical methods with engineering applications. Emphasis is on methods using complex variables and vector calculus. *Prerequisite: math 361. 4 hours.*

**442. LINEAR SYSTEMS 1 (3 + 0).** Application of Laplace Transform methods to transient phenomena in linear systems. *Prerequisite: 201323, 441. 3 hours.*
443. LINEAR SYSTEMS 2 (3 + 0). A continuation of 442. State variable techniques and digital computer solution of linear transient problems. Prerequisite: 442. 3 hours.

451. ELECTRICAL ENGINEERING LABORATORY 1 (0 + 3). Instrumentation and measurement circuits and techniques. Prerequisite: 201323. 1 hour.

452-453. ELECTRICAL ENGINEERING LABORATORY 2 AND 3 (0 + 3). Study of active devices and their associated circuits. Prerequisite: 423 concurrently. 2 hours.

462. DIGITAL COMPUTER TECHNIQUES (2 + 0). Instruction in the use and practicability of numerical methods in engineering problem solutions. Prerequisite: 201102. 2 hours.

463. ANALOG COMPUTER TECHNIQUES (1 + 3). Instruction in the use and practicability of analog computer methods in engineering problem solutions. Prerequisite: 443 concurrently. 2 hours.

511. MICROWAVE THEORY AND TECHNIQUES (3 + 0). A study of the principles of energy transmission using transmission lines, wave guides, and antennas. Prerequisite: 473. 3 hours.

512. NETWORK SYNTHESIS (3 + 0). Introduction to the principles of modern circuit synthesis. Prerequisite: 433. 3 hours.

513. ACTIVE NETWORK SYNTHESIS (3 + 0). A continuation of network synthesis but includes active elements such as gyrators, operational amplifiers and similar devices. The emphasis is on design and application. Prerequisite: 512. 3 hours.

521. ELECTRONICS 3 (3 + 0). Introduction to devices and circuits for the generation and processing of pulse, digital, and switching waveforms. Prerequisite: 423. 3 hours.

522. ELECTRONICS 4 (2 + 3). Continuation of 521 with emphasis on logic and memory circuits. Prerequisite: 521. 3 hours.

523. ELECTRONICS 5 (2 + 3). Electronic power conversion circuits and devices. Power control and regulator circuits. Prerequisite: 522. 3 hours.

531. ENERGY CONVERSION 2 (3 + 0). Steady state and transient analysis of direct current and alternating current machinery. Prerequisite: 433. 3 hours.

532. ENERGY CONVERSION 3 (3 + 0). An introduction to power systems analysis with load flow, faults and stability topics. Prerequisite: 531. 3 hours.

541. CONTROL SYSTEMS 1 (3 + 0). An introduction to the basic theory of feedback control devices. Transfer function formulation, frequency response, root locus and stability are studied. Prerequisite: 443. 3 hours.

542. CONTROL SYSTEMS 2 (2 + 3). A continuation of 541. Additional root locus techniques and compensation are studied. Prerequisite: 541. 3 hours.

543. CONTROL SYSTEMS 3 (2 + 3). Group or individual study of selected topics of current interest in Feedback Control Theory. Topics included might be modern control theory, sampled data systems, or hardware oriented individual projects. Prerequisite: 542. 3 hours.

551. ELECTRICAL ENGINEERING LABORATORY 4 (0 + 3). Laboratory study of electronic wave shaping and switching circuits. Prerequisite: 521 concurrently. 1 hour.

552. ELECTRICAL ENGINEERING LABORATORY 6 (0 + 3). Laboratory study of transmission line and microwave circuits. Prerequisite: 511 concurrently. 1 hour.

553. ELECTRICAL ENGINEERING LABORATORY 8 (0 + 3). Laboratory study of nonlinear systems utilizing real nonlinear devices plus analog and digital computer techniques. Prerequisite: 583. 1 hour.
561. ELECTRICAL ENGINEERING LABORATORY 5 (0 + 3). Laboratory study of feedback control systems. Prerequisite: 541 concurrently. 1 hour.

562. ELECTRICAL ENGINEERING LABORATORY 7 (0 + 3). Study of the generalized machine and other DC, synchronous, and induction machines. Prerequisite: 531. 1 hour.

572. COMMUNICATION THEORY 1 (3 + 0). An introduction to the principles of communication theory. Prerequisites: 423, 443. 3 hours.

