Ohio Northern University
BULLETIN
1964-1965

Liberal Arts - Engineering - Pharmacy - Law
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Dean, College of Pharmacy
Professor of Contemporary Pharmacy and Adviser to the President on Education for the Health Professions

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Assistant Professor of English

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Assistant Professor of Biology

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Dean, College of Law
Professor of Law

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Professor of Education
THE GEORGE FRANKLIN AND SARAH CATHERINE GETTY

College of Liberal Arts

Oscar G. Darlington, Dean

DIVISIONS AND DEPARTMENTS

DIVISION I: HUMANITIES. (Matthias S. Schmitz, Division Head)
1) Art
2) English, Speech, and Theatre
3) Foreign Languages
4) Music
5) Philosophy and Religion

DIVISION II: NATURAL SCIENCES. (Andrew Stauffer, Division Head)
1) Biology
2) Chemistry
3) Mathematics
4) Physics

DIVISION III: SOCIAL SCIENCES. (David H. Markle, Division Head)
1) Economics and Business Administration
2) History and Political Science
3) Psychology and Sociology

DIVISION IV: TEACHER EDUCATION. (Hildred B. Jones, Division Head)
1) Elementary and Secondary Education
2) Industrial Arts Education
3) Physical Education
4) Music Education
5) Art Education

Course descriptions will be found in the departmental listings beginning on page 50.

OBJECTIVES

The objectives of the College of Liberal Arts are: to develop in each student a love of learning and a reasonable competence in some significant area of knowledge; to help him evolve a mature philosophy which gives meaning to life, apart from its material accomplishments; to cultivate comprehensiveness of thought; to share in the intellectual and cultural achievements of mankind; to encourage critical thinking, continued reflection
and re-examination of basic ideas and values; to develop skill in finding information and in evaluating such information so as to distinguish fact from opinion; to clarify knowledge by research and by re-interpretation of the old in the light of the new.

A well-rounded liberal education with stress on moral and spiritual values is designed to develop in the student poise and perspective with which to meet and evaluate life situations; to fit him for responsible citizenship; to give him a scholarly foundation for further study or professional training; and to afford him a rich and full personal life.

**ADMISSION STANDARDS**

In addition to the general requirements for admission to the University stated on page 6 of this catalog, the College of Liberal Arts accepts graduates of high school and non-graduates with fifteen acceptable units of high quality work who are recommended by the high school principal. Twelve of these fifteen units shall be in any combination of the following subjects: English (four years), languages, history, mathematics (one year of algebra required), and natural science. Deficiencies in entrance requirements may be made up to the extent of two units by taking the work during the freshman year or during the prior summer, or from other agencies approved by the University. Priority is given immediately to applicants with an Ohio "State Board Course in Basic Studies" certificate.

An acceptable score on the American College Testing Program (A.C.T.) or its equivalent is expected of all in-coming students.

Students expecting to go to college are encouraged to take two units of Latin and/or a modern foreign language while in high school. High school students on the Advanced Placement Program are accepted at Ohio Northern University.

High school seniors whose ability and maturity warrant, may, upon recommendation of the high school principal and with the approval of the Admissions Committee, take a limited amount of college work for credit either on campus or in the Evening Division during their senior year.

Students admitted with advanced standing from other accredited colleges and universities must be in good academic standing with their present institution at the time of their admission to Ohio Northern University. Students dismissed for academic reasons from other colleges undergo a waiting period of one calendar year before applying for admission to Ohio Northern University and are then admitted only after careful testing. Students transferring to the College of Liberal Arts from one of the other colleges within Ohio Northern University are also considered according to the above standards. In all cases only grades of C or better are transferrable.
COURSE OF STUDY

From the following listing of course offerings a student may select special groups of studies of curricula which meet his needs, interests and abilities. The student should keep in mind that his later adjustment to changing conditions will depend largely on the insights and skills developed by a broad general education. A student is properly accepted as a major in any department and as a candidate for a particular degree only when, with the help of his faculty adviser, he has filled out a Declaration of Major card approved by the chairman of his department and of the dean of the college. A change of major from one program or from one department to another is effected by means of a Change of Major card which requires the signatures of the chairman of the department he is leaving and the chairman of the department in which he wishes to enter and the approval of the dean. These cards are lodged in the Registrar's office and are the Registrar's official authorization concerning his major filed.

THE DEGREE OF BACHELOR OF ARTS

General and Advanced Courses. The curricula leading to the degree of Bachelor of Arts may be divided into two general divisions, general education and advanced education. The first two years are usually devoted to general education, presenting the courses which will furnish the foundation and background for advanced education. The advanced education will consist of the courses which presuppose the completion of the general education as necessary for successfully pursuing these studies. Work in the field of concentration is taken largely on the advanced level, together with advanced electives.

Prescribed: Certain courses are prescribed in the program of general education. These include one year of English Composition, a quarter of Speech, two one-year courses in two of the social sciences, Historical Study of Philosophy and Religion (or a one-year course in philosophy or religion upon approval), six quarters in two of the natural sciences, including Math. 111, 112, and 113, but excluding Chemistry 105 and Physics 210, one full year of advanced work in English or American Literature, two quarters in art, music, theatre, or a foreign language culture course, and two years of one foreign language or their equivalent. The extent to which transfer credits satisfy the requirements in a field shall be determined by the Dean of the College after consultation with the appropriate faculty.

The Field of Concentration. At the end of the second year the student is ready to choose, if he has not already done so, one division and the department within this division in which he desires to complete his field of concentration. For example, a prospective chemist would choose Division II—Natural Sciences, Department of Chemistry.

The candidate for a degree must complete in a logical sequence a field
of concentration of not less than forty-five quarter hours. The faculty adviser will assist the student in planning the field of concentration. Candidates for the degree of Bachelor of Arts who expect to teach in the public school can meet the professional education requirements as outlined on page 70 and will have a member of the Department of Education for a professional adviser.

The following departments offer fields of concentration toward the Bachelor of Arts degree in the College of Liberal Arts:

**FIELDS OF CONCENTRATION**

- Art
- Biology
- Chemistry
- Economics and Business Administration
- English, Speech, and Theatre
- Foreign Language
- History
- Mathematics
- Music
- Philosophy and Religion
- Physics
- Political Science
- Psychology
- Sociology

**Sample Curriculum Plan**

The following suggestion illustrates the manner in which the prescribed courses, the field of concentration, and elective courses may be distributed in a four year plan of study leading to the degree of Bachelor of Arts.

**FRESHMAN YEAR.**

- Freshman Orientation.
- English Composition, C-1,2,3, or 131, 132, 133.
- A year of Social Science, normally Western Civilization.
- A year of Natural Science, usually Mathematics 111, 112, 113.
- A Foreign Language.
- An elective (which may be chosen according to his objective, if the student has already chosen his objective).
- Physical Education.

**SOPHOMORE YEAR.**

- Second Year of Foreign Language.
- Second Year of Natural Science.
- Second Year of Social Science.
- or

*One course in the field of Concentration.

- American or English Literature.
- Quarter courses in Music, Art, Speech.
- Physical Education.

*If the student has not chosen a major field by his sophomore year, he may take a free elective here, then take an additional course in the field of concentration during either the junior or senior year in place of the free
elective of that year—45 quarter hours being considered a field of concentration.

**THIRD YEAR.**
- Two courses in the field of concentration.
- One course in the Division of his field of concentration, but not in the department.
- One course outside the department of his field of concentration.
- One free elective.

**FOURTH YEAR.**
- Two courses in the field of concentration.
- One course in the Division of the field of concentration, but not in the department.
- One course outside the Division of the field of concentration.
- A free elective.

To avoid too great a concentration on the major area the student must have at least 120 quarter hours of work outside the department of his major. (This will permit 60 hours in the major field. Additional hours may be permitted in the major field if they are required for teacher certificate purposes but they are in addition to the 180 academic hours required for graduation.) An exception to this policy is the B.A. in Music when the student fulfills the stipulated B.A. liberal arts requirements but does not need 120 quarter hours outside the Department of Music.

**THE DEGREE OF BACHELOR OF SCIENCE**

The curricula of candidates for the degree of Bachelor of Science include the courses prescribed for the degree of Bachelor of Arts, outlined on page 41 of this catalog. At the end of the first year, or at the latest the end of the second year, the student must choose the department within the natural science division in which he desires to complete his field of concentration. He shall secure, in writing, on standard Declaration of Major cards, the approval of that Department Chairman. The candidate for the Bachelor of Science degree shall complete in logical sequence the following:

1. The concentration of the requirements of the department.
2. A minimum of 80 quarter hours of work in the Division of Natural Science.

It is possible for a student to major in any natural science department under the Bachelor of Arts program. The degree of Bachelor of Science is designed to meet the needs of students planning to do graduate work in the natural sciences or preparing for industrial positions.
THE DEGREE OF
BACHELOR OF SCIENCE IN EDUCATION

The curricula of candidates for the degree, Bachelor of Science in Education, are set forth under the Division of Teacher Education on page 69 of this catalog.

ASSOCIATE IN ARTS CERTIFICATE

A Certificate of an Associate in Arts is awarded to students enrolling in the special two-year course established in the College of Liberal Arts. At present, special curricula of two nine-month academic years are offered in certain of the liberal arts departments. A student who is enrolled in one of these two-year curricula will receive college credit which may be transferred to any other university or college and is eligible to transfer to a full four-year degree program at any time he desires. If the student transfers to the degree program, he is expected to complete the freshman and sophomore requirements for the Bachelor's degree which are not all included in the two-year program. The Associate in Arts Certificate is at present offered in special secretarial fields, industrial supervision, medical technology, recreational direction, and in commercial art. Further two-year courses with college credit may be developed on sufficient demand. For further information regarding these courses write to the Dean of the College of Liberal Arts.

COMBINATION CURRICULUM

ARTS-ENGINEERING

During the first three years the student is registered in the College of Liberal Arts and must secure a minimum of 145 quarter hours of credit. Upon the successful completion of the fourth year in the College of Engineering with a quality point average of two or better, and at least 45 quarter hours, the degree of Bachelor of Arts is granted. Upon fulfilling the requirements as specified in his selected engineering curriculum, the student will also be awarded the appropriate degree in engineering at the end of the fifth year.

Students entering with advanced credits from another college must be in residence three quarters (the third year) and complete a minimum of forty-five quarter hours in the College of Liberal Arts in this University.

Students entering the Arts-Engineering curriculum must conform to the rules and regulations of the College of Liberal Arts and the College of Engineering. By complying with these regulations, it will be possible for the student to secure both the degree of Bachelor of Arts and the appropriate engineering degree in five years. For the special fees pertaining to this combined program, see section on fees.
ARTS-LAW

Beginning in the fall of 1960, a baccalaureate degree became an admission requirement for all Ohio Colleges of Law. It is assumed that in general a broad liberal education is the best foundation for the study of law.

ARTS-MEDICAL TECHNOLOGY, ARTS-NURSING

Students completing a minimum of 135 quarter hours of work in the College of Liberal Arts, including all Division requirements and those requirements prescribed by the Departments of Biology or Chemistry for field of concentration, will be awarded the Bachelor of Arts degree on presentation of evidence of registration as a Medical Technologist by the National Registry or by the presentation of evidence of the R.N. degree. The Departments of Biology or Chemistry allow one-fourth of the total number of credit hours required for a field of concentration (biology or chemistry) for work completed during the one-year internship required for registration.

Copies of the curricula outlined for these two programs may be secured from the Departments of Biology or Chemistry.

Arrangements have been made for a combined curriculum in Liberal Arts and Nursing with Memorial Hospital, Lima, Ohio. Students who elect this combination curriculum are expected to have those personal and social qualities which are essential to success in the field of nursing. This curriculum is of special interest to young women of northwestern Ohio.

PRE-PROFESSIONAL CURRICULA
LEADING TO THE BACHELOR OF ARTS DEGREE

DENTISTRY AND MEDICINE

With a steadily increasing number of qualified applicants applying for admission to colleges of Dentistry and of Medicine, it is strongly recommended that the student looking forward to professional training in these fields plan to complete four years of undergraduate work with a high scholastic average. We offer curricula leading to the Bachelor of Arts degree which afford the appropriate foundation courses for later professional training in these professional fields.

Our counseling follows the recommendation of the many professional schools which advise a well-rounded Liberal Arts education with emphasis on social studies as well as on courses specifically preparatory to the study of medicine.

RELIGIOUS EDUCATION

Religious Education is gaining recognition as a profession and, accordingly, professional education beyond the baccalaureate level is expected of the full-time worker. Graduate and professional schools offer curricula leading to the Master's Degree in Religious Education (M.R.E.) or the
Bachelor of Divinity (B.D.) degree with a major in Religious Education. Ohio Northern offers an A.B. program appropriate for admission to these schools. For those interested in preparing for temporary or part-time work in religious education, Ohio Northern offers a "field of concentration" in the Department of Philosophy and Religion with appropriate technique courses taken in the Department of Education.

PRE-THEOLOGY

Ohio Northern has a vigorous program for pre-theological students. The recommendations of the American Association of Theological Schools are followed in counseling the student in planning his program leading to the A.B. degree. An interdisciplinary major in the Department of Philosophy and Religion, or a major in another appropriate department may be selected. In general, a broad, liberal course enables the student to appreciate his graduate studies to the fullest extent. Emphasis throughout this program is upon Christian idealism designed to develop spiritually-minded young men well-equipped for serious dedication to the Christian ministry.

FOREIGN AND PUBLIC SERVICE

The demand for well-prepared officials in the United States Foreign Service and in the Public Service of the federal and state governments is at a high peak. To prepare for work in these fields a student should plan to continue with graduate education after receiving his degree of Bachelor of Arts. Ohio Northern University offers an inter-departmental concentration in International Relations and a departmental concentration in political science and in foreign languages to prepare students for the Foreign Service and for Public Service. The Dean of the College of Liberal Arts should be consulted for the curricula outline in these fields.

GENERAL REGULATIONS

1. The student may not register for more than seventeen 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 twelve to seventeen scheduled hours including physical education.

    2. All new students in the College of Liberal Arts are required to take one quarter of Freshman Orientation. This is normally offered in the fall quarter.

    3. The student indicates his choice of a major field of concentration by filling out a Declaration of Major card attainable in the office of the Dean of the college or the office of the Registrar, and secures the signature of the department chairman. The completed card indicates that the department accepts a student as a major. To change from one department to another, the student shall complete a Change of Major card, also attainable as indicated
above. A student is officially accepted as a major in a department only when he has completed the above procedure.

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

5. Seniors taking courses in the "100" series in other than Foreign Languages or Mathematics must complete additional work of a high quality for full credit. Seniors selecting "100" courses should consult the Dean of the college.

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

7. Application for senior rating and graduation should be made to the Registrar during the third quarter of the junior year.

HOW COURSES ARE NUMBERED

Courses are numbered in "100", "200", "300" and "400" series. Courses numbered in the "90" series are preparatory courses. With the exception of students who have had special prerequisites, freshmen may take courses only in the "100" series. Students of sophomore rank are not permitted to take "300" and "400" courses unless it is recommended by the adviser and allowed by the Dean of the college. Students of junior and senior rank are required to take a majority of their schedule among courses of "300" and "400" classification unless modification of this requirement is permitted by the Dean in an individual case upon the recommendation of the adviser.

The last digit of the course number designates the quarter in which the course is given: "1" indicates it is given in the Fall; "2" indicates a Winter Quarter course; and "3" indicates a Spring Quarter course. When a course ends in "0" it may be offered any quarter.

The middle digit identifies the course in the series in the department.

A hyphen between course numbers indicates that the course must be taken in sequence. A comma indicates that quarters can be taken separately out of sequence.

The college reserves the right to withdraw any course and to limit the number of students in any course.

CLASSIFICATION OF STUDENTS

For purposes of classification the minimum requirements for sophomore standing are thirty-eight quarter hours of academic work; for junior standing, eighty-four hours with all freshman and sophomore requirements completed; for senior standing, 130 credit hours and the satisfactory completion of the English Proficiency Examination.
WARNING AND PROBATION

A quality point average of 2.0 is expected throughout the freshman year, with 1.8 required as the minimum level of satisfactory work.

An accumulative quality point average of 1.9 is required for admission to sophomore rank in good standing; 1.9 also is the average required for satisfactory standing throughout the sophomore year.

An accumulative quality point average of 2.0 is required for admission to junior rank in good standing; 2.0 also is the average required for satisfactory standing throughout the junior and senior years.

If a student's quality point average for any quarter falls below that designated for satisfactory standing in that year (see above), the student will be placed on warning.

If a student on warning receives a quality point average for the following quarter lower than that stipulated for satisfactory standing in that year (see above), he will be placed on probation, and so long as he is on probation he will not be permitted to represent the university by participating in extra-curricular activities. If his quarter average rises to the required level but his accumulative average is still below the required level, he will be continued on probation.

Any student with an unusually low quality point average for any quarter may be placed directly on probation or strict probation by the Dean of the College even though he has not been on warning in the previous quarter.

A student on probation whose average for the following quarter is below the required minimum for that quarter and whose accumulative average is also below the minimum may be recommended to the President for suspension or dismissal from the University.

Students other than beginning freshmen who have been admitted on probation may be required to earn a quality point average higher than 2.0 in their first quarter at Ohio Northern.

Students may at any time also be placed on strict probation. These students must report in person every two weeks to the Office of the Dean of the College until the end of the quarter at which time they go on good standing or are recommended for dismissal.

Any student who has been on probation and has been restored to satisfactory standing is either placed directly on probation or recommended for dismissal in any subsequent quarter for which his quality point average falls below the required minimum for that quarter.

SENIOR COMPREHENSIVE EXAMINATION

To assist each student to integrate his knowledge in his major field, and to test the overall quality and maturity of his work, a comprehensive exami-
ination covering the work in his major department shall be required of each student during the winter or spring quarter of his senior year. He shall be examined by a committee of the faculty appointed by the Dean of the College in consultation with the department chairman, and the committee shall include one member of the faculty outside the division of the student's major interest.

The examination can be a written or oral examination, or both, at the discretion of the committee chairman, who is usually the chairman of the student's major department.

Students who pass this examination will have recorded on the official transcript of their records the statement, "Passed (or passed with distinction) the senior comprehensive examination in ..." Students who fail will have nothing placed upon their transcripts. All students will meet a reasonable time after the examination with the department chairman who will go carefully over the strengths and weaknesses of their examination.

GRADUATION

As a condition of graduation with the Bachelor's degree, a student must complete a minimum of 180 quarter hours of academic work plus six hours of physical education. The student must have an accumulative qualitative point average of at least 2.0.

A residence period of the last three quarters and the completion of at least forty-five quarter hours, with at least ninety quality points, elected largely from "300" and "400" courses in the College of Liberal Arts of this University are minimum requirements for a student admitted on advanced standing.

THE CORE COURSES

C-1, C-2, C-3. ENGLISH COMPOSITION

These three quarters, constituting a year's course for the freshman, are designed to develop in the student the basic skills of writing and speaking the English language. The three quarters are required of all freshmen.

C-31, C-32, C-33. HISTORICAL STUDY OF PHILOSOPHY AND RELIGION

A study of religion and philosophy as a developing body of convictions by which man has attempted, in every age, to solve the problems and mysteries of life. A one-year unit of study designed and recommended for meeting the Philosophy-Religion requirements for graduation.
THE DEPARTMENTAL COURSES

ART

ASSISTANT PROFESSOR WEST (Chairman)

MR. GRIMES

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.

Students desiring to teach art in the schools of Ohio may obtain certification by completing MINIMUM requirements. It is strongly advised that at least 10 additional hours in painting, drawing, ceramics, sculpture, or crafts be taken in addition to the minimum requirements. (See requirements for Special Certification—Art Education, page 71, under Division of Teacher Education.)

All students majoring in art arrange a public exhibition of their work at some time during their senior year in residence.

100. SKETCHING AND RENDERING 1 hour
This course is designed to introduce the student to "thinking" visually and carrying this "thinking" to a completed state. Emphasis placed on developing awareness in the student of his surroundings and translating visual experiences into drawings.

101-102. ART FOR ELEMENTARY TEACHERS 6 hours
Designed for prospective classroom teachers in the elementary schools; materials, techniques, and methods of utilizing them is stressed.

111, 112, 113. ART FUNDAMENTALS 15 hours
This course is an integration of the traditional courses of study in Drawing and Design. Emphasis on student's development of technique, terminology and its application, styles, and personal interpretation of problems assigned to him. No prerequisite; required for all art majors.

200. INTRODUCTION TO ART 3 hours
A one quarter brief survey of the visual arts with emphasis placed on the appreciation and judgment of those visual arts. Illustrated lecture.

201-202-203. ART HISTORY 9 hours
An historical study of style in the arts of painting, sculpture and architecture from prehistoric times to the present. Illustrated lecture.

ART 210. DESIGN APPLIED TO MATERIALS 3 hours
The application of design to a variety of material with emphasis on decorative quality. Variety of materials and techniques. Permission and Art 123. May repeat to 9 hours.
211. **Figure Drawing I**  
2 hours  
An advanced drawing course and introduction to the study of human form. Elementary anatomy: skeleton, muscles, tendons, and ligaments which determine the exterior form. Linear and tonal media.  
*Prerequisite:* Art 111, 112, 113 or permission. May repeat to total of 6 hours.

220. **Figure Drawing II**  
3 hours  
Emphasis on rendering the human form and incorporating it in compositions; singly and in groups. Linear and tonal media, some color.  
*Prerequisites:* Art 111, 112, 113, and Art 211 with "B" or better and permission of the instructor.

221-222-223. **Ceramics**  
3 hours  
The methods of forming, decorating, and glazing clay bodies; coil, slab, thrown, and cast. Laboratory.  
*Prerequisite:* 123 Design. Laboratory.

**ART 230. Painting**  
3 hours  
Methods, techniques, and personal expression are stressed. Maximum credit in course 9 hours. Permission and Art 113, Art 123.

**ART 251-252-253. Sculpture**  
9 hours  
Modeling from life in clay; casting in plaster and metal; modeling in wood and stone.  
*Prerequisite:* Art 113; permission.

260. **Lettering**  
3 hours  
Selected elements, styles, principles, media, and techniques of lettering are introduced. Emphasis on student practice and application to given and/or determined problems. May repeat to 9 hours.  
*Prerequisite:* Permission.

**ART 300. Jewelry**  
3 hours  
The design and construction of jewelry in a variety of materials. Emphasis on originality and student proficiency.  
*Prerequisite:* Art 123, permission and 10 hours in departmental courses. Demonstrations and laboratory experience. May repeat to 9 hours.

301-302-303. **Printmaking**  
9 hours  
The techniques of making multiple drawings by the Planographic, Intaglio, and Relief processes. Laboratory.  
*Prerequisite:* Permission of Instructor.

**ART 310. Advanced Ceramics**  
3 hours  
Development of technique, collection of relevant information on the compounding of glazes, development of clay bodies for particular applications such as casting, jiggering, etc. Emphasis on self-directed production and inquiry within the discipline of the craft.
Prerequisite: Art 223 and permission of the instructor. Maximum credit 9 hours.

320. FIGURE PAINTING
Portraits and figure studies; singly and in groups. Composition, technique are stressed.
Prerequisite: Art 211, Art 220, and permission. Maximum credit 9 hours.

340. ADVANCED SCULPTURE
Prerequisite: Art 253 with "B" or better, permission of instructor. May repeat to maximum of 9 hours.

399. ART EDUCATION
A laboratory-seminar for teachers not majoring in art. Techniques, materials, literature, and methods, sources, philosophies, etc., are studied and applied in all cases possible. Open only to juniors and above; also to in-service teachers by permission. Permission of instructor required. May repeat to 6 hours.

440. ART PROBLEMS
Advanced independent study of any approved problem within the realm of the department. May be repeated to maximum of 9 hours in any area of specialization within the department. Advanced standing, 25 hours of Art, and approval of department chairman. At least 1 hour must be scheduled by seniors to cover public exhibit of his work.

BIOLOGY
ASSOC. PROF. BOWDEN (Chairman), PROF. STAUFFER, ASST. PROF. SNYDER, ASST. PROF. BUTLER, ASST. PROF. HOCH, DR. TIPPLE

The objective of this department is to stimulate the development in each student an understanding of the living world. From general biology through the advanced courses we emphasize deeper understandings and more integrated concepts of the fundamental principles common to all biological studies. This foundation should enable the student to pursue successfully graduate or professional studies such as medicine, dentistry, nursing, teaching of biology and other areas of applied biology. In addition it should enable him to have a better perspective in the study of governmental, social and economic problems and to have a keener appreciation of the humanities and the arts.

Students concentrating in Biology complete a minimum of forty-five hours in the department, including Courses 111, 112, 113, 201, 202, 223, (301, 302, 303) or (331, 332, 333), 402, 440, 450, 423 or 430 or 433 and a comprehensive examination in Biology. In addition, students concentrating in Biology complete at least one year of mathematics, one year
of chemistry, one year of physics and the second year of a foreign language. Courses in statistics, psychology, sociology and a second year of chemistry are recommended.

111-112-113. **GENERAL BIOLOGY**  
A study of biological principles and concepts manifested in plant and animal life with considerable emphasis on their application to man. Discussion in the presence of laboratory materials, 5 hours.

121-122-123. **ANATOMY AND PHYSIOLOGY FOR NURSES**  
An introductory course designed to develop in the student an appreciation and understanding of the structure and function of the human body. The laboratory includes dissection of a representative mammal and experiments illustrating physiological principles. Lecture, discussion, laboratory, 5 hours.  
Nursing students only.

201, 202. **BOTANY**  
A study of advanced concepts and principles concerning plant life. Special emphasis is given to the general classification, the life cycles, and the environmental relationships of representative members of the plant kingdom. These courses are of fundamental importance to all students concentrating in biology and students who, from a cultural standpoint, wish to know something of the origin and development of plants. Discussions in the presence of laboratory materials, 5 hours.  
**Prerequisite:** General Biology 111-113, or permission of the instructor.

213. **LOCAL FLORA**  
A systematic study of vascular plants, both native and introduced. A field course supplemented by greenhouse and herbarium studies. Field study emphasized. Lecture and class work, 1 hour; laboratory, 6 hours.  
Permission of instructor.

223. **INVERTEBRATE ZOOLOGY**  
A systematic study of the invertebrate phyla. Discussion in the presence of laboratory materials, 5 hours.  
**Prerequisite:** General Biology 111-113, or permission of the instructor.

301, 302, 303. **VERTEBRATE ANATOMY AND EMBRYOLOGY**  
A comparative study of vertebrates which includes discussion and laboratory dissection of the different systems in representative forms. In embryology general principles of vertebrate development are discussed; laboratory study of certain vertebrate embryos illustrates the changes in form in the development of the adult organism. The course is fundamentally important to biology majors and to students who expect to teach biology, study medicine, or who from a cultural standpoint, wish to know something of the origin and development of the hu-
man body. Lecture, discussion laboratory, 8 hours.

Prerequisite: General Biology 111-113 or permission of the instructor.

331, 332, 333. PHYSIOLOGY AND ANATOMY 12 hours
All sessions held in the Julius and Fannie Rogoff Laboratory of Physiology.

A course designed to develop in the student an appreciation and understanding of the structure and function of the human body.

The lectures include a few by guests who lecture in fields of their specialization.

The laboratory includes dissection of a representative mammal and experiments illustrating physiological principles. Lecture, discussion, laboratory, 6 hours.

Prerequisite: General Biology 111-113, or permission of the instructor.

402. LABORATORY TECHNIQUE 3 hours
The principles and procedures used in the killing, preserving and preparing of biological materials are investigated. Experience is gained in the application of these principles through selected laboratory experiences. Lecture and class work, 1 hour; laboratory, 6 to 8 hours.

Permission of instructor.

423. ECOLOGY 3 hours
Each living organism lives and reproduces as both a dependent and a contributing member of an integrated community. Furthermore, each organism, each community, has a living and a non-living environment. In this course the interrelationships involving living organisms are investigated. From this study one will gain a more profound appreciation of the intricacies of the living world and will also be better equipped to pursue work in applied biology.

Prerequisite: Botany 202, Invertebrate Zoology 223, or permission of the instructor.

430. HEREDITY 3 hours
A study of the principles of inheritance in plants and animals with considerable emphasis on human inheritance and the problems of eugenics.

Prerequisite: General Biology 111-113, or permission of the instructor.

433. ORGANIC EVOLUTION 3 hours
A study of the development of the organic world, and an examination of the evidences of evolution and the theories attempting to explain the method of evolution.

Prerequisites: General Biology 111-113, and permission of the instructor.

440. BIOLOGICAL PROBLEMS 1-3 hours
Minor investigations for qualified juniors and seniors who are concentrating in Biology. By arrangement any quarter.
450. Seminar
Readings, discussions and reports on problems of historical and current interest in Biology.
Required of all seniors concentrating in Biology.

CHEMISTRY
Professor Bettinger, Chairman
Associate Professor Messer
Assistant Professor McClure
Mr. Hawbecker

The objective of this department is to help serve the modern cultural need for an understanding of science, to provide the basic preparation in chemistry for those who wish to enter the chemical industry, the teaching profession or pursue graduate study in chemistry, and to serve those who need an understanding of the fundamentals of this physical science as a prerequisite to professional study.

MAJOR IN CHEMISTRY

Two programs are available. One leads to the Bachelor of Science degree and is designed primarily for those who intend to pursue graduate study or terminate their formal education at the Bachelor’s level to enter the chemical profession.

The Bachelor of Arts program is designed primarily for those who wish a chemistry major in preparation for medicine, secondary school teaching, or any other field which requires background in chemistry, although not as extensive preparation as in the Bachelor of Science program.

A grade of C or better is required in all chemistry courses to be counted toward the major. All chemistry majors are required to take the following courses in the department: 131-132-133, 241-242-243, 321, 341-342-343 plus certain other chemistry courses as outlined below depending on the degree sought. The minimum number of hours to major in the department is 45 leading to the B.A. degree. It should be noted that it is possible for a student to fulfill this 45 hour minimum requirement in Chemistry in three academic years. Thus it is possible to begin a minimum major in the sophomore year.
The following is the basic curriculum for a chemistry major:

### FIRST YEAR

<table>
<thead>
<tr>
<th>Subject</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 131-132-133</td>
<td>4</td>
</tr>
<tr>
<td>Mathematics 151, 152, 153</td>
<td>5</td>
</tr>
<tr>
<td>English C-1, C-2, C-3</td>
<td>3</td>
</tr>
<tr>
<td>*Soc. Sci. Elective</td>
<td>3</td>
</tr>
<tr>
<td>Physical Education</td>
<td>1</td>
</tr>
<tr>
<td>Liberal Arts Orientation</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17</td>
</tr>
</tbody>
</table>

*Social Science or other elective depending upon the degree sought.

### SECOND YEAR

<table>
<thead>
<tr>
<th>Subject</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>Chemistry 241-242-243</td>
<td>5</td>
</tr>
<tr>
<td>Mathematics 251, 252, 253</td>
<td>5</td>
</tr>
<tr>
<td>Physics 241, 242, 243</td>
<td>5</td>
</tr>
<tr>
<td>Physical Education</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>16</td>
</tr>
</tbody>
</table>

### THIRD YEAR

<table>
<thead>
<tr>
<th>Subject</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 321</td>
<td>4</td>
</tr>
<tr>
<td>Chemistry 341-342-343</td>
<td>3</td>
</tr>
<tr>
<td>*Chemistry 352-353</td>
<td>2</td>
</tr>
<tr>
<td>*Chemistry 363 or 373</td>
<td>3 or 2</td>
</tr>
<tr>
<td>German 101-102-103</td>
<td>4</td>
</tr>
<tr>
<td>Philosophy &amp; Religion C-31, C-32, C-33</td>
<td>3</td>
</tr>
<tr>
<td>English or American Literature</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17</td>
</tr>
</tbody>
</table>

*Optional for the B.A. degree.

The fourth year depends on whether the student wishes to meet the requirements for the B.A. or the B.S. degree.

### FOURTH YEAR FOR B. S. DEGREE

<table>
<thead>
<tr>
<th>Subject</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 451</td>
<td>5</td>
</tr>
<tr>
<td>Chemistry 462</td>
<td>5</td>
</tr>
<tr>
<td>*Chemistry 481-482-483</td>
<td>2</td>
</tr>
<tr>
<td>*Advanced Course</td>
<td>3-5</td>
</tr>
<tr>
<td>German 221-222-223</td>
<td>3</td>
</tr>
<tr>
<td>Fine Arts 6 hrs., Speech 3 hrs.</td>
<td>3</td>
</tr>
<tr>
<td>Social Science</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>16</td>
</tr>
</tbody>
</table>

*Choices here include Chemistry 363, Chemistry 473, or certain advanced courses in the Physics and Mathematics Departments.

‡Optional
FOURTH YEAR FOR B.A. DEGREE

Chemistry or other electives 7 7 5-7
German 221-222-223 3 3 3
Fine Arts 6 hrs., Speech 3 hrs. 3 3 3
Social Science 3 3 3

16 16, 14-16

CHEMISTRY COURSES

105. THE SCIENCE OF CHEMISTRY 3 hours

(Science majors may not take this course for credit).
This course is intended primarily for students preparing for public school teaching, other than in mathematics or the sciences. The central theme is the structure of matter and the chemical consequences of that structure. The theme enables the discussion of some inspiring discoveries and examples of the human mind at work.

131-132-133. GENERAL CHEMISTRY 12 hours

A study of basic principles underlying the science, including a study of inorganic reaction chemistry with emphasis on correlation with modern theory and periodic relationships. Laboratory work includes experiments illustrating principles, basic quantitative techniques, and methods of separation of ions in aqueous solutions.

Three hours of lecture and one three-hour recitation-laboratory period per week.

Prerequisite: The student must be eligible for college credit courses in the English and Mathematics Departments.

231-232-233. ORGANIC CHEMISTRY 12 hours

A fundamental course consisting of a systematic study of organic compounds introducing the modern approach to bonding, structure, and mechanisms of reaction. The laboratory consists of basic techniques used in synthesis, identification, and separation of organic compounds.

Three hours of lecture and one three-hour laboratory period per week.

Prerequisite: Chemistry 133.

241-242-243. ORGANIC CHEMISTRY FOR MAJORS 15 hours

The lecture is identical with and meets with the Chemistry 231-232-233 lecture. The laboratory is separate from Chemistry 231-232-233 and emphasizes modern techniques used in synthesis, qualitative identification and separation of organic compounds.

Three hours of lecture and two three-hour laboratory periods per week.

Prerequisite: Chemistry major and Chemistry 133.

321 INTERMEDIATE CHEMISTRY 4 hours

Emphasis is placed on aspects of inorganic and analytical chemistry not covered in Chemistry 131-132-133.
Two lectures and two three-hour laboratory periods per week.

Prerequisite: Chemistry 133 and Chemistry 233 or 243.

341-342-343. PHYSICAL CHEMISTRY 9 hours
A fundamental course emphasizing thermodynamics, kinetics, quantum
theory, and structure of matter.
Three hours of lecture per week.
Prerequisite: Chemistry 233 or 243, Physics 243, and Mathematics 253.
Corequisite: Chemistry 321.

352-353. PHYSICAL CHEMISTRY LABORATORY 3 hours
A laboratory course designed to illustrate the major concepts stressed in
Chemistry 341-342-343.
Two three hour laboratory periods per week for 352. One three hour
laboratory period per week for 353.
Corequisite: Chemistry 342-343.

363. ADVANCED ORGANIC CHEMISTRY 3 hours
An advanced course discussing modern bonding concepts and mechan-
isms of organic reactions.
Three hours of lecture per week.
Corequisite: Chemistry 343.

373. JUNIOR RESEARCH 2 hours
Corequisite: Chemistry 343.

451. ADVANCED INORGANIC CHEMISTRY 5 hours
Chemical principles and bonding theory are applied to the study of in-
organic systems. The laboratory stresses correlation of theory, reaction
chemistry and techniques used in synthesis.
Four hours of lectures and one four hour laboratory per week.
Prerequisite: Chemistry 343.

462. ADVANCED ANALYTICAL CHEMISTRY 5 hours
The theory and application of instrumental analysis.
Three hours of lectures and two three hour laboratories per week.
Prerequisite: Chemistry 343 and Chemistry 353.

473. ADVANCED PHYSICAL CHEMISTRY 3 hours
Three hours of lectures per week.
Prerequisite: Chemistry 343.

481-482-483. SENIOR RESEARCH 6 hours
Prerequisite: Chemistry 353 and Chemistry 373.
Corequisite: Chemistry 451 and Chemistry 462.
ECONOMICS AND BUSINESS ADMINISTRATION

ASSOCIATE PROFESSOR HUMPHREY, ASSOCIATE PROFESSOR COOLEY, ASSISTANT PROFESSOR STAUFFER, ASSISTANT PROFESSOR CARLSON and SPECIAL LECTURERS.

