College of Liberal Arts

1971-1972
The $3.2 million Basic Sciences Building opened in 1970.
THE GEORGE FRANKLIN AND SARAH CATHERINE GETTY

College Of Liberal Arts

BERNARD L. LINGER, Dean.

DIVISIONS AND DEPARTMENTS

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

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.

ADMISSIONS STANDARDS

In addition to the general requirements for admission to the University stated in this catalog, the College of Liberal Arts accepts graduates of high school and non-graduates with sixteen acceptable units of work who are recommended by the high school principal. Twelve of these units shall be as follows: four units in English; two units in Mathematics (including algebra and plane geometry); six units in History, Social Studies, Languages or Natural Sciences, or any combination thereof.

Acceptable scores on the College Entrance Examination Board tests or the American College Test are expected of all incoming students. If the former, the English Composition (EN) Achievement Test of the CEEB is required, also, and the Mathematics Level I Achievement Test is suggested for students interested in science areas.

Students are encouraged to take foreign language while in high school. 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 on campus during their senior year, or during the summer preceding their senior year.
THE DEGREE OF BACHELOR OF ARTS

General and Advanced Courses. The first two years are usually devoted to general education, presenting the courses which will furnish the foundation and background for advanced education. Work in the major field is taken largely on the advanced level, together with advanced electives.

Prescribed: The courses listed below constitute the GENERAL EDUCATION UNITS required of all students. They are listed by academic divisions; optional alternate subject disciplines within the division are indicated.

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

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

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

TEACHER EDUCATION
Education 100

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

In order to add depth to the GENERAL EDUCATION UNITS, it is further required that the student complete two additional courses (six credit hours) in each academic division. These two courses must be in the same subject discipline in which the student has completed the GENERAL EDUCATION UNIT; however, the choice of the discipline belongs to the student. Additional course requirements in the Teacher Education Division are excepted for students taking departmental majors. In the division in which the student has selected his major the two additional courses required are fulfilled as a normal part of his major curriculum.

If it is a departmental requirement or if the student so desires, completion of the sixth quarter of a foreign language may substitute for the Foreign Language GENERAL EDUCATION UNITS. In addition this would serve to complete the two additional courses required in the Humanities Division.

Neither credit hours nor letter grades are assigned to the GENERAL EDUCATION UNITS. Four of these courses would constitute a normal academic load for one quarter and the student will be evaluated on the basis of “CR” (competency achieved) and “NC” (competency not achieved).

The basic courses in English must be scheduled in the first three quarters of matriculation.
The Major. The candidate for a degree must complete in a logical sequence a major of not less than forty-five quarter hours. The faculty adviser will assist the student in planning this major not later than the last quarter of the second year. Candidates for the degree of Bachelor of Arts who expect to teach in the public school must satisfy professional education requirements and will have a member of the Department of Education for a professional adviser.

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

- Art
- Biology
- Business Administration
- Chemistry
- Economics
- Elementary Education
- English
- French
- German
- Health and Physical Education
- History
- Industrial Arts
- Mathematics
- Music
- Philosophy
- Philosophy and Religion
- Physics
- Political Science
- Psychology
- Religion
- Social Work
- Sociology
- Spanish
- Speech
- Theatre

**TEACHER CERTIFICATION**

Ohio Northern University is vitally concerned with the preparation of effective, efficient teachers. Consequently, complete certification programs are offered within the degree requirements in almost every department. (See Department of Education listing for details.)

Students preparing to teach must make formal application to the Teacher Education Program by the end of the sophomore year. The student must maintain a 2.25 quality point average in his major field, and have completed 75% of prescribed freshman and sophomore course work. The Teacher Education Committee, representing all Divisions of the College of Liberal Arts, considers applications for admission to the program.

All students preparing to teach are assigned advisers in the Department of Education to assist with scheduling of Professional Education courses. The adviser in the student’s major department continues to advise the student with regard to meeting the requirements for the major.
A grade of "C" or better is required in all Professional Education courses and in all courses in the major field. Students with degrees from other accredited institutions may qualify for teacher certification in the Department of Education by completing the required 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 in teaching.

**LIBERAL ARTS HONORS PROGRAM**

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

The Program is designed to aid a select group of students in more fully realizing their academic potential. To this end, regular curricular requirements are relaxed, a special academic program is planned for the individual student's particular abilities and educational goals, and regulations or requirements deemed necessary to the orderly curricular progress of the general student body are waived wherever such appears to be in his best interests.

A student of outstanding academic potential who is not sufficiently challenged by the regular curriculum or who finds himself hampered by the traditional grading system should consider applying for this program. Whether he has the requisite potential along with the motivation essential to success in the program is determined by the Honors Program Council, who base their judgment on the information submitted with his application, on the recommendations of his teachers, and on one or more interviews with the student himself.

**PRE-PROFESSIONAL CURRICULA LEADING TO THE BACHELOR OF ARTS DEGREE**

**PRE-MEDICAL SCIENCE CURRICULA**

A medical science committee has been established to advise and aid students in obtaining the undergraduate background in the Liberal Arts and sciences necessary for the study of medical sciences. The committee serves as the professional adviser to students along with a departmental adviser after a major has been chosen. Students may major in a department of their choice keeping in mind that in addition to University and Liberal Arts College requirements, every student in the medical science area must have
a knowledge of the basic sciences. For further information and examples of the basic programs write to the Medical Sciences Committee, College of Liberal Arts.