573. COMMUNICATION THEORY 2 (3 + 0). Continuation of 572 and current topics in communication including noise and negative impedance devices. Prerequisite: 572. 3 hours.

583. NONLINEAR ANALYSIS (3 + 0). Analysis of physical systems containing nonlinear elements. Analytical, graphical, and numerical methods are studied. Prerequisite: 541. 3 hours.

590. PROJECTS. Independent planning and conduct of an engineering design or development project in electrical engineering. Prerequisite: departmental permission. 1-3 hours.

591. INDEPENDENT STUDY. Individual study of a topic of particular interest to the student in electrical engineering. Prerequisite: departmental permission. 1-3 hours.

592. CURRENT TOPICS. Group study of selected topics of current interest in electrical engineering. Prerequisite: departmental permission. 1-3 hours.

593. SEMINAR. A series of discussions with practicing engineers pertaining to design problems under their direction in electrical engineering. Prerequisite: departmental permission. 1-3 hours.

MECHANICAL ENGINEERING DEPARTMENT

Professors Burton (Chairman), Scroggin; Associate Professor Farrington; Assistant Professors Whisler, Smith.

Mechanical Engineering is that branch of the profession of engineering which is concerned with the conversion of energy from one form to another, the design of machines, and the control of various processes. Mechanical Engineers are involved in creative design, research, development, and management. They are being challenged today, as never before, to solve many critical problems related to pollution, mass transportation and the supply of energy.

Every mechanical engineering student has the opportunity to use extensively the engineering analysis and design laboratories as well as the Computer Center. The laboratories are equipped to supplement all engineering courses. They also provide the opportunity for individual as well as group projects and limited undergraduate research.
### MECHANICAL ENGINEERING — CLASS OF 1977

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*Acceptable technical electives - production engineering 204556, operations research 204563, modern physics 124303, electric machines 203404, nuclear physics 124353.

**Acceptable science electives: nuclear physics 124353, modern physics 124303.

### MECHANICAL ENGINEERING: DESCRIPTIONS

**Department 204**

**405. THEORY OF MACHINES 1 (3 + 3).** Analysis and synthesis of mechanisms for motion, velocity and acceleration properties. Linkages, cams, gears and gear trains are treated. Laboratory assignments deal with analysis, synthesis and construction of working mechanism models. Prerequisite: 201312. 4 hours.

**406. THEORY OF MACHINES 2 (3 + 0).** Review of static-force analysis using means of vector notation. Dynamic planar and spatial force analysis, balancing of rotating masses, partial balance of reciprocating devices, cam dynamics and introduction to mechanical vibrations. Prerequisite: 405. 3 hours.

416. THERMODYNAMICS 2 (4 + 0). Relations among thermodynamic properties, mixtures, chemical reactions and equilibrium. Topics in gas dynamics and turbomachines. Prerequisite: 415. 4 hours.

424. ANALYTICAL METHODS 1 (3 + 3). A treatment of numerical methods applicable to problems arising in engineering practice; exact and approximate solutions are investigated; finite methods are used for linear and nonlinear equation solution; ordinary and partial differential equations are treated. Prerequisite: math 361. 4 hours.

425. ANALYTICAL METHODS 2 (4 + 0). A study of the use of vector analysis in Mechanical Engineering problems, including gradient, divergence, and curl operations; complex variables and conformal representations with application to fluid flow and heat transfer; Laplace transform theory and applications. Application and use of matrices. Prerequisite: math 361. 4 hours.

426. FLUID MECHANICS 1 (3 + 0). An introduction to the mechanics of fluids; the state of stress in a static fluid; similitude and dimensional analysis; the dynamics of iniscd ideal fluids, Euler's equation, Navier-Stokes equations, Bernoulli's equation, and momentum equation. Prerequisite: 201312. 3 hours.

434. MECHANICAL MEASUREMENTS (2 + 3). An introduction to the theory of engineering experimentation through study of basic detector-transducer systems, intermediate amplification devices and readout devices; management of data with the use of measuring standards; study of the propagation of errors; and the fitting of curves to experimental data. Prerequisite: junior status. 3 hours.

435. ENGINEERING ANALYSIS (3 + 0). The professional method as it applies to the analysis of engineering problems. Emphasis is placed on learning to deal with new situations in terms of fundamental principles. Prerequisite: 424. 3 hours.