Men’s qualifications to reach high positions are based not so much on their technical competence or job know-how as on what kind of people they are. Contrary to accepted thought, the good manager manages quite as much with his heart as with his head; quite as much with instinct and intuition as with precise formulae.

—Crawford H. Greenewalt

The purpose of the Department is to develop a basic understanding of the market economy and to provide an opportunity to learn the fundamental techniques of business administration. All students should gain an understanding of basic economics, and those intending to enter business are advised to major in the Department.

Students majoring in the Department are required to take a minimum of 45 quarter hours within the Department. These must include Economics 201, 202, and 203, which are prerequisite to several advanced courses. Other required courses are: Economics 131, 132, 133, 322, 352, 353, and Mathematics 181, 182, 183. (A similar course in Mathematics may be substituted for Mathematics 181, or Mathematics 181 can be omitted if the student has thorough preparation in mathematics.) Seniors should take Economics 440 in preparation for the Comprehensive Examination.

Beginning with the sophomore year, the students majoring in the department are advised, but not required, to choose their electives according to one of the following options:

**Accounting** (for those students who desire to enter the field of accounting, public or private, or related fields in management). Electives should include:
- Intermediate Accounting 301
- Cost Accounting 312
- Advanced Accounting 452
- Income Tax 381-382
- Auditing 403
- Budgeting 413
- Marketing 351
- Corporation Finance 362
- Business Communications 391

**Business Administration** (for those who desire to become business executives). Electives should include:
- Labor Economics 341
- Business Organization 213
- Personnel Management 363
- Business Communications 391
- Cost Accounting 312
- Business Law 322
- Budgeting 413
- Corporation Finance 362
- Business Law 323
- Marketing 351
Business Education (for those who wish to qualify for a State Comprehensive License in Business Education, which qualifies the student to teach any business subject offered in the Secondary School). Electives should include:

- Typing 101, 102, 103
- Shorthand 111, 112, 113
- Shorthand & Transcription 211, 212
- Secretarial Practice 223
- Office Machines 222
- Business Communications 391

Economics (for those who wish to teach Economics at the college level, study and write in the field of Economics, become professional economists employed by business firms or by government, or those who have no specific vocational aim). Electives should include:

- Labor Economics 341
- Corporation Finance 362
- Intermediate Economic Theory 383
- Comparative Economic Systems 411
- International Economics 421
- Economic History of Europe 441
- Economic History of the United States 442
- Contemporary Economic Problems 433
- History of Economic Thought 443
- Investments 461

Finance (for those who plan to enter banking, investments or other branches of finance). Electives should include:

- Business Organization 213
- Intermediate Accounting 301
- Corporation Finance 362
- Business Communications 391

- International Economics 421
- Public Finance 423
- Investments 461
- Insurance 462

Industrial Management (for those who wish to make a career in management of industrial firms). Electives should include:

- Business Organization 213
- Cost Accounting 312
- Production Control 331
- Time and Motion Study 332
- Quality Control 333
- Business Law 322, 323
- Budgeting 413

- Labor Economics 341
- Marketing 351
- Corporation Finance 362
- Personnel Management 363
- Advertising 372
- Business Communications 391

Merchandising (for those who seek to specialize in marketing, market research, or sales management). Electives should include:

- Marketing 351
- Corporation Finance 362
- Transportation 373
- Business Communications 391
Personnel Management 363
Salesmanship 371
Advertising 372

Insurance 462
Budgeting 413

**Personnel Management** (for those who seek to be personnel executives of firms, dealing with employment problems and policies). Electives should include:

- Business Organization 213
- Production Control 331
- Time and Motion Study 332
- Labor Economics 341
- Personnel Management 363
- Salesmanship 371
- Business Communications 391
- Budgeting 413

**Secretarial** (for those who wish to be secretaries and executive-assistants).

Electives should include:

- Typing 101, 102, 103
- Shorthand 111, 112, 113
- Shorthand & Transcription 211, 212
- Office Machines 222
- Secretarial Practice 223
- Business Communications 391
- Business Organization 213
- Cost Accounting 312
- Labor Economics 341
- Personnel Management 363
- Budgeting 413

**Business-Engineering** (special attention is called to the five-year program which grants two diplomas—one in Liberal Arts at the end of four years and the Engineering degree at the end of the 5th year. The program is designed for those who desire to meet the demands of industry for a knowledge of management, accounting, and expertness in a field of engineering.) Electives in Liberal Arts should include:

- Business Organization 213
- Labor Economics 341
- Income Tax 381
- Cost Accounting 312
- Budgeting 413
- Time and Motion Study 332
- Production Control 331
- Quality Control 333

The special Associate of Arts certificate is awarded for two years of special training in Accounting, Industrial Management, or Secretarial Science.

**SUGGESTED BASIC CURRICULUM FOR MAJORS**

**FRESHMAN YEAR**

<table>
<thead>
<tr>
<th>Liberal Arts Orientation</th>
<th>1 QTR. HOURS</th>
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<tbody>
<tr>
<td>English C-1, C-2, C-3</td>
<td>9</td>
</tr>
<tr>
<td>History or other Social Science subject</td>
<td>9</td>
</tr>
<tr>
<td>Biology, Chemistry, Physics or Mathematics</td>
<td>12-13</td>
</tr>
<tr>
<td>Econ. 131, 132, 133</td>
<td>9</td>
</tr>
<tr>
<td>Typing</td>
<td>3</td>
</tr>
<tr>
<td>Physical Education</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total** 45
### SOPHOMORE YEAR
- Philosophy C-31, 32, 33 or 201, 202, 203: 9
- Speech: 3
- Econ. 201, 202, 203: 9
- Math. of Finance 181, 182, Statistics 183: 11
- Physical Education: 3
- Electives: 12

**Total**: 47

### JUNIOR YEAR
- English or American Literature: 9
- Econ. 322, 352, 353: 9
- Art, Music: 6
- Psychology 201-2, 323: 9
- Foreign Language*: 12
- Elective: 3

**Total**: 48

### SENIOR YEAR
- Foreign Language*: 12
- Electives in Major Field: 27
- Electives in Other Fields: 9

**Total**: 48

*Students who plan to teach and who are candidates for the Degree of Bachelor of Science in Education may omit Foreign Language, substituting the required courses in Education.

**131-132-133. PRINCIPLES OF ACCOUNTING 9 hours**
Fundamental process of accounting applied to service, trading and manufacturing concerns; preparation of working papers and financial statements from properly arranged accounts in general ledger; practice sets of representative business concerns are used to unify the principles and theories studied. *(Required of all Economics majors)*

**201-202-203. PRINCIPLES OF ECONOMICS 9 hours**
A survey course with an analytic description of our economic system. An introduction is made to the price system, supply and demand factors, money and banking, the relation of government to the economy, the role of producers and consumers, and the analysis of income and employment. Current economic problems are analyzed. *(Required of all Economics majors)*

**213. BUSINESS ORGANIZATION 3 hours**
A study of the various types of business and industrial organizations, both
simple and complex. Throughout the course, emphasis is placed on recent trends in management, and methods required for administrative, managerial and industrial control.

222. **Office Machines and Practice** 3 hours

The purpose of this course is to learn to operate a variety of business machines designed to handle the arithmetical work of the office. It includes instruction on listing and non-listing adding machines, registering, calculating and bookkeeping machines. A study will be made of the applications of the accounting machines, the punch card systems and the electronic computers.

301. **Intermediate Accounting** 5 hours

General financial accounting theories with problem illustrations and applications. Classification of accounts, balance sheet forms, items and analysis of balance sheet, depreciation, goodwill, bonds and sinking funds, amortization, surpluses and reserves, statement of affairs, partnerships, and insurance.

*Prerequisite:* Economics 133.

312. **Cost Accounting** 5 hours

Accounting for manufacturing enterprises with emphasis on job order process and standard cost accounting.

*Prerequisite:* Economics 301.

322, 323. **Business Law** 6 hours

The first quarter is required of all economics majors. Business Law takes up the legal aspects of common business transactions involved in the making of contracts, the formation and legal results of agencies, the legal principles of real estate transactions, the law governing the marketing of goods as it relates to personal property, and negotiable instruments. Economics 323 surveys labor law and legislation, setting forth the rights and responsibilities of employers and of employees and examining the public interest in labor disputes. This study also makes applicable the uniform code provision.

331. **Production Control** 3 hours

The principles and methods of planning and controlling the production of goods are studied. Procedures used in manufacturing establishments in the controlling of production operations, procurement, inventory, tools, loading, intra-company traffic and communication, design, mechanization and automation are analyzed.

332. **Time and Motion Study** 3 hours

The theory and application of time and motion study techniques to the improvement of industrial operations. Process charts, fatigue, and relation of time standards to wage incentives are among the subjects studied.

333. **Quality Control** 3 hours

The principles and methods of controlling the quality of materials, workmanship and inspection, as well as the procedures in establishing standards, tests and comparisons of products, are studied. The student is
familiarized with the use of statistical quality control charts and acceptance sampling techniques as tools of scientific management.

341. LABOR ECONOMICS  3 hours
A study of labor as a factor in maximizing production, its use in relation to other factors, and its remuneration. The importance of a freely competitive labor market and of labor mobility are explained. Theories of the determination of wages, and bargaining theory are explored. The history and methods of labor unions, and government relations to labor, are given careful attention.

351. MARKETING  3 hours
The function of marketing in the economic system will be studied in its institutional aspects, its efficiencies, and its current trends of development. Government regulation of markets will be considered. The students will evaluate actual business problems on the basis of the principles covered in this course.

352-353. MONEY AND BANKING  6 hours
A study of the organization and operation of American banking institutions. Includes theories of money and credit; commercial banking practices; reserve banking; monetary and banking laws; money market; money and credit in the world economy.
Prerequisite: Economics 201-202-203.

362. CORPORATION FINANCE  3 hours
The issuance of corporation securities and their regulation will be related to the problems of fixed and working capital, income level, dividend policy and the use of borrowing. Case analysis will be used to consider the problems of expansion, recapitalization, and failure.

363. PERSONNEL MANAGEMENT  3 hours
A course analyzing the functions of the personnel department in industry, its development, and techniques. Text will be supplemented by case analysis of problems in selection, training, and incentives. The course is designed to broaden the student's appreciation of the human factor in industry.

371. SALESMAINSHP  3 hours
A study of the background, modern requirements and techniques of salesmanship, with controlled experience in actual selling in cooperation with neighboring businesses and industries.

372. ADVERTISING  3 hours
A general course for the benefit of those who plan to enter advertising, as well as a survey designed to teach what every business executive needs to know about the field. All types of advertising media are discussed. Both national and retail advertising are treated. The organization and admin-
istration of advertising departments and of advertising agencies receive emphasis.

373. **TRANSPORTATION** 3 hours
A study of the economics of transportation—waterway, railway, highway, pipeline, and air. The story of the development of transportation in the U.S. is reviewed. Rates and their effect on location and development of industry, government regulation, and labor relations are examined.

381, 382. **FEDERAL INCOME TAX** 6 hours
A comprehensive study of the Federal income tax structure as related to individuals; including problems intended to provide a thorough understanding of the law and regulations. This course also investigates specific tax areas applicable to different forms of business organization.

*Prerequisite:* Accounting 131, 132, 133.

383. **INTERMEDIATE ECONOMIC THEORY** 3 hours
Advanced theory considering special problems of pricing, production, and distribution under perfect competition, oligopoly, duopoly and monopoly. An attempt is made to relate theory to practices in the American economy.

391. **BUSINESS COMMUNICATIONS** 3 hours
A study of the techniques of writing business letters and reports, including technical reports. The objective is efficient and accurate communication of economic and business facts and the writer's conclusions therefrom.

400. **ECONOMIC WORKSHOP** 1—3 hours
A special workshop on current problems in Economics or Business Administration to be offered upon sufficient demand. Program of study subject to approval of the department chairman and credit to be granted according to university standards.

*Prerequisite:* Seniors majoring in the department, or on approval of instructor.

403. **AUDITING** 5 hours
Principles and accepted procedures of auditing accounting records and statements, with special emphasis given to making of working papers and the writing of audit papers for making a complete audit.

411. **COMPARATIVE ECONOMIC SYSTEMS** 3 hours
Critically evaluates capitalism, socialism, facism, and communism as they touch on the economics of pricing, production and distribution. Welfare implications of each will be weighed against pure theoretical concepts.

413. **BUDGETING** 5 hours
Procedure for estimating income and expenses; the organization for controlling those expenditures and for measuring the operating efficiency of the organization.
Prerequisite: Accounting 301.

421. INTERNATIONAL ECONOMICS 3 hours
This course studies both theories and actual current problems of trade between nations. Governmental restrictions and controls, such as tariffs, quotas and exchange controls, and the importance of multi-lateral trade are examined. Scarce resources, population, and employment trends are studied in relation to their bearing on world economics.

423. PUBLIC FINANCE 3 hours
A study of how the Federal government and local units of government finance themselves. Taxation in its many forms, the securities issued by government units, and the problem of management of the national debt of the United States are fully considered.

432. GOVERNMENT AND BUSINESS 3 hours
It traces the history and development of government regulation of economic affairs in the United States. The provisions of the U. S. Constitution bearing on this subject, leading court opinions, and the more important regulatory laws of recent years are reviewed.

433. CONTEMPORARY ECONOMIC PROBLEMS 3 hours
An advanced course in the analysis of current economic problems, domestic and international. These include problems in agriculture, population, old age, chronic unemployment, labor-management relations, underdeveloped countries, and the role of the United States in the world economy.

440. SENIOR COMPREHENSIVE 3 hours
This course is designed to prepare the student for the Senior Comprehensive examination, which is the final examination of the course. The plan of the course is to assist the economics major to integrate his ideas and to formulate a philosophy. Required of all seniors.

441. ECONOMIC HISTORY OF EUROPE 3 hours
To understand present-day economics, it is necessary to study the beginnings of trade, medieval economic relationships, and the rise of invention and technology culminating in the Industrial Revolution. The spread of empire and the economic rivalry leading to World War I receive attention.

442. ECONOMIC HISTORY OF THE UNITED STATES 3 hours
After a brief examination of economic life in colonial America and the East-West migration, this course focuses upon the development of modern business and industry in the United States, with especial attention to the corporation and its part in the nation's growth. The causes and consequences of the great depression are studied.

443. HISTORY OF ECONOMIC THOUGHT 3 hours
A critical analysis of the development of economic thought from Greek and Hebrew writers to modern economists. Particular emphasis given to
the works of Adam Smith, Malthus, Ricardo, Marx, Marshall, Keynes and our modern American economists. Attention is given to the influence of environment and political thought. Text and original sources.

452. **ADVANCED ACCOUNTING**


*Prerequisite:* 311.

461. **INVESTMENTS**

A practical study of the investment of savings. The course analyzes the many different investments available, such as common and preferred stocks, bonds of all types, building and loan shares, life insurance, real estate, etc. It evaluates each in terms of (1) safety of principal, and (2) return. Actual balance sheets of firms are analyzed from the standpoint of investment desirability. How to gain information about investments, the processes of investing, and the operations of the securities markets are thoroughly discussed.

462. **INSURANCE**

A course designed to acquaint the student with the general principles of insurance and their chief applications — life, health and disability, fire, casualty and marine. Corporate bonding, pensions and group insurance are studied. Actual insurance problems are presented by experienced operatives.

**SECRETARIAL**

101-102-103. **TYPEWRITING**

A series of courses designed to give the student a practical working knowledge of the typewriter combined with a study of the business letter, office forms, compositions, rough drafts, and tabulation. A high degree of accuracy and speed is required.

111-112-113. **SHORTHAND**

Basic courses in Gregg Simplified Shorthand, designed to give the student a thorough foundation in principles, and practice in reading and writing at a satisfactory rate.

211-212. **SHORTHAND AND TRANSCRIPTION**

Advanced courses with emphasis on speed and accuracy in production. High degree of efficiency is required.

*Prerequisite:* Shorthand 113.

222. **OFFICE MACHINES AND PRACTICE**

Study and use of such office machines as dictaphone, mimeograph, and calculator. Theory and practice in office work both in class and laboratory. See Economics 113.
391. BUSINESS COMMUNICATIONS
Listed previously.

223. SECRETARIAL PRACTICE
3 hours
A study of the secretarial profession with special emphasis on office mail, communication, travel, business reports, office organization, and the financial and legal duties of the secretary combined with the application of theory in a University office.
Prerequisites: Shorthand 211, Typewriting 103, and Office Practice 222 or equivalents.

370. COMPUTER PRINCIPLES
3 hours
A basic course in programming of electronic digital computers. Detail study is given to characteristics of computers, computer programming and computer coding, and accounting, auditing, and data protection. Laboratory experience is provided on available computers in the classroom.
Prerequisites: Cost Accounting and Office Machines.

470. CO-OP PROGRAM (BUSINESS INTERNSHIP)
3 hours
may be repeated
An "on-the-job" learning experience wherein students will work in industry (accounting, secretarial, data-processing) doing actual business operations. The student may not earn more than 3 hours of credit in any one quarter. The student must be a senior (or have permission of the director of the co-op program), have a minimum scholarship of 3.0 quality points per scheduled hour and have completed the prescribed prerequisites for their internship program:

Accounting—29 hours in accounting
Secretarial—Secretarial practice
Data Processing—Principles of account and office machines (or Computer principles)

NOTE: For description of courses in Mathematics 181, 182, 183 refer to the Mathematics section of the catalog.
DIVISION OF TEACHER EDUCATION

HILDRED B. JONES, Division Head

THE DEGREE OF
BACHELOR OF SCIENCE IN EDUCATION

The curricula of candidates for degree, Bachelor of Science in Education, are divided into three general categories: general education, major field of concentration and professional education. These curricula meet the requirements of the State Department of Education for teacher certification and the degree requirements of the College of Liberal Arts.

The prescribed general education courses for the Bachelor of Science in Education degree are: English Composition, C-1, C-2, C-3; one 3 hour course in Speech; two 1 year courses in two of the social studies (not psychology); one year of literature, either English or American; two quarters in two areas of fine or applied arts; Philosophy and Religion, C-31, C-32, C-33, or nine hours in the Department of Philosophy and Religion; and a minimum of 21 hours of natural science including Mathematics 111, 112, 113 or equivalent mathematics courses.

A student may enroll in the Teacher Education program during his freshman or sophomore years. At the end of the sophomore year formal application must be made to be admitted as a candidate for the degree, Bachelor of Science in Education. Acceptance of candidacy will be determined by the Director of Teacher Education upon the recommendation of the Teacher Education Council. The student must have a 2.25 accumulative quality point average, and have completed 75% of prescribed freshman and sophomore course work. The above regulation also applies to students working toward the Bachelor of Arts degree and teacher certification.

All students preparing to teach at either the elementary or secondary level must have their programs approved by the Head of the Division of Teacher Education. Those students preparing to teach at the secondary level must meet the requirements in an area of concentration under the direction of the appropriate department chairman.

Candidates for the Bachelor of Science in Education degree must complete a minimum of 180 hours of course work with a quality point average of 2.25 on a four point scale. A grade of "C" or better is required in all Professional Education courses and in all courses in the field of concentration. Students with degrees from other accredited institutions may qualify for teacher certification in the Department of Education by completing a minimum of 45 quarter hours of acceptable residence course work, including the required professional courses.

The Department of Education permits the completion of degree requirements and/or recommendation for teacher certification only when a student demonstrates such traits as are deemed necessary for competence and success in teaching.
The Division of Teacher Education, in cooperation with the other divisions within the College of Liberal Arts, offers programs leading to certification in the following fields:

1. **ELEMENTARY EDUCATION**
   a. Provisional Elementary Certificate

   The course program as outlined below meets the requirements for the Bachelor of Science in Education degree and the Provisional Elementary Certificate (standard certificate)

**FIRST YEAR**

<table>
<thead>
<tr>
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<th><strong>Fall</strong></th>
<th><strong>Winter</strong></th>
<th><strong>Spring</strong></th>
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<tbody>
<tr>
<td></td>
<td>English C-1</td>
<td>English C-2</td>
<td>English C-3</td>
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<td>Western Civ. 111</td>
<td>Western Civ. 112</td>
<td>Western Civ. 113</td>
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<td></td>
<td>Biology 111</td>
<td>Biology 112</td>
<td>Plays &amp; Games 133</td>
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<td></td>
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<td>or Chemistry 105* 4-3</td>
<td>Art 101</td>
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<td>Desc. Astron. 250</td>
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<td>Music 112</td>
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<tr>
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<td>Math. 111</td>
<td>Math 112</td>
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<td>L. A. Orientation (1)*</td>
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<tr>
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**SECOND YEAR**

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<tr>
<td></td>
<td>or Am. Govern. 201</td>
<td>or Am. Govern. 202</td>
<td>or Am. Govern. 203</td>
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<td></td>
<td>Literature</td>
<td>Literature</td>
<td>Literature</td>
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<td></td>
<td>Health Educ. 122</td>
<td>Children's Lit. 233</td>
<td>Sci. Elem. Tchr. 283</td>
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<td>Teach. Arith. 252</td>
<td>Speech 260 or 271</td>
<td>H'ndcrafts 210 or Arts</td>
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<td>&amp; Crafts 200</td>
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<td>17</td>
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**THIRD YEAR**

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<tr>
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<td>Ohio History 303</td>
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FOURTH YEAR

Eval. & Meas. 460 3  Ad.-Vis. Aids 430 3  Student Teaching, Educ. 470 15
Geography 5  History & Phil. of 3
Electives 7  Educ. 401 3
              Electives 9

15

*Does not apply toward 180 hours required for graduation.

**Those students who take Chemistry 105 in the Fall Quarter take Biology 112 in the Winter Quarter. Those students who take Biology 111 in the Fall Quarter take Chemistry 105 in the Winter Quarter.

b. Dual-Elementary Education major with teaching field in Secondary Education (See Department of Education for course requirements)

2. SPECIAL CERTIFICATION

a. Art Education—required courses in Art

1) Provisional Special Certificate (Elementary and Secondary)

Art 100. Sketching and Rendering 3 hrs.
Art History 201, 202, 203 9 hrs.
Painting 230 9 hrs.
or
Life Drawing 320 4 hrs.
Figure Drawing 211, 212, 213
or
Life Drawing 320 4 hrs.
Ceramics 221, 222, 223 9 hrs.
Sculpture 251 3 hrs.
Jewelry 3 hrs.
Lettering 261 3 hrs.
Design Applied to Materials 210 6 hrs.
(3 hrs. may be Ind. Arts 430)
Printmaking 301, 302 6 hrs.
Art elective (chosen from above areas) 6 hrs.

TOTAL 76 hrs.
b. Health and Physical Education

1) Provisional Special Certificate (Elementary and Secondary)

**PROGRAM OF STUDIES**

<table>
<thead>
<tr>
<th>FIRST YEAR</th>
<th>Winter</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
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<tr>
<td>English C-1</td>
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<td>English C-2</td>
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<td>Biology 111</td>
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<tr>
<td>Health Educ. 121</td>
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<td>Health Educ. 122</td>
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<tr>
<td>Western Civ. 111</td>
<td>or</td>
<td>Western Civ. 112</td>
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<tr>
<td>or American Hist. 211</td>
<td>3</td>
<td>Amer. Hist. 212</td>
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<td>Intro. to Educ. 121</td>
<td>3</td>
<td>Hygiene 110</td>
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<td>P. E. 102a</td>
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<td>*American Lit. 213</td>
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<td>or</td>
<td>or English Lit. 203</td>
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<td>Math. 111</td>
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<td>Speech 271</td>
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<td>Art 200</td>
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<td>P. E. 202a</td>
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<td>Educ. 370</td>
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<td>Educ. 333</td>
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<td>American Hist. 212</td>
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<tr>
<td>American Hist. 211</td>
<td>or</td>
<td>Western Civ. 111</td>
<td>3</td>
</tr>
<tr>
<td>or Western Civ. 111</td>
<td>3</td>
<td>American Hist. 213</td>
<td>3</td>
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<td></td>
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<table>
<thead>
<tr>
<th>FOURTH YEAR</th>
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</thead>
</table>
| Education 470, 6 hours; Education 480, 6 hours; Education 450 or 451, 3 hours; Corrective Gym 402, 3 hours; 6 hours of Education electives chosen from the following: Education 313, 401, 402, 430 or 440. Electives to round out required hours each quarter. *300 level literature courses may be substituted in some cases.
c. Industrial Arts Education

1) Provisional Special Certificate (Elementary and Secondary)

<table>
<thead>
<tr>
<th>PROGRAM OF STUDIES</th>
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<tbody>
<tr>
<td><strong>FRESHMAN YEAR</strong></td>
</tr>
<tr>
<td>English C-1</td>
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<tr>
<td>Math 111</td>
</tr>
<tr>
<td>Drawing 111</td>
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<tr>
<td>Ind. Arts 101</td>
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<tr>
<td>History 111</td>
</tr>
<tr>
<td>or</td>
</tr>
<tr>
<td>History 211</td>
</tr>
<tr>
<td></td>
</tr>
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</table>

| **SOPHOMORE YEAR**  | **Literature 201** | **Literature 202** | **Literature 203** |
| or                  | Literature 211    | Literature 212    | Literature 213    |
| or                  | Amer. Govt. 201   | Amer. Govt. 202   | Amer. Govt. 203   |
| or                  | Finishing 241     | Arts & Crafts     | Metal Casting 213 |
| or                  | Furniture Con. 231| Intro. to Art 200 | Study of Music 200|
| or                  | Physics 221       | Physics 222       | Physics 223       |
| or                  | or                | or                | or                |
| Chemistry 131       | 4                  | Chemistry 132     | Chemistry 133     |
|                     | 17                 |                   |                   |

| **JUNIOR YEAR**     | **Fall** | **Winter** | **Spring** |
| Metalwork Tech.     | 5        | Metal Mach. 332 | Welding 345 |
| Phil. C-31          | 3        | Phil. C-32     | Phil. C-33   |
| Graphic Arts 311    | 3        | Printing 322  | H.S. Curr. 390 |
| Gen. Psych. 201     | 5        | Ceramics 221  | Speech 271  |
|                     | 16       | Intro. Educ. 121 | School & Society |
|                     |          |                   |             |

| **SENIOR YEAR**     | **Elective** | **Ind. Arts Methds.** |
| Auto-Power Mech.    | 5          | Elec.-Electronics    | Ind. Arts Methds. |
| Mat'l's-Processes   | 5          | Lab. Planning 412   | 451              |
| Photography 430     | 3          | Audio-Vis. Aids 430 | Student Teach. 470 |
| Adol. Growth & Dev. | 3         | Eval. & Meas. 460   | Student Teach. 480 |
| Elective            | 1          | Ceramics 222        |                   |
|                     | 17         |                     | 17               |

|                     | 17         |                     | 17               |

|                     | 17         |                     | 17               |
d. Music Education — Provisional Special Certificate (Elementary and Secondary)

**PROGRAM OF STUDIES**

**FRESHMAN YEAR**

*Fall*

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>101 Theory</td>
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<tr>
<td>English C-1</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science</td>
<td>4</td>
</tr>
<tr>
<td>Western Civ. 111</td>
<td>3</td>
</tr>
<tr>
<td>Applied Music</td>
<td>2-3</td>
</tr>
<tr>
<td>Choir-Band-Orch.</td>
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<tr>
<td>Gym</td>
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**Winter**

<table>
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<tr>
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<tbody>
<tr>
<td>102 Theory</td>
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<tr>
<td>English C-2</td>
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<tr>
<td>Natural Science</td>
<td>4</td>
</tr>
<tr>
<td>Western Civ. 112</td>
<td>3</td>
</tr>
<tr>
<td>Applied Music</td>
<td>2-3</td>
</tr>
<tr>
<td>Choir-Band-Orch.</td>
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<tr>
<td>Gym</td>
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**Spring**

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<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>103 Theory</td>
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<td>English C-3</td>
<td>3</td>
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<tr>
<td>Natural Science</td>
<td>4</td>
</tr>
<tr>
<td>Western Civ. 113</td>
<td>3</td>
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<tr>
<td>Applied Music</td>
<td>2-3</td>
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<tr>
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**SOPHOMORE YEAR**

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<tbody>
<tr>
<td>211 Theory</td>
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<tr>
<td>Phil. C-31</td>
<td>3</td>
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<td>Math 111</td>
<td>3</td>
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<tr>
<td>Speech 160</td>
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<td>Applied Music</td>
<td>2-3</td>
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<tr>
<td>Gym</td>
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<tr>
<th>Course</th>
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<tbody>
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<td>3</td>
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<tr>
<td>Phil. C-32</td>
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<tr>
<td>Math 112</td>
<td>3</td>
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<tr>
<td>Art, Theatre or Culture</td>
<td>3</td>
</tr>
<tr>
<td>Applied Music</td>
<td>2-3</td>
</tr>
<tr>
<td>Choir-Band-Orch.</td>
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<tr>
<td>Gym</td>
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<table>
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<tr>
<th>Course</th>
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<td>Phil. C-33</td>
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<td>Math 113</td>
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<tr>
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<tr>
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<td>Gym</td>
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**JUNIOR YEAR**

*Fall*

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<td>Ed. 340A</td>
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<tr>
<td>351 Hist. of Music</td>
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<td>English Lit.</td>
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<tr>
<td>Gen. Psych. 201</td>
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<td>Applied Music</td>
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<td>Choir-Band-Orch.</td>
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<tr>
<td>Ed. 340B</td>
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<td>352 Hist. of Music</td>
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<td>English Lit.</td>
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<td>Adol. Growth &amp; Dev.</td>
<td>3</td>
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<tr>
<td>Applied Music</td>
<td>2-3</td>
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<tr>
<td>Choir-Band-Orch.</td>
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<tr>
<td>Methods Ed. 450</td>
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</tr>
<tr>
<td>353 Hist. of Music</td>
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<tr>
<td>English Lit.</td>
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<tr>
<td>Educ. Elective</td>
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</tr>
<tr>
<td>Applied Music</td>
<td>2-3</td>
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<tr>
<td>Choir-Band-Orch.</td>
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<td>302 Conducting</td>
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<td>442 Teach. of Woodwinds</td>
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<td>370 School &amp; Soc.</td>
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<tr>
<td>Social Studies</td>
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<td><em>Student Teach.</em></td>
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<td><em>Student Teach.</em></td>
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<td>320 Class Voice</td>
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<td>443 Teach. of Strings</td>
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<tr>
<td>Educ. Elective</td>
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<tr>
<td>Social Studies</td>
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<tr>
<td><em>Student Teach.</em></td>
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>470 or 480</td>
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*Must be taken sometime during Senior Year. Total of 12 hours, 6 hours 470 and 6 hours 480.*
3. SECONDARY EDUCATION. (Minimum requirements for certification in subject teaching field). The minimum requirements listed below are not to be construed as meaning they will meet the requirements of an area of concentration (45 hours minimum). They represent only the minimum number of hours in each field for which certification will be recommended. (Secondary education students majoring in one of the subject fields listed below, see the chairman of the department concerned).

a. Art—High School Provisional Certificate, Grades 7-12
   Design 121, 122 6 hrs.
   Lettering 261 3 hrs.
   Drawing 111, 112 6 hrs.
   Painting 230 3 hrs.
   Sculpture 251 3 hrs.
   Design Applied to Materials 210 3 hrs.*
   Ceramics 221 3 hrs.*
   Jewelry 300 3 hrs.
   Art History 202, 203 6 hrs.
   **TOTAL 36 hrs.

*May take all 6 hours in one of these course sequences. It is recommended that Art 113, Art 123, and Art 211 or Art 320 be taken as electives by students desiring this certificate.

b. Biological Science—36 hours
   Biology 111, 112, 113 General Biology 12 hrs.
   Biology 201, 202 Botany 8 hrs.
   Biology 223 Invertebrate Zoology 4 hrs.
   Biology 301, 302 Vertebrate Anatomy and Embryology
   or Biology 331, 332, 333 Physiology & Anatomy 12 hrs.

c. Business Education
   1) Comprehensive Major—69 hours
   Typing 101, 102, 103 9 hrs.
   Shorthand 111, 112, 113 9 hrs.
   *Shorthand & Transcription 211, 212 6 hrs.
   *Office Machines & Practice 222 3 hrs.
   *Business Communications 391 3 hrs.
   Principles of Accounting 131, 132, 133 9 hrs.
   Business Law 322, 323 6 hrs.
   *Math 181 5 hrs.
   *Math 182, 183 6 hrs.
   *Business Organization 213 3 hrs.
   Salesmanship 371 3 hrs.
   *Marketing 351 3 hrs.
   *Advertising 372 3 hrs.
   *Electives
2) Bookkeeping—15 hours (Bookkeeping and Accounting)
   Principles of Accounting 131, 132, 133  9 hrs.
   Intermediate Accounting 301  3 hrs.
   Cost Accounting 312  3 hrs.

3) Bookkeeping—Basic Business—30 hours
   Principles of Accounting 131, 132, 133  9 hrs.
   Principles of Economics 201, 202, 203  9 hrs.
   *Math 181, Math of Finance  5 hrs.
   *Math 182, Math of Finance  3 hrs.
   *Statistics 283  3 hrs.
   *Business Organization 213  3 hrs.
   *Business Law 322, 323  6 hrs.
   *Electives

4) Stenography-Typing—33 hours
   Shorthand 111, 112, 113  9 hrs.
   Shorthand & Transcription 211, 212  6 hrs.
   Typing 101, 102, 103  9 hrs.
   Secretarial Practice 223  3 hrs.
   Office Machines & Practice 222  3 hrs.
   Business Communications 391  3 hrs.

d. English—36 hours
   English Composition & Language—14 quarter hours, including work in advanced composition (creative writing, etc.) and the English Language.
   Literature—18 quarter hours, including course work in both American and English Literature.
   Electives—4-6 hours, may be in either composition or literature.

c. History and Government—42 hours
   Western Civilization 111, 112, 113  9 hrs.
   American History 211, 212, 213  9 hrs.
   American Government 201, 202, 203  9 hrs.
   History of Ohio 303  3 hrs.
   Other upper level History or Government electives  12 hrs.

f. Industrial Arts
   Drawing 111, 112, 113  9 hrs.
   Ind. Arts 101  3 hrs.
   Wood Tech. 112  3 hrs.
   Furniture Construction 231  3 hrs.
   Metalwork Technology  5 hrs.
   Metal Machining 332  5 hrs.
   Graphic Arts 311  3 hrs.
   Ceramics 221  3 hrs.
Industrial Materials and Processes 5 hrs.
Fundamentals of Electricity & Electronics 5 hrs.
Laboratory Planning 412 3 hrs.
Arts & Crafts 3 hrs.

g. Health and Physical Education
Same as Provisional Special except 9 hours of Education 480 must be taken. Education 470 is not required.

h. Languages—48 hours—(See Department Chairman)
French, Spanish, German, Latin, Russian

i. Mathematics—30 hours
151 College Algebra 5 hrs.
152 Trigonometry 5 hrs.
153 Analytical Geometry 5 hrs.
142 Calculus and Analytical Geometry II 5 hrs.
143 Calculus and Analytical Geometry III 5 hrs.
241 Calculus and Analytical Geometry IV 5 hrs.

j. Physical Science—Physics and Chemistry
Math 151, 152, 153, 251, 252, 253—30 hours, required for
Physics Concentration
Physics 241, 242, 243 15 hrs.
Physics 310, 320, 330 6 hrs.
Physics 250 3 hrs.
Physics Adv. Lab. 2 hrs.
Physics 302 5 hrs.
Physics 423 5 hrs.
Physics 303 3 hrs.

TOTAL 39 hrs.

Chemistry Concentration
Chemistry 131, 132, 133 12 hrs.
Chemistry 231, 232, 233 12 hrs.
Chemistry 321 4 hrs.
Chemistry 341, 342, 343 9 hrs.
Chemistry 352, 353 3 hrs.