*Pre-Medicine.* These students meet regularly with the medical science committee for counsel concerning preparation for the study of medicine. It is recommended that the student preparing for professional training in medicine plan to complete four years of undergraduate study.

*Pre-Dentistry, Arts-Medical Technology.* These students meet with the medical sciences committee for counsel concerning preparation for the respective areas of professional study. In order to receive a Bachelor's degree from Ohio Northern University most students will need to complete four years of undergraduate study.

**PRE-THEOLOGY**

The recommendations of the American Association of Theological Schools are followed in counseling the pre-theological student in planning his program leading to the A.B. degree. An interdisciplinary major in the Department of Philosophy and Religion, or a major in another appropriate department may be selected.

**PRE-LAW**

In general, law colleges advise a broad liberal undergraduate preparation. A faculty adviser assists the student in the selection of courses.

**COMBINATION CURRICULA**

**ARTS-ENGINEERING** (Five-year, Two-Degree Program)

The Arts-Engineering Program is a five-year curriculum for the superior student challenged by the rewards of understanding more fully both human society and current technology. The student enrolls simultaneously in the Colleges of Liberal Arts and Engineering, pays at the Engineering College rate, and receives an appropriate degree in each college upon graduation. To enter this program a first-year student must be prepared to take advanced mathematics. Transfer students in this program must be in residence at Ohio Northern the last three years before graduation. Each student has an adviser in each college. The curriculum outline is given in the engineering section of this catalog.
GENERAL REGULATIONS

1. The student may not register for more than eighteen 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 eighteen scheduled hours (or equivalent) including physical education.

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

3. The student indicates his choice of a major field by filling out a Declaration of Major card available in the offices of the department chairmen. 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 obtainable as indicated above. A student is officially accepted as a major in a department only when he has completed the above procedure. The faculty adviser will assist the student in planning this major not later than the last quarter of the second year.

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

5. Seniors selecting "100" courses should consult the Department Chairman and the Dean of the college for permission.

6. Students of Sophomore rank are not permitted to take 300/400 courses unless it is recommended by the student's adviser and approved in writing by the Chairman of the Department concerned.

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

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

9. With the permission of the Instructor and the Department Chairman, any course prerequisite may be waived.
CLASSIFICATION OF STUDENTS

For purpose 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.

PROBATION

A grade point average of 2.0 is necessary for graduation. If the accumulative grade point average of a freshman student falls below 2.0 or if the student fails to complete successfully within one of as many GENERAL EDUCATION UNITS as attempted within a given quarter on a normative accumulative basis, the student will be placed on probation and his participation in extra-curricular activities shall be reviewed by his adviser, the Dean of Students and the Dean of his College; once the student is classified as a sophomore or above, the accumulative grade point average alone is used to determine academic standing.

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

SENIOR COMPREHENSIVE EXAMINATION

The requirement of a Senior Comprehensive Examination is a matter of departmental policy. The decision and authority either to require or not require the examination rests with the department, as does the determination of all policies regarding such examinations, where they are required.

Students should consult the departmental sections of the catalog and the department chairman in order to determine the existing policy for Senior Comprehensive Examinations within the respective departments.

GRADUATION

To graduate with the Bachelor of Arts degree, the student must complete a MINIMUM of 16 GENERAL EDUCATION UNITS, plus 130 quarter hours of academic work (including 3 quarter hours in physical education), with 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 considered to be minimum residence requirements for all students.

THE DEPARTMENTAL COURSES

ART

(DEPARTMENT 151)

ASSOCIATE PROFESSORS DEVORE, GORDON (Chairman), WEST; INSTRUCTOR CHESSER.

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

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

A student majoring in Art must complete 76 hours including Art 151, 152, 161, 162, 210 (6 hours), 250 or 420 (9 hours), 350 or 410 (6 hours), 360, 489, 6 hours selected from 270, 280, 370, 380 and 12 hours selected from 100, 305, 315, 325, 335. Students seeking certification in Art Education must additionally complete Art 222, 457 or Education 450, and 6 hours selected from Art 221, 350, 410.

Professional Education requirements are listed by the Department of Education.

A comprehensive examination in art and a public exhibition of the student's studio work is prerequisite for graduation with a major in art.

100. ART. Analyses of the visual arts through selected works from the past and present. Illustrated lecture. One unit.

114-115. ART FOR ELEMENTARY TEACHERS. For prospective classroom teachers with emphasis on theory, media, and techniques. 114 3 hours, 115 3 hours.

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

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

161. DESIGN I. Introduction to, and application of, the elements and principles of plastic and graphic design. Required of all art majors. 3 hours.
162. DESIGN II. Organization of elements and principles in three dimensions. 3 hours.

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

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

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

250. PAINTING. Techniques, and modes of painting in various media. May repeat for credit to total of 12 hours. 3 hours.

270. RELIEF PRINTMAKING. Woodcut, linocut, wood engraving and other relief techniques. May repeat for total of 6 hours. 3 hours.

280. SERIGRAPH PRINTMAKING. Methods and techniques. May repeat for total of 6 hours. 3 hours.

305. ANCIENT/MEDEIVAL ART HISTORY. Art forms and styles from prehistoric times to the 14th century. 3 hours.

315. RENAISSANCE AND BAROQUE ART HISTORY. Art forms and styles during the 15th, 16th, and 17th centuries in Italy and Northern Europe. 3 hours.