436. MECHANICAL ENGINEERING LABORATORY 1 (0 + 6). Continuation and expansion of the concepts developed in 434 with specific emphasis on: the development of basic fluid flow processes in conjunction with the Fluid Mechanics course, the development of analog simulation and solution techniques utilizing modern analog computation devices. The measurement of material properties and the use of stress analysis techniques. Prerequisite: 434. 2 hours.

446. ENGINEERING MATERIALS & PROCESSES (4 + 0). Introduction to structure and properties of metals and alloys. Characteristics of common engineering materials including iron, steel and their alloys. Metal working processes and their heat treatment as well as other contemporary metal processes. Engineering processes which cover the basic machining operations, their machines, tools, equipment and the control for automation and mass production. Prerequisite: chemistry 171. 4 hours.

511. MECHANICAL DESIGN 1 (3 + 3). Analysis and Synthesis of various machine parts: consideration of correct size and shape for specific function. Stress and strength as related by the theories of failure. Initiation of a comprehensive design project. Prerequisite: 446. 4 hours.

512. MECHANICAL DESIGN 2 (3 + 3). Study of various standard machine elements. Correlation of components which interact in the design process. Continuation of the comprehensive design project. Prerequisite: 511. 4 hours.
513. MECHANICAL DESIGN 3 (1 + 6). Completion of the comprehensive design project of 204511-12. Treatment of small mechanical systems. Legal, sociological, economic and other factors affecting the professional design engineer. Prerequisite: 512. 3 hours.

521. HEAT TRANSFER 1 (3 + 0). Heat conduction in steady and non-steady state in one and two dimensions; thermal radiation concepts and heat exchange. Graphical, numerical and electric analog methods of solutions. Prerequisite: physics 232. 3 hours.

522. HEAT TRANSFER 2 (3 + 0). Fundamentals of convection; dimensional analysis; free and forced convection; boiling and two-phase heat transfer and heat pipes. Applications to design. Prerequisite: 521. 3 hours.

523. THERMAL SYSTEMS DESIGN (3 + 0). Heat power systems design utilizing the concepts of thermodynamics, fluid mechanics, and heat transfer. Special emphasis on nuclear power plants and solar energy systems. Prerequisite: 522. 3 hours.

534. FLUID MECHANICS 2 (3 + 0). Elements of potential flow, boundary layer theory and compressible fluid mechanics; one-dimensional isentropic flows. Prerequisite: 426. 3 hours.

541. VIBRATION ANALYSIS (3 + 0). Fundamentals of linear and nonlinear vibration of single degree of freedom, multi-degree of freedom, and continuous systems. Prerequisite 406. 3 hours.

542. CONTROL SYSTEMS (4 + 3). Modeling, analysis and design of linear feedback control systems. Laplace transforms, transfer functions, frequency response and root locus techniques. Laboratory work in analog simulation of dynamic systems and performance studies of real systems. Prerequisite 425. 5 hours.

551-553. MECHANICAL ENGINEERING LABORATORY 2 AND 3 (0 + 6). Individual and group projects with particular emphasis on planning and report writing. Upon the recommendation of the Mechanical Engineering faculty a student may undertake a two quarter in depth, experimental study, with a specific faculty member as project advisor. Prerequisite: 436. 4 hours.

556. PRODUCTION ENGINEERING (3 + 0). An introduction to scientific organizing, standardizing, and operating principles in production engineering. Basic industrial management and principles of engineering administration. Capabilities of manufacturing processes. Fundamentals of time and motion study, quantity and quality control, space, location and material flow for a manufacturing enterprise. Prerequisite: 446. 3 hours.

563. OPERATIONS RESEARCH (3 + 0). Theories and methods for making optimal decisions in management and design situations. Linear and Dynamic Programming and their applications to allocation, transportation and network problems, game (or competition) theory, project scheduling, inventory control and queueing theory, with emphasis on deterministic situations. Sensitivity studies via duality considerations. Prerequisite: junior or senior status. 3 hours.