TOTAL 40 hrs.

k. Science Comprehensive—Changes in course sequence must be approved by the chairman of the department in which concentration is desired.
### PROGRAM OF STUDIES

#### FRESHMAN YEAR

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#### SOPHOMORE YEAR

| Chemistry 231             | Chemistry 232            | Chemistry 233            |
| Physics 241               | Physics 242              | Physics 243              |
| Math 251                  | Math 252                 | Math 253                 |
| P & R C-31                | P & R C-32               | P & R C-33               |
|                           | 17                       | 17                       |

#### JUNIOR YEAR

| Gen. Psych. 201           | Literature               | Literature               |
| Literature                | Adol. Grow. & Dev.       | H. S. Curriculum         |
| School & Society          | Biology 202              | H. S. Methods 450       |
| Biology 201               | Soc. Science             | Soc. Science             |
| Physics 210               | Physics 320              | Physics 330              |
|                           |                          | Biology 203              |
|                           | 17                       | 15                       |

#### SENIOR YEAR

**Concentration in Physics**

| Physics 250               | Soc. Science             | Physics 423              |
| Soc. Science              | Education Elective       | Electives 1-2            |
| Eval. & Meas. 460         | Fine or Applied Art      | Student Teaching, Educ. 480 |
| Physics Adv. Lab.         | Physics 302              | 9                        |
| Speech 271                | Elective                 | 15 or 16                 |
| Fine or Applied Art 3     |                          |                          |
|                           | 17                       | 17                       |

**Concentration in Biology**

| Biology 301 or 331        | Biology 302 or 332       | Biology 303 or 333       |
| Eval. & Meas. 460         | Educ. Elective           | Student Teaching,        |
|                           | 3                        |                          |
College of Liberal Arts

Fall | Winter | Spring
--- | --- | ---
Speech 271 | 3 | Elective | 3 | Educ. 480 | 9
Fine or Applied Art | 3 | Fine or Applied Art | 3 | | |
--- | --- | --- | --- | --- | ---
16 | 16 | | 15 or 16 | |

Concentration in Chemistry

Chemistry 341 | 3 | Soc. Science | 3 | Fine or Applied Art | 3
Soc. Science | 3 | Educ. Elective | 3 | Student Teaching,
Eval. and Meas. 460 | 3 | Elective | 3 | Educ. 480 | 9
Speech 271 | 3 | Fine or Applied Art | 3 | Chemistry 343 | 3
Chemistry 321 | 4 | Chemistry 342 | 3 | Chemistry 353 | 1
Chemistry 352 | 2 | | | |
--- | --- | --- | --- | --- | ---
16 | 17 | | 16 | |

1. Social Studies Comprehensive — 68 hours

Students planning to teach in the fields of Social Studies should take course work in the field according to one of the programs listed below.

PROGRAM 1

Western Civilization | 9 hrs.
American History | 9 hrs.
Elective in History | 9 hrs.
Political Science | 18 hrs.
Sociology | 9 hrs.
Economics | 9 hrs.
Geography | 3-5 hrs.
Elective in Social Studies | 3-6 hrs.

PROGRAM 2

Western Civilization | 9 hrs.
American History | 9 hrs.
Elective in History | 9 hrs.
Political Science | 9 hrs.
Sociology | 18 hrs.
Economics | 9 hrs.
Geography | 3-5 hrs.
Elective in Social Studies | 3-6 hrs.

PROGRAM 3

Western Civilization | 9 hrs.
American History | 9 hrs.
Elective in History | 9 hrs.
Political Science | 9 hrs.
Sociology | 9 hrs.
Economics | 18 hrs.
Geography | 3-5 hrs.
Elective in Social Studies | 3-6 hrs.
m. Speech (including Theatre)—30 hours

Speech 271 Public Speaking I 3 hrs.
Speech 272 Public Speaking II 3 hrs.
Speech 273 Public Speaking III 3 hrs.
Speech 261 Voice & Diction 3 hrs.
Speech 262 Oral Interpretation 3 hrs.
Acting Fundamentals 283 3 hrs.
Speech 371 Debate 3 hrs.
Speech 373 Discussion 3 hrs.
Theatre 381 Theatre Technique 3 hrs.

In addition, the student must participate for and/or during at least two quarters in extra-curricular speech or theatre activities, or both, and must elect Theatre 291, Introduction to Theatre as one of his two quarters in Art, Music or Theatre.

n. Professional Education

Students preparing to teach in secondary schools are required to complete a minimum of 75% of an area of concentration in a subject matter department in the College of Liberal Arts and have the endorsement of that department’s chairman before qualifying for student teaching.

The professional education requirements for students in the field of secondary education are listed below:

1. Required courses:

121 Introduction to Education 3 hrs.
(prerequisite: Gen. Psych. 201)
370 School and Society 3 hrs.
390 High School Curriculum 3 hrs.
450 Methods of Teaching in High School 3 hrs.
or -
451 Special Methods of Teaching 3 hrs.
480 Student Teaching 9 hrs.

24 hrs.

2. Two electives from the following courses:

313 Educational Psychology 3 hrs.
343 Human Growth & Development 3 hrs.
401 History & Philosophy of Education 3 hrs.
402 School Organization & Administration 3 hrs.
430 Audio-Visual Aids 3 hrs.
440 Special Problems in Teacher Educ. 1-3 hrs.
460 Evaluation & Measurements 3 hrs.

TOTAL 30 hrs.
EDUCATION

PROFESSOR JONES (Chairman)
PROFESSOR HANSON
PROFESSOR BEHRENS
PROFESSOR SPENCER
ASSISTANT PROFESSOR MACNAUGHTON
ASSISTANT PROFESSOR EARL
ASSISTANT PROFESSOR VAN ATTA
ASSISTANT PROFESSOR RUBECK
ASSISTANT PROFESSOR ELLERY

The Teacher Education Program is designed primarily to aid present and prospective teachers in helping themselves, children and youth identify and meet more effectively their physical, mental, social, personal, and spiritual needs. It is realized that self-improvement will occur among Education students as they develop successful techniques in the promotion of the learning process, and acquire useful knowledge that they can impart to others.

Experiences in working with children and youth in varied situations are provided that enable education students to relate theory to practice and to use content in the actual solving of significant problems of living. Evaluating education in terms of human growth and development is stressed.

To realize the objectives of the Department, public school experiences are utilized.

OBJECTIVES FOR THE DEPARTMENT OF EDUCATION

The primary purpose of the Department of Education at Ohio Northern University is to prepare the professional teacher of highest quality.

To achieve this purpose, the Department of Education endeavors to develop a teacher who

1. possesses a broad background of knowledge and appreciation gained from a study of the humanities, the social sciences, the natural sciences and mathematics.
2. possesses a high degree of competence in his teaching field.
3. possesses the qualifications necessary for teaching and understands the opportunities in education.
4. demonstrates sound principles of human growth and development and the learning process in the teaching situation.
5. manifests understanding of the curriculum, function and organization of the school in a democratic society.
6. demonstrates competence in appropriate methods, techniques, and the use of instructional materials essential for effective teaching and working with children.
7. reveals professional attitudes and values appropriate to the teacher in a democratic society.
GENERAL COURSES

121. INTRODUCTION TO EDUCATION 3 hours
This course is designed to acquaint students with the teaching profession, its requirements, opportunities, and problems. Special emphasis is placed on the nature and function of our educational system. (Required of all students in the Division of Teacher Education).

313. EDUCATIONAL PSYCHOLOGY 3 hours
A study of the learning process and conditions that promote learning.
Prerequisite: Psychology 201 or permission of the instructor.

401. HISTORY AND PHILOSOPHY OF EDUCATION 3 hours
This course is designed to promote a better understanding of modern educational practice through a study of historical changes in instructional processes and ideas. Emphasis is placed upon the study of educational beliefs and points of view in an attempt to foster critical thinking which will lead to a clearer understanding of the purpose of Education in American Democracy.

402. SCHOOL ADMINISTRATION AND ORGANIZATION 3 hours
A course designed to present the scope and general character of the American public school system, its organization and administrative units and other agencies through which it is managed, and the administrative tasks for which a classroom teacher is responsible.

420. CURRICULUM IMPROVEMENT 3 hours
Designed primarily for students who wish to work on individual and group problems growing out of their own school situations.

430. AUDIO-VISUAL AIDS IN EDUCATION 3 hours
A study of audio and visual materials and their uses in the promotion of the learning process.

440. PROBLEMS IN TEACHER EDUCATION 1-3 hours
This course provides for individual study, investigation, and research in the field of professional teacher education. Open to qualified seniors with approval of the department chairman.

460. EVALUATION AND MEASUREMENT OF PUPIL PROGRESS 3 hours
A study of the basic problems of evaluation and measurement as they apply to instruction; construction of tests for use in the classroom and a survey of standardized tests and their uses.

ELEMENTARY EDUCATION COURSE DESCRIPTION

223. CHILD DEVELOPMENT 3 hours
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.
(Prerequisite: Psychology 201)
233. **Children's Literature**

A study of the best of literature for elementary school children; the place of literature in the education of the child; principles involved in the teaching of literature with stress on its integration with other school activities.

3 hours

252. **Teaching Arithmetic**

Methods and principles underlying the teaching of arithmetic in the elementary grades; diagnosis and remedial work; preparation and evaluation of materials of instruction.

(Prerequisite: Math 111 and 112).

3 hours

283. **Teaching of Science for the Elementary Teacher**

Content, methods and principles underlying the teaching of Science in the elementary grades. Special emphasis will be given to the organization and the use of materials in the teaching of elementary science.

3 hours

301. **The Elementary School Curriculum**

Designed to help students develop learning situations in the classroom that are in harmony with basic psychological principles of learning with special emphasis on the objectives of elementary education.

3 hours

310. **Reading Improvement**

Promotes understanding of the reading process and provides experiences that aid in comprehension and speed through a study of basic reading skills; the mechanics of reading, causes of difficulties; prevention and treatment of individual problems; and evaluation of progress in reading.

3 hours

311. **Teaching of the Social Studies in the Elementary School**

Objectives, methods, modern tendencies and evaluation in history, geography, civics, and related fields, planning of experience units and materials of instruction.

3 hours

312. **Teaching of Language Arts in Elementary School**

Problems and methods of teaching oral and written expression, handwriting and spelling and their relation to other subjects in the curriculum. Attention is given to the organization and administration of a functional language arts program.

3 hours

330. **Kindergarten Methods and Materials**

A study of programs and practices in the kindergarten of four and five-year-olds. Open to advanced students in education and by special permission. Given upon sufficient demand.

3 hours

340. **Primary Methods and Materials**

Study of programs and practices in the primary grades required of all students who are candidates for the Kindergarten-Primary Certificate.

3 hours

350A. **Primary Music Methods**

The study of music techniques, teaching procedures, and the use of ma-
terials in the primary grades. This course is designed for music teachers and supervisors.

340B. INTERMEDIATE MUSIC METHODS 3 hours
The study of music techniques, teaching procedures, and the use of materials in the intermediate grades. This course is designed for music teachers and supervisors.

341. TEACHING OF READING 3 hours
Principles and techniques of teaching reading in the elementary grades. Attention will be given to reading readiness, phonics, oral and silent reading, diagnostic and remedial measures, evaluation of textbooks and tests. (Formerly 241).

470. STUDENT TEACHING IN THE ELEMENTARY GRADES 15 hours
The work consists of planning and teaching under supervision in the elementary grades. An integral part of student teaching is the seminar held an average of once a week on the campus. Problems of mutual concern, procedures, acquaintance with pertinent literature and materials in the field comprise this phase of the program. The following prerequisites are required: (1) senior rank; (2) have a scholarship average of 2.25 or higher in education courses with no grade in any course lower than "C." In case of students preparing for the Dual Certificate, a scholarship average of 2.25 or higher in required courses in the subject sequence with no grade lower than "C"; (3) must possess a desirable teaching personality including such traits as interest in teaching, social adaptability, the ability to get along with people, responsibility and high moral standards; (4) must demonstrate effective communicative skills in speaking and writing; (5) approved by the Director of Teacher Education. (Formerly 380).

SECONDARY EDUCATION COURSE DESCRIPTION

333. ADOLESCENT GROWTH AND DEVELOPMENT 3 hours
A study of the adolescent, his physical, social, emotional, and intellectual development. Special emphasis is placed on deriving an accurate picture of the adolescent growth and development in accordance with his genetic constitution and the various environmental forces that have affected him from birth.

(Prerequisite: Psychology 201).

343. HUMAN GROWTH AND DEVELOPMENT 3 hours
Required of secondary education majors. This is parallel to Education 223, which is required of all majors in elementary education. A study of the social and developmental factors underlying high school instruction.

370. SCHOOL AND SOCIETY 3 hours
A study of schools in relation to their supporting society; the meaning of democracy in its relation to public schools; the responsibilities of educators
to the community as well as to the school itself; the nature, type, and limitations of both the official and unofficial controls of the public school.

390. **THE HIGH SCHOOL CURRICULUM**

A study of secondary school curriculum practices, instructional materials, curriculum development, curriculum changes and trends.

3 hours

433. **DRIVER EDUCATION**

A course designed for those who plan to teach driving in the public schools. The course will consist of a number of classes and driving demonstrations daily. No other course can be taken concurrently. The credit will be approximately 1½ hours per week of instruction. (Formerly 450).

3 hours

450. **TEACHING METHODS IN THE SECONDARY SCHOOL**

An analysis of the methods, devices, and techniques which are most effective in directing learning in the various subject areas at the high school level. Emphasis upon cooperative learning, activities, understanding the student, the core curriculum, television in learning, instructional planning and other new developments in teaching practices. Observations and evaluations of actual classroom situations as well as laboratory practice within the class are included. (Formerly 350).

3 hours

451. **TEACHING METHODS IN SPECIAL HIGH SCHOOL TEACHING AREAS**

Similar to Education 450 except emphasis is concentrated upon the student's major teaching area. As in Education 450, observation and evaluation of actual classroom situations are required.

3 hours

480. **STUDENT TEACHING—JUNIOR AND SENIOR HIGH SCHOOL**

To be eligible for student teaching the candidate must:

1. have senior rank
2. have a cumulative scholarship average of 2.25
3. have a scholarship average of 2.25 or higher in education courses with no grade in any course lower than "C". In case of students preparing to teach at the secondary level, a scholarship average of 2.25 or higher in required courses in the subject matter sequence with no grade lower than "C".
4. have completed or be in the process of completing the following courses, preferably in order of this listing:
   a. Introduction to Education
   b. Human Growth & Development (prerequisite: General Psychology 201)
   c. School and Society
   d. High School Curriculum
   e. Special Methods or High School Methods
5. teach either in his major or minor teaching field
6. must possess a desirable teaching personality, including
such traits as interest in teaching, social adaptability, the ability to get along with people, responsibility and high moral standards
7. must demonstrate effective communicative skills in speaking and writing
8. be approved by the Director of Teacher Education and by the chairman of his department.

The work consists of planning and teaching under supervision in the junior or senior high school one-half day, five days per week for one quarter and an average of one hour per week with supervision on the campus.

ENGLISH, SPEECH, AND THEATRE

ASSOCIATE PROFESSOR DORNBUSCH (Chairman)
ASSOCIATE PROFESSOR PRICE
ASSOCIATE PROFESSOR BARTLETT
ASSOCIATE PROFESSOR HASTINGS
ASSISTANT PROFESSOR GERDES, ASSISTANT PROFESSOR SPELMAN
ASSISTANT PROFESSOR BENNETT
ASSISTANT PROFESSOR BELCH
MR. MYERS.

OBJECTIVES

The courses in Language, Literature, Speech, and Theatre are designed (1) to develop the student's skill in writing and in oral communication so that he may express his ideas clearly and effectively and thus better participate as an active member in a democratic community; (2) to give the student a knowledge of literature so that he may read with critical ability, understanding, and appreciation; (3) to give the student a fundamental knowledge and understanding of the nature of language; (4) to provide the opportunity for the student to experience a variety of speech and theatre activities which may make a direct contribution to satisfactory living; (5) to offer advanced work to those who plan to teach in the public schools and to those who plan to continue specialization in graduate study.

CLASSIFICATION OF COURSES

Classification of courses within the department is shown by the middle digit of the course number: 0-3, Literature; 4-5, Language; 6-7, Speech; 8-9, Theatre. For example, 322 is a Literature course, 253 is a Language course, 371 is a Speech course, 483 is a Theatre course, and so forth.

FIELDS OF CONCENTRATION

The Department of English, Speech, and Theatre offers three fields of concentration, as follows:
General Requirements: Of the required number of hours for the concentration at least eighteen must be from the Language and Literature classification and at least twenty-seven must be on the 300-400 level. All three concentrations require two years of a modern foreign language (two years in high school being considered the equivalent of one year in college). The English Composition sequence (C-1, 2, 3), Basic Speech (S-1, 2, 3), and Theatre Workshop (280) do not count toward a concentration. No course with a grade below C may be counted toward a concentration.

English: For a field of concentration (major) in English the following courses are required: English 211, 212, 213, American Literature; English 201, 202, 203, English Literature; Speech 262, Oral Interpretation; Theatre 283, Acting Fundamentals; English 322, Chaucer; English 351 or 352, Language Study; Shakespeare, 3 hours; English 340, Creative Writing 3 hours, or English 350, Advanced Composition, 3 hours, or Journalism, 3 hours. Additional courses from the Language and Literature classifications must be selected to complete a minimum of forty-two hours. Two years of a modern foreign language and one year of English History are also required.

Speech: For a field of concentration in speech, the following courses are required: Speech 271, Elements of Speech; English 331, 332, 333, The Drama; English 351, Language Study; Speech 371, Debate; Speech 372, Advanced Public Speaking; and Speech 373, Discussion. Additional courses must be selected from the departmental offerings to complete at least eighteen hours in the Language and Literature classifications and at least twenty-seven hours in the Speech classification. In addition to the forty-five hours within the department, two years of a modern foreign language are required.

Theatre: For a field of concentration in theatre, the following courses are required: Theatre 291, 292, 293, Introduction to Theatre, Theatre History; Theatre 381, 382, 383, Theatre Techniques; and Theatre 481, 482, 483, Play Production. Additional courses must be selected from the departmental offerings to complete forty-five hours in Theatre and Speech; of these forty-five hours, at least twenty-seven must be in Theatre (the remaining eighteen hours may be in either Theatre or Speech). In addition to the forty-five hours of the concentration, nine hours of dramatic literature beyond the liberal arts general literature requirement and two years of a modern foreign language are required.

ENGLISH COURSES

C-263. COMPOSITION 9 hours

These three quarters, constituting a year's work for the freshman, are designed to develop the student's skill in writing. All three quarters or their equivalent are required for graduation.
201, 202, 203. **INTRODUCTION TO ENGLISH LITERATURE** 9 hours
In these three quarters some of the principal works of the major English writers are studied. English 201, 202, 203 are required for a concentration in English.

211, 212, 213. **AMERICAN LITERATURE** 9 hours
In these three quarters some of the principal works of the major American writers are studied. English 211, 212, 213 are required for a concentration in English.

241-242-243. **JOURNALISM** 9 hours
This is a practical course providing basic instruction in newspaper organization, procedures, and techniques. Students work closely with or are members of the staff of the *Northern Review*. Credit is three hours per quarter for students who participate in the laboratory held on alternate Sunday afternoons at the printer’s, two hours for those who do not.

253. **VOCABULARY STUDY** 2 hours
This course, which meets three hours per week and is open to all students (freshman through senior rank) without prerequisite, consists of a systematic study of English vocabulary with a view both to enlarging and enriching the student’s store of words and to developing his precise and effective use of them.

**PREREQUISITES FOR ADVANCED LITERATURE COURSES**

*Nine hours of Introduction to English Literature (English 201, 202, 203) and/or American Literature (English 211, 212, 213) or consent of the Instructor are required for admission to any 300-400 level literature course. In all sequential courses (as shown by hyphens joining the course numbers) each quarter is the prerequisite for the following quarter.*

301, 302, 303. **THE NOVEL** 9 hours
In this study of the development of the novel from the eighteenth century to the present, some of the more significant works of the major novelists are read and analyzed.

311-312-313. **SHAKESPEARE** 9 hours
The early comedies and histories are studied in the first quarter, and some attention is also given to the poet’s life and the medium in which he worked. In the second quarter the sonnets, the later histories, the early tragedies, and the foremost comedies are treated. In the final quarter the realistic comedies, the later tragedies, and the dramatic romances are studied. At least one quarter is required for a concentration in English.

*Prerequisites:* English 311 or consent of the Instructor for 312; English 312 or consent of the instructor for 313.

320. **THE SHORT STORY** 3 hours
A number of the works of the master short story writers are read and
studied. Particular emphasis is placed on acquiring an understanding and appreciation of the short story as a literary form, its techniques, and its advantages and limitations as a means of artistic expression.

322. CHAUCER

*The Canterbury Tales* and some of the shorter poems are read. The lingual, social, and historical backgrounds of the poems are also treated. English 322 is required for a concentration in English.

331-332-333. THE DRAMA

In the first quarter the student is introduced to the aims and special techniques and characteristics of the drama as an art form. Illustrative plays are studied, beginning with simpler and progressing during the year to more mature types, with emphasis in the third quarter on plays in the more complex tragic mode. Most of the plays studied are from the modern theatre. All three quarters are required for a concentration in Speech.

Prerequisites: English 331 or consent of the Instructor for 332; English 332 or consent of the Instructor for 333.

340. CREATIVE WRITING

In this course students are encouraged to discover and develop their abilities in imaginative and personal writing—verse, fiction, plays—by means of individually directed study of and self-expression in these forms. Writing is supplemented by class discussion and private conferences with the Instructor.

Enrollment is limited and admission is only with approval of the Instructor. A maximum of nine hours of credit is permitted.

350. ADVANCED COMPOSITION

The emphasis in this course is on clear, effective expository writing with particular attention to content and style. The student's mastery of the fundamentals of English grammar and mechanics is assumed (a quality-point average of at least 2.3 in freshman English is recommended).

Enrollment is limited and admission is only with approval of the Instructor. A maximum of nine hours of credit is permitted.

351, 352. LANGUAGE STUDY

This is an introductory study from a scientific viewpoint of the sounds and grammar of the English language. Particular emphasis is on modern English and the American dialects. English 351 or 352 is required for a concentration in English or in Speech.

401, 402, 403. WORLD LITERATURE

In the first quarter the masterpieces of Greek and Roman writers are studied. In the second quarter some of the principal works of the major Italian, Spanish, German, and French writers from the Middle Ages to the middle of the eighteenth century are treated. Some of the principal works of the major German, French, Norwegian, and Russian writers from the
middle of the eighteenth century to the present day are studied in the final quarter. All works are read in English translation.

411, 412, 413. ADVANCED AMERICAN LITERATURE 9 hours
The major works of the principal American writers from the Colonial period to the present are studied, with attention also to literary movements and the cultural and historical backgrounds of these works. Emphasis is on Emerson, Thoreau, Hawthorne, Poe, Melville, Whitman, Twain, Dickinson, and James, as well as several of the best-known figures of recent years, such as O'Neill, Hemingway, and Frost.

421. RESTORATION AND EIGHTEENTH CENTURY 3 hours
The major works of several of the British writers of the neo-classical period, 1660-1800, are studied intensively, with particular emphasis on Dryden, Swift, Addison and Steele, Pope, and Johnson and Boswell.

422. THE ROMANTIC PERIOD 3 hours
Some works of the leading poets and prose writers of the Romantic Period are studied.

423. MODERN POETRY 3 hours
The works of the major twentieth-century poets writing in English are studied.

433. THE VICTORIAN PERIOD 3 hours
The works of Tennyson, Browning and other writers of the Victorian Period are studied.

440. SEMINAR: LANGUAGE AND LITERATURE 1-3 hours
Qualified seniors concentrating in English may undertake an individual research project supervised by a member of the department. A maximum of three hours of credit is permitted.

Prerequisites: English C-3 at this University or approval of the department chairman upon special recommendation by the member of the department who will supervise the project.

SPEECH COURSES

160. SPEECH IMPROVEMENT 3 hours
Materials are developed for the individual to aid students with personal articulation, voice, rhythm, hearing, or symbol problems.

Prerequisites: Admission by consent of the Instructor.

260. SPEECH RE-EDUCATION 3 hours
A course devoted to the study of speech disorders; the materials of this unit are developed from the point of view of the elementary and secondary school teacher.

261. VOICE AND DICTION 3 hours
262. ORAL INTERPRETATION
3 hours
The development of expressive and modulated individual speech is stressed; the literature of and for personal expression is studied. Speech 262 is required for a concentration in English.
Prerequisites: Speech 261 or consent of the Instructor for 262.

271, 272, 273. PUBLIC SPEAKING
9 hours
The nature and philosophy of oral communication in the various areas of speech are explored; the principles and practices of public speaking in contemporary life are developed and executed. Speech 271 is required for a concentration in Speech.
Prerequisites: Speech 271 or the equivalent for 272; Speech 272 or the equivalent for 273.

360. ADVANCED SPEECH RE-EDUCATION
3 hours
The work of Speech 260 is continued with further exploration of the nature and rehabilitation of speech disorders; and opportunity is presented for each student to assist with a clinical problem.
Prerequisites: Speech 260 or the equivalent.

371. DEBATE
3 hours

372. ADVANCED PUBLIC SPEAKING
3 hours

373. DISCUSSION
3 hours
The function and place of public debate, public speaking, and public discussion in a democratic society are examined; opportunities for intercollegiate participation in the various areas are presented. Speech 371, 372, and 373 are required for a concentration in Speech.

470. SEMINAR: SPEECH
Qualified seniors concentrating in Speech may undertake an individual research project supervised by a member of the department. A maximum of three hours of credit is permitted.
Prerequisites: English C-3 at this University or approval by the department chairman upon special recommendation by the member of the department who will supervise the project.

THEATRE COURSES

280. THEATRE WORKSHOP
1 hour
The work of the sequence is directly related to the production schedule of the Northern Players and Theta Alpha Phi. A maximum of six hours of credit is permitted.

283. ACTING FUNDAMENTALS
3 hours
This course is designed to follow the two vocal expression courses, Speech 261 (Voice and Diction) and Speech 262 (Oral Interpretation), with the
addition of physical expression through movement and gesture. The basic
theories and techniques of acting and makeup also are explored, with
emphasis upon individual growth.
Prerequisites: Speech 261 and 262 or consent of the Instructor.

290. RADIO WORKSHOP
1 hour
The work of the sequence is directly related to the current university
radio and television programs. A maximum of six hours of credit is
permitted.

291. INTRODUCTION TO THEATRE
3 hours
An audience-centered survey of theatrical theories and techniques designed
to aid the student in establishing high standards of judgment and criticism
in all aspects of production in the three primary dramatic mediums (theatre,
cinema, television). Each aspect of the theatre experience will be analyzed
with more complete enjoyment and appreciation through better understand-
ing as the primary goal. Theatre 291 is required for concentration in
Theatre. (This course counts toward the liberal arts requirement of two
quarters in art, music, and theatre).

292, 293. THEATRE HISTORY
6 hours
A history of the theatre from its beginning in primitive man to the
present. Primary emphasis will be on the development of the physical
theatre, with secondary emphasis on the plays evolving from each period. The
first term will cover the periods from the beginnings of the eighteenth
century, the second term from the eighteenth century to the present, with
attention also to the oriental theatre. Each term is a self-contained unit,
though both are recommended if full value is to be acquired. Theatre 292
and 293 are required for a concentration in Theatre.

381, 382, 383. THEATRE TECHNIQUES
9 hours
The first unit presents the basic considerations for good directing; the
second unit is devoted to stagecraft; the third unit presents the fundamentals
of design. Theatre 381, 382, and 383 are required for a concentration in
Theatre.
Prerequisites: Theatre 381 or consent of the Instructor for 382; Theatre
382 or consent of the Instructor for 383.

391. ADVANCED DICATION AND DIALECTS
3 hours
This course is designed to develop a high standard of competence in the
use of the spoken English language and to develop the necessary vocal
flexibility for dialect, verse, and period drama.
Prerequisites: Theatre 283 or consent of the Instructor.

392. CHARACTERIZATION DEVELOPMENT
3 hours
This course presents a detailed study of the theory of acting. Emphasis is
upon the development of depth and insight into individual characterizations
chosen from the world's great dramatic literature.
Prerequisites: Theatre 391 or consent of the Instructor.
393. **Styles and Periods** 3 hours

This course comprises a thorough study of style and period in acting. Emphasis is on ensemble performance.

**Prerequisites:** Theatre 392 or consent of the Instructor.

480. **Seminar: Theatre** 1-3 hours

Qualified seniors concentrating in theatre may undertake an individual research project supervised by a member of the Department. A maximum of three hours of credit is permitted.

**Prerequisites:** English C-3 at this University or approval by the department chairman upon special recommendation by the member of the department who will supervise the project.

481-482-483. **Play Production** 9 hours

Unit one of this sequence considers the elements of expressive design in settings, lights, costumes, and movement; unit two provides advanced work in the theories and techniques of directing; unit three develops the many-faceted duties and responsibilities of the producer-director. Theatre 481, 482, and 483 are required for a concentration in theatre.

**Prerequisites:** Theatre 381, 382, and 383 or the equivalent for 481; Theatre 481 for 482; Theatre 482 for 483.

490. **Theatre Projects** 1-9 hours

The purpose of a theatre project is to give advanced training in an area of special interest or need to senior students concentrating in theatre. The five areas and their prerequisites are as follows:

1. **Design:** *prerequisite:* Theatre 381-2-3 or the equivalent.
2. **Directing:** *prerequisite:* Theatre 381-2-3 or the equivalent.
3. **Acting:** *prerequisite:* Speech 261-2 and Theatre 283 or the equivalent.
4. **History and/or Criticism:** *prerequisite:* Theatre 291-2-3 or English 331-2-3 or the equivalent.
5. **Playwriting:** *prerequisite:* Theatre 291 or the equivalent.

Permission of the Instructor must be obtained for any project. The choice of area, scope of project, and credit to be earned will be determined in conference with the Director of Theatre. The student must have demonstrated to the satisfaction of the Director of Theatre, through participation in the theatre program, his ability to complete the proposed project. Upperclassmen who are not concentrating in theatre but who meet the prerequisites may elect a project by obtaining permission of the Department Chairman and the Director of Theatre.

A maximum of nine quarter hours is permitted, with not more than six hours in any one quarter.
FOREIGN LANGUAGES

Professor Schmitz (Chairman), Associate Professor Gminder, Assistant Professor Elias, Mr. Judd

The ultimate educational value of knowing foreign languages and literature is that it helps the student to cultivate a greater breadth and comprehensiveness of thought, to arrive at a more thorough understanding of a foreign culture, and to lead to a deeper knowledge of the English language and the American cultural heritage.

The various courses in French, German, Spanish, and Russian are designed to meet both practical and cultural needs, promoting proficiency in understanding, speaking, reading and writing the foreign language. Emphasis is placed on a comprehension of the spoken language and the development of a speaking knowledge. All courses are conducted for the most part in the foreign language, and lectures, discussions and written work in the majority of the courses are carried on in the foreign language, so that linguistic proficiency may be acquired along with the study of literature. The department considers a thorough mastery of the language as the indispensable basis for an objective, intelligent, and significant understanding and interpretation of literature.

The Thomas R. Schoonover Laboratory (with master-tapes, pre-recorded tapes and discs) provides opportunities for practice with tape recorders in 24 semi-soundproof booths, and extends the contact of the student with a living language, aiming at a maximum of active participation; offering recorded materials which have been carefully prepared as an adjunct to class work, interrelated and coordinated with class instruction; rendering ample opportunity for aural comprehension, auditory-visual drill, speaking, simultaneous and consecutive interpreting, and self-correction.

Elementary and intermediate courses in French, German, Spanish, and Russian may be counted as Upper Division courses if taken during the junior or senior year. Courses conducted entirely in English cannot be counted toward the major.

Students with two years of high school preparation in a foreign language should begin with an intermediate course; those with more than two years should take a placement examination, and may be permitted to take a 300 level course, if approved by the head of the foreign language department.

Requirements for a major in a foreign language:

Prerequisite: Course 101-102-103 or two units of high school instruction in a foreign language.
Major: 45 hours.

For students desiring to take a field of concentration in either French, German, Spanish or Russian, the following courses are required:

French: 201-202-203; 301-302-303; 311-312-313; 401-402-403.
German:  201-202-203; or 221-222-223; 301-302-303; 311-312-313; 401-402-403.

Spanish:  201-202-203; 301-302-303; 311-312-313; or 321-322-323; 401-402-403.

Russian:  201-202-203; or 221-222-223; 301-302-303; 311-312-313; 401-402-403.

All students majoring in a foreign language are urged to spend their junior year studying in a foreign country under conditions compatible with their major and conducive to gaining spoken and written mastery of the language studied. The Department of Foreign Languages will provide assistance in placing the student in a foreign university.

Students returning from any period of foreign study may be required to take an oral or written examination (or both, at the discretion of the Dean of the College), for the purpose of determining the credits to be granted.

FRENCH

101-102-103. ELEMENTARY FRENCH  12 hours
The aim is to develop the ability to understand, speak, read, and write French. Stress on functional, rather than formal grammar. Special emphasis on early and fluent speaking. Elementary reading based on French life, customs and manners. Three hours of class and two scheduled laboratory practices a week.

201-202-203. INTERMEDIATE FRENCH  12 hours
A systematic 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. Regular use made of film strips, slides and motion pictures with French sound tracks. Three class periods and two scheduled laboratory practices a week.
Prerequisite: 101-103, or two years of high school instruction in French.

291. FRENCH CULTURAL DEVELOPMENTS  3 hours
A survey of the outstanding contributions of France to the cultural heritage of the western world in the visual arts, music, theatre and literature, with special emphasis on the interrelationships of these arts. Many audio-visual aids are employed to concretize the subject matter presented, such as moving pictures, color slides, film strips and recordings.

The course is conducted entirely in ENGLISH and counts toward the Humanities requirement of two quarters in Art, Music, Theatre or Foreign Cultural Developments. Does not count toward a department major in French. Open to all students.

301, 302, 303. ADVANCED FRENCH CONVERSATION AND COMPOSITION  12 hours
Based on a wide range of topics dealing with France and the French-speaking peoples. The aim is to develop both a useful command of the language and an appreciation of French civilization. Recorded conversational dialogues on a variety of topics useful to the student or traveler in France, films and slides, and current French periodicals are used and discussed. Three class periods and two hours of scheduled laboratory.

Prerequisite: 201-203.

311-312-313. SURVEY OF FRENCH LITERATURE 9 hours
A study of the main currents and characteristic monuments of French literature. Class discussions based on the reading of representative French masterpieces. Lectures and reports.

Prerequisite: French 201-203, 301-303, or the consent of the instructor.

401-402-403. CIVILISATION FRANCAISE 9 hours
A survey of the history of France, its topography, industries, government, educational system, journalism, etc.
The course, given entirely in French, is required of all French majors.
Prerequisite: French 301-303, or consent of instructor.

440. FRENCH SEMINAR 3 hours
For seniors majoring in French. May be repeated up to 6 hours.

GERMAN

101-102-103. ELEMENTARY GERMAN 12 hours
The aim is to develop the ability to understand, speak, read, and write German. Stress on functional, rather than formal grammar. Special emphasis on early and fluent speaking. Elementary reading based on German life, customs, and manners. Three class hours and two periods of scheduled laboratory practice a week.

201-202-203. INTERMEDIATE GERMAN 12 hours
A systematic review of the fundamentals of grammar, pronunciation, vocabulary and idioms. Abundant conversational practice and composition based on short stories, plays, and poetry. Occasional lectures on German life, history, civilization, art, music, etc., illustrated with slides, film strips and motion pictures with German sound tracks. Three class periods and two hours of scheduled laboratory practice a week.

Prerequisite: German 101-103 or two years of high school instruction in German.

221-222-223. SCIENTIFIC GERMAN 9 hours
The objective is to enable the student to use German in professional or graduate work. The technique of reading advanced German and its application; practice in intensive and extensive reading of material. Emphasis on special needs and interests of each individual student according to his field of study. German technical magazines and books are used.
Prerequisite: German 101-103, or two years of high school instruction in German.

291. GERMANIC CULTURAL DEVELOPMENTS 3 hours
A survey of the outstanding contributions of Germanic countries to the cultural heritage of the Western world in the visual arts, music, theatre and literature, with special emphasis on the interrelationships of these arts. Many audio-visual aids are employed to concretize the subject matter presented, such as moving pictures, color slides, film strips and recordings.

The course is conducted entirely in English and counts toward the Humanities requirement of two quarters in Art, Music, Theatre, or Foreign Cultural Developments. Does not count toward a departmental major in German. Open to all students.

301, 302, 303. GERMAN CONVERSATION AND COMPOSITION 12 hours
Based on a wide range of topics dealing with Germany. The aim is 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. Three class periods and two hours of scheduled laboratory practice a week.

Prerequisite: German 101-103, 201-203, or 221-223.

311, 312, 313. SURVEY OF GERMAN LITERATURE 9 hours
Basic monuments of German literature from the earliest times to the present. Lectures, class discussions, reading of representative masterpieces, reports.