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

335. CONTEMPORARY TRENDS ART HISTORY. Emphasis on appearances, and development of basic artistic expressions from beginning of 20th century to the present. 3 hours.

350. CERAMICS. Methods and techniques of forming, decorating, glazing, and firing clay bodies; slab, wheel-thrown, and cast. May repeat for total of 12 hours. 3 hours.

360. SCULPTURE. The design and rendering of sculptural forms in a variety of media and techniques. May repeat to total of 12 hours. 3 hours.

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

380. INTAGLIO PRINTMAKING. Methods and techniques of etching and engraving. Prerequisites: Art 152, 162, and 210. May repeat to total of 6 hours. 3 hours.

410. ADVANCED CERAMICS. Directed study. May repeat to total of 12 hours. Prerequisite: 6 hours of 350. 3 hours.

415. ADVANCED PRINTMAKING. Directed study. May repeat to total of 12 hours. Prerequisite: 6 hours of printmaking. 3 hours.

420. ADVANCED PAINTING. Directed study. May repeat to total of 12 hours. Prerequisite: 6 hours of 250. 3 hours.

425. ADVANCED SCULPTURE. Directed study. May repeat to total of 12 hours. Prerequisite: 6 hours of Art 360. 3 hours.
457. ART EDUCATION METHODS. Laboratory-seminar dealing with materials, techniques, and methods of secondary classroom instruction in art. Meets professional education requirement in methods area. 3 hours.

489. SENIOR THESIS. Required of all Art Majors. Preparation for and evaluation of the comprehensive examination and exhibit. Arrangements for this course must be made one quarter in advance with the student’s major adviser and the department chairman. 1 hour.

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

494. SEMINAR IN ART. 1-3 hours.

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

BIOLOGY
(DEPARTMENT 121)

PROFESSORS BOWDEN (Chairman), MEYER; ASSOCIATE PROFESSORS BUTLER, DAWSON, HOCH, LAING, TIPPLE; ASSISTANT PROFESSORS GIDWANI, KEISER, NELSON; INSTRUCTORS DUDROW, PORTERFIELD; ASSISTANT INSTRUCTOR SMITH.

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

Additional requirements for majors are:

Biology 112, 113, 195, 201 or 202, 223, 301, 331, 343, 430, 431, 495 and fifteen (15) credit hours elected from: 201, 202, 213, 234, 290, 297, 302, 303, 332, 333, 350, 423, 490, 495, 497, microbiology 361, 362 (offered in the College of Pharmacy).

Preparation in the related area of mathematics, statistics, chemistry and physics as determined by the department in consultation with the individual student. (A minimum of 25 hours beyond the basic course requirements of the College of Liberal Arts including statistics and at least a one year sequence in chemistry.)

A comprehensive examination.

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

100. BIOLOGY. Biological principles and concepts of plant and animal life, stressing their application to man. One unit.

112, 113. GENERAL BIOLOGY. Biological principles and concepts of plant and animal life, stressing their application to man. Prerequisite: General Biology 100. 8 hours.

Alternate 112, 113. GENERAL BIOLOGY. Independent Study Program. The student’s rate and method of study are given maximum independence under department supervision. Consult the chairman. Prerequisites: General Biology 100. 8 hours.
195. Seminar. Readings, discussions and reports on problems of historical and current interest in biology. Required of all prospective Biology majors. 1 hour.

201. Development in Seed Plants (2 + 4). A quantitative and developmental approach to the life history of the seed plant emphasizing the interactions of structures and processes. Prerequisite: General Biology 112. 4 hours.

202. The Seed Plant As An Organism (2 + 4). The interactions of structures and processes in the vegetative stage of the life history of the seed plant. Prerequisite: General Biology 112. 4 hours.

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

223. Invertebrate Zoology (2 + 4). Invertebrate relationships including morphology, physiology, life cycles and taxonomy. Prerequisite: General Biology 113. 4 hours.

Biology 231-232-233. Anatomy and Physiology (3 + 3). Basic principles of human body structure and function, including the physiology of exercise. Prerequisite: General Biology 113. 12 hours.

234. The Environment of Man. (2) The interactions of man and his surroundings with emphasis on the problems arising from increasing human population. 2 hours.

290. Special Topics in Biology.

297. Introduction to Biological Investigations. Minor investigations for qualified freshmen and sophomores. 1 hour.

301, 302, 303. Developmental Anatomy (2 + 5). Biological principles involved in embryonic development, the structural changes and the resulting functional modifications of the vertebrates. Prerequisites: General Biology 113. 12 hours.

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

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

343. Techniques and Instrumentation (1 + 3). Principles and procedures used in biological investigations. Open to juniors majoring in biology. 1 hour.

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

423. Ecology (2 + 3). The distribution, abundance and productivity of organisms interacting among themselves and with their nonliving environs. Prerequisite: Proficiency in elementary mathematics, statistics and quantitative life history studies or Biology 201, statistics. 3 hours.
430. Genetics. The principles of genetics as exemplified by microorganisms, higher plants and animals. Mendelian, biochemical, developmental and population genetics are considered. Prerequisite: Biology 113, one year of chemistry, statistics. 3 hours.