590 MECHANICAL ENGINEERING PROJECTS. 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: senior status. 1-5 hours.

591. INTERNSHIP PROGRAM. The student selects an engineering task offered by an industry, where he works and receives experience under a practicing engineer in an industrial environment. Prerequisite: senior status and departmental permission. 1-5 hours.
THE RUDOLPH H. RAABE

college of pharmacy

LEROY D. BELTZ, Dean
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 profession of pharmacy. Currently, the College of Pharmacy occupies a modern, one and one-half million dollar building, designed and equipped to provide the facilities required for contemporary pharmaceutical education. The course of instruction in pharmacy is a five-year program leading to the Bachelor of Science in Pharmacy (B.S. Pharm.) degree.

Throughout its ninety year history, the Ohio Northern University College of Pharmacy has played an important role in pharmaceutical education. Over two thousand pharmacists have been graduated by this institution. Its position in pharmaceutical education in Ohio is particularly significant. More than one-third of the registered pharmacists practicing in Ohio are graduates of the Ohio Northern University College of Pharmacy. Its graduates are particularly active and prominent in the local, state, and national pharmaceutical organizations.

The Raabe College of Pharmacy is an integral part of Ohio Northern University. It is recognized and approved 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.
For the purposes 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).

**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 pharmacists and to carry their share of the responsibility for improvement of the quality of the health, welfare and educational services to their respective communities.

Counseling students in the development of self-reliance, character and ethical concepts to the end that they will render safe and efficient pharmaceutical services to all who seek it.

Acquainting students with the need for the value of membership in local, state and national pharmaceutical associations and in civic, social and religious bodies of the communities in which they live. In this connection, student affiliation with chapters of the American and Ohio State Pharmaceutical Associations is strongly urged.

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 the student’s opportunity and ability to carry them, will broaden his outlook, enrich his college experience, and add much to his preparation of life.

**Admission to the College of Pharmacy**

Persons seeking admission to the College of Pharmacy 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 of Pharmacy.

Students are permitted to enter the pharmacy program either as high school graduates or as transfer students from other recognized colleges.
High School Graduates. It is recommended that high school graduates entering the pharmacy curriculum 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 (preferably general science, biology, and chemistry or physics). Priority will 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 his record at that institution and a copy of their current catalog. Approval for admission and advanced placement will be determined by the Faculty of the College of Pharmacy upon review of 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 in this institution. Credit will not be allowed for a course in which the lowest passing grade was received (i.e. - grades below C).

Persons who meet the requirements for admission as indicated in the preceding paragraphs are issued a Permit to Enter the College of Pharmacy. To enter any of the regular courses of study, the candidate, after being granted a Permit to Enter, 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. All required courses in the Lower Division must be completed before the student is permitted to enter the second year of the Upper Division.

Classification of Students

Students enrolled in the College of Pharmacy are classified as P-1 students until they have earned a minimum of forty-five quarter hours credit, 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. Additionally, students whose accumulative average in their scientific and professional accumulative course is below 1.60, are not eligible for advancement to the P-2 class. In the same manner, students whose scientific and professional accumulative average is below 1.80, are not eligible for P-4 or P-5 standings.

Arts-Pharmacy Curriculum

Superior students may elect to earn the Bachelor of Arts degree in the College of Liberal Arts concurrently with the Bachelor of Science degree in the College of Pharmacy. The student following this option pursues both degrees simultaneously under the supervision of a professional adviser from the College of Pharmacy and an adviser selected from the department of his chosen major in the College of Liberal Arts. Tuition is charged at the College of Pharmacy rate and the student receives the appropriate degree in each college upon completion of all graduation 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 second major is available in the office of the Dean 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 of Pharmacy, or (3) being dismissed from the College of Pharmacy.

If a student’s accumulative quality point average falls below 2.0, the student will be placed on probation. If a student on probation does not restore his quality point average during the following or any subsequent quarter, he 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 quality point average for any quarter may be placed on probation.
Actions to suspend or dismiss a student from the College of Pharmacy shall be initiated by the Academic Actions Committee when just cause for such action is evident.

If action is taken to suspend a student, the suspension will be for a definite period of time after which the student will be eligible to resume his studies. 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; therefore, 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 as determined by the faculty of the College of Pharmacy and sufficient elective courses to total 255 quarter hours of credit.

3. Must have earned an accumulative grade point average of 2.0 in all course work and have maintained an accumulative grade point average of 2.0 in all professional courses as defined by the American Council of Pharmaceutical Education.