Prerequisite: German 201-203, 301-303, or the consent of the instructor.

401, 402, 403. DEUTSCHE KULTURGESCHICHTE 9 hours
The course, given entirely in German, presents an integrated picture of the political, economic, social, and cultural forces which have shaped Germany, and is required of all German majors.

Prerequisite: German 201-203, 301-303, 331-333.

440. GERMAN SEMINAR 3 hours
For seniors majoring in German. May be repeated up to 6 hours.

SPANISH

101-102-103. ELEMENTARY SPANISH 12 hours
The aim is to develop the ability to understand, speak, read, and write Spanish. Stress on functional, rather than formal grammar. Special emphasis on early and fluent speaking. Elementary reading based on Spanish life, customs and manners, using materials dealing with Spain, Mexico and South America. Three class periods and two scheduled laboratory practices.

201-202-203. INTERMEDIATE SPANISH 12 hours
To improve aural-oral skills. Includes a systematic review of the fundamentals of grammar and pronunciation, and abundant conversational practice and composition based on short stories, plays and poetry, and on current periodicals. Occasional lectures in Spanish on Spanish life, history, arts, crafts, and civilization, illustrated with film strips, slides, photographs and reproductions, and realia. Three class periods and two scheduled laboratory practices.

**Prerequisite:** Spanish 101-103, or two years of high school instruction in Spanish.

291. **Hispanic Cultural Developments** 3 hours
A survey, in English, of the outstanding contributions of Spain and Spanish America to the cultural heritage of the western world, with special attention to the fine arts, music, theatre and literature, and the interrelationships of the arts. Use of photographs and reproductions, color slides, film strips, motion pictures, recordings.

This course counts toward the Humanities requirement of two quarters in Art, Music, Theatre, or Foreign Cultural Developments. Does not count toward a departmental major in Spanish. Open to all students.

301, 302, 303. **Spanish Conversation and Composition** 12 hours
Based on a wide range of topics dealing with Spain and the Spanish-speaking world. The aim is to develop both a useful command of the language and an appreciation of Spanish civilization. Recorded conversational dialogues on a variety of topics useful to the student or traveler in Spain, Mexico and Latin America, films, slides, and current periodicals are used and discussed. A study of commercial Spanish, and practice in correspondence, especially useful to students in the Department of Economics and Business Administration. Three class periods and two hours of scheduled laboratory practice.

**Prerequisite:** Spanish 201-203, 301-303.

311, 312, 313. **Survey of Spanish Literature** 9 hours
A study of the background, main trends and chief authors in the literature of Spain from the beginnings to the present, with special emphasis on the Golden Age. Discussions, readings and reports.

**Prerequisite:** Spanish 201-203, 301-303, or the consent of the instructor.

321, 322, 323. **Spanish American Literature** 9 hours
Main currents of Spanish-American literature with relation to their European background.

**Prerequisite:** Spanish 201-203, or the consent of the instructor.

401, 402, 403. **Civilizacion Hispanica** 9 hours
This course, given entirely in Spanish, presents an integrated picture of the political, economic, social, geographical and cultural forces which have shaped Spain and Hispanic America, and is required of all Spanish majors.

**Prerequisite:** Spanish 301-302-303, and consent of instructor.
440. **SPANISH SEMINAR**  
For seniors majoring in Spanish. May be repeated up to 6 hours.

**RUSSIAN**

101-102-103. **ELEMENTARY RUSSIAN**  
12 hours  
Ear training leading to instantaneous aural comprehension. Oral structural drill in basic grammatical patterns. Elementary reading based on drill in basic grammatical patterns. Elementary reading based on Russian life, customs and manners. Simple conversation based on practical, every-day situations. *Three class periods and two hours of scheduled laboratory practice a week.*

201-202-203. **INTERMEDIATE RUSSIAN**  
12 hours  
Oral grammatical review, and conversational practice. Advanced reading (short stories, plays, Russian history and easy science material). Occasional lectures on Russian life, history, art and civilization. Regular use made of film strips and slides. *Three class periods and two hours of scheduled laboratory practice a week.*  
**Prerequisite:** Russian 101-103.

221-222-223. **SCIENTIFIC RUSSIAN**  
9 hours  
The objective is to enable the student to use Russian in professional or graduate work. The technique of reading advanced Russian and its application; practice in intensive and extensive reading of scientific material. Emphasis on special needs and interests of each individual student according to his field of study. Russian technical periodicals and books are used.  
**Prerequisite:** Russian 101-103.

291. **RUSSIAN CULTURAL DEVELOPMENTS**  
3 hours  
A survey of the outstanding contributions of Russia to the cultural heritage of the western world in the visual arts, music, theatre and literature, with special emphasis on the interrelationships of these arts. Many audio-visual aids are employed to illustrate the subject matter presented, such as moving pictures, color slides, film strips and recordings.  
The course is conducted entirely in English and counts toward the Humanities requirement of two quarters in Art, Music, Theatre or Foreign Cultural Developments. Does not count toward a departmental major in Russian. Open to all students.

301-302-303. **RUSSIAN CONVERSATION AND COMPOSITION**  
12 hours  
Based on a wide range of topics dealing with Russia. The aim is to develop both a useful command of oral and written idiomatic Russian language, and an appreciation of Russian civilization. Recorded conversational dialogues on a variety of topics to acquaint the student with Russian life, customs and geography. Films, slides and current Soviet periodicals are used.
and discussed. Three class periods and two hours of scheduled laboratory practice a week.

**Prerequisite:** Russian 101-103, 201-203, or 221-223.

**311, 312, 313. SURVEY OF RUSSIAN LITERATURE 9 hours**

Basic monuments of Russian literature from the Kiev period to the present, with special emphasis on the major classics of the nineteenth century. Class discussions based on the reading of representative Russian masterpieces. Lectures and reports.

**Prerequisite:** Russian 201-203, 301-303, or the consent of the instructor.

**401-402-403. RUSSIAN CIVILIZATION 9 hours**

A study of Russian life: intellectual, social and cultural, with emphasis on the modern period. A survey of Russian political and cultural history from the foundation of the Russian State to the fall of the Tsarist regime. The historical background of the Russian Revolution of 1917 and the basic features of Marxism-Leninism, followed by a comprehensive study of the political, economic and cultural aspects of Soviet life. The course is given in Russian, illustrated by slides, films and music recordings, and is required of all Russian majors.

**Prerequisite:** Russian 201-203, 301-303, 311-313.

**460. RUSSIAN SEMINAR 3 hours**

For seniors majoring in Russian. Research or special projects in Russian linguistics, literature or civilization. May be repeated up to 6 hours.

**CLASSICAL GREEK.**

**101-102-103. FIRST YEAR GREEK 9 hours**

The aim of this course is to develop the ability to read, understand, and translate classical Greek through an adequate grasp of the structure of this highly inflected language. Selected readings from Greek prose writers.

**201-202-203. SECOND YEAR GREEK 9 hours**

The objective is to develop the student's skill in interpreting Greek prose and poetry from the classical period. Further elaboration of points of grammar and syntax arising from the reading material. Occasional lectures on Greek civilization illustrated with slides.

**LATIN.**

**101-102-103. ELEMENTARY LATIN 9 hours**

The course is designed for those students who have not had Latin in high school. Given upon sufficient demand.

**201-202-203. INTERMEDIATE LATIN 9 hours**

Reading from various Latin writers. Given upon sufficient demand.

**Prerequisite:** Latin 101-103, or two units of high school Latin, and the consent of the instructor.
HISTORY AND POLITICAL SCIENCE

Professor Hilliard (Chairman), Professor Binkley,
Professor Darlington, Professor Milnar,
Assistant Professor Sabol, Assistant Professor Sobers

The History courses stress the evolution of human institutions with a view to developing an informed appreciation of past centuries as well as an understanding of our present civilization. Students majoring in history must take courses in both American and European History and electives in the allied social sciences, particularly political science, sociology, psychology and economics. It is the policy of the Department to recommend no graduate for the teaching of history who has not taken nine hours in American Government in addition to the hours of his history major.

HISTORY

The most appropriate sequence of courses for a field of concentration in history would be History of Western Civilization 111, 112, 113; History of the United States 211, 212, 213; History of England, 321, 322, 323; Recent American History 361, 362; or Constitutional History of the United States 331, 332; and Recent European History 371, 372, 373. In addition to the forty-five hours required for the field of concentration in History the student must complete nine hours in American Government.

111. History of Western Civilization to 1517 3 hours
112. History of Western Civilization: 1517 to 1815 3 hours
113. History of Western Civilization: 1815 to the Present Time 3 hours
   An introductory survey of European history. The Medieval background, the Renaissance, the rise of international rivalry, the World Wars and their aftermath. Open to freshmen.

211. History of the United States to 1850 3 hours
212. History of the United States to 1900 3 hours
213. History of the United States: 1900 to the Present 3 hours
   A study of the political, social and economic development of the United States from the colonial period to the present time. Open to freshmen.

303. History of Ohio 3 hours
   The political and cultural evolution of the state from prehistoric times to the present.
   Prerequisite: History 211, 212, 213, or consent of the Instructor.

321. English History to 1603 3 hours
322. English History: 1603-1815 3 hours
323. **English History: 1815 to the Present Time**  
A general introductory study of the English people in their political, social and institutional development, followed by a survey of the growth of the British Empire and evolution of the British Commonwealth of Nations.

324. **Renaissance**  
The political evolution of the Italian communes into city republics, with emphasis on Florence, Milan, Genoa and Rome; early capitalism and industrial and commercial movements; an analysis of the culture, art, science, and literature of the period and their influence upon the Church, the Papacy, and modern modes of thought and behavior.

325. **Reformation**  
The Church and European society in the later Middle Ages; culture and thought in the age of the Reformation; the rise of the European state system; Luther and the beginning of the Reformation; Zwingli and Switzerland; Calvin; the expansion of Protestantism in Europe; the Counter Reformation; and the relation of the Reformation to medieval and modern civilization.

327. **Revolutionary Era**  
A study of the period of the French Revolution and Napoleon, with emphasis on the philosophical background and ideological development of the period, together with their effect on later history.

331-332. **Constitutional History of the United States**  
A survey of the constitutional development of the United States from the colonial period to the present time.  
Prerequisite: Political Science 201, 202, 203, and History 211, 212, 213.

341-342. **American Foreign Relations**  
The inception, development and present interpretation of the outstanding foreign policies of the United States; the emergence of the United States as a world power; the trend from isolationism.  
Prerequisite: History 211, 212, 213.

343. **Modern History of the Far East**  
A study of China and Japan since 1840 with attention given to other neighboring nations as they affect the overall political and cultural development of the Far East.  
Prerequisite: History 111, 112, 113.

344. **History of the Modern Middle East**  
A study of the social, political, and economic evolution of Turkey, Iran, and the Arab World from 1800 to the present.

351, 352. **Ancient History**  
The development of civilization from pre-history to the fall of Rome. Emphasis is placed upon the early pre-Greek Oriental civilization and the cultural and political contributions of the period.
353-354. Latin America 6 hours
The conditions in Spain and Portugal leading to Latin American colonization, and the growth of the cultural and political institutions of Latin America. The struggle for independence, and the rise of the modern Latin American Republics.

361, 362. Recent American History 6 hours
An investigation and intensive study of some of the major movements of United States history since 1900.
Prerequisite: History 211, 212, 213, or consent of the instructor.

371-372-373. Recent European History 9 hours
Europe and its relations with the rest of the world since 1914: imperialism; the alliance system; World War I; the war debt and reparations problems; the rise of the Soviet Union and the fascist powers; the great depression relations with the Middle-East and the Far-East; World War II; the Cold War.
Prerequisite: History 111, 112, 113.

381. The Westward Movement in the United States 3 hours
Territorial expansion from colonial times to the present. Emphasis is placed on Indian relations, land policies, transportation and trade.

382. The Westward Movement in the United States 3 hours
A continuation of the first course; the advance of the frontier. The development of sectionalism; the influence of the West on American ideals and institutions. Emphasis is placed on the Trans-Mississippi West.
Prerequisite: History 211, 212, 213 or consent of the instructor.

400. Human Geography 5 hours
The interaction of man and his physical environment.

411, 412, 413. Russian History 9 hours
A study of the development of Russia from the time of Peter the Great to the present. The courses place emphasis upon the economic and social development, political and religious traditions, the nationalist, liberal, socialist and revolutionary developments, the post-war developments of the U.S.S.R., and the role of Russia in European affairs.

433. Global Geography 5 hours
The study of world geography to the end of discovering the relationship of the physical environment to the economic, social and political problems of mankind.

440. History Problems 3 hours
Individual investigation on a specific problem. Open to qualified seniors majoring in history.

POLITICAL SCIENCE

The courses in political science are designed to prepare the student for
the intelligent performance of the functions of citizenship, for entrance into public service, for the study of law, and for graduate study in this field. Those majoring in political science are advised also to pursue courses in sociology, psychology, history and economics.

201-202-203. **American Government** 9 hours
A study of the origin, development, structure, and functions of national, state and local governments in the United States. Sophomore course.

312. **Municipal Government** 3 hours
A study of the principal problems of municipal government in the United States.

**Prerequisite:** Political Science 201, 202, 203.

331-332. **Comparative Government** 6 hours
A study of the governments of England, France, Germany, and Russia.

**Prerequisite:** Political Science 201, 202, 203, or consent of the Instructor.

341. **American Political Parties** 3 hours
A brief survey of the development of political parties in the United States followed by an investigation of the psychological, sociological, and practical aspects of the phenomena of political parties.

**Prerequisite:** Nine hours of Political Science or the consent of the Instructor.

343. **American Political Theories** 3 hours
The development of American political theories from the colonial period to the present with a view to providing a basis for rational approach to the solution of our present political problems.

**Prerequisite:** Nine hours of Political Science or the consent of the Instructor.

363. **Public Administration** 3 hours
A study of the problems and fundamental principles of administration in national, state and local government in the United States.

**Prerequisite:** Political Science 201, 202, and 203 or the consent of the Instructor.

371. **International Relations** 3 hours
A study of the forces which determine the policies of the major world powers.

372. **International Organization** 3 hours
A study of the principles underlying the ideas of international organization. A comparative analysis of the objectives, structure, machinery, agencies, and procedures of the League of Nations, the United Nations. Brief consideration will be given to present functional and regional organizations.

373. **International Law** 3 hours
Historical and theoretical development of the law governing the relation-
ship between states, its nature, sources and applications; international agreements, community of nations, territory, nationality, jurisdiction, state responsibilities, and the laws of force and war.

383. EUROPVAN POLITICAL THEORIES 3 hours
A survey of the development of political philosophy from the period of Ancient Greece to modern times.
Prerequisite: Political Science 201, 202, 203, or the consent of the Instructor.

391. SOCIAL FORCES IN AMERICAN GOVERNMENT 3 hours
An investigation of the part played by interest and pressure groups and ideologies in the determination and execution of public policies.

421. GOVERNMENT OF THE SOVIET UNION 3 hours
Demographic, historical and ideological basis of Soviet rule. The social and governmental structure. Nationalism and federalism. The Party. Trade unions and cooperatives. The Church, army, courts, prosecutors, and organs of police. Dynamics of power in the U.S.S.R.

422. FOREIGN POLICY OF THE SOVIET UNION 3 hours
The constant factors in Russian foreign policy. Policy of the early years as affected by Marxist ideology, internal condition and foreign interference. Period of truce and limited cooperation with Western Powers. Second World War and aftermath.

423. SOVIET SOCIAL AND ECONOMIC INSTITUTIONS 3 hours
A comparative study of the Soviet economic structure and legislation; general principles of private law, including family law; industrial and trade relations; labor law; and collective farms.

450. POLITICAL SCIENCE PROBLEMS 3 hours
Individual investigation in the field of political science. Open to qualified seniors majoring in this department.

INDUSTRIAL ARTS

ASSOCIATE PROFESSOR KAIN (Chairman),
ASSISTANT PROFESSOR BOWLING

The technological world of the present and future commands a knowledge of materials, products, tools and machines, skills and occupations in order that one may more intelligently interpret the economic and social environment of which he is a part.

The principal objective of the Department of Industrial Arts is to provide a basic education in applied arts and sciences by encouraging the growth of an understanding of manufacturing, production and consumption, utilizing a variety of materials, processes, operations and procedures.

In the course areas attention is directed toward researching, experimenting, inventing and creative artistry, involving problem-solving situations derived
from both theory and practice of the arts and sciences. The courses are organized to provide a basic professional-technical education for persons preparing to teach the arts of industry and technical subjects in the public schools.

This department offers several courses that are of interest and value to both men and women students concentrating in other fields. The recommended courses are: 113 Drawing, 200 Arts and Crafts, 210 Handcrafts for Teachers, 241 Finishing Methods and Materials, 311 Graphic Arts, 323 Lapidary and Jewelry, 430 Photography, 440 Special Problems, and 460 Industrial Materials and Processes. These courses have no prerequisite.

Students concentrating in Industrial Arts are required to complete a minimum of 83 quarter-hours in the areas of drawing, woodworking, metalworking, industrial crafts, graphic arts and printing, electricity-electronics, ceramics, and automotive-power mechanics. Four years of study in these areas and in the areas of liberal arts and professional teacher education qualify students for the Provisional Special Certificate required for teacher certification.

Prospective teachers who do not wish to concentrate in Industrial Arts as a major teaching field but desire to obtain credit sufficient to teach Industrial Arts courses on a minor basis are required to complete a minimum of 45 quarter-hours in the previously listed subject areas. Care should be taken in scheduling in order that courses may be taken in their proper sequence and that sufficient elective time is provided to complete the total credit-hour requirement. Fulfillment of these requirements and those in the field of concentration leads to qualification for the Provisional Teaching Certificate.

An orientation course (101, 3 hours) designed to assist students in adjusting themselves to college life and to develop a better understanding of the profession, is required of all students seeking a major or minor in Industrial Arts. This course must be taken during the freshman year.

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

101. INDUSTRIAL ARTS ORIENTATION 3 hours
An introduction to Industrial Arts, presenting a basic coverage of the philosophical origins and contemporary practices. The functions of Industrial Arts and insights into the profession are exemplified through public school visitations and visiting speakers. The fundamental procedures, operations, and the special equipment for each of the several areas of Industrial Arts are briefly explored through laboratory activities.
### INDUSTRIAL ARTS CURRICULUM FOR MAJORS

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<tr>
<th>FALL</th>
<th>FRESHMAN YEAR</th>
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<td><strong>English C-1</strong></td>
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<tr>
<td><strong>Mathematics 111</strong></td>
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<td><strong>Drawing BE 201</strong></td>
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<td><strong>Drawing 113 (1A)</strong></td>
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<tr>
<td><strong>Industrial Arts 101</strong></td>
<td><strong>Wood Technology 112</strong></td>
<td><strong>Carpentry 123</strong></td>
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<td><strong>Literature 211 or 201</strong></td>
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<tr>
<td><strong>Finishing Methods 241</strong></td>
<td><strong>Arts and Crafts 200</strong></td>
<td><strong>Metal Casting 213</strong></td>
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<td><strong>Furniture Constr. 231</strong></td>
<td><strong>Intro. to Art 200</strong></td>
<td><strong>Study of Music 200</strong></td>
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<td><strong>Chemistry 111 or Physics 221</strong></td>
<td><strong>Chemistry 112 or Physics 222</strong></td>
<td><strong>Chemistry 113 or Physics 223</strong></td>
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<td><strong>Physical Education</strong></td>
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<th>JUNIOR YEAR</th>
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<tr>
<td><strong>Metalwork Technol. 321</strong></td>
<td><strong>Metal Machining 332</strong></td>
<td><strong>Welding 343</strong></td>
</tr>
<tr>
<td><strong>Philosophy C-31</strong></td>
<td><strong>Philosophy C-32</strong></td>
<td><strong>Philosophy C-33</strong></td>
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<tr>
<td><strong>Graphic Arts 311</strong></td>
<td><strong>Printing 322</strong></td>
<td><strong>High Sch. Curi. 390</strong></td>
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<tr>
<td><strong>Gen. Psychology 201</strong></td>
<td><strong>Ceramics 221</strong></td>
<td><strong>Speech 271</strong></td>
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<td><strong>Intro. to Education 121</strong></td>
<td><strong>School &amp; Society 370</strong></td>
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<tr>
<th>SENIOR YEAR</th>
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<tr>
<td><strong>Auto-Power Mech. 451</strong></td>
<td><strong>Elec.-Electronics 402</strong></td>
<td><strong>Ind. Arts Methods 423</strong></td>
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<tr>
<td><strong>Mat'l's-Proceses 460</strong></td>
<td><strong>Laboratory Plan. 412</strong></td>
<td><strong>Student Teach. 480</strong></td>
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<tr>
<td><strong>Photography 430</strong></td>
<td><strong>Electives in Educ.</strong></td>
<td><strong>Special Problems 440</strong></td>
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<tr>
<td><strong>Human Growth-Dev. 433</strong></td>
<td><strong>Ceramics 222</strong></td>
<td><strong>or Elective 3</strong></td>
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113. DRAWING

The major purpose of this course is to create an awareness of the value of good design as it is applied to fabrication and construction, using typical industrial materials. Through selected exercises the question of design (as applied to a particular function and material) becomes personal to the extent that it demands a response of thinking and feeling on the part of the individual. Efforts are made to bring the student into close relationship with good design as it exists in textiles, furniture, sculpture, graphics, paintings, interiors and architecture, in addition to its application to the manufacture of industrial products.

112. WOOD TECHNOLOGY

This is the first in a series of three courses devoted to woodworking. An investigation is made of the nature of wood, its qualities, and its present day applications in many forms. Forestry, lumbering, grading, preserving, and the utilization of wood products and by-products are emphasized. Laboratory experiences include the identification of common commercial lumbers, determining moisture content, strength analysis, control of shrinkage, methods of preservation and beautification. Wood fabrication and joining techniques are employed in the construction of related projects.

123. CARPENTRY AND WOOD STRUCTURES

In this course a practical approach is made to the utilization of efficient construction practices in the building of modern wood structures. Structural types, materials, plans, specifications, and construction procedures are studied. Through the use of carpentry tools and power equipment various applications are made in the fabrication of structural elements.

Prerequisite: 111 Drawing, 101 Industrial Arts, 112 Wood Technology.

200. ARTS AND CRAFTS

Laboratory experiences in working with a large selection of craft materials: copper, brass, aluminum, wood, plastics, leather, gemstones, textiles, reed, and others. The essentials of design and ornamentation are considered as they are applicable to the material. Primary emphasis is given to handicraft techniques and the tools and procedures involved.

210. HANDICRAFTS FOR TEACHERS

The primary purpose of this course is to introduce prospective teachers, both elementary and secondary, to the basic hand tools and their proper manipulation in simple constructional activities. Exemplary projects are chosen to meet typical units of study, their construction utilizing available and inexpensive materials.

B.F. 201. DRAWING

Use of instruments, applied geometry, lettering, orthographic projection, and pictorial drawing. This course is offered in the College of Engineering.
B.E. 202. Drawing II  
Continuation of 111 Drawing Developments, intersection, and working drawings. Projects in the main fields of engineering are used. This course is offered in the College of Engineering.  
Prerequisite: 111 Drawing.

213. Metal Casting  

221, 222. Ceramics  
Introduction to pottery making. Experiences in forming, glazing and firing. Hand building and use of the potter's wheel. Introduction to the art phases of the ceramic field with emphasis on the decorative processes. Mold making and casting of ceramic ware. Offered in the Department of Art.

231. Furniture and Cabinet Construction  
Particular emphasis is placed upon advanced cabinetry procedures through the study of traditional and contemporary period designs. Hand and machine-tool techniques are employed in joinery and decorative treatments which feature carving, turning, veneering, inlaying, fluting, and associated styling elements. At least one major project is required for the completion of this course.  
Prerequisite: 113 Drawing, 101 Industrial Arts, 112 Wood Technology.

241. Finishing Methods and Materials  
A study of finishing materials, their composition, qualities, and characteristics; protective agents and preservatives. Mixing and matching colors. Interior floor and wall treatment and finishes. Experience in the application of various finishes to wood and metal.

311. Graphic Arts  
An introductory course in the manipulative processes of duplicating written communications. Practical experiences in process printing, mimeographing, spirit duplicating, photography, blueprinting, block printing, etching, letterpress and offset printing.

321. Metalwork Technology  
Fundamentals of general metalwork. The course provides practice in layout and pattern drafting, bending, forming, seaming, soldering, resistance and oxyacetylene welding and machining. Minor problems in wrought iron work. Construction of fixtures, tools, ornaments, and furniture.

322. Printing  
An historical study of printing with typical exercises in composition, typography, imposition, principles of display, platen press, cylinder press
operation, and offset press operations.

Prerequisite: 331 Graphic Arts or permission of the department chairman.

323-324. LAPIRARY AND JEWELRY 6 hours

Introduction to the fundamentals of the art of lapidary; knowledge of jewelry materials and design. Experiences in working with natural and synthetic stones including the sawing, shaping, polishing, and mounting of jewelry stones.

332. METAL MACHINING 5 hours

Machine shop practice and metalwork technology. Precision measuring and layout in metalwork. The study and operation of the engine lathe, shaper, milling machine, grinder, and power hack-saw. Machining of bar stock and castings.

Prerequisite: Metalwork Technology 321.

343. WELDING THEORY AND PRACTICE 5 hours

Welding theory, and weld types. Welding metallurgy. Experiences in electrical resistance and arc welding, oxyacetylene welding, brazing, and burning. Welded metal fabrications.

402. FUNDAMENTALS OF ELECTRICITY & ELECTRONICS 5 hours

A study of the principles of electricity: magnetism, current, Ohm's Law, circuitry, heating effects, and power. Practical calculations and the application of principles to laboratory experiments and to the construction of a variety of electrical devices. An introduction to the field of electronics, Study and experimentation with vacuum tubes, rectifiers, power supplies, amplifiers, oscillators, transmitters, and receivers. Basic lessons in International Morse Code and amateur radio operating techniques and procedures.

Prerequisite: Math. 111-112.

412. LABORATORY PLANNING AND EQUIPMENT SELECTION 3 hours

The architectural features, selection, arrangement, and maintenance of equipment of the modern Industrial Arts laboratory. The drawing of floor plans and writing of specifications.

Prerequisite: Same as 323 Industrial Arts Organization and Methods.

451. INDUSTRIAL ARTS ORGANIZATION AND METHODS 5 hours

A professional course in the methods of teaching Industrial Arts, featuring the determination of objectives, preparing lesson plans, organizing courses, laboratory procedures, instructional materials, and administrative practices. Visitations are made to representative high school laboratories. Open only to students having 30 hours or more of Industrial Arts courses.

430. PHOTOGRAPHY 3 hours

A course designed to present proper picture taking techniques through the study of photographic composition, camera types and accessories, photo-
graphic optics, and laboratory methods and materials. Dark room practices in developing and printing negatives are featured in this course.

440. SPECIAL PROBLEMS IN INDUSTRIAL ARTS 1-3 hours
Industrial Arts students of junior or senior standing are given special professional assignments dealing with problems not fully explored in the methods courses. Problems in course organization, curriculum content, laboratory equipment maintenance and repair, investigation of research materials, and planned observations are featured on an individual basis.

Time for the course is arranged by permission of the department chairman any quarter.

451. AUTOMOTIVES & POWER MECHANICS 5 hours
The course is designed to provide an understanding of the construction and operating principles of the modern motor vehicle. The laboratory activities provide experiences in the present-day methods of maintaining and repairing automobiles as determined through scientific methods of diagnosing troubles.

460. INDUSTRIAL MATERIALS AND PROCESSES 5 hours
The aim of this course is to present a study of industrial materials, their origins, sources, characteristics, uses, and the manufacturing processes involved in industrial production. Classroom discussions, technical motion pictures, and field trips to refineries, mines, quarries, mills, kilns, foundries, machine shops, and other manufacturing firms assist students in gaining an understanding of the processing and utilization of many kinds of materials.

480. STUDENT TEACHING IN INDUSTRIAL ARTS EDUCATION 9 hours
See Education 480.
MATHEMATICS

ASSISTANT PROFESSOR BENNETT
ASSISTANT PROFESSOR KUHNS
ASSISTANT PROFESSOR SHULT
MRS. GREEN, MR. JACOBS, MR. LHAMON, MRS. ROIDER

Although it is aware, of course, of the importance of mathematics as a tool used in science, engineering, pharmacy, and many other disciplines, the department feels that a great, though less well publicized, importance of mathematics lies in its cultural value as one of the liberal arts. In its teaching, therefore, the department stresses the structural aspects of the quantitative language which is mathematics as well as its "practical" aspects.

Students concentrating in mathematics take at least 45 quarter hours of mathematics. These hours include Mathematics 253 and at least 20 hours (which must include Mathematics 451) in courses more advanced than Mathematics 253. Physics 241, 242, 243 must be completed. Chemistry 121, 122, 123 must be completed. One year of a foreign language must be completed.

All freshman students in liberal arts are required to take Mathematics 111-112-113 unless they take either Mathematics 151 and 152 or Mathematics 181 and 182. With permission of the Department Chairman, a student majoring in the physical sciences may enroll for courses in Mathematics 241, 242, and 243 instead of Mathematics 151, 152, and 153 respectively.

The several courses for freshmen are based on the entrance units which are indicated as prerequisite for each course. The following table and the prerequisites listed for each course should be observed in registering for a course:

**FRESHMAN COURSES**

<table>
<thead>
<tr>
<th>Math 111-112-113</th>
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<tr>
<td>Math 151, 152, 153</td>
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<td>Math 241, 242, 243</td>
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<td>Math 151, 152, 183</td>
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<td>Math 181, 182, 183</td>
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**Required of Students in**

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<th>Liberal Arts</th>
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<tr>
<td>Science, Mathematics, Engineering (five-year program)</td>
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<tr>
<td>Engineering (four-year program)</td>
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<tr>
<td>Prepharmacy</td>
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<tr>
<td>Business Administration</td>
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### BASIC CURRICULUM FOR CONCENTRATION IN MATHEMATICS

#### FRESHMAN YEAR
- Mathematics 151, 152, 153: 15 hours
- Gen. Chem. 121, 122, 123: 15 hours
- Social Science Course: 9 hours
- English C-1, C-2, C-3: 9 hours
- Physical Education: 3 hours
- Liberal Arts Orientation: 1 hour

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#### SOPHOMORE YEAR
- Mathematics 251, 252, 253: 15 hours
- Phil. & Religion C-31, C-32, C-33: 9 hours
- Foreign Language: 12 hours
- Speech, Art, Music: 9 hours
- Physical Education: 3 hours

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#### JUNIOR YEAR
- Mathematics: 12 hours
- Foreign Language: 9 hours
- Physics 241, 242, 243: 15 hours
- English or American Lit. or Social Science Course: 9 hours

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#### SENIOR YEAR
- Mathematics: 14 hours
- English or American Lit. or Social Science Course: 9 hours
- Advanced Physics Courses and Elective: 11 hours
- Other Electives: 12 hours

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99. **PREPARATION FOR COLLEGE MATHEMATICS** (Formerly 100) 9 hours
   Review of arithmetic, transition to algebra, factoring, fractions, linear and quadratic equations, exponents and radicals.

111-112-113. **FUNDAMENTAL MATHEMATICS** 9 hours
   A one year terminal course. Logic in mathematics and science, the num-
ber concept and number system, arithmetic, the logic of algebra, exponents and logarithms, definitions and use of trigonometric functions, introduction to analytic geometry, various geometries, some classical problems.

**Prerequisite:** One year of high school algebra.

151. **COLLEGE ALGEBRA (Formerly 121)**

A brief refresher through quadratic equations in one unknown, simultaneous quadratics, inequalities, ratio, proportion, variation, progressions, theory of equations, determinants, compound interest and annuities, permutations, combinations, probability, binomial theorem, mathematical induction.

**Prerequisite:** 1½ units high school algebra, 1 unit high school plane geometry.

152. **TRIGONOMETRY (Formerly 122)**

Trigonometric functions and their graphs, functions of sums and differences and multiples, equations and identities, formulas for triangle solution, theory of logarithms, calculations using logarithmic tables, complex numbers, De Moivre's theorem and applications, introduction to spherical trigonometry.

**Prerequisite:** Mathematics 151 or equivalent.

153. **ANALYTICAL GEOMETRY (Formerly 132, 141)**

Straight lines, conics, translation and rotation of axes, higher plane curves, parametric equations, polar coordinates, oblique coordinates, space curves and surfaces.

**Prerequisite:** Mathematics 151 and 152 or equivalent.

181. **MATHEMATICS OF FINANCE, I**

Selected portions of arithmetic, elementary algebra, and college algebra, including logarithms, the binomial theorem, and progressions.

**Prerequisites:** 1 unit high school algebra.

182. **MATHEMATICS OF FINANCE, II**

The mathematical tools of business: simple and compound interest, discounts, installment buying, depreciation, bonds, amortization, sinking funds, annuities, life insurance. Required of business administration and secretarial students.

**Prerequisite:** Mathematics 181 or equivalent.

183. **ELEMENTARY STATISTICS (Formerly 283)**

Concepts and practices commonly used in statistical problems of business, economics, education, and social welfare: testing hypotheses and estimation, chi-square test, t test, analysis of variance, mean, correlation, methods of sampling.

**Prerequisite:** Mathematics 113, or 151, or 181.

241, 242, 243. **CALCULUS AND ANALYTIC GEOMETRY**

(Formerly Engr. Math. I, II, III) **15 hours**
The content of Mathematics 153, 251, 252 and 253 with the exception of series, is taught for students in the four-year Engineering program and for science majors at the discretion of the department chairman.

251. **CALCULUS AND ANALYTICAL GEOMETRY II** (Formerly 142) 5 hours

Algebraic and calculus aids to graphing, families of curves, the logarithmic function and its derivatives, the exponential function and its derivative, the hyperbolic functions and their derivatives, the logarithm function defined as an integral, trigonometric integrals, trigonometric and other substitutions in integration, partial fractions, integration by parts, numerical methods for definite integrals, the concepts of limit and continuity, theorems of mean value, theorems on existence and evaluation of definite integrals, the fundamental theorem of the integral calculus.

*Prerequisite:* Mathematics 153.

252. **CALCULUS AND ANALYTICAL GEOMETRY III**

(Formerly 143) 5 hours

Maxima and minima, related rates, differentials, parametric representation, arc length, curvature, more on limits of sums, work, line integrals, first moments, moment of inertia, improper integrals, polar coordinates, solid analytical geometry, vector product, partial derivative and its geometric interpretation.

*Prerequisite:* Mathematics 251.

253. **CALCULUS AND ANALYTICAL GEOMETRY IV**

(Formerly 241) 5 hours

Total differentials, directional derivatives, normal lines and tangent planes, chain rules for partial derivatives, higher order partial derivatives, implicit function theorems, volumes, areas of surfaces, iterated and multiple integration, cylindrical and spherical coordinates, polynomial approximation of functions, convergence theorems for infinite series, Taylor’s theorem, the Taylor series expansion for a function, applications.

*Prerequisite:* Mathematics 252.

300. **ANALYTICAL GEOMETRY OF SPACE** 4 hours

Theory of matrices and determinants, systems of linear equations, equations of curves and surfaces, transformations of coordinates, classification of quadric surfaces.

*Prerequisite:* Mathematics 253 or 341.

305. **ELECTRONIC COMPUTER CONCEPTS** 4 hours

Nondecimal systems, Boolean algebra, introduction to several computer languages, familiarization with several types and makes of computers, effort being made to show the student how the computer performs its logic.

*Prerequisite:* Mathematics 253 or 341.

310. **COLLEGE GEOMETRY** (Formerly 302) 4 hours

Points, lines, and circles related to a triangle, vector geometry, centers,
harmonic properties, inversion, projection, introduction to non-Euclidean geometry.

**Prerequisite:** Mathematics 253 or 341.

320. **HISTORY OF MATHEMATICS** (Formerly 401)  
3 hours  
The origin and growth of mathematical concepts, with emphasis on the development of ideas but with personal glimpses of some of the men who made major contributions.  

**Prerequisite:** Mathematics 253 or 341.

341. **DIFFERENTIAL EQUATIONS I AND CALCULUS**  
5 hours  
Sequences, infinite series, Taylor's formula with remainder and content of Mathematics 351.  

**Prerequisite:** Mathematics 243.

351. **DIFFERENTIAL EQUATIONS I AND VECTOR ALGEBRA**  
(Formerly 223)  
5 hours  
Ordinary differential equations of the first order, linear differential equations with constant coefficients, simultaneous linear differential equations, applications to mechanical and electrical circuits. Vector algebra.  