490. Special Topics in Biology. 1-3 hours.

495. Seminar in Biology. 1-3 hours.

497. Independent Study in Biology. 1-3 hours.

BUSINESS ADMINISTRATION AND ECONOMICS

(Department 131)

Professor Conklin (Chairman); Associate Professor Cooley; Assistant Professors Kniffen, Webster, Young; Instructors Bissey, Goldberg, Hamilton, Minks; Lecturer DaPore.

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

The student entering this department has a choice of two major fields, Economics and Business Administration. Within the field of Economics are two areas of concentration, Economics and Finance. In the field of Business Administration, there are two areas of concentration, Accounting and Management.

A student majoring in the department must complete a minimum of 45 hours in the department including courses 131, 132, 133, 202, 203, 322, 352, 353. In addition, students majoring in Economics and Business Administration are required to complete Mathematics 142 and 143, Probability and Statistics. A Senior Comprehensive Examination is required.

100. Economics. The origins, characteristics, and functions of our economic organization. Current institutional arrangements, the use of appropriate tools of economic analysis; relevant economic and social goals. One unit.


202. Principles of Microeconomics. Economics of the individual firm in the free market economy; competitive and monopolistic markets. How prices ration goods and services to users, and the principles on which the total product is divided among the owners of factors of production. Actual cases from business. Prerequisite: Economics 100. 3 hours.
203. **Principles of Macroeconomics.** Forces that determine the behavior of national income and output, unemployment, and the price level. Rudiments of money and banking, monetary and fiscal policy, growth and development. Selected issues of contemporary social relevance. Prerequisite: Economics 100. 3 hours.

301-302. **Intermediate Accounting.** Income measurement and recognition. The accounting cycle, matching process, financial statement presentation and actuarial mathematics as applied to accounting problems. Prerequisite: Accounting 133. 6 hours.

312. **Cost Accounting.** Job order, process, and standard cost systems. Controls for material, labor, and overhead. Methods of cost allocation. Joint and by-product costs. Flexible budgets and the development of cost parameters. Prerequisite: Accounting 133. 3 hours.

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

330. **Principles of Management.** The organization of firms. Modern management methods, decision making processes, procedures, physical equipment and standards. Organization and managerial relationships of major industrial functions. Prerequisite: Economics 202-203. 3 hours.

341. **Labor Economics.** Labor is a factor in production; labor mobility; theories of the determination of wages, and bargaining theory; history and methods of labor unions, and government relations to labor. Prerequisite: Economics 202-203. 3 hours.

351. **Marketing.** Management-oriented; concepts, processes, and problems of marketing; channels of distribution, marketing research, brands and price policies. Prerequisite: Economics 202-203. 3 hours.

352-353. **Money and Banking.** The organization and operation of American banking institutions; 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 202-203. 6 hours.

362. **Corporation Finance.** Handling and flow of corporate funds; problems of fixed and working capital, income level, dividend policy and the use of borrowing; case analysis used. Prerequisite: Economics 202-203. 3 hours.

363. **Personnel Management.** The functions of the personnel department in industry. Case analysis of problems in selection, training, and incentives; the human factor in industry. Prerequisite: Economics 202-203. 3 hours.

370. **Managerial Accounting.** Use and interpretation of accounting data in controlling and planning business activities and decision making. Business problems examined from the point of view of internal management. Prerequisite: Cost Accounting 312. 3 hours.

371. **Salesmanship.** The principles, techniques and problems of salesmanship; sales management, recruiting, controlling and evaluating the sales force; market research, channels of distribution and pricing. Prerequisite: 202-203. 3 hours.
372. Advertising. Advertising as a phase of the marketing process; selling appeals and types of advertising; consideration of copy and media; problems of publishing and broadcast advertising. Prerequisite: Economics 202-203. 3 hours.

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

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

383. Intermediate Microeconomic Theory. Special problems of pricing, production, and distribution under perfect competition, oligopoly, duopoly, and monopoly in the American economy. Prerequisite: Economics 202-203. 3 hours.

384. Intermediate Macroeconomic Theory. The principles, measurement, analysis, and control of aggregate economic activity; the role of consumption, investment and saving in achieving a full-employment out-put, economic growth, and price stability. Prerequisite: Economics 202-203. 3 hours.

385. International Economics. Theories and current problems of trade between nations; governmental restrictions and controls; the importance of multilateral trade; balance of payments; scarce resources; population, and employment trends. Prerequisite: Economics 202-203. 3 hours.

391. Business Communications. The techniques of writing business letters and reports; efficient and accurate communication of economic and business facts and presentation of conclusions for management decision-making; further study of English for self-improvement. 3 hours.

403-404. Auditing. Auditing accounting records and statements, techniques of verifying financial statement items, preparation of working papers, and the writing of audit reports for complete audit. Prerequisite: Intermediate Accounting 302. 6 hours.

411. Comparative Economic Systems. A comparative study of capitalism, socialism, and communism with emphasis on the economics of pricing, production, and distribution under these systems. A specific and empirical examination of these systems in actual use, as in the United States, Russia, Great Britain and China. Prerequisite: Economics 202-203. 3 hours.

413. Budgeting. Relationship of budgeting to management functions; principles and procedures of profit planning and financial control for both, manufacturing and non-manufacturing organizations. Prerequisite: Managerial Accounting 370. 3 hours.

423. Public Finance. How the Federal government and local units of government finance themselves; taxation in its many forms, the securities issued by government units and the national debt of the United States. Prerequisite: Economics 202-203. 3 hours.