4. Must satisfy a minimum residency requirement of three academic years (9 quarters) of full-time enrollment in an accredited college of pharmacy. Transfer students from schools of pharmacy accredited by the American Council on Pharmaceutical Education must complete a full-time residency of not less than three quarters (senior year) in the Ohio Northern University College of Pharmacy.

5. Must be recommended for the degree by a majority vote of the faculty of the University.

6. 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 liberal arts and sciences are to be found there along with books, periodicals, and journals pertaining to pharmacy, medicine, and related professions. Current issues of pharmaceutical and related professional journals are available in the instructional resources 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

The pharmacy curriculum, because of rapid developments in the medical and allied professions, is constantly being reviewed by the faculty. The College of Pharmacy 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, Ohio 45810.
PROGRAM OF STUDY LEADING TO THE DEGREE OF BACHELOR OF SCIENCE IN PHARMACY

CURRICULUM*

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*This curriculum is applicable to students entering fall 1975.
For descriptions of the lower division courses, turn to the listing of the courses offered in the college of liberal arts.

First number of parentheses is lecture hours per week, second number is laboratory hours per week. Multiple course listings separated with a hyphen are sequential. Courses listed with an asterisk are elective.

DEPARTMENT OF PHARMACY AND HEALTH CARE ADMINISTRATION
(Department 311)

Professors Beltz, Fitzgerald, Stuart, Theodore; Associate Professors Previte, Stansloski, Vottero (Acting Chairman); Assistant Professor Sheumaker; Instructors Shoemaker, Reiselman, Turner, Correll, Rostorfer; Lecturer Sherrin; Clinical Associate DeLeone

101. PHARMACY ORIENTATION (1 + 0). A general orientation to the university. 1 hour.

102-103. PHARMACY ORIENTATION (1 + 0). The profession of pharmacy; its development, its educational requirements, the role of the pharmacist and the challenges. 2 hours.

201-202-203. PHARMACY, DRUGS AND MEDICAL CARE (3 + 0). The health care system in the United States and its relationship to pharmacy. Topics are presented that require interaction with the development of allied health professions, medical care processes, health manpower, health planning, economics of health care, politics of health care, public health and other facets of comprehensive health care. Prerequisite: pharmacy orientation 103. 9 hours.

321. PHARMACEUTICS I (3 + 3). A goal oriented course which attempts to make the student aware of the need to apply physicochemical concepts to the entire range of pharmaceutical considerations, eg. bioavailability, pharmacokinetics, stability and preservation. Pertinent pharmaceutical calculations are introduced where feasible. 4 hours.

322. PHARMACEUTICS II (3 + 3). An introduction to pharmaceutical dosage forms. Homogeneous systems are emphasized and the principles learned in Pharmaceutics I are applied to real situations. Pharmaceutical calculations are integrated into the lecture and laboratory. Prerequisite: Pharmaceutics I 321.

323. PHARMACEUTICS III (3 + 3). Further development of pharmaceutical technique is achieved through the laboratory preparation of heterogeneous systems. Stability, consistency and form are studied in relationship to the therapeutic intent and bioavailability of the active ingredient. Effect of changes in formulations are emphasized and studied using applied physicochemical techniques. Prerequisite: Pharmaceutics II 322. 4 hours.

352.* PHARMACEUTICAL ANALYSIS (2 + 6). Gravimetric and volumetric analysis of chemicals, pharmaceuticals and crude drugs. Laboratory exercises emphasize analytical procedures, chemical control methods and some qualitative tests. Prerequisites: Chemistry 173 and 231. 4 hours.

353.* INTRODUCTORY INSTRUMENTAL ANALYSIS (3 + 3). Instruments used in qualitative, quantitative and control analysis. Prerequisite: pharmaceutical analysis 352. 4 hours.
421. INTRODUCTION TO INSTITUTIONAL PHARMACY (2 + 0). Professional services, concepts, standards of practice and roles of the pharmacist in contemporary hospitals and related institutions. Prerequisite: consent of instructor. 2 hours.

431. HISTORY OF PHARMACY (3 + 0). The educational, organizational and professional growth and development of pharmacy in Western Europe and North America. 3 hours.

441. INTRODUCTION TO RADIOACTIVE PHARMACEUTICALS (2 + 2). A survey course in the types of radiation, methods of detection and measurement and the application of radiotopes to modern health care. Emphasis in the laboratory will be on the safe storage, handling and control of radioactive material. Prerequisite: consent of instructor. Offered fall quarter. 3 hours.