**Prerequisite:** Mathematics 253.

352. **DIFFERENTIAL EQUATIONS II AND FINITE DIFFERENCES**  
5 hours  
Fourier series, finite differences, Laplace transforms, partial differential equations. Bessel functions and Legendre polynomials.  

**Prerequisite:** Mathematics 341 or 351.

353. **VECTOR AND COMPLEX CALCULUS** (Formerly 213)  
5 hours  
Vector calculus, complex calculus, analytic functions, infinite series over the complex plane, theory of residues, conformal mapping.  

**Prerequisite:** Mathematics 341 or 351.

382. **ADVANCED STATISTICS** (Formerly 330)  
4 hours  
Fundamental statistical aspects such as variability, multiple correlation, measures of functions of distribution, control charts, tests for significance, regression analysis, analysis of variance, probability, sampling.  

**Prerequisite:** Mathematics 253 or 341.

440. **SPECIAL PROBLEMS**  
1-3 hours  
Independent study in special topics. By arrangement.

441. **INTRODUCTION TO TOPOLOGY** (Formerly 414)  
3 hours  
Intrinsic qualitative properties of sets of points. Topologies, topological spaces, neighborhoods, cluster points, homeomorphisms, connected spaces, compactness, metric spaces.  

**Prerequisite:** Mathematics 253 or 341.

451. **INTRODUCTION TO MODERN ALGEBRA** (Formerly 410)  
4 hours  
Rings, integral domains, the integers, fields, the rational numbers, the real numbers, the complex numbers, polynomials, groups, vector spaces, matrices,
determinants.

Prerequisite: Mathematics 253 or 341.

452. ADVANCED CALCULUS I (Formerly 322) 3 hours

An intensive study of the concepts of limit and continuity, uniform continuity, extended law of the mean, indeterminate forms, fundamental theorem of integral calculus, improper integrals, the Riemann-Stieltjes integral, limit and continuity theorems for functions of several variables, Duhamel's principle, envelopes, Jacobians, Lagrange multipliers, Leibnitz's rule, functional dependence.

Prerequisite: Mathematics 253, knowledge of structure of real number system, some basic topological concepts.

453. ADVANCED CALCULUS II (Formerly 324) 3 hours

Intensive study of infinite series, with emphasis on theorems and their proofs, Taylor series for several variables, uniform convergence and uniform limits, Weierstrass M-test, Cauchy criterion, Abel's test, gamma and beta functions, Fourier series, Bessel's inequality, Parseval's equation, Riemann-Lebesgue theorem, vector analysis, line and surface integrals, Green's theorem, Stoke's theorem, Green's identities, harmonic functions.

Prerequisite: Mathematics 452.

MUSIC

PROFESSOR ROIDER (Chairman)
ASSISTANT PROFESSOR WEITZ
ASSISTANT PROFESSOR SONNTAG
ASSISTANT PROFESSOR BYRD
MR. ANDERSON  MRS. GMINDER
MR. LASKO

REQUIREMENTS FOR DEGREES:

To Qualify for a Bachelor of Arts degree in Music, or a Bachelor of Science in Education (Music) degree, a student must complete the requirements established by the University and the Department of Music. These are in accordance with the published regulations of the National Association of Schools of Music and the State Department of Education.

DEPARTMENTAL REQUIREMENTS:

BACHELOR OF ARTS DEGREE

Theory 16 hours
Counterpoint, Choral or Instrumental Arranging 3
Form and Analysis 3
History of Music 9
Applied Music 36
Conducting  4  
Participation in a performing group  6  
Senior Recital  

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<th>BACHELOR OF SCIENCE IN EDUCATION</th>
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<td>Teaching of Instruments</td>
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<td>Music Teaching Methods</td>
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<td>Participation in a performing group</td>
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(Required courses in Education, including Student Teaching are listed in the Department of Education section of the catalog.)

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<th>SUGGESTED SCHEDULE</th>
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<tr>
<td>FOR</td>
</tr>
<tr>
<td>BACHELOR OF ARTS IN MUSIC</td>
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<tr>
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<tr>
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<tr>
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<tr>
<td>C. B. O.</td>
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<th>SOPHOMORE YEAR</th>
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<tr>
<td>Theory</td>
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<tr>
<td>Math</td>
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<tr>
<td>C. B. O.</td>
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<tr>
<td>Gym</td>
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| Theory | 4 |
| English Comp. | 3 |
| Natural Science | 3-4 |
| Language | 4 |
| Applied Music | 2-3 |
| C. B. O. | 1 |
| Gym | 1 |

<p>| Counte, Choral Arrang. or Instrumental Arr. | 3 |
| Western Civ. | 3 |
| Math | 3 |
| Language | 4 |
| Applied Music | 2-3 |
| C. B. O. | 1 |
| Gym | 1 |</p>
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**Suggested Schedule**

**FOR BACHELOR OF SCIENCE IN EDUCATION (MUSIC)**

(See Department of Education section, Page 74)

Certification For Elementary Classroom Teachers To Teach Music: Occasionally students majoring in Elementary Education who have a strong music background seek qualification for the teaching of music in the elementary schools. Such students must complete the following requirements to meet this certification:

- Theory: 8 hours
- Functional Piano: 2 hours
- Class Voice: 2 hours
- Music for the Elementary Classroom Teacher (Primary grades): 3 hours
- Music for the Elementary Classroom Teacher (Intermediate Grades): 3 hours
- History of Music or The Study of Music: 3 hours
- Participation in a Performing Group: 6 hours

(Part of the student teaching program should be devoted to the music curriculum in the elementary school.)

**APPLIED MUSIC**

Fees:

All students who register for private instruction in applied music pay $25 per quarter hour credit—one lesson per week.

Auditions are held at the beginning of each quarter whereby any student
majoring in music is eligible for an Applied Music scholarship covering the cost of the applied music fee. These may be renewed each quarter upon audition.

A limited practice room schedule is available to students not taking applied music lessons but who wish to continue their music practice. Practice rooms are available only under the advisement of the department chairman. A fee of $10 per quarter per hour for organ, and $5 per quarter per hour for piano is charged for such use.

20a. VOICE  
1—2 hours per quarter

The courses in voice aim to establish correct physical and mental poise, the principles of breathing and breath control, proper diction and articulation using the best of various methods from the old Italian classic of the Bel Canto period to the modern scientific theories. Repertoire, interpretation, and presentation are stressed, and opportunities are afforded each student to present vocal works before an audience through recital and student assembly. Students are encouraged to study songs in the modern languages, Italian, French, and German.

20b. PIANO  
1—2 hours per quarter

The special needs of each individual student guide the approach to instruction in piano playing. Technical studies and selections are carefully chosen to develop the student's ability to recreate the desire of the composer. As music is a means of intellectual culture and artistic enjoyment, the works of the masters are stressed through all grades. Recitals and public appearances give the student an opportunity to gain poise and develop self-assurance.

20c. ORGAN  
1—2 hours per quarter

No student will be accepted unless he has reached a grade in piano playing sufficient to warrant organ instruction. The course of study provides for thorough training in preparation for church and concert work including the best organ literature and the principles of modulation, accompaniment, and improvisation.

20d. STRINGS  
1—2 hours per quarter

20e. WOODWINDS

20f. BRASSES

20g. PERCUSSION

After a thorough preparation in the fundamentals, instruction includes not only the systematic development of adequate technical facility but also definite emphasis on such phases as intonation, tone production, and style, all necessary to artistic performance and interpretation. The course of study is flexible and depends upon the individual needs and qualifications of the student.

0 35. CHORUS-CHOIR  
1 hour per quarter

Students of any College of Ohio Northern University interested in singing
in the Chorus-Choir have the opportunity to try out for this organization. Music of all types, accompanied and a cappella, is used throughout the year. Sacred and secular music for concerts at the University and outside the community are a part of the program. Up to 6 hours credit are permitted for non-music majors.

40. BAND
1 hour per quarter
All University students who play band instruments are given the opportunity to play in the University Band. A wide variety of material is used throughout the year. The Band appears in concert as well as at many school and community functions. Band members may participate in woodwind and brass ensembles. Up to 6 hours credit are permitted for non-music majors.

45. ORCHESTRA
1 hour per quarter
All university students who play orchestral instruments are given the opportunity to participate in the Lima Symphony Orchestra. Enrollment is subject to audition. Up to 6 hours credit are permitted for non-music majors.

50. VOCAL ENSEMBLE
Enrollment by permission of instructor.
1 hour per quarter up to 6 hours

55. INSTRUMENTAL ENSEMBLE
Enrollment by permission of instructor.
1 hour per quarter up to 6 hours

COURSES IN MUSIC

101-102-103. THEORY
12 hours
The singing, reading, and writing of scales, intervals, triads and simple part-writing from melodies and figured bases. As the course progresses, seventh chords, modulation and the non-harmonic tones are added. Original work includes the hymn tune and simple two and three part song-forms.

111. MUSIC FOR THE ELEMENTARY CLASSROOM TEACHER (Primary)
3 hours
Music activities, music materials, and literature, unit planning and teaching methods and skills for the elementary classroom teacher—grades 1-3 including kindergarten. This includes the use of the auto-harp, melody instruments, records, and creativity.

112. MUSIC FOR THE ELEMENTARY CLASSROOM TEACHER (Intermediate)
3 hours
Music activities, music materials, and literature, unit planning and teaching methods and skills for the elementary classroom teacher—grades 4-6.

200. THE STUDY OF MUSIC
3 hours
A survey type course stressing listening experience rather than the technicalities of musical development in history. Each quarter covers material
inclusive of the seventeenth century, eighteenth and early nineteenth centuries, and from the Romantic period to the present time. Each quarter includes rudiments in musical analysis and score reading. The aim of the course is to equip the student with the tools necessary to a more full and intelligent enjoyment of good musical literature. Meets the Liberal Arts music requirement.

211. THEORY

Altered chords, non-harmonic tones, chromatics, and advanced modulation are added to the previous year of the Structure of Music. Analytical technique of music compositions and the study of Musical Form from the motive and song-form to the sonata and contrapuntal forms.

Prerequisite: Theory 103.

301-302. CONDUCTING

Courses in principles of conducting, concluding with conducting choral, band and orchestra scores.

311. or Ed. 340A. PRIMARY MUSIC METHODS

(Music Education Majors) 3 hours

The study of music techniques, teaching procedures, and the use of materials in the primary grades. This course is designed for music teachers and supervisors.

312 or Ed. 340B. INTERMEDIATE MUSIC METHODS

(Music Education Majors) 3 hours

The study of music techniques, teaching procedures, and the use of materials and instruments in the intermediate grades. This course is designed for music teachers and supervisors.

313 or Ed. 450. JUNIOR AND SENIOR HIGH SCHOOL METHODS

(Music Education Majors) 3 hours

The study of music techniques, teaching procedures and the use of materials and instruments in the junior and senior high school. This includes the study of band, orchestra, and chorus organization and management, high school repertoire, competition-festival and public performance participation.

320. CLASS VOICE

2 hours

330. FUNCTIONAL PIANO

2 hours

Group instruction designed to prepare the music specialist and general student in the piano literature appropriate to the primary and secondary school situations. Improvisation, the extemporaneous harmonization of melodies and experience in vocal and instrumental accompaniment are included in the course of study.

351-352-353. HISTORY OF MUSIC

These courses deal with the origin and development of music, studied from an appreciative basis.
340. INSTRUMENTATION AND ORCHESTRATION 1—3 hours
   Designed to give the public school music instructor in the instrumental
   field of music a thorough knowledge of the instruments of the orchestra
   and band, and the arrangements of music for complete school orchestras
   and bands.

350. COUNTERPOINT 1—3 hours
   Courses designed to give the public school music instructor in the vocal
   field of music the technique of contrapuntal writing.

360. CHORAL ARRANGING 3 hours
   The arranging of music for the school choir, glee clubs, and vocal orga-
   nizations.

440. SPECIAL PROBLEMS 1—3 hours
   Open only to seniors who are majors in music.

441. TEACHING OF BRASS AND PERCUSSION INSTRUMENTS 2 hours

442. TEACHING OF WOODWIND INSTRUMENTS 2 hours

443. TEACHING OF STRINGED INSTRUMENTS 2 hours
   Courses designed to give the prospective teacher a general knowledge of
   the playing technique of the instruments in the orchestra.

480 or Ed. 480. SUPERVISED TEACHING IN ELEMENTARY,
    JUNIOR, AND SENIOR HIGH SCHOOL 12 hours

PHILOSOPHY AND RELIGION

PROFESSOR TINSLER (Chairman), ASSISTANT PROFESSOR HODGES,
ASSISTANT PROFESSOR SMITH, ASSISTANT PROFESSOR HINDERLITER

FIELD OF CONCENTRATION (Interdisciplinary major)
   A field of concentration of 52 hours, exclusive of the core course, C-31-
   32-33, required of all students, shall constitute a field of concentration in
   philosophy and religion and shall include the following courses: Bible
   History, Rel. 241-242-243; Logic and Introduction to Philosophy, Phil. 201,
   202-203; St. Paul and Church History, Rel. 301, 302, 303; and the History
   of Philosophy, Phil. 311, 312, 313, together with General Psychology and
   a basic course in Sociology, Problems in Religion, 440, or Problems in
   Philosophy, 440, in the Senior year; plus electives in Philosophy or Religion
   or both to total at least 52 hours.

*C-31-32-33. HISTORICAL STUDY OF PHILOSOPHY AND RELIGION 9 hours
   A study of religion and philosophy as a developing body of convictions
   by which man has attempted, in every age, to solve the problems and
mysteries of life. A one-year unit of study designed and recommended for meeting the philosophy-religion requirements for graduation. Each quarter is prerequisite to the following quarter.

**PHILOSOPHY**

In the Department of Philosophy a search is made for a comprehensive view of the universe and of man's place in it. Assumptions are examined and conclusions evaluated. The goal is the achievement of principles of sound reasoning in connection with the living issues of both personal and social life.

201. **LOGIC** 3 hours
A study of the principles and methods of reasoning with the purpose of improving skill in reasoning. Examines the relations of truth and validity, the uses of language, the sources of fallacies, and the structure of deductive arguments.

202-203. **INTRODUCTION TO PHILOSOPHY** 6 hours
A two quarter course initiating the student into the perennial problems of philosophy—its living issues—by means of firsthand acquaintance with the writings of prominent philosophers through the ages.

302. **AESTHETICS** 3 hours
A study of the theories relating to the creation, appreciation and critical evaluation of objects of art. Discusses the various theories of the concept of beauty and related subjects of aesthetic valuation.

311, 312, 313. **THE HISTORY OF WESTERN PHILOSOPHY** 9 hours
311. THE CLASSICAL PERIOD OF GREEK AND ROMAN PHILOSOPHERS
312. THE MEDIEVAL AND RENAISSANCE PERIOD
313. THE MODERN PERIOD, INCLUDING ANALYTICAL, POSTIVIST AND EXISTENTIAL PHILOSOPHIES.

401. **PHILOSOPHY OF SCIENCE** 3 hours
Discussion of the concepts and assumptions of the scientific method of approach to empirical knowledge. Study of the relations of philosophy and science with special attention to the impact of modern scientific developments on metaphysical speculations.

402. **SCIENCE AND VALUES** 3 hours
Attempts to orient the student towards an integral understanding of life and the appreciation of its possibilities beyond the limited realm of strict scientific investigation. Examines the place of moral, aesthetic, and religious values in a world of facts and technology.

403. **AMERICAN PHILOSOPHY** 3 hours
Reading and discussion of selected writings of modern American philo-
osophers, beginning with C. S. Peirce and including W. James, J. Dewey, G. Santayana, A. N. Whitehead and some influential contemporary philosophers.

300 and 400 courses in philosophy have the 200 series in philosophy or the Core course as prerequisites.

411. **ETHICS** 3 hours

A critical study of the various moral theories developed in the Western world in its attempt to formulate a standard for moral behavior applicable to individuals and social groups.

412. **PHILOSOPHY OF HISTORY** 3 hours

A study of the principles and methods used by historians in their writing of history. Critical discussion of the suggested theories of the meaning of recorded events of human social development.

410. **PROBLEMS IN PHILOSOPHY** 1—3 hours

Research or special projects for seniors prepared to do special work in philosophy. By arrangement.

**NOTE:** All courses in the 300-400 series in both Philosophy and Religion require a) Junior or Senior standing and b) a previous one-year course in this department in the appropriate area, or c) the consent of the instructor.

**RELIGION**

Believing that anything which existed in history can be studied historically, the historical (or objective) approach to the study of religion is used, presenting the figures of Bible history and religion as real people in real life situations, facing real problems and finding real solutions through their religious insights. The courses are neither sectarian nor dogmatic but, instead, aim to give the student the factual background for his own interpretation of a vital faith.

201. **BIBLE CUSTOMS AND MANNERS** 3 hours

A study of the social, political and religious customs and folkways of the peoples of the Near East, to provide a background and local color for understanding of the Bible.

202. **INTRODUCTION TO RELIGION** 3 hours

Presenting religion as the vital experience and growing conviction of real people facing real problems in real life situations, with a careful examination of the contrast between the religion of primitive and of advanced cultures.

203. **THE MESSAGE OF JESUS CHRIST** 3 hours

The teachings of Jesus Christ, as recorded in the New Testament Gospels, with special attention to their personal and social application to everyday life.
BIBLE HISTORY
A study of the history of the Hebrew and early Christian peoples of Old and New Testament times, with special reference to the scriptural record, and in relation to the cultural, political and religious influence of their Near East neighbors. The fall quarter traces this history from early times to the reign of Solomon; the winter quarter, from the period of the Divided Kingdom through the Exile and Restoration with special attention to the prophets; the spring quarter, from the Maccabeans Period through the times in which Jesus lived and taught, the work and writings of St. Paul, the beginnings of the Early Church, and the writing and selection of the New Testament Scriptures.

301. THE LIFE AND LETTERS OF ST. PAUL
A study of the development of the early Church and the relation of St. Paul to this work as revealed in the Book of Acts and in the Letters of Paul.

302. CHURCH HISTORY THROUGH THE REFORMATION
A study of the Church in history, with consideration of individuals, ideologies, and events in the Church from the Apostolic Age to the Reformation and their relation to the course of general history.

303. CHURCH HISTORY FROM THE REFORMATION TO THE PRESENT
A continuation of 302, with emphasis on Christianity in America today.

304. COMPARATIVE CHRISTIANITY
A study of Roman Catholicism, Greek Orthodoxy, and the chief denominations of Protestantism to ascertain their key concepts, chief emphases and doctrines which distinguish them and continue their peculiar contribution to Christianity in its current phases.

321. INTRODUCTION TO RELIGIOUS EDUCATION
An introductory course for voluntary lay workers in the local church, dealing with the modern church-school movement; the work of the local-church commission on education; home and community relationships; agencies and councils; and the problem of administration, supervision and promotion of the Sunday, week-day and vacation church schools.

323. CHURCHMANSHIP
A study of the Christian Church in modern life, its historical purpose and functions, organizations and agencies, types of activities, professional and lay leadership, missionary outreach, the ecumenical movement, social concerns, program building, etc.

402. PHILOSOPHY OF RELIGION
A constructive study and discussion of the philosophy underlying such religious concepts as God, soul, freedom, prayer, destiny, evil, and immortality. Credit applicable to either philosophy or religion.
403. **Christian Ethics**  
A study of the theories of value in the field of conduct which have been recognized as "Christian ethics," with special attention to the presuppositions which underly it. Ethics relating to the individual, the family, society, economics, the state, international relations, war and the like will be studied in the light of the Christian presuppositions.

441. **World Religions**  
A study of the major living religions of the world.

440. **Problems in Religion**  
Research or special projects for seniors prepared to do special work in the field of religion. By arrangement.

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**Physical Education**

**Professor Lamb (Chairman), Associate Professor English, Assistant Professor Roberson, Assistant Professor Banks, Mr. Michael, Mrs. Ludwig, Mr. Stahl**

Some form of physical activity is required of all students during their first two years in the University. The nature and amount of work to be taken depends upon physical condition as revealed by a careful examination and by efficiency tests given at the beginning of the school year. A varied program of elective and required activities is provided, which aims to secure and maintain the highest degree of individual and social efficiency both during and after college life.

The elective courses are both theoretical and practical. A strong intramural sports program is designed to provide some form of activity for nearly every student on the campus.

Some variation in sequence is permitted those students who have teaching fields in mathematics, biology, science, industrial arts. These four teaching fields along with driver education are the best for majors of health & physical education, according to our experience.

**Health & Physical Education**  
(Curriculum for Majors)

**First Year**

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<tr>
<th></th>
<th>Fall</th>
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<td>English C1</td>
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### SECOND YEAR

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<td>Math. 111</td>
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‡ 300 level Literature courses may be substituted in some cases.

### THIRD YEAR

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### FOURTH YEAR

- 9 Hours of Ed. 480 (Student Teaching for Sec. Ed.)
- OR 12 Hours of Ed. 480 (Student Teaching for Special Certificate)
- 3 Hours of Education 450 or 451
- 3 Hours of Corrective Gym
- 6 Hours of Education electives chosen from the following:
  - Education 312, 401, 402, 430, or 440
  - Electives to round out required hours each quarter.

In as much as requirements are high for State Certification, it is recommended that as many electives as possible be taken in fields outside its department.

### REQUIRED COURSES

Physical Education two hours a week. One credit each quarter for the first six quarters.

First Year. This work is given both out-of-doors and in the gymnasium. It is systematically graded and arranged to fit the needs and interest of the individual. Corrective work for those who need it, and the fundamentals of natural gymnastics and games are stressed.

Second Year. A continuation of the first year program, with greater emphasis on play activities.
101-102-103. PHYSICAL EDUCATION 1 hour each
Men—Gymnasium and outdoor classes in season, natural gymnastics, informal play. Freshmen.
Women—A course in natural gymnastics including games and sports in season, dancing. Freshmen.

201-202-203. PHYSICAL EDUCATION 1 hour each
Men—Continuation of Course 103 with team games and apparatus added. Sophomores.
Women—A continuation of Course 103. Sophomores.

ELECTIVE COURSES

INTRAMURAL SPORTS. Ample athletic fields and a splendid gymnasium afford exceptional facilities for an intramural program that is sufficiently broad and varied to offer some form of activity for practically all university students. In their proper season, the following sports are offered: football, basketball, free throwing, baseball, speedball, handball, playground ball, volleyball, tennis, wrestling, boxing, track, touch football, golf, horseshoes and swimming.

PROFESSIONAL CURRICULUM FOR TEACHERS

For students who wish to specialize in the field of health and physical education, a four-year professional curriculum is offered, leading to the degree of Bachelor of Science in Education, and to a special state four-year Provisional Certificate.

In addition to the requirements listed below each major in the health and physical education program must be affiliated in some manner with one of the major sports in the inter-collegiate program.

101a-102a-103a. PHYSICAL EDUCATION FOR MAJORS 1 hour each

201a-202a-203a. PHYSICAL EDUCATION FOR MAJORS 1 hour each
Courses 101a to 203a inclusive are required of all students majoring or minoring in physical education in place of Courses 101 to 203. These courses consist of natural activities in season, including games, stunts, tumbling, clogging, folk and character dancing, natural dancing, and combat activities for men. These courses apply toward physical education major.

110. PERSONAL AND GENERAL HYGIENE 3 hours
A course designed to cover the various phases of personal hygiene and health from the individual aspect, with emphasis on preventive measures. Each quarter.

112. FIRST AID AND SAFETY EDUCATION 3 hours
Lectures, discussion and practice in the giving of first aid in cases of emergency. The American Red Cross First Aid Certificate may be obtained by students who pass a satisfactory examination.
120. **Nutrition for Nursing**  
A course designed to teach the nurses the importance of nutrition to her own health and that of her patient. Lecture: the study of the role of food in the body, the nutritive requirements of individuals and the modifications required during the stages of development from infancy to later life. Laboratory: theoretical and practical knowledge in meal planning and the selection, care, preparation and service of basic foods.

121. **Health Education**  
The relation of hygiene to home and community life, including a study of sewage disposal, refuse disposal, transmission and control of diseases.

122. **Health Education**  
This course deals with the health program of the public schools, and the teaching of habits, attitudes and knowledge conducive to good health.

123. **Health Education**  
A course for the special teacher and supervisor of physical education, dealing with the sanitation of school buildings, surveys of various school systems, teachers’ health, and other health problems arising in a school system.

133. **Theory and Practice of Plays and Games**  
The need, purpose, and function of play in education are studied. Activities adaptable to various levels of the elementary and secondary schools are studied. Two hours of theory and two hours of laboratory per week.

213. **Advanced First Aid**  
This is a course designed to give instruction and advanced training in first aid. Upon satisfactory completion of this course the Advanced First Aid Certificate and Instructor Training Certificate will be awarded.  
Pre requisite: First Aid and Safety Education 112.

223. **Body Mechanics**  
This course deals with the general body mechanics of the human organism, furnishing the student an opportunity to study and analyze the activities of the physical education program in their relation to coordination and the proper body mechanics.  
Pre requisite: Physiology and Anatomy 331 and 332.

301-302-303. **Principles and Methods of Physical Education**  
Lectures, demonstrations, and practice. An examination of the principles underlying modern practices in physical education and recreation from the standpoint of general education. The methods used in the natural program of physical education, such as the teaching of fundamental skills of tumbling and stunts, basketball, indoor baseball, speedball, volleyball, handball. Class, three hours; practice, two hours.
321. METHODS IN COACHING FOOTBALL   3 hours
A course covering in detail, equipment, fundamentals of the game, kicking, passing, handling the ball, tackling, blocking, etc.; individual position play; discussion of various types of offensive and defensive formations now in use, and the merits of each; strategy and generalship.

321b. METHODS IN COACHING FOR WOMEN   3 hours
This course is to prepare major and minor students in physical education to coach Athletics in secondary schools. The course covers presentation of technique, basic principles, teamplay and methods for instruction of hockey, soccer, and speedball.

322. METHODS IN COACHING BASKETBALL   3 hours
Men—Special emphasis is given to the fundamentals, passing, shooting, dribbling, feinting, and pivoting; to the various styles of offense and defense used by leading coaches; to equipment; to the conditioning of a team; and to the handling of a team in games. Lectures, reports, demonstration and practice.

Women—Volleyball, basketball, and handball.

323. METHODS IN COACHING BASEBALL AND TRACK   3 hours
This course covers pitching, catching, batting, fielding, baserunning, individual position and team play in baseball. It takes up the best methods and forms for all of the events in track and field. Lectures, reports, demonstrations, and practice.

Women—Baseball, tennis, track, and field sports.

331-332-333. ADVANCED COACHING PRACTICE   3—9 hours
These courses are designed to give students who have had Courses 321, 322 and 323 an opportunity to do actual coaching under supervision, in all sports in season. Hours arranged.

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

342. BASKETBALL OFFICIATING   3 hours
Same description as Course No. 341 except as it applies to basketball officiating.

343. ATHLETIC TRAINING AND CONDITIONING   3 hours
Designed to meet the need of the high school coach. It deals with the training procedures and conditioning of athletic teams for all sports. Special emphasis is placed upon treatment of athletic injuries.

402. CORRECTIVE PHYSICAL EDUCATION   3 hours
It is the aim of this course to present to the physical educator, the school nurse, the physician, the handicapped, the parent, and all who are concerned with the education of the handicapped, a method of teaching that
will motivate the typical student to improve not only his physical condition, but also his outlook on life.

440. PROBLEMS IN PHYSICAL EDUCATION
This course deals with specific problems in physical and health education and is open to properly qualified students. Time to be arranged.

480. STUDENT TEACHING
See Education 480.

PHYSICS (124)

PROFESSOR ABELE (Chairman), PROFESSOR BENEDICT,
ASSISTANT PROFESSOR THOMAS,
MR. MESSICK

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. Emphasis is placed on clear concepts, accurate thinking, and the complementary nature of the experiment and theory.

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 school, to apply physics in engineering, medicine and other sciences, and to pursue graduate work to the best advantage.

The physics field of concentration must include at least four hours each of 310, 320, and 330; mathematics through 261; and general chemistry should be completed. A reading knowledge of German or French is strongly recommended.

BASIC CURRICULUM FOR CONCENTRATION IN PHYSICS

FRESHMAN YEAR
Mathematics 151, 152, 153, or 241, 242, 243 15 5 5 5
Gen. Chem. 131, 132, 133 12 4 4 4
English C-1, C-2, C-3 9 3 3 3
Soc. Sci. Courses 111, 112, 113 9 3 3 3
Physical Education 101, 102, 103 (3) (1) (1) (1)
Lib. Arts Orientation (1) (1) — —

Total 45 15 15 15
(49) (17) (16) (16)
### SOPHOMORE YEAR

<table>
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<th>Course</th>
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<tr>
<td>Mathematics 251, 252, 253, or 341, 342</td>
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<tr>
<td>Physics 241, 242, 243</td>
<td>15</td>
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<tr>
<td>Ph. &amp; Religion C-13, C-32, C-33</td>
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<td>Foreign Language</td>
<td>12</td>
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<td>Physical Education 201, 202, 203</td>
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Total: 51

### JUNIOR YEAR

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<td>Math 351</td>
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<tr>
<td>Physics 302, 303, 423</td>
<td>13</td>
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<tr>
<td>Foreign Language</td>
<td>12</td>
</tr>
<tr>
<td>Speech, Art, Music</td>
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<tr>
<td>Engl. or Amer. Liter. or Social Science Course</td>
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<tr>
<td>Th. &amp; Adv. Lab. in Phys. 310, 320, 330</td>
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Total: 53

### SENIOR YEAR

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<td>Physics 401, 402, 413, or 403</td>
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</tr>
<tr>
<td>Th. &amp; Adv. Lab. in Phys. 310, 320, 330</td>
<td>7</td>
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<tr>
<td>Engl. or Amer. Liter. or Social Science Course</td>
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<tr>
<td>Electives</td>
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</tbody>
</table>

Total: 48

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210. **Physic**

A lecture and demonstration course of fundamental physical laws in mechanics, heat, electricity, sound, and light for education majors.

*Prerequisites:* Math 111, 112 or equivalent.

221. **General Physics: Mechanics of Solids and Fluids**

4 hours

222. **General Physics: Electricity and Magnetism**

4 hours

223. **General Physics: Sound, Heat and Light**

4 hours

These courses are required for pre-medical, pre-dental and pharmacy students. Three class periods and two hours of laboratory. 221 should precede 222 and 223.

*Prerequisite:* 1 year of College mathematics.

241. **Physics: Mechanics of Solids and Fluids**

5 hours

242. **Physics: Electricity and Magnetism**

5 hours
243. **Physics: Sound, Heat and Light**  
5 hours  
A series of courses designed for engineers and physical science majors. Four class periods and two hours of laboratory. 241 should precede 242 and 243.  
**Prerequisite:** Mathematics 251 or 241 to be taken concurrently.

250. **Astronomy**  
3 hours  
Study of celestial bodies including distance, motion, size, distribution of planets, stars, extragalactic nebulae, and modern theories regarding their origin and evolution.  
**Prerequisite:** Physics 210 or equivalent.

302. **Electronics**  
5 hours  
Electron ballistics, thermionic emission, vacuum tubes and characteristics, rectifiers, amplifiers, oscillators, modulators, demodulators, and electron tube instruments. Four class periods and two hours of laboratory.  
**Prerequisite:** Calculus 253 and Physics 242.

303. **Modern Physics**  
3 hours  
A lecture and problem course reviewing and applying vectors and differential equations to classical mechanics and electrodynamics. The concepts involved in quantum mechanics, relativity and statistical mechanics are introduced. Applications of the above fields are presented to atomic physics, macrophysics and astrophysics.  
**Prerequisites:** Math. 351 or 341 and Physics 243.

310. **Theory and Advanced Laboratory: Mechanics**  
1-6 hours  

320. **Theory and Advanced Laboratory: Light, Heat, Sound**  
1-6 hours  

330. **Theory and Advanced Laboratory: Electricity and Nuclear Physics**  
1-6 hours  
Credit is given in courses 310, 320, and 330 according to the amount of work done. A quiz is given on assigned readings for each experiment. Offered every quarter.  
**Prerequisites:** Physics one year.

401. **Analytical Mechanics**  
5 hours  
A course covering the principles of mechanics as applied to statics; also a study of dynamics of particles and bodies.  
**Prerequisites:** Physics 241 and Mathematics 351 and 341.

402. **Electricity and Magnetism**  
5 hours  
A study of electric and magnetic fields, dielectrics, inductance, capacitance, direct and alternating current circuits.  
**Prerequisites:** Physics 242 and Mathematics 351 or 341.

403. **Nuclear Reactor Principles**  
3 hours  
Radioactive decay. Cross sections. Diffusion area. Chain reaction. The

Prerequisite: Thermodynamics 301 or equivalent.

413. SOLID STATE
3 hours
A lecture and problems course in the structure of solids and their phenomena. Quantum and statistical mechanics concepts are introduced to develop theories of internal stress and strain in crystals, conductivity of electricity in metals, semiconductors and superconductors, magnetism, the thermal properties of solids and imperfections in solids.

Prerequisite: Modern Physics or permission of instructor.

423. LIGHT
5 hours
The laws of physical and geometric optics; optical instruments, reflection, refraction, absorption, dispersion, interference, and polarization. A study of lenses, prisms, mirrors, gratings, and instruments used in the study of light.

Prerequisite: Physics 243.

440. SPECIAL PROBLEMS IN PHYSICS
1-3 hours
Independent study or research in special topics in physics. By arrangement any quarter.

SOCIOCOPY AIDE AND PSYCHOLOGY

PROFESSOR MARKLE (Chairman),
ASSISTANT PROFESSOR CRIDER,
ASSISTANT PROFESSOR COHOE
ASSOCIATE PROFESSOR MILLER

The purpose of this department is to give its students an understanding of human relationships, institutions, and social processes; to familiarize them with the nature and causes of social problems; to acquaint them with the facts and laws of behavior and mental life, primarily of man; to enable its students to develop wholesome personalities and to make adequate social adjustments; and to give the students deeper insight into the requirements of intelligent citizenship and useful participation in community life.

In order to complete a field of concentration in the area of social welfare the student must complete the following courses:

1. HUMANITIES
   Liberal Arts Orientation (1) hour
   C-1-2-3 English 9 hours
   201-202-203 English Literature 9 hours
   or 211-212-213 American Literature
A Foreign Language 24 hours
C-31-32-33 Historical Study of Philosophy and Religion 9 hours
271 Elements of Speech or 373 Discussion or 3 hours
200 Introduction to Art or 3 hours
200 Introduction to Music or 3 hours
291 Germanic Cultural Development 3 hours

II. NATURAL SCIENCES
111-112-113 Fundamental Mathematics 9 hours
111-112-113 General Biology 12 hours

III. SOCIAL SCIENCES
201-202-203 American Government 9 hours
211 General Psychology 5 hours
351 Social Psychology 5 hours
201-202-203 Marriage and the Family 9 hours
321-323 Criminology and Juvenile Delinquency 10 hours
341 Introduction to Social Welfare 3 hours
342 Social Welfare Needs and Resources 3 hours
343 Social Work Methods 3 hours
441-442 Social Welfare Investigation 6 hours
443 Social Field Work Observation and Orientation 2-5 hours
433 Human Growth and Development 3 hours

In addition to the above requirements the following courses are recommended to majors in this area:

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
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<tbody>
<tr>
<td>History 111, 112, 113</td>
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<tr>
<td>History 211, 212, 213</td>
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<tr>
<td>Math. 183</td>
<td>3</td>
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<tr>
<td>Math. 283</td>
<td>3</td>
</tr>
<tr>
<td>Soc. 301</td>
<td>5</td>
</tr>
<tr>
<td>Econ. 201, 202, 203</td>
<td>9</td>
</tr>
<tr>
<td>Soc. 331</td>
<td>5</td>
</tr>
<tr>
<td>Geog. 400</td>
<td>5</td>
</tr>
</tbody>
</table>

In order to complete a field of concentration in this department with emphasis in sociology the student must complete forty-five hours in sociology. In addition fifteen hours must be completed within the Division of Social Sciences, in departments other than the Department of Sociology.

In order to complete a field of concentration in this department with emphasis in psychology, the student must complete forty-five hours in psychology. Psychology majors must complete one year of general biology.

PSYCHOLOGY

211. GENERAL PSYCHOLOGY 5 hours

A general survey of psychological facts and principles stressing human
experience and behavior. Open to qualified freshmen with the consent of the instructor. Formerly 201.

223. **CHILD DEVELOPMENT**  3 hours
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.
Prerequisite: Psychology 211.