432. Accounting Information Systems. Theory and procedure for designing, installing, and maintaining accounting information systems for collecting, recording, analyzing, and presenting financial data. Prerequisite: Intermediate Accounting 301-302. 3 hours.
433. Data Processing. To prepare managers to understand electronic data processing equipment and its uses. Prerequisite: Management 330. 3 hours.

441. Economic History of Europe. The beginnings of trade, medieval economic relationships, and the rise of invention and technology culminating in the Industrial Revolution; economic rivalries leading to World War I. 3 hours.

442. Economic History of the United States. Economic life in colonial America and the East-West migration; the development of modern business and industry in the United States; the corporation and its part in the nation's growth; the causes and consequences of the great depression. 3 hours.

443. History of Economic Thought. The development of economic thought from Greek and Hebrew writers to modern economists: Adam Smith, Malthus, Ricardo, Marx, Marshall, Keynes and modern economists. 3 hours.

461. Investments. Problems of investment policy: types of investment risks, the analysis of investment requirements, and types of investment policies. Problems of both individuals and institutional investors. Prerequisite: Corporation Finance 362. 3 hours.

462. Insurance. Chief applications of insurance: life, health and disability, fire casualty and marine; corporate bonding, pensions and group insurance, actual insurance problems presented by experienced operatives. Prerequisite 202-203. 3 hours.

490. Special Topics in Economics. 1-3 hours.

491. Special Topics in Management. 1-3 hours.

492. Special Topics in Accounting. 1-3 hours.

494. Seminar in Economics. 1-3 hours.

495. Seminar in Management. 1-3 hours.

496. Seminar in Accounting. 1-3 hours.

497. Independent Study in Economics. 1-3 hours.

498. Independent Study in Management. 1-3 hours.

499. Independent Study in Accounting. 1-3 hours.

Chemistry

Department 122

(Department 151)

Professors Bettinger (Chairman), Wilhelm; Associate Professors Haight, Hawbecker; Assistant Professors Boersma, Godwin; Instructor Putnam; Lecturer Sutliff.

The Department of Chemistry is on the list of departments approved by the American Chemical Society for the professional education of chemists.
The objective of this department is to help serve the modern cultural need for an understanding of science in our modern society, to provide the basic preparation in chemistry for those who plan to enter the chemical industry, the teaching profession, pursue graduate study in chemistry or related fields, and to serve those who need an understanding of the fundamentals of this physical science as a prerequisite to various professional studies.

MAJOR IN CHEMISTRY

A. The Program leading to the American Chemical Society certified major is recommended for those who wish to become professional chemists or intend to pursue graduate study. Chemistry 152, 153, 241, 242, 243, 251, 304, 324, 334, 341, 342, 343, 375, 451, 462, 475, 494 and two of the following units: I, Chemistry 473; II, Chemistry 474; III, Chemistry 481-482-483 or Chemistry 497 for three hours; IV, an advanced mathematics or physics course approved by the department. A comprehensive examination must be taken during the senior year.

B. The Program leading to the basic major is intended for those who wish to prepare for related areas as for example, medicine, sales or management in the technical industries, patent law, scientific communication and information retrieval, secondary school teaching, and so forth. This basic program provides an opportunity to elect more work in areas that support the major background with respect to the student’s chemistry related career goal. Chemistry 152, 153, 241, 242, 243, 251, 324, 341, 342, 343, 494, 304 or 375, and one additional chemistry course. A comprehensive examination must be taken during the senior year.

100. CHEMISTRY. Orientation to and understanding of the fundamental nature of Chemistry; models and measurements. One unit.

112-113. GENERAL CHEMISTRY. Fundamental principles and use of modern theory and periodic relationships to explain observable facts. The laboratory illustrates principles in a quantitative manner and involves the study of ions in aqueous solution. (3 + 3). Prerequisite: Chemistry 100. 4 + 4 hours.

152-153. GENERAL CHEMISTRY FOR MAJORS. The same lecture and laboratory as Chemistry 112-113 (3 + 3). Prerequisite: Chemistry 100. 4 + 4 hours.


241-242. ORGANIC CHEMISTRY FOR MAJORS. The same lecture and laboratory as Chemistry 231-232. (3 + 3). Prerequisite: Chemistry 153. 4 + 4 hours.

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

251. CHEMICAL ANALYSIS. Basic principles and techniques and laboratory applications of quantitative elemental analysis. (1 + 6). Prerequisite: Chemistry 113 or 153. 3 hours.
290. Special Topics. 1-3 hours.


324. Intermediate Inorganic Chemistry. Preparations, properties and reactions of elements and their compounds in terms of modern concepts. The laboratory involves the application of fundamental techniques to the synthesis of compounds and the systematic study of their properties and reactions. (2 + 3). Prerequisite: Chemistry 251. 3 hours.

334. Chemical Literature. Types of chemical literature available and their use; literature searching and preparation of scientific papers. Laboratory consists of actual library problems. (1 + 3). Prerequisite: Chemistry 232 or 242. 2 hours.

341. Physical Chemistry I. Fundamentals, primarily thermodynamics. (3 + 0). Prerequisite: Physics 231, 232, 233; Math 263, and Chemistry 113 or 153. 3 hours.