451. PHARMACEUTICS IV (3 + 3). Drug distribution functions of the pharmacist with special emphasis on drug delivery systems. Distribution systems peculiar to the institutionalized patient are specifically considered. The laboratory is problem centered and consists of compounding extemporaneous prescriptions.

452. PHARMACEUTICS V (3 + 3). Continuation of Pharmaceutics IV. This course deals primarily with over-the-counter preparations and the therapeutics involved in their application. In general, these products include dermatologicals, eye, ear, nose and throat preparations and products designed for self medication. The laboratory involves some extemporaneous compounding of prescriptions as well as problem solving. Specific problems involving interpreting and dispensing prescriptions written for prepackaged products sold by manufacturers are covered in the laboratory. Prerequisite: pharmaceutics 451.

453. PHARMACEUTICS VI (3+3). Continuation of Pharmaceutics V with special emphasis of the pharmacist role in monitoring drug utilization. Special topics include drug interactions, patient consultation and economics of drug product selection. The laboratory is problem centered and consists of product selection and the proper selection of generic prescriptions, both phoned and oral. Prerequisite: pharmaceutics 452.

510. COSMETIC SCIENCE (3 + 0). An overview of various types of cosmetics; how they are prepared and the rationale for their formulation. Prerequisite: consent of instructor. 3 hours.

511. VETERINARY PHARMACY (2 + 0). The various pathological conditions peculiar to animals, and the pharmaceuticals used in the treatment thereof. 2 hours.

515. COSMETIC TECHNOLOGY (0 + 3). 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: consent of instructor. 1 hour.

530. MANUFACTURING PHARMACY (1 + 6). The formulation and fabrication by mechanized methods of a variety of pharmaceutical dosage forms. Offered fall and winter quarters. Prerequisite: consent of instructor. 3 hours.

540. PHARMACY SEMINAR (3 + 0). Related areas of pharmacy are discussed by visiting lecturers. Ethics, third party payments, surgical appliances, prescription accessories, the use of diagnostic reagents, the importance of pharmaceutical organizations have been discussed. 3 hours.

551. PHARMACEUTICAL LAW (4 + 0). 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. 4 hours.
552. PHARMACEUTICAL MARKETING (3 + 0). Fact, 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. Principle economic, legislative, and social forces affecting the health-care industry are discussed, and resulting policies and procedures are appraised. Prerequisite: pharmaceutical law 551. 3 hours.

553. PHARMACEUTICAL MANAGEMENT (4 + 0). Organization policies, planning, and controlling the relation of pharmaceutical services, professional practice and pharmacy operation to general business activity, patients, the human service professions, and public health. 4 hours.

560. CLINICAL PHARMACY 1 (3 + 6). Introduction to Clinical Pharmacy: Course consists of experience in area hospitals, with view to introducing the student to health care delivery and drug disease relationships. During the course, the student will be given the opportunity to see the application of principles discussed in other courses. Transportation is arranged by the student. Offered each quarter. Prerequisite: P-4 standing. 5 hours.

570.* ADVANCED INSTITUTIONAL PHARMACY (2 + 0). A study of the organization and management of contemporary hospitals and the interrelationship of the pharmacy department to the hospital structure. Offered spring quarter. Prerequisites: Pharmacy 421 and consent of instructor. 2 hours.

580. STRUCTURED EXTERNSHIP. A program of structured experience in various health care centers. The course is intended to provide the student with experience in the actual application of material learned in didactic subjects. Prerequisite: P-5 standing and pharmacy 560. 15 hours.

590.* SPECIAL TOPICS IN PHARMACY AND HEALTH CARE ADMINISTRATION. 1-3 hours.

594.* SEMINAR IN PHARMACY AND HEALTH CARE ADMINISTRATION. 1-3 hours.

597.* INDEPENDENT STUDY IN PHARMACY AND HEALTH CARE ADMINISTRATION. Prerequisites: permission of department chairman, 2.50 accumulative average. 1-3 hours.

DEPARTMENT OF PHARMACOLOGY AND BIOMEDICAL SCIENCES (Department 312)

Professors Awad, Mallin, Stewart; Gossel, Suffness; Instructor Jee.