311. **PSYCHOLOGY OF PERSONALITY**  5 hours
A study of the nature and development of personality, and methods of adjustment; discussion of the various theoretical approaches to the psychology of personality.
Prerequisite: Psychology 211.

313. **EDUCATIONAL PSYCHOLOGY**  3 hours
A study of the learning process and the conditions that promote learning.
Prerequisite: Psychology 201.

332. **APPLIED PSYCHOLOGY**  5 hours
The application of psychological principles to problems of modern life; clinical practice; personnel work; home life; education; industry; business law and criminology; medicine and social reform.
Prerequisite: Psychology 211.

351. **SOCIAL PSYCHOLOGY**  5 hours
A study of social behavior and social adjustment. The effect of the social environment upon the development of personality. The relation of social and psychological laws to problems of the community.
Prerequisite: Psychology 211. Formerly 321.

353. **PSYCHOLOGY OF BUSINESS AND INDUSTRY**  3 hours
A study of the principles and applications of psychology as used in business, industry and personnel work.
Prerequisite: Psychology 211. Formerly 323.

411. **COUNSELING AND GUIDANCE**  5 hours
A study of the basic psychological principles involved in educational, vocational, and personnel counseling; the application of these principles to a sound guidance program.
Prerequisite: Psychology 211.

421. **ABNORMAL PSYCHOLOGY**  5 hours
Study of behavior pathology; the neuroses and psychoses; various theoretical approaches to the problems of etiology.
Prerequisite: Psychology 211.

423. **PSYCHOLOGY OF THE EXCEPTIONAL CHILD**  3 hours
The classification of the non-typical child; the use of the school and other
sources for meeting his needs. Special attention to the slow learner and retarded child.

*Prerequisite:* Psychology 211.

424. **Psychology of the Gifted Child**

An analysis of the psychological problems of the gifted child.

*Prerequisite:* Psychology 211.

433. **Human Growth and Development**

A systematic study of human development from conception to old age. Special emphasis is given to the physical, emotional and personality development of the individual.

440. **Psychological Problems**

Minor investigation. Open only to qualified seniors. By arrangement.

**Sociology**

201. **Courtship and Marriage**

A practical course in the study of adjustment in courtship, preparation for marriage and for family living.

202. **Marital Adjustment**

An analysis of the factors in modern life affecting the stability of the family. A critical study of the biological, psychological, and social factors in marital adjustment.

203. **Family Relationships**

A study of the effects of early family relationships and the individual's day by day experiences upon the child in American society.

241. **General Sociology**

A study of the phenomena of human relations, including the nature and import of sociology, socialization, social ideals and social control.

300. **Population Problems**

The composition of population according to sex, age, color; its distribution in the territory of the U.S.; fertility, mortality. The problems of race selection, birth control, standard of living and migrations are discussed.

301. **Social Pathology**

Social Pathology, as it concerns our own society, including the study of such problems as child labor, poverty, crime, the family, public health, etc.

321. **Criminology**

A consideration of the problems of crimes and criminals. Special attention is given to the factors conducive to the making of criminals, together with a suggested program of treatment and prevention. Some study of penal institutions and of the history of punishment.
323. Juvenile Delinquency 5 hours
A study of the factors associated with juvenile delinquency, characteristics of delinquents, juvenile court procedures, correctional training in institutions plans and programs for the prevention of delinquency.

331. The Culture of Early Man (Cultural Anthropology) 5 hours
A study of preliterate culture, its relation to geography, biology and psychology. Study of primitive religion, family patterns, and cultural variations.

341. Introduction to Social Welfare 3 hours
The historical development of health and welfare services, public and voluntary, from English and early American background to the present.

342. Social Welfare Needs and Resources 3 hours
The function and programs of state and local governments, private and voluntary agencies, in meeting the problems of the aged, unemployed, disabled, handicapped, children and other special groups.

343. Social Work Methods 3 hours
Introduction to the basic processes used in social work practices; social case work, social group work, and intergroup or community work.

403. Race Relations 5 hours
A study of the phenomena which arise when groups of people who differ racially or culturally come into contact with one another.

411. Rural-Urban Sociology 5 hours
A comparative study of the organization, social processes, problems, and interrelationships of rural and urban communities.

413. Industrial Sociology 3 hours
A study of the social organization of industry and human relations in the work plant. Problems of conflict and cooperation in the work group and the relation between the work group and the community are emphasized.

421. Public Opinion and Propaganda 3 hours
An analysis of the nature and sources of contemporary public opinion and the nature, extent, and direction of propaganda in contemporary society.

422. Marriage and Family Counseling 5 hours
A course dealing with the development of premarital and marital counseling together with the details of its practice. Emphasis upon role playing in a counseling situation. This course is open only to students with the approval of the instructor.
Prerequisite: Sociology 201-202.

430. Conference Leadership in Human Relations 3 hours
A course designed to aid participants in better use of conference leading techniques by furnishing them with basic information regarding techniques and offering them an opportunity to lead supervised practice discussion.
440. Social Problems

Minor investigation. Open only to qualified seniors by arrangement.

441-442. Social Welfare Investigation

Social welfare investigation and methods of research and their application to the analysis of social phenomena.

443. Social Field Work Observation and Orientation

To enable qualified students to observe and participate in social work programs under the supervision of professional workers.
College of Engineering

LAWRENCE HARRY ARCHER, Dean

ACADEMIC RECOGNITION

The Engineers' Council for Professional Development, the only official accrediting agency for engineering curricula, has accredited all of the programs in the College of Engineering. Each department, Civil, Electrical, and Mechanical Engineering, enjoys the distinction. Membership by the College is held in the American Society for Engineering Education. The Ohio State Board of Registration for Professional Engineers and Surveyors lists Ohio Northern University as a recognized engineering school. In all, the College of Engineering at Ohio Northern University is a quality school.

PURPOSE

Basically, the engineering student learns how to think in a logical sequence, subject to the facts involved. In keeping with the avowed purpose of Ohio Northern University, it is the aim of the College of Engineering to develop the whole individual. It is our purpose to have each student attain the highest standard of undergraduate proficiency in the areas of subject matter basic to all engineering and education in the essentials of his chosen branch of the profession as well as the areas of living. Through this emphasis each graduate should be able to have a full life of professional performance and true citizenship.

HISTORY

During the eighty-three years of its existence the College of Engineering has had more than twenty-five hundred graduates. The Civil Engineering Department had its first class in 1882; Electrical Engineering in 1898; and Mechanical Engineering, in 1904.

The student has always been treated as an individual. Classes have been kept at a minimum. Close faculty-student relationship is still maintained today. The best interests of the student are the first and most important consideration of faculty and staff at Ohio Northern University.

ADMISSION

An applicant for admission to the College of Engineering should write to the Admissions Office, Ohio Northern University, Ada, Ohio, or to the Dean, College of Engineering, for complete information and instructions for admission. More complete data is found on page 6 of this bulletin. You will find it advantageous to apply early. We would suggest that this procedure start in the junior year of high school and be completed by the end of the Christmas Season of the senior year. Late applicants are accepted but on a first come first served basis.
We welcome students who have not spent four years sitting in required classes, but have attained a level of knowledge in English, mathematics, and science, by independent study, far in excess of the standard four-year high school course.

Candidates of good moral character may apply for admission upon one of the following plans:

A. High School or Academy Graduates. For the regular program each applicant must have course description as follows: English, 4 years; mathematics, 4 years; science, 2 years. It is recommended that applicants have two years of foreign language.

In mathematics, two years should be in algebra, one in plane geometry, one-half in solid geometry, and one-half in trigonometry. The sciences must include physics, and should include chemistry.

Those people who meet the general university admission standards, but are found to be deficient in mathematics and/or physics, will be required to make up the material. This will take at least one summer session above the regular four year program or, in some cases, may require five years.

B. Transfer Students. An applicant from another college seeking advanced standing must present evidence of honorable dismissal and an official transcript of his college record. Some credit may be allowed for practical experience in Drafting. Applicants for such credit must submit a satisfactory statement from their employer giving time of service, nature of work, name and address of employer.

Advance credit from other institutions of higher learning will not be given for more than 162 quarter hours (108 semester hours). The work must be "C" level or better.

C. Special Student. Mature persons not candidates for a degree may be admitted, if, on consultation, the Dean is satisfied that they have sufficient preparation to pursue the work successfully. Such applicants are classified as Special Students. Upon successful completion of their work a certificate showing the course of study pursued and the amount of work covered is presented to them.

LOAD

The standard load in the College of Engineering is listed under each department term by term. Extra hours based upon scholarship attainments may be granted by the Dean upon recommendation of the student's advisor and the payment of the extra hour fee.

Engineering students are responsible to fulfill the requirements of the current year's catalog as they apply to that year of his course.
ACADEMIC STANDING

The general categories are good standing, warning, probation, suspension, and dismissal. Any student who is in good standing, which is the normal condition of admission, and makes less than 2.0 point average for the quarter is placed on warning. A student is warned only once. Warning means that the faculty of the College of Engineering is not satisfied with the work done by the student the first time that the student falls below 2.0.

At any future time when the student drops below 2.0 for the quarter or accumulative average, he is placed on probation. Probation means that the quarter’s work or the accumulative work is not satisfactory for a second time. At this stage the student’s load is reduced. In extreme cases the Dean may place any student on probation without first having had the student on warning.

When a student is on probation and falls below 2.0, either for the quarter or accumulative average, he is subject to suspension or dismissal. Suspension and dismissal differ only in matter of degree. A person who is suspended has the privilege of re-applying for admission after the lapse of a year. When a student is dismissed, this is final action.

Students on warning are required to have at least monthly consultations with their advisor and the Dean, while students on probation are required to meet with their advisor and the Dean at least every two weeks.

CLASSIFICATION

For purposes of classification, the minimum requirements for sophomore standing are 55 quarter hours of academic work; for junior standing, 110 hours, with all freshman and sophomore requirements completed; for senior standing, 165 credit hours and the satisfactory completion of the English Proficiency Examination.

GRADUATION AND DEGREES

In addition to meeting specific departmental requirements, a minimum of 220 hours, of which six are in Physical Education, is required for graduation. He must have a scholarship rating of at least two quality points for each credit hour scheduled with an accumulative point average of 2.0 in all engineering courses. A student is not permitted to be a candidate for more than one degree at any one time.

All degree candidates must spend their Senior year in residence, taking at least forty-five quarter hours for final credit toward graduation.

The University is empowered to grant the customary academic degrees, which in the College of Engineering are Bachelor of Science in Civil Engineering, Bachelor of Science in Electrical Engineering, and Bachelor of Science in Mechanical Engineering.

REGISTRATION AS A PROFESSIONAL ENGINEER

In order to practice as a Professional Engineer after graduation it is necessary to become registered by the state. Complete information on this subject can be obtained by corresponding with the College of Engineering
of Ohio Northern University or by writing to the Secretary of the Board of Registration for Professional Engineers and Surveyors, 21 West Broad Street, Columbus, Ohio. Further information is furnished to all students as freshmen and again as seniors.

Since four years of practical experience in Engineering are required beyond the college education before full registration as a Professional Engineer can be obtained, this item necessarily becomes an important factor in choosing Professional Engineering as a career.

ENGINEERING BUILDING

The College of Engineering, staff, and faculty are housed in a three story, thirty-eight room brick structure. The building has special provision for well-equipped drafting rooms, laboratories, and classrooms.

Some of the laboratories, rooms, and shops are as follows: Testing Materials Laboratory, Fluid Mechanics Laboratory, Concrete Laboratory, Soils Laboratory, Steam Laboratory, Internal Combustion Engine Laboratory, Air-Flow Laboratory, A.C. Power Laboratory, D.C. Power Laboratory, Surveying Supply, Senior Design Room, Visual Aid Room, Graphics Laboratory, Machine Shop, Carpenter Shop, Tool Crib, Electronics Laboratory, and Computer Center.

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 en-
engineer needs an educational background in the use of computers. The establishment of the Computer Center follows the current engineering trend to make equipment available to the undergraduate student.

A course which uses the Computer Center as a Laboratory is taught to all engineering freshmen. The student is his own operator, and does his own work within the Center. The use of the Center is intended to become an integral part of a student's engineering education, and will be required in other engineering course work.

The Center contains a scientific IBM 1620 Digital Computer, a 1622 Card Reader Punch, a 1311 Random Access Disk file, and needed support equipment, and is located on campus within the Engineering Building.

PROFESSIONAL AND TECHNICAL ORGANIZATIONS

All engineering students are strongly encouraged to belong to and participate in the professional society and their technical organization. From the beginning each student should realize that he is a member of an honorable profession and that these organizations are a part of his program.

The student branch of the Ohio Society of Professional Engineers embraces all students of the College of Engineering as the professional organization. Professional Standards, Professional Registration, Ethics and the Engineer's place in the community are some of the things inculcated by the student branch of the Ohio Society of Professional Engineers, and the National Society of Professional Engineers.

All Civil Engineering students are eligible for membership in the Ohio
Northern Student Chapter of the American Society of Civil Engineers. Activities of A.S.C.E. are helpful in rounding out the student’s program. This technical group is affiliated with the Toledo Section of the American Society of Civil Engineers.

The Institute of Electrical and Electronics Engineers Student Branch is the technical society of electrical engineers. Topics pertinent to the field of Electrical Engineering are presented and discussed at their meetings. All students interested in Electrical Engineering are eligible for membership. The student chapter enjoys a very close association with the Lima Section of the Institute of Electrical and Electronics Engineers.

The Ohio Northern Student Section of the American Society of Mechanical Engineers is the technical society that sponsors the discussion of mechanical engineering and its allied fields. The student section is allied with the Toledo Section of the American Society of Mechanical Engineers.

Monthly meetings are held by the professional and the three technical groups on first and third Thursdays, respectively.

PRE-ENGINEERING CURRICULA

Since the first two years of any particular curriculum in engineering are practically the same, it is possible to offer pre-engineering in all fields. As soon as the pre-engineering student decides where he or she will get his or her degree, the program is varied so that it will conform to the schedule as listed in the catalog of that institution. All pre-engineering students are enrolled in the College of Engineering.
ARTS-ENGINEERING CURRICULA

Students entering with advanced credit from liberal arts colleges must be in residence at least nine quarters and complete a minimum of 135 hours before the B.A. and B.S. degrees are awarded by Ohio Northern University. The courses being applied toward the B.A. degree are subject to approval by the College of Liberal Arts while all of them must be approved by the College of Engineering.

Normally the major area in Liberal Arts is Business Administration, Mathematics, Physics, or Chemistry. Students entering the Arts-Engineering curriculum must conform to the rules and regulations of the College of Liberal Arts and the College of Engineering. In order to make this program work, the student must enter it at the beginning.

Those students entering from other selected liberal arts colleges with three years of work gets the B.A. degree from the home institution after completing the junior year engineering program at Ohio Northern University. For specific data the home institution catalog must be consulted. After completing the junior and senior years in the College of Engineering, the appropriate engineering degree is awarded.

SURVEYING FIELD PRACTICE

BASIC ENGINEERING

During the first two years all Engineering students follow the same general program. Except for advisory purposes, it is not necessary for the student to select a branch of Engineering until the end of the third quarter of the Sophomore year.

No sharp line of distinction can be drawn in the fundamental education of Civil, Chemical, Electrical or Mechanical Engineers for the reason that the sciences basic to Engineering—Mathematics, Physics, Chemistry, and some Engineering Science—are essential in all branches of Engineering.

Since certain courses in engineering are considered to be fundamental courses and deal with the basics of the several fields, these courses are used by all three departments in the first three years of the curriculum.
BASIC ENGINEERING — COURSE DESCRIPTIONS

The courses that carry the "BE" prefix to the number are courses taught by the Engineering faculty and are required of all Engineering students.

BE 100. HIGH SCHOOL REFRESHER FOR BEGINNING ENGINEERING STUDENTS (Pre-Fall) No credit

For a period of three weeks, five days per week, eight hours per day, a review of those portions of high school mathematics that are necessary to start the college mathematics, is offered previous to the opening of the Fall Quarter. All beginning freshmen find the systematic review of value in getting started in the college mathematics. The course includes topics in algebra, geometry, trigonometry, and analytical geometry.

Students who do not place sufficiently high on mathematics placement tests during Summer Orientation are required to take this course during the Fall Quarter. The basic purpose is to prepare the student to start the calculus.

001. ORIENTATION OF ENGINEERING STUDENTS No credit

002. ORIENTATION OF ENGINEERING STUDENTS No credit

003. ORIENTATION OF ENGINEERING STUDENTS No credit

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. The purpose of this course is to help the student to make the transition from high school to college as well as the proper orientation in the profession.

BE 101. DIGITAL COMPUTATION I (1 + 0)* 1 hour


Prerequisite: Math 241 or concurrently.

BE 102. DIGITAL COMPUTATION II (1 + 1) 1 hour

Continuation of BE 101.

Prerequisite: Math 242 or concurrently, BE 101.

BE 103. DIGITAL COMPUTATION III (1 + 1) 2 hours

Continuation of BE 102.

Prerequisite: Math 243 or concurrently, BE 102.

BE 201. ENGINEERING GRAPHICS I (0 + 4) 2 hours

Lettering, use of instruments, applied geometry, orthographic projection, sketching, pictorial sketching, dimensioning.

*NOTE: (1 + 0) indicates the hours of lecture and laboratory per week. The first number gives the lecture hours while the second number shows the laboratory hours.
BE 202. ENGINEERING GRAPHICS II (0 + 4) 2 hours
Advanced orthographic projection, descriptive geometry: point, line, plane problems, curved surfaces, developments, intersections, perspective.
Prerequisite: BE 201.

BE 211, 212, 213. ENGINEERING MECHANICS I, II, III (3 + 0) 9 hours
Prerequisite: Math 243, Physics 243, BE 211 to 212 to 213.

BE 221. PASSIVE & ACTIVE CIRCUITS I (3 + 0) 3 hours
Introductory concepts followed by the presentation of a-c circuits as a problem in differential-equation theory. Phasor representation, series and parallel circuits, resonance phenomena and network theorems are studied. Lectures and recitation periods.
Prerequisite: Physics 243.

BE 222. PASSIVE & ACTIVE CIRCUITS II (3 + 0) 3 hours
A continuation of BE 221. Coupled circuits, balanced and unbalanced polyphase circuits, polyphase power measurements, and nonsinusoidal waves. Lectures and recitation periods.
Prerequisite: BE 221.

BE 223. PASSIVE & ACTIVE CIRCUITS III (3 + 0) 3 hours
A continuation of BE 222. Active devices and their equivalent linear active circuits are studied.
Prerequisite: BE 222.

BE 231. ENGINEERING LABORATORY I (0 + 3) 1 hour
The first of a sequence of three courses designed to show how to plan an experiment on a rational basis and correctly interpret the results. One or more problems requiring a digital computer solution will be given during the 3-quarter sequence. Fundamentals of probability and error analysis, propagation of errors and reduction of variables.
Prerequisite: Physics 243.

BE 232. ENGINEERING LABORATORY II (0 + 3) 1 hour
A continuation of BE 231. Test planning, data checking and statistical analysis.
Prerequisite: BE 231.
BE 233. ENGINEERING LABORATORY III \((0+3)\) \(1\) hour
A continuation of BE 231 and BE 232. Curve plotting and graphical analysis; curve fitting and mathematical analysis.
Prerequisite: BE 232.

BE 241. CIRCUITS LABORATORY I \((0+3)\) \(1\) hour
A laboratory study of electric circuits including resonant circuits, current and voltage loci and theory and range of application of electrical instruments.
Prerequisite: BE 221 or concurrent.

BE 242. CIRCUITS LABORATORY II \((0+3)\) \(1\) hour
Continuation of BE 241. Coupled circuits, network theorems, polyphase circuits and power measurements.
Prerequisite: BE 241.

BE 243. CIRCUITS LABORATORY III \((0+3)\) \(1\) hour
Continuation of BE 242. A laboratory study of active devices and their associated circuits.
Prerequisite: BE 242.

BE 253. THERMODYNAMICS I \((3+0)\) \(3\) hours
Study of conservative systems, energy, temperature and other properties by methods of statistical inference.
Prerequisite: Physics 243, Math 243.

BE 321. THERMODYNAMICS II \((3+0)\) \(3\) hours
Application of thermodynamics to machines, power, and refrigeration cycles.
Prerequisite: BE 253.

BE 322. FLUID MECHANICS \((3+0)\) \(3\) hours
Mechanics of compressible and incompressible liquids, fluid statics, steady flow in pipes.
Prerequisite: BE 212.

CIVIL ENGINEERING

PROFESSOR MILES (Chairman), ASSOCIATE PROFESSOR HILLERY

Although many of the former divisions have grown into separate departments, Civil Engineering offers greater opportunities than ever before. The Civil Engineer conceives, designs, and supervises the building of projects, coordinating and utilizing all resources for all types of developments. He works in many broad fields of specialization such as: Structural Engineering, Construction Engineering, Highway and Transportation Engineering, Sanitary Engineering, Soil Engineering, Surveying, Mapping, City Managing, Consultant in Engineering, etc.
The Department is supplied with high grade instruments and appliances necessary for first class instruction and practice. The laboratories are well equipped, the drafting room large and modern, the scientific library excellent.

The Civil Engineering Department offers laboratory work in Testing Materials, Concrete, Soil Mechanics and Fluid Mechanics, as well as field work in Surveying.

CONCRETE LABORATORY

In the Testing of Materials Laboratory, equipment is available which enables the student to perform a wide variety of standard ASTM tests. This laboratory has screw gear universal testing machines, hydraulic testing units, a pendulum type torsion machine, a universal impact tester, a high speed rotary fatigue testing machine, hardness testers, and other equipment including extensometers, compressometers, and SR-4 strain gages.

The Concrete Laboratory provides for the conducting of many of the tests, standardized by ASTM and AASHO, for concrete materials, cement and mortars. A high and low temperature humidity chamber, a sieve shaker with standard sieves, a motor driven concrete mixer, concrete beam and cylinder testing machines, and a flow table, together with the usual small pieces of equipment, are located in this laboratory.

The Soil Mechanics Laboratory has a portable unconfined compression machine, drying oven, water bath, soil dispersion apparatus, C.B.R. apparatus, sampling equipment, permeameter, compaction outfit, direct single shear apparatus, double shear equipment, triaxial apparatus with pore pressure attachment, and Proctor and Howard miniature moisture density apparatus.
## CIVIL ENGINEERING PROGRAM

### FIRST YEAR
- **English Composition I, II, III**
  - Fall: C-1, C-2, C-3
  - Winter: 3 0 3
  - Spring: 3 0 3
- **General Chemistry I, II, III**
  - Fall: 131, 132, 133
  - Winter: 3 3 4
  - Spring: 3 3 4
- **Calculus and Analytical Geometry I, II, III**
  - Fall: 241, 242, 243
  - Winter: 5 0 5
  - Spring: 5 0 5
- **Physics I, II, III**
  - Fall: 241, 242, 243
  - Winter: 4 2 5
  - Spring: 4 2 5
- **Digital Computation I, II, III**
  - Fall: BE 101, BE 102, BE 103
  - Winter: 1 0 1
  - Spring: 1 1 1

### SECOND YEAR
- **Philosophy & Religion I, II, III**
  - Fall: C-31, C-32, C-33
  - Winter: 3 0 3
  - Spring: 3 0 3
- **Engineering Mathematics I, II, III**
  - Fall: 341, 352, 353
  - Winter: 5 0 5
  - Spring: 5 0 5
- **Engineering Graphics I, II**
  - Fall: BE 201, BE 202
  - Winter: 0 4 2
  - Spring: 0 4 2
- **Thermodynamics I**
  - Fall: BE 253
  - Winter: BE 253
  - Spring: BE 253
- **Engineering Mechanics I, II, III**
  - Fall: BE 211, BE 212, BE 213
  - Winter: 3 0 3
  - Spring: 3 0 3
- **Passive & Active Circuits I, II, III**
  - Fall: BE 221, BE 222, BE 223
  - Winter: 3 0 3
  - Spring: 3 0 3
- **Engineering Laboratory I, II, III**
  - Fall: BE 231, BE 232, BE 233
  - Winter: 0 3 1
  - Spring: 0 3 1
- **Circuits Laboratory I, II, III**
  - Fall: BE 241, BE 242, BE 243
  - Winter: 0 3 1
  - Spring: 0 3 1

### SURVEYING CAMP FOR CIVILS
- **Surveying I**
  - CE 214
  - Post-Spring (12 successive Days)
  - 5 hours

---

**R** = Recitation, **L** = Laboratory, **C** = Credit Hours

Catalog numbers followed by - (dash) indicate dependence courses.

Catalog numbers followed by - (dash) indicate dependence courses.

Catalog numbers followed by , (comma) indicate no dependence.

Student will work out six terms of Physical Education during the first six terms of school.

Orientation will be scheduled by each freshman each term.
### Third Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
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<tbody>
<tr>
<td>Mechanics of Materials I, II</td>
<td>CE 301 - CE 302</td>
<td>3</td>
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<tr>
<td>Numerical Methods in Engineering</td>
<td>CE 311</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Theory of Structures, I, II</td>
<td>CE 312 - CE 313</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Thermodynamics II</td>
<td>BE 321</td>
<td>3</td>
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<tr>
<td>Fluid Mechanics, Hydraulics</td>
<td>BE 322 - CE 323</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Surveying II, Photogrammetry</td>
<td>CE 331 - CE 332</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Transportation Engineering</td>
<td>CE 333</td>
<td>2</td>
<td>3</td>
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<tr>
<td>Engineering Mechanics Laboratory I, II</td>
<td>CE 342 - CE 343</td>
<td>3</td>
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<tr>
<td>Materials Science I, II, Engrg. Geology</td>
<td>CE 351 - CE 352</td>
<td>1</td>
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<tr>
<td>Social Science Elective</td>
<td>CE 353</td>
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### Fourth Year

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<tr>
<th>Course</th>
<th>Fall</th>
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<tr>
<td>Old Program - Last Year to be offered, 1964-65</td>
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<tr>
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<tr>
<td>Theory of Structures II, III</td>
<td>CE 401 - CE 402</td>
<td>3</td>
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<tr>
<td>Structural Design I, II, III</td>
<td>CE 411 - CE 412 - CE 413</td>
<td>3</td>
<td>2</td>
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<tr>
<td>Reinf. Concrete Theory I, II, III</td>
<td>CE 421 - CE 422 - CE 423</td>
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<tr>
<td>Reinf. Concrete Design I, II</td>
<td>CE 422a - CE 423a</td>
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<tr>
<td>Soil Mechanics, Sanitary Engineering</td>
<td>CE 431 - CE 432</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Cost Analysis</td>
<td>CE 433</td>
<td>4</td>
<td>0</td>
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<tr>
<td>*Electrical Engineering I, II, III</td>
<td>EE 301 - EE 302 - EE 303</td>
<td>3</td>
<td>0</td>
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<tr>
<td>Engineering Law</td>
<td>E 403</td>
<td>3</td>
<td>0</td>
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<tr>
<td>Humanities Elective</td>
<td></td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>*These course numbers refer to descriptions in the catalogues prior to 1964-65.</td>
<td></td>
<td>15</td>
<td>9</td>
</tr>
</tbody>
</table>
In the Fluid Mechanics Laboratory, water under constant head is supplied from a standpipe to weirs, venturi meters, orifices, displacement meters, a friction board, a flume and other equipment. Pumps of various designs are available for use on a pump test stand.

A great number of varied field exercises in surveying is provided by numerous transits, levels, plane tables, alidades, theodolites and the smaller equipment necessary for such work.

The Senior Design Room has a Friden electric calculator and several models of trusses.

The aim of this Department is to give the student a well-rounded Engineering education and to instill within the student the idea of knowing how, knowing why, and doing the best engineering job possible for his client for the least amount of money, always abiding by the Code of Ethics of the

CIVIL ENGINEERING — COURSE DESCRIPTIONS

CE 214. SURVEYING I (3 + 6) (Surveying Camp) 5 hours

CE 301. MECHANICS OF MATERIALS I (3 + 0) 3 hours
Continuation of BE 213 including introduction to design of beams and columns under a variety of loading and support conditions; combined stresses and resultant deformations commonly encountered in beams and columns; shaft couplings; riveted and welded connections.
Prerequisite: BE 213.

CE 302. MECHANICS OF MATERIALS II (3 + 0) 3 hours
Continuation of CE 301 including beams with more than two supports; special beams; dynamic loading; shear flow; thin plates and shells; mechanical properties (yielding, work hardening, fatigue, creep, and theories of strength) of common structural materials; and other additional topics.
Prerequisite: CE 301.

CE 311. NUMERICAL METHODS IN ENGINEERING (3 + 0) 3 hours
Prerequisite: Eng. Math. 353.

CE 312. THEORY OF STRUCTURES I (3 + 0) 3 hours
Analysis of statically determinate beams, frames and trusses by analytical and graphical methods. Influence lines and their application to the analysis of structures subjected to moving loads.
Prerequisite: CE 302 or concurrently.

CE 313. THEORY OF STRUCTURES II (3 + 0) 3 hours
Continuation of CE 312. Analysis of simple space structures; cables;
approximate methods of analyzing building bents and multistory frames; introduction to the deflections of structures.

Prerequisite: CE 312.

CE 323. HYDRAULICS (3 + 0)  
Flow in pipes and complex pipe systems; introduction to non-uniform flow in open channels and rivers; elementary hydraulic model theory; pumping machinery.

Prerequisite: BE 322.

CE 331. SURVEYING II (3 + 6)  
Theory and practice in horizontal and vertical curves as applied to the location and design of highways, railroads, and other routes of transportation, with special emphasis on highway geometrics and interchanges. Procedures and problems encountered in high-order control surveys for bridges, dams, tunnels and other large construction projects.

Prerequisite: CE 300.

CE 332. PHOTOGRAFMETRY (2 + 3)  
The use of aerial photography in different phases of engineering such as transportation, surveying, etc. Air photo interpretation. A study of devices used in photogrammetry. Analytic solution of tilt and rectification problems. Controlled mosaics.

Prerequisite: CE 331.

CE 333. TRANSPORTATION ENGINEERING (4 + 0)  
A study of transportation systems covering the areas of geometric design, location, development, prediction for future demands, finance and economics.

Prerequisite: CE 332 or Junior Standing.

CE 342. ENGINEERING MECHANICS LABORATORY I (0 + 3) 1 hour  
Experimental verification of fundamental theories of mechanics of materials; advanced instrumentation. Introduction to techniques of model analysis.

Prerequisite: CE 301.

CE 343. ENGINEERING MECHANICS LABORATORY II (0 + 3) 1 hour  
Verification of fundamental principles covered in Fluid Mechanics and Hydraulics. Calibration of hydraulic measuring devices; measurement of pipe friction; flow in open channels; efficiency tests of centrifugal pumps.

Prerequisite: BE 322.

CE 351. MATERIALS SCIENCE I (1 + 3)  
Theory and practice in the design of concrete mixes. A study of the physical and chemical properties of cements and aggregates, brick, block, tile, and stone. Use of admixtures in concrete and natural destructive agents.

Prerequisite: Junior Standing.

CE 352. MATERIALS SCIENCE II (0 + 3)  
A laboratory study of the methods of design of bituminous concrete
mixes as applied to airport runways and highways and the study of the physical and chemical properties of constituent materials.

Prerequisite: CE 351.

CE 353. ENGINEERING GEOLOGY (3 + 0) 3 hours
Study of minerals and rocks; physical, historical and structural geology; geological forms; land formations; planning of soil surveys. Techniques of air photo interpretation in identifying the engineering properties of soil: Surface and subsurface geological maps. Field trip.

Prerequisite: CE 214, Chemistry 133.

*CE 401. THEORY OF STRUCTURES II (3 + 0) 3 hours
Continuation of the use of influence lines for the analysis of highway and railway bridges. Approximate analysis of statically indeterminate structures. Introduction to finding deflections of structures.

Prerequisite: CE 313.

*CE 402. STATICALLY INDETERMINATE STRUCTURES (3 + 0) 3 hours
Continuation of finding the deflections of structures. Analysis of statically indeterminate structures by the method of super-position, Castigliano's second theorem, virtual work, slope deflection, moment distribution, and column analogy.

Prerequisite: CE 401.

*E 403. ENGINEERING LAW (3 + 0) 3 hours
Legal principles of vital interest to engineers. General nature of law and the working of the judicial system. Contracts, agencies, sales, negotiable instruments, workmen's compensation, mechanics liens, property, patents, and expert testimony.

*CE 411. STRUCTURAL DESIGN I (0 + 6) 2 hours
The elements of structural design in steel and light gage metals. Tension members, compression members. Riveted and welded connections. Design and drawings of a steel roof truss. Introduction to timber design.

Prerequisite: CE 313.

*CE 412. STRUCTURAL DESIGN II (0 + 6) 2 hours
Rolled beams and girders. Design and drawing a plate girder railroad or highway bridge.

Prerequisite: CE 401, 411.

*CE 413. STRUCTURAL DESIGN III (0 + 6) 2 hours
Design and drawings of a tall building. Moment resisting wind connections. Introduction to plastic design in steel.

Prerequisite: CE 412.

*These courses are offered for seniors in 1964-65. The new senior program will be published in the 1965-66 catalog. Course numbers listed as prerequisites refer to descriptions in the catalogs prior to 1964-65.
*CE 420a. ADVANCE STRUCTURAL MECHANICS (3 + 0) 3 hours
Prerequisite: CE 402.

*CE 421. REINFORCED CONCRETE I (3 + 0) 3 hours
Principles of elastic design of structural elements including beams, columns, and slabs. An introduction to ultimate strength design of beams and columns.
Prerequisite: CE 313, 333.

*CE 422. REINFORCED CONCRETE II (2 + 0) 2 hours
A continuation of CE 421; design of footings and retaining walls; an introduction to arch and bridge design.
Prerequisite: CE 421.

*CE 422a. REINFORCED CONCRETE DESIGN I (0 + 6) 2 hours
Design of concrete structures with emphasis on structural design of buildings; details.
Prerequisites: CE 421 and concurrent with CE 422.

*CE 423. PRESTRESSED CONCRETE (2 + 0) 2 hours
Principles of linear prestressing; study of materials used in prestressed concrete; design of simple beams on the bases or ultimate stresses and working loads; design of continuous prestressed concrete beams.
Prerequisite: CE 422.

*CE 423a. REINFORCED CONCRETE DESIGN II (0 + 3) 1 hour
Students choice of problem dealing with investigation, and design of a concrete structure; to develop student initiative and technique under general supervision.
Prerequisite: CE 422, 422a.

*CE 431. SOIL MECHANICS (3 + 3) 4 hours
An introduction to soil engineering, physical properties of soils as affecting engineering design and construction, soil sampling, mechanics of soil masses, stability, settlement, types of foundations, and laboratory soil tests.
Prerequisite: CE 221, 303.

*CE 432. WATER SUPPLY AND SANITARY ENGINEERING (4 + 0) 4 hours
General course on sewerage systems, disposal of sewage, requisites of a water supply, quality of water, studies of rainfall and runoff, water treatment, and inspection trip.
Prerequisite: CE 322.

*These courses are offered for seniors in 1964-65. The new senior program will be published in the 1965-66 catalog. Course numbers listed as prerequisites refer to descriptions in the catalogs prior to 1964-65.
*CE 433. Cost Estimating (2 + 3) 3 hours
Specifications, economical construction methods, quantity take-offs, cost analysis, and cost estimating as applied to various engineering projects.
Prerequisite: C.E. 412, 422a for senior C.E. students. All others, permission of instructor.

*CE 450a. Projects 1—5 hours
Practical projects involving calculation, design, drafting, engineering judgment, and skill in construction or repair work. Reference work is used to a great extent.
a. Taught upon sufficient demand.

*These courses are offered for seniors in 1964–65. The new senior program will be published in the 1965–66 catalog. Course numbers listed as prerequisites refer to descriptions in the catalogs prior to 1964–65.

ELECTRICAL ENGINEERING

Professor Klingengerger (Chairman)  
Professor Alden
Assistant Professor Cheng  
Assistant Professor Tse ng
Assistant Professor Carmean  
Mr. Busch

Electrical Engineering is that segment of engineering whose core is built around the science and application of electricity and magnetism. It treats, among other things, the laws governing energy conversion, communication science, vacuum tube and solid state electronics, power systems, automatic controls, and electronic analog and digital computers.

The Electrical Engineering curriculum is a coordinated program of study whereby the student may obtain both a thorough theoretical background along with good scientific working knowledge which will enable him to embark upon a successful professional career. In the first quarter of the Sophomore year the student starts in the electrical engineering sequence by studying basic circuit theory. In these and subsequent courses he will do work in electronics, electromagnetic fields and waves, network analysis and synthesis, energy conversion, automatic control systems, and information theory.