342-343. Physical Chemistry II, III. Fundamentals: kinetics, quantum theory and structure of matter. Laboratory illustrates the principles. (3 + 3). Prerequisite: Chemistry 233 or 243, 251, and 341. 4 + 4 hours.

375. Advanced Preparations and Techniques I. Advanced preparative and analytical technique; the use of modern instrumentation to characterize substances. (1 + 6). Prerequisite: Chemistry 324. Corequisite: Chemistry 343. 3 hours.

451. Advanced Inorganic Chemistry. Chemical principles and bonding theory applied to the study of inorganic systems. (4 + 0). Prerequisite: Chemistry 324, 334 and 343. 4 hours.

462. Advanced Analytical Chemistry. The theory of instrumental analysis. (3 + 0). Prerequisite: Chemistry 324, 334 and 343. 3 hours.

473. Advanced Topics in Physical Chemistry. (3 + 0). Prerequisite: Chemistry 334, 343, Math 264 and a reading knowledge of German (Taught in alternate years). 3 hours.

474. Theoretical Organic Chemistry. (3 + 0). Deals at an advanced level with the relationships of structure and reactivity of organic compounds including reaction mechanisms. Prerequisite: Chemistry 304, 334, 343 and a reading knowledge of German (Taught in alternate years). 3 hours.

475. Advanced Preparations and Techniques II. (0 + 6). Prerequisite: Chemistry 375, 451, 462 and reading knowledge of German. 2 hours.

481-482-483. Senior Research I, II, III. Prerequisite: Chemistry 324, 334, 343, a reading knowledge of German and approval of chairman required. 2 + 2 + 1 hours.

490. Special Topics in Chemistry. 1-3 hours.


497. Independent Study in Chemistry. 1-3 hours.
EDUCATION
(Department 141)
PROFESSORS HANSON, MILLER, SPENCER, VAYHINGER (Chairman); ASSOCIATE PROFESSORS CRIDER, ELLERY, PARSONS, RUBECK, VAN ATTA; INSTRUCTOR TRAXLER; LECTURER LLOYD.

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

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

It is required that all prospective teachers have at least four experiences in working with youth groups prior to the student teaching experience. The most important is the Participation Program, when students spend one week in their hometown school. Elementary Education majors are required to complete the departmental Senior Comprehensive Examination.

All students preparing to teach are required to:
A. Make formal application for admission to the Teacher Education Program after the completion of 75% of their freshman and sophomore work.
B. Have for acceptance:
   1. An accumulative average of 2.25 in their major field.
   2. Favorable recommendations from advisors, major department, Dean of Women or Men, and Health Department.
   3. Action by the Liberal Arts Committee on Teacher Education.
C. Meet the requirements in an area of concentration under the appropriate chairman.

1. ELEMENTARY EDUCATION
   a. Provisional Elementary Certificate:
      Professional Education requirements:
      Education 100—Education
      Education 223—Child Psychology
      Education 233—Children’s Literature
      Education 251—Instructional Media Lab
      Education 308—Teaching Mathematics
      Education 309—Teaching Science
      Education 311—Teaching Social Studies
      Education 312—Teaching Language Arts
      Education 341—Teaching Reading
      Education 381—Elementary School Curriculum
      Education 461—Seminar in Evaluation and Measurement
      Education 470-471—Student Teaching
      Electives in Education

      \[ \text{TOTAL} \quad \text{One Unit} \]

      Education 100 \(+ 48 \text{ hours} \)
2. SPECIAL CERTIFICATION—ELEMENTARY AND SECONDARY
   a. Art Education
      Provisional Special Certificate. See Chairman of Department of Art for program of
      studies.
   b. Health and Physical Education
      Provisional Special Certificate. See Chairman of Department of Health and Physical
      Education for program of studies.
   c. Music Education
      Provisional Special Certificate. See Chairman of Department of Music for program
      of studies.

3. SECONDARY EDUCATION
   Requirements for certification in the various secondary teaching fields may be ob-
   tained from the Office of the Director of Teacher Education.
   Students preparing to teach in secondary schools are required to complete a minimum
   of 75% of a major in a subject matter department in the College of Liberal Arts and
   have the endorsement of the department’s chairman before qualifying for student
   teaching.

Professional Education requirements:
   Education 100—Education
   Education 224—Adolescent Psychology (Prereq.: Psych. 100)
   Education 370—School and Society
   Education 380—Secondary Curriculum
   Education 450—Secondary Methods of Teaching
      or Special Methods of Teaching
   452 English
   453 Social Studies
   454 Mathematics
   455 Science
   456 Language
   457 Art
   Music 313
   Industrial Arts 423
   Education 480-481-482—Student Teaching
   Elective in Education

TOTAL

<table>
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<tr>
<th>Course</th>
<th>Hours</th>
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<td>Education 100 +</td>
<td>Education 100 + 28 hours</td>
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Elective from the following courses:
   Education 250—Instructional Media
   Education 251—Instructional Media Lab
   Education 313—Educational Psychology
   Education 401—History and Philosophy of Education
   Education 402—School Organization & Administration
   Education 460—Evaluation and Measurement
   Education 465—Comparative Education
Secondary Certification programs are offered in the following areas:

- Art
- Biology
- Bookkeeping-Basic Business
- Chemistry
- Comprehensive Social Studies
- Driver Education
- Economics
- English
- General Science
- Health
- History
- Industrial Arts
- Languages: French, German, Spanish
- Mathematics
- Music
- Physical Education
- Physics
- Political Science
- Social Psychology
- Sociology
- Speech

**GENERAL COURSES**

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

250. **INSTRUCTIONAL MEDIA IN EDUCATION.** Preparation, study and evaluation of instructional materials; their uses in the promotion of the learning process. Enrollment in Ed. 250 must be accompanied by enrollment in Ed. 251. *2 hours.* (Formerly Ed. 350)

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

313. **EDUCATIONAL PSYCHOLOGY.** The learning process and conditions that promote learning. Prerequisite: Psychology 100. *3 hours.*

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

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

420. **CURRICULUM IMPROVEMENT.** Individual and group problems growing out of students' own school situations. *3 hours.* Not offered 1971-72.