321. PHARMACOCOGNOSY (4 + 3). The course deals with various background information on the more important drugs and pharmaceuticals of biological origin. Biomedicinals covered are classified under carbohydrates, lipids, proteins, enzymes, glycosides, alkaloids and other related products. The laboratory is an integral part of the course and part of the time is devoted to discussion and viewing of audio-visual material. Prerequisite: organic chemistry 233 and biology 113. Corequisite: biochemistry 341. 5 hours.

331.* MARINE PHARMACOCGNOSY (3 + 0). An introduction to the study of natural products obtained from marine plants and animals. It deals with the chemical nature and the potential biological activities of the major constituents of some of the biomedically interesting marine organisms. Students are expected to research the literature, to write and to present their reports. To be offered in the fall. Prerequisite: biology 223 and consent of instructor. 3 hours.
341. BIOCHEMISTRY (4 + 0). An introduction to the chemistry of living organisms with emphasis on the human system. Chemistry, metabolism, and biological significance of amino acids, proteins, enzymes, and carbohydrates. Prerequisite: chemistry 233. 4 hours.

342. BIOCHEMISTRY (4 + 0). A continuation of Biochemistry 341. Topics covered include biochemical genetics, lipid metabolism, blood chemistry, vitamins and nutrition, biochemical evolution, and special topics of current interest. Prerequisite: biochemistry 341. 4 hours.

343. PRINCIPLES OF CHEMICAL PHARMACOLOGY (3 + 3). An introductory interdisciplinary approach to the fundamental chemical and pharmacological principles of drugs. Topics include, but are not restricted to: Structure-Activity-Relationships; absorption; distribution; metabolism, excretion; site and mechanism of action and therapeutic applications. Pre- or co-requisite: physiology 333; biochemistry 342.

361. MICROBIOLOGY (4 + 3). Fundamentals of general microbiology and a general survey of techniques and principles pertaining to bacteria, yeasts, molds, viruses and rickettsia. The course includes a broad discussion of microbial pathogens and a detailed consideration of the host-parasite relationship. Prerequisite: one year of general biology, or botany-zoology, biochemistry 342. 5 hours.

362. MICROBIOLOGY (3 + 3). Fundamentals of general and medical microbiology for students interested in medical technology. Prerequisite: one year of biological science and/or biochemistry 342. 4 hours.

363. MEDICAL MICROBIOLOGY (2 + 0). A continuation of discussions involving the host-parasite relationship and aspects pertaining to immunology and virology. Prerequisite: microbiology 361. 2 hours.

433. ANTIBIOTICS AND BIOLOGICALS (4 + 0). A team-taught, integrated course which deals with the concept of antibiotics, chemotherapy, and principles of immunology. It covers the production, chemistry and pharmacology of the major antibiotics and chemotherapeutic agents of medicinal value. Emphasis is placed on biologicals currently recommended by the Public Health Service Advisory Committee on immunization practice in the United States. Prerequisite: microbiology 361. 4 hours.

441. MEDICINAL PLANT PROPAGATION AND CULTIVATION (2 + 3). An introduction to the economic, geographical, commercial and biological aspects of plants as source of drugs, spices and various natural chemical products. Common poisonous plants and potentially harmful toxic constituents of plant foodstuff are discussed. Time will be allocated for field trips and for the cultivation of some medicinal plants. Students are expected to research the literature, to write and present their reports. To be offered in the spring term. Prerequisite: pharmacognosy 321 and consent of instructor. 3 hours.

453. INTRODUCTION TO DISEASE (3 + 0). An introductory study of the underlying principles concerning the etiology of disease through an understanding of the disturbances and the methods in which they express themselves as symptoms and signs. Cassette tapes and outlines constitute the resource material along with informal discussion. Students may advance at their own speed. Pre- or corequisite: physiology 333; biochemistry 342.

462. VIROLOGY (2 + 0). A comprehensive coverage of the virus-host relation from the viewpoint of molecular biology. Model systems will be discussed utilizing the bacteriophage. Wherever possible the use of current film material will be introduced. Prerequisite: biochemistry, microbiology 361 and 362 and consent of the instructor. 2 hours.
471. CHEMICAL PHARMACOLOGY (4+3).
A continuation of chemical pharmacology 343. Examination of the chemistry, pharmacology and therapeutics of medicinal agents active on the autonomic nervous system. Introduction to local and general anesthetics and to the hypno/sedative agents. Prerequisite: chemical pharmacology 343. 5 hours.