The classroom activities are supplemented by work in the various laboratories. Problem solving is emphasized in the laboratory courses to cultivate the creative ability of the students. The Electrical Engineering Laboratories occupy three large adjoining rooms on the main floor of the Engineering building. The instrument room is equipped with the finest indicating instruments and other testing and measuring equipment available. The Power Laboratory contains a number of transformers of convenient size, AC-DC motor generator sets, generalized machines, and other power and automatic control equipment. The Communications Laboratory is equipped with a wide variety of test equipment, including bridge-type instruments, portable
cathode ray oscilloscopes and analog computers. The facilities of the Engineering Computer Center are also available for student use.

Recognizing that extensive specialization is no longer possible or even desirable in undergraduate study, this curriculum is designed to provide an excellent background for students who intend to pursue more advanced specialized work in graduate school, or who may choose employment in any of the following fields: Radio communication, television, telegraph systems, electronics, development of electrical equipment and controls for the aerospace science, construction and operation of generating stations and electric power systems, installation and operation of equipment in industrial plants, design of power apparatus, manufacture and sale of electrical equipment.

**ELECTRICAL ENGINEERING LABORATORY**

**ELECTRICAL ENGINEERING — COURSE DESCRIPTIONS**

EE 301. ENGINEERING ANALYSIS (3 + 3)  
Emphasis on use and practicality of numerical methods in solution of actual engineering problems.  
Prerequisite: Math 353.

EE 311. ELECTRONICS I (3 + 0)  
Small-signal amplifiers; feedback; audio-frequency and radio-frequency amplifiers with large signals.  
Prerequisite: BE 223.
# Electrical Engineering Program

## First Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
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<tbody>
<tr>
<td>English Composition I, II, III</td>
<td>R</td>
<td>L</td>
<td>C</td>
</tr>
<tr>
<td>General Chemistry I, II, III</td>
<td>131</td>
<td>132</td>
<td>133</td>
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<tr>
<td>Calculus and Analytical Geometry I, II, III</td>
<td>241</td>
<td>242</td>
<td>243</td>
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<tr>
<td>Physics I, II, III</td>
<td>241</td>
<td>242</td>
<td>243</td>
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<tr>
<td>Digital Computation I, II, III</td>
<td>BE 101</td>
<td>BE 102</td>
<td>BE 103</td>
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</table>

## Second Year

<table>
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<tr>
<th>Course</th>
<th>Fall</th>
<th>Winter</th>
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<tbody>
<tr>
<td>Philosophy &amp; Religion I, II, III</td>
<td>R</td>
<td>L</td>
<td>C</td>
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<tr>
<td>Engineering Mathematics I, II, III</td>
<td>341</td>
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<tr>
<td>Engrg. Graphics I, II, Thermo. I</td>
<td>BE 201</td>
<td>BE 202</td>
<td>BE 253</td>
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<tr>
<td>Engineering Mechanics I, II, III</td>
<td>BE 211</td>
<td>BE 212</td>
<td>BE 213</td>
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<td>Passive &amp; Active Circuits I, II, III</td>
<td>BE 221</td>
<td>BE 222</td>
<td>BE 223</td>
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<tr>
<td>Engineering Laboratory I, II, III</td>
<td>BE 231</td>
<td>BE 232</td>
<td>BE 233</td>
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<td>Circuits Laboratory I, II, III</td>
<td>BE 241</td>
<td>BE 242</td>
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R = Recitation, L = Laboratory, C = Credit Hours
Catalog numbers followed by a dash indicates dependence courses.
Catalog numbers followed by a comma indicates no dependence.
Student will work out six terms of Physical Education during the first six terms of school.
Orientation will be scheduled by each freshman each term.
### THIRD YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Electronics I, II, Network Analysis</td>
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<tr>
<td>Field and Waves I, II, III</td>
<td>3</td>
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<tr>
<td>Electrical Engineering Laboratory I, II, III</td>
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<tr>
<td>Humanities Elective</td>
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### FOURTH YEAR

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<th>Course</th>
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<td>Present Program—Last Year to be offered, 1964-65.</td>
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<tr>
<td>New Program will be listed for 1965-66.</td>
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<tr>
<td>Electronics II, III, IV</td>
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<tr>
<td>Electrical Machinery I, II, III</td>
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<td>Social Science Elective</td>
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<td>Technical Elective</td>
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<th>Spring Credits</th>
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<td>17 3 18</td>
<td>16 3 17</td>
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<tr>
<td>Winter</td>
<td>17 6 19</td>
<td>15 9 18</td>
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<tr>
<td>Spring</td>
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</table>
EE 312. **Electronics II** \((3 + 0)\)  \(3\) hours
Oscillators; AM-FM-PM modulation and demodulations.
*Prerequisite:* EE 311.

EE 323. **Network Analysis** \((3 + 0)\)  \(3\) hours
Matrix circuit and topological circuit analysis; signal-flow graphs and circuit analysis; one-port reactive networks; two-port reactive networks.
*Prerequisite:* EE 342.

EE 331. **Fields and Waves I** \((4 + 0)\)  \(4\) hours
Static electric fields; steady electric currents and their magnetic fields; boundary relations; magnetic fields of ferromagnetic materials; vector analysis used throughout.
*Prerequisite:* BE 223, Math 353.

EE 332. **Fields and Waves II** \((4 + 0)\)  \(4\) hours
Time-changing electric and magnetic fields; Maxwell's equations; plane waves; energy relations, Poynting vector; boundary value problems.
*Prerequisite:* EE 331.

EE 333. **Fields and Waves III** \((4 + 0)\)  \(4\) hours
Electric energy propagation; infinite line; lossless lines; Smith Chart; impedance transformation and matching; loss line analysis; wave guides; group and phase velocity; impedance of wave guides.
*Prerequisite:* EE 332.

EE 342. **Transient Analysis** \((4 + 0)\)  \(4\) hours
Transform method used in the study of transients and steady-states in linear systems.
*Prerequisite:* BE 223, Math 353.

EE 343. **Control Systems I** \((3 + 0)\)  \(3\) hours
A course in closed-loop systems performance from equations and transfer-function plots.
*Prerequisite:* EE 342.

EE 351. **Electrical Engineering Laboratory I** \((0 + 3)\)  \(1\) hour
Tube and transistor multistage amplifiers, radio-frequency amplifier; audio frequency power amplifier; feedback amplifier.
*Prerequisite:* EE 311 or concurrently.

EE 352. **Electrical Engineering Laboratory II** \((0 + 3)\)  \(1\) hour
Design and evaluation of single frequency oscillator; amplitude modulation; demodulation of a modulated wave.
*Prerequisite:* EE 351 and EE 312 or concurrently.

EE 353. **Electrical Engineering Laboratory III** \((0 + 3)\)  \(1\) hour
Laboratory study of servomechanism equipment; use of analog computer.
*Prerequisite:* EE 343 or concurrently.
*EE 411. COMMUNICATION CIRCUITS II (3 + 3) 4 hours
A continuation of Communications Circuits I. Theory and analysis of transmission lines. Topics covered include traveling waves, reflections, impedance matching by open and shorted stubs, transmission line charts and power lines. Lectures, recitations, computing, and laboratory periods.
Prerequisite: E.E. 313.

*EE 412. ELECTRIC AND MAGNETIC WAVES (5 + 0) 5 hours
A study of the fundamentals of electromagnetics. Time-varying electric and magnetic fields, Maxwell’s equations, plane waves in dielectric and conducting media, and wave guides are studied. Lecture and recitations.
Prerequisite: EE 411.

*EE 421. ELECTRONICS II (3 + 0) 3 hours
A continuation of Electronics I. The topics studied include small-signal amplifiers, feedback, direct-coupled amplifiers, and the audio-frequency amplifier with large signals.
Prerequisite: E.E. 323.

*EE 422. ELECTRONICS III (3 + 3) 4 hours
A continuation of Electronics II. The topics studied include the radio frequency amplifier, oscillators, modulation, and demodulation.
Prerequisite: E.E. 421.

*EE 423. ELECTRONICS IV (3 + 3) 4 hours
A continuation of Electronics III. The topics studied include wave-shaping circuits, gaseous conduction, power rectification, gaseous control tubes and circuits, and photoelectric devices.
Prerequisite: E.E. 422.

*EE 431. ELECTRICAL MACHINERY I (3 + 3) 4 hours
This is a course in the theory, application, operating characteristics, and control of direct-current machinery. Lectures, recitations, computing, and laboratory periods.
Prerequisite: E.E. 213.

*EE 432. ELECTRICAL MACHINERY II (3 + 3) 4 hours
A comprehensive study of the theory and performance of the alternator, the induction motor, and the transformer. Lectures, recitations, computing, and laboratory periods.
Prerequisite: E.E. 312.

*EE 433. ELECTRICAL MACHINERY III (4 + 3) 5 hours
A continuation of Electrical Machinery II comprising a study of induction motors of special types, induction regulator and related control apparatus, the synchronous motor, and the synchronous converter, all in theory, con-

*These courses are offered for seniors in 1964-65. The new senior program will be published in the 1965-66 catalog. Course numbers listed as prerequisites refer to descriptions in the catalogs prior to 1964-65.
struction, and performance. Lecture, recitations, computing, and laboratory periods.

Prerequisite: E.E. 432.

*EE 441. TRANSIENT CIRCUITS (4 + 0) 4 hours

Prerequisite: E.E. 312.

*EE 442. AUTOMATIC CONTROL I (3 + 0) 3 hours
This is a course in closed-loop systems performance from equations and transfer-function plots. Lectures and recitations.

Prerequisite: E.E. 441.

*EE 443. AUTOMATIC CONTROL II (2 + 3) 3 hours
A continuation of Automatic Control I. Topics studied include: gain adjustment, series compensation, parallel compensation, and logarithmic method of analysis. Lectures, recitations, computing, and laboratory periods.

Prerequisite: E.E. 442.

*EE 450B. PROJECTS 1—5 hours
Practical projects involving calculation, engineering judgment and skill in construction or repair work. These projects may vary from armature winding and motor repairing to the design and construction of laboratory apparatus. Individual assignments are used for each student.

*EE 462B and 463B. ADVANCED ELECTRICAL LABORATORY I & II 3 hours
Senior year. Special laboratory problems and investigations are intricate and more advanced than those included in regular courses. Minor research projects may be undertaken. Hours to be arranged to suit balance of schedule.

b: Taught upon sufficient demand.

*These courses are offered for seniors in 1964–65. The new senior program will be published in the 1965-66 catalog. Course numbers listed as prerequisites refer to descriptions in the catalogs prior to 1964–65.

MECHANICAL ENGINEERING

PROFESSOR HIRLDT,  PROFESSOR JENNINGS
ASSOCIATE PROFESSOR BURTON (Chairman)
ASSISTANT PROFESSOR FARRINGTON

Mechanical Engineering is a general term which may include the specialized fields of Applied Mechanics, Automotive Engineering, Heat Transfer, Machine Design, Materials Handling, Power, Production Engineering, and many others.

The mechanical engineer today is faced with such vital problems as space flight, automation, ever greater demands on the use of existing materials
and mechanisms in missiles, automotive, electronic, and other fields, and the design of equipment necessary to produce them.

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 well equipped to supplement all engineering courses. They provide instructions, procedures, and techniques for the individual as well as group projects and limited undergraduate research.

**STEAM LABORATORY—PERFORMANCE TEST OF A STEAM TURBINE**

**MECHANICAL ENGINEERING — COURSE DESCRIPTIONS**

**ME 311. MATERIALS I (3 + 0)**

Metallurgy: introduction to structures and properties of metals and alloys. Effects of diffusion, corrosion, heat treatment, etc.

*Prerequisite:* Chemistry 133, Physics 243.

**ME 312. MATERIALS II (3 + 0)**

Manufacturing processes: manufacturing synthesis, equipment, methods, materials; foundry, welding and fabricating processes; machine tools, gear cutting, abrasive processes, gauging and inspection.

*Prerequisite:* ME 311.

**ME 313. INTRODUCTION TO DESIGN (0 + 4)**

An introductory course covering the specialized aspects to, and preparatory for mechanical design. The main object is the use and application of metal-
# MECHANICAL ENGINEERING PROGRAM

<table>
<thead>
<tr>
<th>COURSE</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIRST YEAR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English Composition I, II, III</td>
<td>C-1 -</td>
<td>3 0 3</td>
<td>3 0 3</td>
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<tr>
<td>General Chemistry I, II, III</td>
<td>131 -</td>
<td>3 3 4</td>
<td>3 3 4</td>
</tr>
<tr>
<td>Calculus and Analytical Geometry I, II, III</td>
<td>241 -</td>
<td>5 0 5</td>
<td>5 0 5</td>
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<td>Physics I, II, III</td>
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<tr>
<td>Digital Computation I, II, III</td>
<td>BE 101-</td>
<td>1 0 1</td>
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| SECOND YEAR                                     |       |        |        |
| Philosophy & Religion I, II, III                | C-31 -| 3 0 3  | 3 0 3  |
| Engineering Mathematics I, II, III              | 341 - | 5 0 5  | 5 0 5  |
| Engineering Graphics I, II, Thermo. I           | BE 201- | 0 4 2  | 0 4 2  |
| Engineering Mechanics I, II, III                | BE 211- | 3 0 3  | 3 0 3  |
| Passive & Active Circuits I, II, III            | BE 221- | 3 0 3  | 3 0 3  |
| Engineering Laboratory I, II, III               | BE 231- | 0 3 1  | 0 3 1  |
| Circuits Laboratory I, II, III                  | BE 241- | 0 3 1  | 0 3 1  |

R = Recitation,  L = Laboratory,  C = Credit Hours

Catalog numbers followed by (dash) indicates dependence courses.
Catalog numbers followed by (comma) indicates no dependence.
Student will work out six terms of Physical Education during the first six terms of school.
Orientation will be scheduled by each freshman each term.
*These course numbers refer to descriptions in the catalogues prior to 1964-65.
### THIRD YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
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<tr>
<td>Mech. of Matls. I, Transients, Contr. Syst. I</td>
<td>CE 301,</td>
<td>EE 342 - EE 343</td>
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<tr>
<td>Electrical Engineering Laboratory III</td>
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<td>EE 353</td>
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<tr>
<td>Engr. Matls. I, II, Intro. to Design</td>
<td>ME 311 - ME 312 - ME 313</td>
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<tr>
<td>Mech. Engrg. Laboratory I, II, III</td>
<td>ME 331 - ME 332 - ME 333</td>
<td>0 6 2</td>
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<tr>
<td>Kinematics, Adv. Thermo., Heat Trans. I</td>
<td>ME 341, ME 342 - ME 343</td>
<td>3 0 3</td>
<td></td>
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<tr>
<td>Social Science Elective</td>
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<td>3 0 3</td>
<td>13 13 18</td>
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### FOURTH YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
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<tbody>
<tr>
<td>Present Program—Last Year to be offered, 1964-65.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>New Program will be listed for 1965-66.</td>
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<tr>
<td>Mechanical Design I, II, III</td>
<td>ME 411 - ME 412 - ME 413</td>
<td>R L C</td>
<td></td>
</tr>
<tr>
<td>Gas Dyn., Mech. Vibr., Control Systems</td>
<td>ME 421, ME 422, ME 423</td>
<td>3 3 4</td>
<td></td>
</tr>
<tr>
<td>Mech. Engrg. Laboratory IV, V, VI</td>
<td>ME 431, ME 432 - ME 433</td>
<td>4 0 4</td>
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</tr>
<tr>
<td>*Electrical Engineering I, II, III</td>
<td>EE 301 - EE 302 - EE 303</td>
<td>0 3 1</td>
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</tr>
<tr>
<td>(ME 410, 420, 430, 440, 450, Phys. 403)</td>
<td>3 0 3</td>
<td>3 0 3</td>
<td>15 9 18</td>
</tr>
<tr>
<td>Humanities Elective</td>
<td></td>
<td>3 0 3</td>
<td>14 12 18</td>
</tr>
</tbody>
</table>

‡Majority of the ME Seniors or 10 (whichever is smaller) must choose one of the ME Option courses in order for it to be offered.
surgical and manufacturing processes. All drawings are executed according to existing commercial and industrial standards.

Prerequisite: ME 312.

ME 323. ADVANCED FLUID MECHANICS (4 + 0) 4 hours
Hydrodynamics and Gas Dynamics: Isentropic, diabatic and frictional flow cases. Shock phenomena and generalized one-dimensional flow. Introduction to three-dimensional flow.
Prerequisite: BE 322.

ME 331-332-333. MECHANICAL ENGINEERING LABORATORY I, II, III (0 + 6) 6 hours
Fundamental mechanical laboratory sequence: specific experiments involving measurements, instrumentation, calibration and analysis of experimental accuracies. Concurrent small-team investigative projects of timely interest.

ME 341. KINEMATICS (2 + 3) 3 hours
The study of mechanisms and their motion: displacement, velocity, and acceleration of machine elements (gears, cams, etc.)
Prerequisite: BE 212.

ME 342. ADVANCED THERMODYNAMICS (3 + 0) 3 hours
Chemical reactions; generalized equilibrium and special non-equilibrium topics.
Prerequisite: BE 321.

ME 343. HEAT TRANSFER I (3 + 0) 3 hours
Heat and momentum transfer: similar treatment for convection in fluid systems; heat transfer in stationary system; steady and transient conduction.
Prerequisite: Math 353, BE 322.

*ME 400C. PROJECTS 1—5 hours
Practical studies or investigations involving the application of original thought, the determination of new information, or new applications of known information or equipment.

*ME 410C. INTERNAL COMBUSTION ENGINES (3 + 0) 3 hours
Fundamentals of spark—and compression—ignition engines and internal combustion processes.
Prerequisite: Old M.E. 313.

*ME 411. DESIGN OF MACHINE ELEMENTS I (3 + 3) 4 hours
Calculation and analytical study of the design of functional machine elements such as shafts, bearings, fasteners, gears, clutches, couplings, etc., as well as the preparation and execution of drawings according to professional standards.
Prerequisite: Old M.E. 323, Old C.E. 303.

*These courses are offered for seniors in 1964-65. The new senior program will be published in the 1965-66 catalog. Course numbers listed as prerequisites refer to descriptions in the catalogs prior to 1964-65.
*ME 412. DESIGN OF MACHINE ELEMENTS II (3+3) 4 hours
A continuation of M.E. 411.
Prerequisite: M.E. 411.

*ME 413. MACHINE DESIGN (3+6) 5 hours
Complete design and layout of a machine or unit as used in a particular industrial branch of mechanical engineering including in the design the previously studied elements and mechanisms, in order to develop engineering judgment and professional proficiency from the original conception of an idea to the finished product.
Prerequisite: Old M.E. 312.

*ME 420. AIR CONDITIONING (3+0) 3 hours
Estimating loads, heating systems and equipment, refrigerating systems and equipment, ducting and air conditioning.
Prerequisite: Old M.E. 313, Old 342.

*ME 421. GAS DYNAMICS (4+0) 4 hours
Simple flows: isentropic, diabatic and friction. Shock phenomena and generalized 1-dimensional flow. Introduction to thermochemistry. (Formerly M.E. 441).
Prerequisite: Old M.E. 313, Old 343.

*ME 422. MECHANICAL VIBRATION (4+0) 4 hours
Fundamentals of free, damped and forced vibration of single degree of freedom systems. Multidegree of freedom systems and introduction to vibration of elastic bodies and analogs. (Formerly M.E. 422).
Prerequisite: Old M.E. 322.

*ME 423. CONTROL SYSTEMS (3+0) 3 hours
Automatic feedback control systems; servomechanisms and process controls.
Prerequisite: Old M.E. 322, Old 343.

*ME 430. TURBOMACHINES (3+0) 3 hours
Velocity vector, energy relationships, and similarity parameters for fans, pumps, compressors, turbines, fluid couplings, and torque converters.
Prerequisite: M.E. 422.

*ME 431. MECHANICAL LABORATORY IV (0+3) 1 hour
Applied mechanical laboratory sequence; specific test projects on engines, fluid handling machines and environmental conditioning apparatus. Concurrent investigative projects of an individual interest and nature. Stressed development of the art of communication in reporting on laboratory work.

*ME 432. MECHANICAL LABORATORY V (0+3) 1 hour
Continuation of ME 431.

*These courses are offered for seniors in 1964-65. The new senior program will be published in the 1965-66 catalog. Course numbers listed as prerequisites refer to descriptions in the catalogs prior to 1964-65.
*ME 433. MECHANICAL LABORATORY VI \((0 + 3)\)  \(1\) hour
   Continuation of ME 432.

*ME 440H. HEAT POWER \((3 + 0)\)  \(3\) hours
   Modern power plants and equipment; heat balances. An introduction to
   supercritical and nuclear power plants. The economics of power systems.
   Prerequisite: Old M.E. 313, Old 343.

*ME 450T. TOOL ENGINEERING \((2 + 3)\)  \(3\) hours
   Optional. An engineering study involving economic principles in the
   design, building and use of tools, dies, jig and fixtures, including measuring
   and gaging devices as used in mass production. Emphasis is also given to
   estimating and processing of simple and complex production parts, as well
   as the preparation of conventional shop drawings.
   Prerequisite: M.E. 412.

c: Taught upon sufficient demand.
College of Pharmacy

ROBERT P. FISCHELIS, Dean

Ohio Northern University College of Pharmacy is a member of the American Association of Colleges of Pharmacy and is accredited by the American Council on Pharmaceutical Education and the Ohio State Board of Pharmacy

DUKES MEMORIAL BUILDING
Which houses the College of Pharmacy
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:

To prepare its students to meet satisfactorily the professional and cultural demands expected of pharmacists, and to carry their share of the responsibility for the public health, welfare, and education of their respective communities.

Moreover, the students of the college are trained to develop self-reliance, character, and ethics to the end that they will, with confidence and satisfaction, render safe and efficient pharmaceutical service to all who seek it.

Furthermore, they are made acquainted with the need for and value of membership in local, state, and national pharmaceutical associations and in civic, social and religious bodies of the communities in which they live. As students, they are urged also to affiliate with the student branch of the Ohio and the American Pharmaceutical Associations and other groups that promote worthwhile professional and social activities on the campus.

To accomplish these scholastic, professional, and social goals, students are advised concerning their plans of study and are encouraged to maintain high standards of scholarship. Participation in a reasonable number of campus activities, not deterrent to good academic record, is encouraged. It is believed this gives breadth to the student's college experience and better prepares him for life following graduation.

REQUIREMENTS FOR ADMISSION TO PRE-PHARMACY

Students entering pre-pharmacy should have at least three years but preferably four years of English, two years of mathematics (algebra and plane geometry) but preference will be given to students with advanced credit. Two to three years of science (biology, general science and chemistry or physics or both) preference will be given to students with four years of science subjects.

Freshmen, upon entering the pre-pharmacy program, prior to registration, will be given entrance examinations in English and Mathematics.

REQUIREMENTS FOR ADMISSION TO THE COLLEGE OF PHARMACY

1. To enter the College of Pharmacy an applicant must furnish to the committee on admissions of the College of Pharmacy proof of satisfactory completion of 45 term hours, or 30 semester hours, with an accumulative grade point average of 2.0 ("C" average). Further, the applicant must have
completed the requirements (or their equivalent) as listed in the Pharmacy Catalog under Pre-pharmacy Curriculum.

2. ADVANCED STANDING. A student desiring to transfer from another college must present a transcript of his record and a certificate of honorable dismissal from the college he is leaving. He should submit a catalogue of his college. Full credit will be given for work satisfactorily completed in recognized institutions of higher learning, provided such work is parallel to the requirements for graduation in this institution, but credit will not be allowed for a course in which the lowest passing grade was received. Advanced credit is given for not more than 135 quarter hours (ninety semester hours) exclusive of physical education.

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 who are entitled to advanced standing may enter at the time approved by the Dean. Write for further information.

3. SCHOLARSHIP RATING AND PROBATION. To remain in good standing a student must maintain a 2.0 (C) average. If the accumulative point average of the student falls below 2.0, he is then placed on warning and allowed to carry a full or modified schedule. If the student fails to bring his accumulative average up to 2.0, the student will be placed on probation and requested to carry a reduced schedule. After one quarter on probation the student who fails to improve his standing will be subject to suspension. (A student is permitted only one quarter on warning. If a student who has been on warning, even though he has been removed, allows his accumulative point average to fall below 2.0, he will be placed on probation).

After being suspended for a period of not less than two academic quarters, a student may apply for re-admission to the committee on admissions of the College of Pharmacy. Upon re-admission, students will be placed on probation and must make a 2.0 point or better each term and must bring their accumulative point average up to 2.0 by the time set by the scholarship committee of the College of Pharmacy, or be subject to permanent dismissal.

Any student on probation may have restrictions placed on his social, intramural and extra curricular activities by the scholarship committee of the College of Pharmacy.

A student placed on probation may be continued on probation if in the term following the above action a 2.0 point or better average is made. Students who fail to obtain a 2.0 point or better term average when on continued probation will be subject to suspension.

Students placed on suspension may have their case reviewed by the
Scholarship Committee of the College of Pharmacy. If allowed to re-enter they must make better than a 2.0 point average the following term and comply with the conditions imposed by the Scholarship Committee of the College of Pharmacy. Students re-entering under these conditions who fail to comply with the above will be subject to suspension for a period of three academic quarters or one academic year.

(All conditions of warning, probation, suspension and dismissal are recommended by the faculty of the College of Pharmacy. The President of the University has the final authority on all cases of suspension and dismissal.)

To calculate the accumulative point average a three credit hour course with a grade of A gives twelve quality points. A five credit hour course with a grade of B, gives fifteen quality points, etc.

REQUIREMENTS FOR GRADUATION

Each candidate for a degree:

1. Must be of good moral character.


3. Must have completed not less than 240 term hours of acceptable course work and 6 term hours of physical education.

4. Must have maintained an overall 2.0 quality point average and have a satisfactory accumulative quality point average in all major courses of Pharmacy, Pharmaceutical Chemistry, Pharmacognosy, Pharmacology and Pharmacy Administration.

5. Must meet such other qualifications as the faculty may determine.

QUALIFICATIONS FOR EXAMINATION AND REGISTRATION AS A PHARMACIST

The Ohio pharmacy laws require that an applicant for registration as a pharmacist shall be:

A. A citizen of the United States, or shall have made application for citizenship.

B. Not less than twenty-one years of age;

C. Of good moral character and habits;

D. A graduate from a school or college of pharmacy or a department of pharmacy of a university recognized and approved by the State Board of Pharmacy and have completed at least the minimum course in pharmacy as outlined by the American Council on Pharmaceutical Education.
E. Able to submit proof to the Board of Pharmacy, substantiated by proper affidavits, of a minimum of one year's internship under the personal supervision of a registered pharmacist. Credit for internship may be granted only if obtained when the intern is not enrolled and in attendance in a college or university. Internship credit may be given only after completion of one year in a college or university.

LIBRARY

The facilities of the main library are at the disposal of the pharmacy students. In this building will be found many of the current books and classics along with books, periodicals and journals in physics, biology and related sciences. All books pertaining to pharmacy, medicine and related sciences are in the main library as well as bound periodicals on pharmacy and related sciences. Current issues of journals in pharmacy and related sciences are found in the pharmacy reading room.

THE CURRICULUM

Many courses are required to obtain satisfactory background in any field of endeavor and pharmacy is no exception. The curriculum is made flexible enough to allow preparation for specialized activities in the profession. All subjects are listed in a logical sequence so that the student will be better prepared for each ensuing course.

FIVE YEAR PHARMACY PROGRAM

(SUBJECT TO REVISION)

The following plan of study has been projected for the Degree of Bachelor of Science in Pharmacy under the five year program of study. It is now being reviewed and the final program will be announced in a separate catalog of the College of Pharmacy.

Total hours required for graduation are: Two hundred and forty (240) term hours plus six (6) terms or quarters of physical education.

FIRST YEAR

<table>
<thead>
<tr>
<th>FALL</th>
<th>HOURS</th>
<th>WINTER</th>
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<tr>
<td>Physical Education</td>
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<td>English C-1</td>
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<td>Chemistry 131</td>
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SPRING
Physical Education 0
English C-3 3
Mathematics 183 3
Chemistry 133 4
Social Studies 3
Pharmacy Orientation 103 1

SECOND YEAR
FALL
Physical Education 0
Chemistry 231 4
Physics 221 4
Biology 111 4
Philosophy Core C-31* 3
or
Philosophy 201* —

 or
Philosophy Core C-32*
Logic 202*

SPRING
Physical Education 0
Chemistry 233 4
Physics 223 4
Biology 113 4
Philosophy Core C-33*
 or
Ethics 203*

WINTER
Physical Education 0
Chemistry 232 4
Physics 222 4
Biology 112 4

15 or 18

* If either of these programs, that is, Philosophy Core C-31, C-32 and C-33 or the sequence of Philosophy 201, Logic 202 and Ethics 203 are once started the student must continue in the same sequence for the full year to receive credit.

THIRD YEAR
FALL
Pharmacognosy 211 4
Pharmaceutical Chem. 321 4
Physiology 331 4
Pharmacy 220* 3
Accounting 131* 3
Pharmacy 220* 3
First Aid 112* 3

15 or 18
15 or 18

SPRING
Pharmacognosy 213 4
Pharmaceutical Chem. 323 4
Physiology 333 4
Pharmacy 220* 3
Speech 271* 3

Winter
Pharmacognosy 212 4
Pharmaceutical Chem. 322 4
Physiology 332 4

15 or 18

*Pharmacy 220, Accounting 131, First Aid 112, and Speech 271 will be offered each term unless otherwise announced. Classes will be limited in number.
### FOURTH YEAR

<table>
<thead>
<tr>
<th>FALL</th>
<th></th>
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<tbody>
<tr>
<td>Pharmacy 210</td>
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<td>Pharmaceutical Chem. 421</td>
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<td>Pharmacy Admin. 310*</td>
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<td>Microbiology 322</td>
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<tr>
<td>Pharmaceutical Chemistry 422</td>
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<td>Pharmacology 322</td>
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*Pharmacy Administration or electives may be taken during the fourth or fifth year. Pharmacy administration courses 310, 410 and 420 will be scheduled each term.

### FIFTH YEAR

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<td>Pharmacy 320</td>
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<td>Microbiology 323</td>
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</table>

### ELECTIVES:

All elective courses may be elected from the divisions of humanities, natural sciences, or social sciences in the College of Liberal Arts and approved by the department involved and the College of Pharmacy student advisor or professional electives.

Students planning to enter graduate school should elect a modern language (German, French, Russian); if a major in chemistry is desired, more mathematics should be elected.

Professional Electives may be selected from the following group:

- Advanced First Aid 113 | 3
- Hospital Pharmacy      | 3
- Pharmacognosy 411      | 2
- Pharmacognosy 413      | 2 or 3
- Pharmacology 430       | 2
- Pharmaceutical Chemistry 410 | 2
- Virology 423           | 2
- Parasitology 413       | 2
- Pharmacognosy 430      | 3
- Pharmacy 420           | 3
- Pharmacy 430           | 3
All 450 courses are "Problems Courses" and are given in Bacteriology and the five divisions of the Pharmacy College. These courses are open to those students of acceptable standing. In no case will a student be admitted to such a course if he has less than a 2.5 accumulative point average.

DESCRIPTION OF COURSES

For detailed description of the basic pre-professional courses such as freshman English, biology, chemistry, mathematics, et cetera, see these Departments as listed elsewhere in this catalogue.

BACTERIOLOGY

123. INTRODUCTORY MICROBIOLOGY  \( 3 + 2 \) 4 hours
A course in the fundamentals of general and medical microbiology for students in the nursing program.

321. GENERAL MICROBIOLOGY \( 3 + 3 \) 4 hours
A general course in the fundamentals of microbiology with emphasis on those points of special interest in the pharmaceutical industry.

322. IMMUNOLOGY AND PATHOGENIC MICROBIOLOGY \( 3 + 3 \) 4 hours
The basic principles of immunity and pathogenicity are considered. The more common bacterial infections of man and domestic animals are discussed together with methods used to prevent and treat them.

323. PUBLIC HEALTH FOR PHARMACISTS 3 hours
A study of epidemiology, geriatrics, industrial disorders and diseases, and community health problems.

450. MICROBIOLOGY PROBLEMS (el) 1 to 3 hours
A minor investigation course designed to familiarize qualified fifth year
students with research methods. The student will review the literature pertaining to his problem and perform laboratory experiments designed to solve the problems, and write a report summarizing his work.

Prerequisite: An adequate training in bacteriology and organic chemistry.

BIOLOGY

All students who are candidates for graduation from the College of Pharmacy are required to complete at least one year of biology or its equivalent.

A description of these courses is listed elsewhere in this catalog.

CHEMISTRY

All students who are candidates for graduation from the College of Pharmacy will be required to complete Chemistry 131, 132, 133, 231, 232 and 233 or the equivalents. Additional courses in chemistry may be elected upon approval of the College of Pharmacy student advisor and dean.

A description of the courses taught in the chemistry department is listed elsewhere in this catalog.

ENGLISH

See requirements elsewhere in this catalog under English Courses, page 76. Read under 131, 132, 133 Literature and Writing.

All students must complete one year of college English and one term of Public Speaking. Vocabulary Studies, and Business Communications are recommended as electives.

HEALTH AND PHYSICAL EDUCATION

Some form of physical activity is required of all students during the first two years of residence at the University. The nature of the work will depend upon the needs of the individual as revealed by a careful examination.

The pharmacist should learn the fundamentals of personal and general hygiene so that he may be able to maintain a high degree of efficiency during and after college life and to assist in the promotion of public health as outlined by the United States Public Health Service.

All students are required to take First Aid 112.

Courses 110, 121, and 212 in Health and Physical Education may be used as electives on approval of the College of Pharmacy student advisor and dean. A complete description of these courses will be found under courses of Health in another part of this catalog.

MATHEMATICS

Mathematics is of the utmost importance to a pharmacist; inaccuracies in computations have led to serious results. All pharmacy students are required to take Mathematics 151, 152, and 183 or their equivalents and
a specially designed course in Pharmacy Arithmetic described as Pharmacy 220.

Students desiring to pursue a major in chemistry should take additional courses in mathematics, subject to approval by the College of Pharmacy student advisor and dean. A description of the required courses and other suitable electives in this field will be found elsewhere in this catalog.

MODERN FOREIGN LANGUAGES

Many texts and periodicals on pharmacy and the allied sciences are published in a foreign language. In order to meet the demand of students who desire a knowledge of a foreign language for reading, conversational, or business purposes, appropriate courses are offered. If a student expects to do graduate work, he should have a reading knowledge of at least two foreign languages.

PHARMACEUTICAL CHEMISTRY

321. PHARMACEUTICAL ANALYSIS 3 + 4 4 hours
A study of the gravimetric and volumetric procedures and theory, and their application to pharmaceutical analyses.
Prerequisites: Chemistry 131, 132, 133.

322. PHARMACEUTICAL ANALYSIS 3 + 4 4 hours
A continuation of volumetric procedures and theory. Quantitative methods applied to the chemical assay of crude drugs and official preparations.

323. PHARMACEUTICAL ANALYSIS 3 + 4 4 hours
A continuation of Pharmaceutical Chemistry 322 with an introduction to instrumental methods.
Prerequisites: Pharmaceutical Chemistry 322.

421. BIOPHARMACEUTICS 3 + 0 3 hours
A beginning course in the composition of organisms, their inorganic and organic requirements, and a general discussion of the character of carbohydrates, proteins and lipids.
Prerequisites: Chemistry 231, 232, and 233.

422. BIOPHARMACEUTICS 3 + 0 3 hours
A study of the chemistry and metabolism of carbohydrates, proteins, lipids, enzymes and vitamins.
Prerequisite: Pharm. Chem. 421.

423. BIOPHARMACEUTICS 3 + 0 3 hours
A study of the chemistry, endocrinology and metabolism of steroids and hormones.
Prerequisite: Pharm. Chem. 422.
431. CHEMISTRY OF INORGANIC MEDICINAL PRODUCTS 5 + 0 5 hours
A study of the chemical properties, solubilities, tests for identification and purity, and medicinal properties.
Prerequisite: Pharmaceutical Chemistry 321, 322, 323.

432. CHEMISTRY OF ORGANIC MEDICINAL PRODUCTS 5 + 0 5 hours
A study of the structural relationships, the synthesis and chemical properties of medicinal products.
Prerequisite: Pharmaceutical Chemistry 323 and Chemistry 233.