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

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

490. **SPECIAL TOPICS IN EDUCATION.** *1-3 hours.* (Formerly Ed. 440)

494. **SEMINAR IN EDUCATION.** *1-3 hours.*

497. **INDEPENDENT STUDY IN EDUCATION.** *1-3 hours.*
ELEMENTARY EDUCATION COURSES

223. CHILD PSYCHOLOGY. Characteristics of the child at different levels of maturity; physical, mental and emotional growth; growth and organization of meanings; control of social and ethical behavior; development of personality. Prerequisite: Psychology 100. 3 hours.

233. CHILDREN’S LITERATURE. Knowledge and appreciation of children’s books. Audio-visual aids, up-to-date study, critical aids and enjoyment of representative selections are utilized. 3 hours.

308. TEACHING MATHEMATICS IN THE ELEMENTARY SCHOOL. Content, methods, and materials reflecting the current emphasis in mathematics. Development of functional relationships with other curriculum areas. Prerequisite: 9 hours of college math and Education 223. 3 hours.

309. TEACHING SCIENCE IN THE ELEMENTARY SCHOOL. The role of science in childhood education, the preparation of materials, and organization of learning activities for problem solving. Prerequisite: 12 hours of college science and Education 223. 3 hours.

311. TEACHING SOCIAL STUDIES IN THE ELEMENTARY SCHOOL. Objectives, trends, issues, and evaluation of the teaching of social studies relative to the concepts and principles underlying the disciplines of the social sciences. Prerequisite: Education 223. 3 hours.

312. TEACHING LANGUAGE ARTS IN THE ELEMENTARY SCHOOL. Principles and methods of teaching language arts including oral and written expression, handwriting, spelling, and creativity in relation to other subjects in the curriculum; the preparation and evaluation of language arts materials. Prerequisite: Education 223. 3 hours.

330. KINDERGARTEN METHODS AND MATERIALS. Programs and practices in the kindergarten of four and five-year-olds. Advanced students in education and by special permission. 3 hours. Offered 1971-72.

341. TEACHING READING IN THE ELEMENTARY SCHOOL. Materials and principles underlying the teaching of reading including new concepts, readiness, phonics, word analysis, silent and oral reading, vocabulary development, and comprehension; preparation and evaluation of reading materials. Prerequisite: Education 223. 3 hours.

381. THE ELEMENTARY SCHOOL CURRICULUM. An overview of the elementary school program, conceptions of teaching in harmony with basic psychological principles. Prerequisite: 6 hours of elementary methods courses. 3 hours. (Formerly Ed. 391)

410. EDUCATION OF SLOW LEARNING CHILDREN. Introductory; developmental growth and learning characteristics; etiology; diagnosis and differentiation; teacher and learner problems in education. 3 hours. Offered Spring, 1972 (Tentative). Seniors and graduates.

411. LANGUAGE ARTS FOR SLOW LEARNING CHILDREN. Methods, materials for functional communication skills. 3 hours. Offered Summer, 1972 (Tentative). Seniors and graduates.

412. MATHEMATICS AND SCIENCE FOR SLOW LEARNING CHILDREN. Methods, materials for basic mathematic and science concepts; practical application. 3 hours. Offered Fall, 1972 (Tentative). Seniors and graduates.
413. **Social Studies for Slow Learning Children.** Problems and deviations in civic, social and cultural behavior and adequacy. 3 hours. Offered Spring, 1973 (Tentative). Seniors and graduates.


416. **Education of Exceptional Children.** Ways to promote learning with atypical school children who are above or below normal expectations of children. From mental, social and physical standpoints. 3 hours. Not offered 1971-72.

441. **Advanced Reading Methods and Materials.** Advanced study of the reading process, comprehension and speed, skills; prevention and treatment of individual problems. Prerequisite: Education 341. 3 hours.

461. **Seminar in Evaluation and Measurement in Education.** Basic areas of evaluation and measurement with emphasis on statistical terminology, test construction and interpretation, survey of evaluative instruments. Required of Elementary Education majors concurrent with first Methods course. 1 hour.

470-471. **Student Teaching in the Elementary Grades.** Planning and teaching under supervision in the elementary grades; weekly seminar on campus. Prerequisites: senior rank; average of 2.25 or higher with no grade in any required Education course lower than "C"; Ed. 100, 223, 308, 309, 311, 312, 341, 461; at least four field experiences, including Participation; a desirable teaching personality including interest in teaching, social adaptability, the ability to get along with people, responsibility and high moral standards; effective communicative skills in speaking and writing; approved by the Director of Teacher Education. 6, 9, or 15 hours.