472. CHEMICAL PHARMACOLOGY (4+3).
A continuation of chemical pharmacology 471. Examination of the chemistry, pharmacology and therapeutics of medicinal agents active on the central nervous system, including analgesics and contemporary drugs of abuse. Introduction to renal and cardiovascular disease and the drugs used in management of such disorders. Prerequisite: chemical pharmacology 471. 5 hours.

473. CHEMICAL PHARMACOLOGY (4+3).
A continuation of chemical pharmacology 472. Discussions will include: endocrine pharmacology; gastrointestinal tract pharmacology; autocoids and chemotherapeutic agents. Prerequisite: chemical pharmacology 472. 5 hours.

502. PRINCIPLES AND PRACTICES OF PUBLIC HEALTH (3 + 0). Individual and community aspects of the public hygiene, including infections, epidemiology, prophylaxis, and a discussion of the major types of illness (nutritional, metabolic, mental, environmental, occupational). Prerequisite: microbiology 361. 3 hours.

521. TOXICOLOGY (3 + 0). An introduction and examination of the essential subject matter of toxicology. Major emphasis will be upon areas of medical importance. The course approach will be based upon class lectures, supplemented with assigned readings from textbook and current literature sources and with student participation projects. Topics will include, but are not limited to: classifications and mechanisms of toxicity; adverse drug reactions; drug induced toxicities, clinical toxicity; food and food additives; environmental and household poisonings; laboratory determination of toxicity of chemicals. Prerequisites: principles of chemical pharmacology 343; and permission of instructor.

541.* THE ORGANIC CONSTITUENTS OF MEDICINAL HIGHER PLANTS (3 + 0). Chemistry and interrelationships of constituents obtained from pharmacognostical plants; outline of the methods of isolation, purification, identification and structure determination. To be offered in the fall term. Prerequisite: consent of the instructor. 3 hours.

542.* BIOGENESIS OF NATURAL PRODUCTS (3 + 0). An outline with discussion and study of research involving biosynthesis of compounds of pharmaceutical interest. To be offered in winter term. Prerequisite: instructor’s approval.

590.* SPECIAL TOPICS IN PHARMACOLOGY AND BIOMEDICAL SCIENCES. 1-3 hours.

594.* SEMINAR IN PHARMACOLOGY AND BIOMEDICAL SCIENCES. 1-3 hours.

597.* INDEPENDENT STUDY IN PHARMACOLOGY AND BIOMEDICAL SCIENCES. Prerequisites: Permission of department chairman, 2.50 accumulative average. 1-3 hours.
Ohio Northern University’s College of Law, founded in 1885, is the second oldest law college in the state. Today, with more than 450 students enrolled and a new law building, the college is rapidly gaining state-wide and national recognition. The college is a member of the Association of American Law Schools, is accredited by the American Bar Association, and is a member of the League of Ohio Law Schools. It offers a three-year degree program leading to the Juris Doctor degree.

Since the fall of 1973 the law school has occupied its new $1.3 million building. The Jay P. Taggart Library now houses more than 80,000 volumes. Because the library is a government depository, it contains an abundance of primary research material. Also, the library offers the services of LEXIS/OBAR computerized research. Students, alumni, faculty and practicing attorneys have found the computerized research a valuable tool.

Northern’s law program is directed toward preparing students for the practice of law in any state. Its curriculum is based on the law of all 50 states and the federal government. Clinical experiences are available
through the Allen County Legal Aid Society, the Lima State Hospital for the Criminally Insane, and the Mansfield State Reformatory. Opportunities for practical experience are available to third year students under a rule of the Ohio Supreme Court which allows seniors to practice as legal interns under the supervision of licensed attorneys.

There are 20 members on the law faculty holding degrees from institutions such as Yale, Michigan, Columbia, Smith, Chicago, Wisconsin, Notre Dame, New York University, Case Western Reserve, Fordham, Boston University, Indiana, Michigan State and George Washington.

Currently there are about 1,300 law alumni practicing in 35 states.

All candidates for the College of Law are required to have a bachelor's degree. Inquiries concerning eligibility for admission and requests for the law school bulletin should be directed to the Director of Admissions of the College of Law.
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