433. CHEMISTRY OF ORGANIC MEDICINAL PRODUCTS 5 + 0 5 hours
A study of the structural relationships, the synthesis and chemical properties of medicinal products.
Prerequisite: Pharmaceutical Chemistry 432.

450. CHEMISTRY PROBLEMS (el) 1 to 3 hours
The title and character of the course is dependant upon the problem. This course is designed to stimulate introductory research work. Open to fifth year students only.

410. CHROMATOGRAPHIC ANALYSIS (el) 2 hours
A study of the various types of Chromatographic Analysis.

PHARMACOGNOSY

211. GENERAL PHARMACOGNOSY 3 + 3 4 hours
The content of the course is based upon biochemical classification. It includes the study of nomenclature, descriptions, sources, production, preservation, constituents, and therapeutic properties of the official and of some important non-official vegetable and animal drugs and their derivatives. The
course includes a study of the basic plant cells and tissues and non-protoplasmic cell inclusions. In the laboratory microscopical studies are supplemented with histological examinations and microscopical examinations of important powdered drugs as well as with chemical tests.

Prerequisites: Biology 111, 112, 113 and Chemistry 131, 132, and 133.

213. General Pharmacognosy 3 + 3 4 hours
A continuation of General Pharmacognosy 211 and 212. In addition, the fundamentals of antibiotics, herbicides, insecticides and rodenticides are studied.

212. General Pharmacognosy 3 + 3 4 hours
A continuation of General Pharmacognosy 211.

411. Review of Current Pharmacognosy Literature 2 + 0 (el) 2 hours
A review of recent literature, books, and articles in the field of Pharmacognosy.

413. Allergenic Plants, Allergy and Allergens 2 + 0 or 2 + 3
(el) 2 or 3 hours
A study of plants causing allergies and of the mechanism of allergy. Pollen and mold spore counts are made.

PHARMACOGNOSY LABORATORY

430. Special Pharmacognosy Methods 1 + 6 (el) 3 hours
(One class period and two 3-hour lab. periods)
Microscopical and microchemical methods of evaluation, isolation and identification of crude drug constituents are studied.

450. Pharmacognosy Problems (el) 1 to 3 hours
A special problems course. Small research projects in Pharmacognosy
are carried out. Students may also work on problems of cultivation of medicinal plants.

540. **BIOLOGICALS**

A study of the biological preparations used in pharmacy, their sources, uses, storage and standards.

**PHARMACOLOGY**

133. **PHARMACOLOGY** $3 + 2$

An elementary general course in Pharmacology for students in the nursing program.

421. **PHARMACOLOGY** $4 + 3$

Introduction, vocabulary and terminology used in pharmacology are discussed. The carthartics, chologogues, choleretics, antacids, digestants, anthelmintics, local anti-infectives, sulfonamides and related compounds, antibiotics, anti-fungal agents and biological preparations are considered. Laboratory experiments are related to the lectures of the quarter.

**Prerequisites:** Physiology 331, 332, and 333. Pharmacognosy 211, 212, and 213.

**PHARMACOLOGY LABORATORY**

422. **PHARMACOLOGY** $4 + 3$

Local anesthetics, central nervous system stimulants and depressants, sympathomimetics, sympatholytics, parasympathomimetics, parasympatholytics, antispasmodics, psycholeptics, psychoanaleptics and psychodyseleptics are studied. Experiments in the laboratory are related to the lectures of the quarter.

**Prerequisites:** Pharmacology 421.

423. **PHARMACOLOGY** $4 + 3$

A study of histamines, antihistamines, drugs affecting the hematopoietics
system, cardiovascular drugs, hormones, drugs acting on the endocrine glands, diuretics, vitamins, diagnostic aids and general principles of toxicology is considered. Laboratory experiments are related to lectures of the quarter with some emphasis on methods of pharmacological testing.

Prerequisites: Pharmacology 422.

430. PHARMACOLOGY (TOXICOLOGY) 2 + 0 (el) 2 hours
The general Principles of Toxicology. The toxic effects, signs of poisoning, antidotal measures and current pharmaceutical agents used to treat poisonings are considered.
Prerequisites: Pharmacology 423.

450. PHARMACOLOGY (el) 1 to 3 hours
A special course to stimulate interest in research in this field. Open only to fifth year students, with the approval of the instructor.

PHARMACY

101-102-103. PHARMACY ORIENTATION 1 + 0 3 hours
This course is designed to acquaint the student with the educational and legal requirements of the profession of pharmacy, its organizations, and the many areas of service open to those who are properly qualified.

210. INTRODUCTION TO PHYSICAL PHARMACY 3 + 3 4 hours
The physical and chemical theories that are considered to be basic to a clear understanding of the science of pharmacy are presented in this course. In-so-far-as possible, the laboratory will apply to the theoretical problems.
Prerequisites: Chemistry 131, 132, 133, 231, 232, 233, and Pharmacy 220.

220. PHARMACY CALCULATIONS 3 + 0 3 hours
A course in the arithmetic that pertains to pharmacy covering the subjects of weights and measures, density, percentage, discounts and related subjects.

301. PHARMACEUTICAL PREPARATIONS 3 + 3 4 hours
This course is concerned with the manufacture of official solutions, suspensions and other liquid medications. Emphasis is given to an understanding of the chemistry and/or physics involved in making the above preparations and to the correct procedures of manufacture, packaging and labeling.
Prerequisites: Pharmacy 210 and 220.

302. PHARMACEUTICAL PREPARATIONS 3 + 3 4 hours
This course is a continuation of Pharmacy 301. It includes the manufacturing of solid and semi-solid preparations such as ointments, pastes, capsules, tablets and related products.
Prerequisites: Pharmacy 301.

320. HISTORY OF PHARMACY 3 + 0 3 hours
The course is designed to show the place of pharmacy in Western
civilization. Emphasis is given to the educational, organizational, and professional growth and development of pharmacy in the United States.

Prerequisites: Pharmacy 301 and 302.

401. Physical Pharmacy 3 + 3


Prerequisites: Pharmacy 210, 220, 301, 302 and Pharmaceutical Chemistry 321, 322, and 323.

402. Prescription Practice 4 hours


Prerequisites: Pharmacy 401.

403. Prescription Practice 3 + 3 4 hours

403. Prescription Practice II 3 + 3 4 hours

Prescriptions involving percentage and ophthalmic solutions, ointments, emulsions, suspensions, and suppositories. Continuation of the study of commercial specialties. Sustained release dosage forms.

Prerequisites: Pharmacy 402.

410. Cosmetics 2 + 3 (el) 3 hours

Formulation, preparation, and packaging of the more common types of cosmetics.

Prerequisites: Pharmacy 301, and 302.
420. **Inorganic Pharmaceutical Preparations**  \(2 + 3\) \((el) \ 3\) hours
The course includes the manufacture of a number of the more complex medicinal products. The assignments will involve library assignments and reports.

*Prerequisites:* Pharmacy 301 and 302.

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430. **Pharmacy Professional and Pharmaceutical Ethics**  \(3 + 0\) \((el) \ 3\) hours
The course is designed to study the development and place of ethics in business and professional practice. It will include library assignments and reports.

*Prerequisites:* Pharmacy 301, 302, and 320.

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440. **Hospital Pharmacy Administration**
A series of lectures to provide more complete and more technical information about the functions, systems and responsibilities of hospital practices as well as the study of policies, procedures and the application of principles to the practice of pharmacy in hospitals.

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450. **Pharmacy Problems**  \((el) \ 1—3\) hours
The course is designed for those students who are interested in research.

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**PHARMACY ADMINISTRATION**

131. **Principles of Accounting**  \(3 + 0\)  \(3\) hours
See Department of Economics, College of Liberal Arts for description.

310. **Pharmacy Laws**  \(3 + 0\)  \(3\) hours
A study of the federal, state and local acts, and regulations governing the practice of Pharmacy and the sale of potent and habit forming drugs. Government bulletins and pamphlets are issued to students so that they will become acquainted with said laws.

410. **Business Management**  \(3 + 0\)  \(3\) hours
A course in drug store business methods. Attention is given to arrangement of fixtures and stock, sources of supplies, distribution to the physician, dentist, veterinarian, the public hospitals, and to other phases of business essential to successful drug store management.

420. **Drug Marketing**  \(3 + 0\)  \(3\) hours
A study of the marketing of drugs and drug products. Emphasis is from the manufacturer's and wholesaler’s standpoint rather than from the retailer's point of view. The laws governing commercial manufacture, distribution, and the various fair practices acts, as they pertain to pharmacy, are discussed.

450. **Pharmacy Administration**  \((el) \ 1—3\) hours
A course in research problems concerning Drug Store Management, Drug Marketing, or Pharmaceutical Jurisprudence.
PHYSICS

All pharmacy students under the five-year plan will be required to take Physics 221, 222 and 223 or their equivalents. For a complete description of these courses see the description under "Physics" in another section of this catalog.

PHYSIOLOGY

All students are required to complete at least three terms of Physiology. A description of these courses is listed under Biology elsewhere in this catalog.

SPECIAL NOTICE!

The Pharmacy Curriculum is in process of revision. The College of Pharmacy reserves the right to change the content, duration and sequence of any course included in the curriculum leading to the accepted degree, without notice. A separate catalog covering the revised course and other pertinent matters will be issued after July 1, 1964. Please address requests for copies to the DEAN OF PHARMACY, OHIO NORTHERN UNIVERSITY, ADA, OHIO.
College of Law

EUGENE N. HANSON, Dean

In addition to the colleges whose courses are listed in this catalog, Ohio Northern University also maintains a College of Law on its campus. This college is accredited by the American Bar Association and is a member of the League of Ohio Law Schools. It offers a three-year program leading to the degree of Juris Doctor. Its graduates are eligible to take the bar examination in practically all of the states by virtue of its accreditation by the American Bar Association.

The College of Law requires that all entrants have a Bachelor's degree. Inquiries concerning eligibility for admission and requests for the Law School catalogue should be directed to the Dean of the College of Law.

The following is the outline of courses taken during the three year program:

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THIRD YEAR

FALL QUARTER
Practice Court I 589
Legal Ethics 590
Electives 1*

347
WINTER QUARTER
Trusts 591
Practice Court II 592

314
ELECTIVES

347
SPEARING QUARTER
Commercial Transactions 593 4
Electives 5-8
Wills 594 4
Commercial Transactions 596 4
Electives 3-6

*Courses are required for graduation but no credit hours are given toward the 124 hours required for graduation.

‡This course is graded with a satisfactory or unsatisfactory.

Elective courses are chosen from the following:

411 Administrative Law 550
412, Conflict of Laws 551
481 Creditors' Rights 552
490 Criminal Procedure 553
421 Damages 554
431 Domestic Relations 555
422-23 Federal Taxation I and II 556
431 Future Interests 557
437 Insurance 558
470 International Law 559
460 Jurisprudence 560
441 Labor Law 561
475 Land Use Planning 562
470 Medicine for Lawyers 563
457 Municipal Corporations 564
470 Practice Court I and II 565
447 Private Corporations 566
490 Real Estate Transactions 567
461 Restitution 568
450 Seminar In Estate Planning 569
480 State and Local Taxation 595
465 Trade Regulations 596
Board of Trustees

OFFICERS OF THE BOARD

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RALPH W. BOOKER, Vice Chairman
BURKE GARDNER, Secretary

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President of the University

HAZEN G. WERNER, A.B., B.D., D.D., LL.D.
Bishop of the Ohio Area of The Methodist Church
Columbus, Ohio

G. GLEN HUGHES, A.B., S.T.B., D.D.
Lima District Superintendent of The Methodist Church
Lima, Ohio

MEMBERS OF THE BOARD

<table>
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<tr>
<th>Initus</th>
<th>Elected by the Ohio Conference</th>
<th>Exodus</th>
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<td>1949</td>
<td>CHARLES B. HOFFMAN</td>
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<td>Secretary, A.A.S.R.</td>
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<td>PAUL M. VANDEGRIFF, S.T.B.</td>
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<td></td>
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</table>
1958  Lester L. Cecil, LL.M., LL.D.
      Judge, U.S. Federal Court
      Cincinnati, Ohio

1960  Harold R. Weaver, A.B., B.D., Ph.D.
      First Methodist Church
      Findlay, Ohio

1960  Stephen S. Beard, LL.B.
      201 Marsh Building
      Van Wert, Ohio

1963  Frank Wiley, LL.B.
      Judge, Common Pleas Court
      Toledo, Ohio

      Administrative Assistant to the Bishop,
      Ohio Area of The Methodist Church,
      Columbus, Ohio

1955  Stewart McHenry, B.A., LL.B.
      250 Peoples Bank Bldg.
      Canton, Ohio

1950  Arthur Hooper, LL.B., LL.D.
      Judge, Common Pleas Court
      Steubenville, Ohio

1960  Robert R. Dieterich, A.B., S.T.B.
      First Methodist Church
      Massillon, Ohio

1960  Norman J. Brickner, Ph.G.
      The Lea Drug Stores
      Cuyahoga Falls, Ohio

Initus

Elected by the Alumni

Exodus

1962  James Fulks, B.S.E.E.
      V. Pres., Ex-Cell-O Corp.
      Detroit, Michigan

1958  George C. Hindall, A.B., M.B.A.
      Hindall & Sons
      Ada, Ohio

1968
1959  BURKE GARDNER, Ph.G.
      Gardner Drug Store
      Ada, Ohio
      1964

      Supt. of City Schools
      270 East State Street
      Columbus, Ohio
      1965

1961  JOSEPH E. MARMON, B.S. Pharmacy
      V. Pres., Eli Lilly Co.
      Indianapolis, Indiana
      1966

1963  THOMAS L. K. SMULL, A.B., A.E.D.
      National Aeronautics and
      Space Administration
      Washington, D.C.
      1968

1963  ROBERT W. BIGGS, B.S.C.E.
      President, S. R. Wellman Company
      Bedford, Ohio
      1967

      Ada, Ohio
      1966

1963*  HAROLD J. MEREDITH, L.L.B.
      Pres., City Loan & Savings Co.
      Lima, Ohio
      1965

1963**  MERRILL J. INSLEY, B.S. Ph.
        Insley Drug Store
        Bellefontaine, Ohio

*Mr. Meredith also served from 1957-1962.
**Mr. Insley also served from 1953-1958.

ELECTED BY TRUSTEES AT LARGE

1950  MRS. JAY P. TAGGART, B.Or.
      119 W. Montford St.
      Ada, Ohio
      1964

      The Diocese of Michigan
      Detroit, Michigan
      1964

      Booker & Associates
      St. Louis, Missouri
      1965
1955  William O. Elzay, A.B., M.B.A.
      339 East 58 Street
      New York, New York

1954  John M. Tittle, B.S.
      Stein, Roe & Farnham
      Chicago, Illinois

1951  Harold J. Bowers, B.S., M.A., Ph.D.
      State Department of Education
      Columbus, Ohio

1947  J. Otis Young, A.B., B.D., D.D.
      The Methodist Publishing House
      Chicago, Illinois

TRUSTEES EMMERITI

      89 Greenacres Ave.
      Scarsdale, New York

1947  Warren W. Wiant, D.D.
      129 Glencoe Road
      Columbus, Ohio

1947  J. Boyd Davis, B.S., M.S., D.B.A.
      700 Bryden Road
      Columbus, Ohio

      Long Bottom, Ohio

LIFE TRUSTEE

1946  J. V. Melick, D.B.A.
      Toledo, Ohio
University Administration

UNIVERSITY ADMINISTRATIVE COMMITTEE

FRANK BRINGLE McINTOSH, A.B., S.T.B., D.D., LL.D.
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    Vice President for Academic Affairs

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    Treasurer and Business Manager

JAMES S. UDY, S.T.B., Ph.D.
    Director of Religious Life

GEORGE B. MILLER, JR., B.S.A.E., M.Ed., Ed.D.
    Dean of Students

PRISCILLA R. MORTON, B.A., M.A.
    Dean of Women

GEORGE W. SCHERTZER, A.A.
    Associate Director of Development and
    Public Relations, Secretary of Alumni Association

WILLIAM L. ROBINSON, B.S.Ed.
    Dean of Men
    Head Resident, Lima Hall

ADDITIONAL UNIVERSITY STAFF MEMBERS

OSCAR G. DARLINGTON, A.B., A.M., Ph.D.
    Dean, College of Liberal Arts

    Dean, College of Engineering

ROBERT P. FISCHELIS, Ph.G., Ph.C., Pharm.D., B.S., Ph.M., Sc.D.
    Dean, College of Pharmacy

EUGENE N. HANSON, A.B., A.M., LL.B., LL.M.
    Dean, College of Law
JAMES A. WIRE, B.A., B.D., M.S.
Director of Testing

WILLIAM H. SMERLING, B.S., M.A.
Registrar

JAMES ANDREW WOOFTER, A.B., A.M., Ed.D.
Recording Registrar

FREDERICK I. KUHNS, B.A., B.D., A.M., Ph.D.
Librarian

WILLIAM D. HUMPHREY, B.S., M.A.
Director of Evening Division

HILDRED B. JONES, A.B., A.M., Ph.D.
Dean of the Summer School

RALPH L. MCFARLAND, B.S.Ed.
Director of Admissions

MARY LOU PFEIFER
Assistant to the Director for Alumni Relations

W. BARRY WORTHING, B.S.C.
Director of High School Relations

WILLIAM J. STANCHINA, Jr., A.B.
Admissions Counselor

WILLIAM A. HAGGSTROM, B.S., M.Ed.
Director of University Union

ADMINISTRATIVE ASSISTANTS

Counselor of Freshman Men

HAROLD COTSAMIRE, B.B.A.
Bursar

ANNA STOTTS
Head Resident, Moorman Annex

MRS. JOSEPHINE ANDERSON
Head Resident, Clark Hall
Leora Smith
Head Resident, Women's Dormitory

DEANS EMERITI

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Dean Emeritus, College of Pharmacy

Claude Westcoat Pettit, A.B., LL.B., LL.M., LL.D.
Dean Emeritus, College of Law

UNIVERSITY HEALTH SERVICE

Robert B. Elliott, M.D., Physician

Floyd M. Elliott, M.D., Physician

Miriam Warren, R.N., Nurse
The Faculty
and Administrative Officers

(The year refers to the time of initial service to the University)

FRANK BRINGLE McINTOSH, A.B. (DePauw), S.T.B. (Boston), D.D. (De-
Pauw), LL.D. (Rio Grande), LL.D. (Ohio Wesleyan), 1949
President of the University with rank of Professor

Ph.D. (Pittsburgh), LL.D. (Findlay), 1958
Vice President for Academic Affairs

ERNESTS ABELE, M. Math. Sc. (University of Latvia), 1952
Chairman, Department of Physics
Professor of Physics

CARROLL R. ALDEN, B.S.E.E., B.S.M.E., (Ohio Northern), M.E. (Detroit
Institute of Technology), P.E. (Ohio), Fellow A.S.M.E., 1955
Professor of Electrical Engineering

JOHN M. ANDERSON, B.S., M.A. (Peabody), 1962
Instructor in Band

LAWRENCE H. ARCHER, B.S.C.E., B.S.Ed., (Ohio Northern), M.A. (Bow-
ing Green), P.E. (Ohio), 1945
Dean, College of Engineering
Professor of Civil Engineering

ALBERT A. BAILLIS, A.B., LL.B. (Western Reserve), LL.M. (New York),
1957

JOSEPH BANKS, B.S.Ed. (Ohio Northern), M.E. (Kent State), 1960
Assistant Professor of Physical Education

RUTH BARLOW, A.B. (Heidelberg), M.A. (McMaster, Hamilton, Ontario),
1964
Instructor in English

BETTY JANE BARTLETT, B.A. (Muskingum), M.A. (Michigan), 1960
Director of Theatre, Associate Professor of Speech and Drama

HERMAN D. BEHRENS, B.Sc.Ed. (Kansas), M.A., Ph.D. (Ohio State), 1961
1961
Professor of Education
Faculty and Administrative Officers

GEORGE E. BELCH, B.A. (Austin), M.A. (Texas), 1960
  Assistant Professor in English and Journalism

A. A. BENEDICT, A.B. (Ohio Wesleyan), A.M. (Ohio State), 1952
  Professor of Physics

FRANCES HARRIET BENNETT, B.S.Ed., A.M. (Ohio State), 1953
  Associate Professor of English

GORDON M. BENNETT, B.A. (New York State), M.A. (Teachers College, Columbia), 1959
  Assistant Professor of Mathematics

DONALD J. BETTINGER, B.S. (Miami, Ohio), M.S. (Cincinnati), Ph.D. (North Carolina), 1963
  Chairman, Department of Chemistry
  Professor of Chemistry

  Professor of History and Political Science

ROBERT BOWDEN, A.B. (Haverford), B.S. (Ohio Northern), A.M. (Michigan), 1952
  Chairman, Department of Biology
  Associate Professor of Biology

DAVID E. BOWLING, JR., B.S.Ed. (Wilmington), M.Ed. (Ohio U.), 1959
  Assistant Professor of Industrial Arts

GEORGE BRABSON, B.A. (Tennessee), LL.B. (Yale), M.A. (George Washington), 1962
  Professor of Law

  Head, Department of Mechanical Engineering
  Associate Professor of Mechanical Engineering

CHARLES L. BUSCH, B.S.C.E. (Ohio Northern), 1963
  Instructor in Engineering

DANIEL R. BUTLER, JR., B.S. (Florida), Ph.D. (Ohio State), 1961
  Assistant Professor of Biology (Leave of Absence)

CHARLES CARLSON, A.B. (Bard), A.M. (New York Teachers College), 1962
  Assistant Professor of Business Administration

SILAS EARL CARMEAN, JR., B.S.E.E. (Ohio Northern), M.S. (Ohio State), E.I.T. (Ohio), 1960
  Instructor in Electrical Engineering
HOU SHYI CHENG, B.S.E.E. (Nat'l. Chiao-Tung U.), M.S.E.E. (Michigan),
Assistant Professor of Electrical Engineering

ALFRED E. COHOE, B.A. (Albion), M.A. (Bowling Green), 1962
Assistant Professor of Sociology and Psychology

OSCAR W. COOLEY, A.B. (Middlebury), M.S. (Butler), 1956
Associate Professor of Economics

HAROLD COTSAMIRE, B.B.A. (Ohio State), 1957
Bursar with rank of Instructor

WILLIAM ROBERT CRIDER, B.S. in Soc. Adm. (Ohio State), M.Ed. (Bowling
Green), 1961
Assistant Professor of Psychology

OSCAR G. DARLINGTON, A.B., A.M. (Penn State), Ph.D.
(Pennsylvania), 1955
Dean, College of Liberal Arts
Professor of History

ELMA GRANT DAVIS, B.A. (Northwestern), M.A. (Arkansas), 1956
Assistant Professor of English

CLYDE H. DORNBUSCH, B.A. (DePauw), M.A., Ph.D. (Duke), 1962
Associate Professor of English

RHEA EARL, B.S.Ed. (Ohio Northern), M.Ed. (Pittsburgh), 1960
Assistant Professor of Education

JOSEPH ELIAS, (U. of Kaunas), (U. of Munchen, Germany), (U. of Rome),
M.A. (Loyola), 1963
Assistant Professor of Foreign Language

MARVIN ENGLISH, B.S. (Ohio Northern), A.M. (Columbia), 1949
Associate Professor of Physical Education

Marilynne S. Ellery, B.S. Ed. (Ohio Wesleyan), M.E. (Toledo), 1963
Assistant Professor of Elementary Education

FRANKLIN D. FARRINGTON, B.S.M.E. (Ohio Northern), M.S. (Arizona),
1961
Assistant Professor of Mechanical Engineering

JOHN P. FINAN, B.A. (Fordham), LL.B. (Columbia), 1963
Assistant Professor of Law

OTIS GAMES, A.B., A.M. (Ohio Wesleyan), D.Ped. (Ohio Northern), 1952
Counselor of Freshman Men with the rank of Assistant Professor
A. Louise Hastings, A.B., M.A., Ph.D. (Indiana), 1957
Associate Professor of English

Byron L. Haw Becker, B.A. (Manchester), M.S. (Arizona), 1963
Instructor in Chemistry

Professor of Pharmacology and Toxicology

Allen W. Higgins, B.S.Ed. (Bemidji State), M.A. (Minnesota), 1955
Assistant Professor of English
(Leave of Absence)

Archie V. Hillery, B.S.C.E. (Ohio Northern), P.E. (Ohio), 1954
Associate Professor of Engineering Graphics

Chairman, Department of History and Political Science
Professor of History

Harold H. Hinderliter, A.B. (Houghton), S.T.B. (Wesley Theological Sem.), Ph.D. (Vanderbilt), 1960
Assistant Professor of Philosophy and Religion

Floyd W. Hoch, B.S. in Ed. (Ohio Northern), 1961
Assistant Professor of Biology

Ivan C. Hodges, A.B. (Taylor), S.T.B. (Boston), A.M. (Earlham), 1955
Assistant Professor of Philosophy and Religion

Henry Horlott, (Technical School, Karlsruhe, Germany), B.S.M.E. (Michigan College of Mining and Tech.), P.E. (Michigan), 1958
Professor of Mechanical Engineering

Robert R. Huddleston, A.B. (Baker), B.D. (Garrett), Th.D. (Illiff), 1959
Assistant Professor (Leave of Absence)

William D. Humphrey, B.S. (Lafayette), M.A. (Oberlin), 1957
Director of Evening Division
Associate Professor of Business Administration

Ada L. Hunt, B.A. (Ohio Wesleyan), M.A. (Ohio State), 1964
Instructor in English

White A. Jacob, A.B., B.S.Ed. (Kansas State Teachers College), M.A. (Iowa), 1964
Assistant Professor of Speech

Oscar Jacobs, B.S.E.E., B.S.Ed. (Ohio Northern), P.E. (Ohio), 1963
Instructor in Mathematics
Assistant to the Dean of Liberal Arts
NORMAN F. JENNINGS, B.S.M.E., B.S.E.E. (Ohio Northern), M.S. (Ohio State), P.E. (Ohio), 1951
Professor of Mechanical Engineering

HILDERED B. JONES, A.B. (Blue Ridge College), A.M. (West Virginia), Ph.D. (University of Pittsburgh), 1954
Head, Division of Teacher Education
Dean of the Summer School
Professor of Education

BARRY W. JUDD, A.B. (Oberlin), 1961
Instructor in Foreign Language

RICHARD D. KAIN, B.S. (Ohio Northern), M.A. (Ohio State), 1953
Chairman, Department of Industrial Arts
Associate Professor of Industrial Arts

JAMES L. KLINGENBERGER, B.S.E.E. (Ohio Northern), M.S. (Ohio State), P.E. (Ohio), 1949
Head, Department of Electrical Engineering
Professor of Electrical Engineering

ANNA H. KOFFLER, (Maechden Realgymnasium, Vienna), Diploma (State Teachers College, Vienna), Ph.D. (University of Vienna), Graduate Studies (Rutgers), 1953
Professor of Pharmacognosy

FREDERICK I. KUHNS, B.A. (Ohio State), B.D. (Union), A.M. (Chicago), Ph.D. (Chicago), 1960
Librarian with the rank of Associate Professor

KATHRYN Z. KUHNS, B.A. (State Teachers College, N.D.), M.Ed. (Montana), 1960
Assistant Professor of Mathematics

RAYMOND E. LAAKANIEMI, A.B. (Michigan), 1963
Director of Public Information

CLYDE A. LAMB, B.S. (Coe), A.M. (Columbia), 1929
Chairman, Department of Physical Education
Professor of Physical Education

RICHARD LASKO, B.S.Ed., M.Ed. (Ohio), 1962
Instructor in Music (Leave of absence)

CHARLES OREN LEE, B.Sc. in Pharm. (Kansas, Baker), M.S. (Chicago), Ph.D. (Wisconsin), R.Ph. (Indiana), 1954
Professor of Pharmacy

EARL E. LHAMON, B.A., B.S.E.E. (Ohio Northern), 1959
Instructor in Mathematics
WILLIE LONGSHORE, B.F.A. (Miami), 1962
Instructor in Art (Leave of absence)

HELEN LUDWIG, B.S.Ed. (Ohio Northern), 1963
Instructor in Women's Physical Education

MARGARET E. MACNAUGHTON, B.A. (Mary Washington), M.A. (Indiana), 1960
Assistant Librarian with the rank of Instructor

Assistant Professor of Education

JUDSON P. MCCLURE, B.S. (Bob Jones U.), Ph.D. (Colorado), 1963
Assistant Professor of Chemistry

RALPH L. MCFARLAND, B.S.Ed. (Wilmington), 1957
Director of Admissions with the rank of Instructor

DAVID H. MARKLE, A.B. (Ohio Wesleyan), B.D., A.M., Ph.D. (Yale), 1949
Head, Division of Social Sciences
Chairman, Department of Sociology and Psychology
Professor of Sociology

KENNETH F. MARTIN, B.S. (New York), M.A. (Columbia), M.B.A. (Toledo), 1952
Treasurer and Business Manager with the rank of Associate Professor

W. EARL MESSER, S.B., Ph.D. (Mass. Inst. of Tech.), 1963
Associate Professor of Chemistry

GERALD R. MESSICK, B.S.E.E. (Ohio Northern), 1958
Instructor in Physics

LARRY LEE MICHAEL, B.S.Ed. (Ohio Northern), 1960
Instructor in Physical Education

HENRY J. MILES, B.S.C.E. (Brooklyn Poly.), M.S., Ph.D. (Rutgers), 1962
Head, Department of Civil Engineering
Professor of Civil Engineering

GEORGE B. MILLER, JR., B.S.A.E. (Georgia Tech.), M.Ed. (Emory), Ed.D. (Georgia), 1960
Dean of Students
Professor of Psychology

ANTHONY L. MILNAR, A.B. (Upsala), M.S. (Indiana), Ph.D. (Georgetown), 1955
Professor of History and Political Science
Instructor in Art

PRISCILLA R. MORTON, B.A., M.A. (Syracuse U.), 1964
Dean of Women with the rank of Associate Professor

CLARENCE MYERS, B.A. (Ohio Northern), 1962
Instructor in English

Assistant Librarian

HARRY H. PETHERAM, A.B. (Kansas Wesleyan), M.S. (Iowa State), 1964
Instructor in Chemistry

MARY LOU PFEIFFER, 1959
Assistant to the Director for Alumni Relations

ROBERT P. PRICE, A.B. (Southwestern), A.M. (Columbia), 1951
Assistant to the Dean
Associate Professor of English (Leave of Absence)

GORDON L. PROFFITT, B.S. (Concord), M.S. (Marshall U.), 1964
Instructor in Chemistry

RANDY M. RASSOUL, B.A. (Toledo), M.A. (Michigan), 1964
Instructor in Foreign Language

ARDEN ROBERSON, B.S.Ed. (Ohio Northern), M.E. (Kent), 1960
Assistant Professor of Physical Education

WILLIAM L. ROBINSON, B.S.Ed. (Ohio Northern), 1961
Dean of Men

CATHERINE L. ROIDER, B.A. (Rochester), 1959
Instructor in Mathematics

KARL ANDREW ROIDER, B.Mus. (Eastman School of Music), M.Mus. (Rochester), Ed.D. (Columbia), 1945
Chairman, Department of Music
Professor of Music

VIRGIL R. RUBECK, B.S., M.S. Ed.D. (Indiana State), 1962
Assistant Professor of Education

JOHN SABOL, B.A., M.A. (Michigan State), 1957
Assistant Professor of History

GEORGE W. SCHERTZER, A.A. (Ohio Northern), 1956
Associate Director of Development and Public Relations, Secretary of Alumni Association
MATTHIAS SCHMITZ, A.B. (Cologne), A.M., Ph.D. (Harvard), 1952
Head, Division of Humanities
Chairman, Department of Foreign Languages
Professor of Foreign Languages

DONALD F. SHULT, A.A. (Kendall), B.S. (Northwestern), M.S. (Southern Illinois), 1963
Assistant Professor of Mathematics

WILLIAM H. SMERLING, B.S. (Northern Illinois), M.A. (Northwestern), 1963
Registrar with rank of Associate Professor

ALBERT CHARLES SMITH, B.S.in Pharm. (Ohio State), M.S., Ph.D. (Purdue), R.Ph. (Ohio, Indiana), 1944
Professor of Pharmaceutical Chemistry

CECIL L. SMITH, A.B. (Ohio Wesleyan), S.T.B., M.R.E. (Boston), 1959
Assistant Professor of Bible and Religion

E. VERGON SMITH, A.B., LL.B. (Ohio Northern), 1922
Professor of Law and Law Librarian

ROY E. SNYDER, B.S., M.S. (West Virginia), 1956
Assistant Professor of Biology

BOYD M. SOBERS, B.A. (Ohio Northern), M.A. (Western Reserve), 1956
Assistant Professor of History

Assistant Professor of Music

GEORGIA P. SPELLMAN, A.B. (Eureka), M.A. (Bradley), 1959
Assistant Professor of Speech

HERBERT S. SPENCER, B.S. in Fine Arts (Nebraska), M.A. (Columbia), Ph.D. (Nebraska), 1962
Professor of Education

JIMMIE O. STAHL, B.E.Ed. (Ohio Northern), M.A. (Bowling Green), 1963
Instructor in Physical Education

WILLIAM J. STANCHIA, JR., A.B. (Ohio), 1964
Admissions Counselor

ANDREW STAUFFER, B.S. (Ohio Northern), B.S.A., M.S. (Ohio State), 1953
Head, Division of Natural Sciences
Professor of Biology

KOTTARATHIL M. THOMAS, B.S. (Madras U.), M.S. (Madras Christian Col.), Ph.D. (Ohio State), 1962
Assistant Professor of Physics
ROGER J. STAUFFER, B.S. (Ball State), M.A. (Columbia), 1959  
Assistant Professor in Business Education

MARION ELMER TINSLER, A.B. (Bluffton), B.D. (Garrett), Th.D. (Iliff), 1943  
Chairman, Department of Philosophy and Religion  
Professor of Philosophy and Religion

ROBERT E. TIPPLE, B.A. (Ohio Northern), D.D.S. (Ohio State), 1962  
Instructor in Biology

TSE-KWAN TSENG, B.S.E.E. (National Taiwan U.), M.S.E.E. (Univ. of Michigan), 1962  
Assistant Professor of Electrical Engineering

JAMES S. UDY, S.T.B. (Boston), Ph.D. (Boston), 1963  
Director of Religious Life with rank of Associate Professor

JOSEPH A. UVEGES, JR., A.B. (Ohio Northern), M.A. (U. of Florida), 1964  
Instructor in History and Political Science

ERNEST A. VAN ATTA, B.S.Ed. (Ohio Northern), M.A. (Ohio State), 1960  
1960  
Assistant Professor of Education

GEORGE D. VAUBEL, LL.B. (Ohio Northern), 1958  
Associate Professor of Law

LOWELL E. WEITZ, B.S.Mus.Ed. (Ohio Northern), M.FA. (Ohio), D.M.A.  
(U. of Mo.), 1960  
Assistant Professor of Music

Chairman, Department of Art  
Assistant Professor of Art

GENEVIEVE WHEELOCK, A.B. (Ohio Wesleyan), B.S.L.S. (Western Reserve), 1949  
Library Assistant  
Assistant Professor of Education

HOWARD E. WHISLER, B.S.E. (Michigan), M.S.E. (Akron), 1964  
Assistant Professor of Mechanical Engineering

ROBERT J. WILLEY, B.A., LL.B. (Nebraska), 1963  
Assistant Professor of Law

JAMES A. WIRE, B.A. (Oakland City), B.D. (Southern Baptist Seminary),  
M.S. (Purdue), 1959  
Director of Testing with the rank of Instructor
WILLIAM WOODWARD, B.S.Pharm. (Ohio Northern), 1963
   Instructor in Pharmacy

JAMES ANDREW WOOFTER, A.B. (Salem), A.M. (Virginia), Ed.D. (Cincinnati), 1947
   Recording Registrar with the rank of Professor

W. BARRY WORTHING, B.S.C. (Ohio), 1963
   Director of High School Relations

PART-TIME FACULTY

CHARLES L. BLUMSTEIN, M.D. (Louisiana State University School of Medicine), 1961
   Lecturer in Law

WILLIAM C. BYRD, B.Mus., M.Mus. (Cincinnati), 1960
   Assistant Professor of Music

NANCY DAPORE, A.B. (Ohio Northern), 1962
   Instructor in Economics and Business Administration

MARY KATHRYN HAMMOND, B.A. (Swarthmore), M.A. (Delaware), 1963
   Instructor in History and Political Science

FRANK W. SWACKER, B.A. (Union), LL.B. (Virginia), LL.M. (New York U.), 1963
   Lecturer in Law
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