**SECONDARY EDUCATION COURSES**

224. **Adolescent Psychology.** The adolescent, his physical, social, emotional, and intellectual development; in accordance with genetic constitution and environmental forces from birth. Prerequisite: Psychology 100. 3 hours. (Formerly Ed. 333)

342. **Developmental Reading in the Secondary School.** Principles and materials that aid in developing reading abilities. Diagnosis of reading disabilities. Development of programs to help students improve reading skills. Open to English majors or by permission of the instructor. 3 hours.

370. **School and Society.** Schools in relation to their supporting society; democracy in its relation to public schools; the responsibilities of educators to the community and to the school; the nature, type, and limitations of both the official and unofficial controls of the public school. Prerequisite: Education 224. 3 hours.

380. **The Secondary School Curriculum.** Secondary school curriculum standards, practices, instructional materials, curriculum development, curriculum functions, changes and trends. Prerequisite: Education 224. 3 hours. (Formerly Ed. 390)
450. **Teaching Methods in the Secondary School.** Methods, devices, and techniques which are most effective in directing learning in the various subject areas at the high school level; observations and evaluations of actual classroom situations. 3 hours. Prerequisite: Ed. 224.

452. **Teaching Methods in High School English.** Methods, devices and techniques which are most effective in directing learning in secondary classes in English; observation, participation and evaluation in actual classroom situations. (Taken 1 hour per quarter for 3 quarters.) 1-3 hours.

453. **Teaching Methods in High School Social Studies.** Similar to Education 450 with emphasis on the student’s major teaching area. 3 hours. Prerequisite: Ed. 224.

454. **Teaching Methods in High School Mathematics.** Similar to Education 450 with emphasis on the student’s major teaching area. 3 hours. Prerequisite: Ed. 224.

455. **Teaching Methods in High School Science.** Similar to Education 450 with emphasis on the student’s major teaching area. 3 hours. Prerequisite: Ed. 224. Not offered 1972-73.

456. **Teaching Methods in High School Foreign Language.** Similar to Education 450 with emphasis on the student’s major teaching area. 3 hours. Prerequisite: Ed. 224. Offered on demand.

457. **Teaching Methods in High School Art.** Similar to Education 450 with emphasis on the student’s major teaching area. 3 hours. Prerequisite: Ed. 224.

480-481-482. **Student Teaching—Junior and Senior High School.** Planning and teaching under supervision in the junior or senior high school fulltime five days per week in major teaching field; weekly seminar on campus. Prerequisite: senior rank; average of 2.25 or higher in major area plus education, with no grade in any required Education course lower than “C”; a scholarship average of 2.25 or higher in required courses in the subject matter sequence with no grade lower than “C”; Education 100, 224, 370, 450 or Special Methods; at least four field experiences, including Participation; a desirable teaching personality, including interest in teaching, social adaptability, the ability to get along with people, responsibility and high moral standards; effective communicative skills in speaking and writing; approved by the Director of Teaching Education and the chairman of his major department. 9 (Special only), or 15 hours.

*A future teacher gains practical experience at an elementary school.*
ENGLISH
(DEPARTMENT 112)

PROFESSORS C. DORNBUSCH (CHAIRMAN), HASTINGS, PRICE; ASSOCIATE PRO-
FESSORS T. BANKS (Leave of Absence), BECK, BENNETT; ASSISTANT PROFESSORS
BELCH, HUNT, OLIVER, ROBINSON; INSTRUCTORS BROWN, FLEMING, E. MILLER;
LECTURER J. DORNBUSCH.

OBJECTIVES:
The courses in English are designed to help the student demonstrate an awareness of
style and the ability to express himself maturely, clearly, concisely; understand generally
the symbolic process of language and particularly the structure and usage of the English
language; read critically and creatively as a regenerating means of gathering, understanding,
evaluating, and enjoying recorded human experience; comprehend the growth and con-
tinuity of Western ideas and confront the humanizing values of the Western World through
the study of literature; be able to analyze a piece of literature by applying some of the
techniques of the specialist; respect and understand the techniques of research and the
accomplishments of scholarship in the discipline of English; and recognize the relationship
of language and literature to other areas of knowledge. Advanced courses increasing the
breadth and depth of the above objectives are offered to majors who plan to teach in the
public school or do graduate study. A Senior Comprehensive Exam is required.

To meet the 45-hour minimum for a major in English, the following courses are re-
quired:

200
205 or 305 and 206 or 306 (Majors are encouraged to choose 305, 306.)
311-312-313
321
Two of the following: 322, 323, 324
Two of the following: 337, 338, 339
351-352
410
494 or 495

Also required are one year of English History and either (1) Intermediate French or
German or (2) three courses in philosophy beyond Philosophy 100. The major is, however,
strongly urged to take both the intermediate language and the three courses in philosophy.

100, 101, 102 do not count toward a major in English, nor does any course with a grade
below “C.”

ENGLISH COURSES

100. ENGLISH. Critical thinking and writing based upon studies in fiction. One unit.

101. ENGLISH. Critical thinking and writing based upon studies in drama. One unit.

102. ENGLISH. Critical thinking and writing based upon studies in poetry. One unit.

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

English 100, 101, 102 are prerequisites for all other courses in English (unless otherwise
noted).
200. Principles of Literary Criticism. The theory of literature and critical approaches applied to specific works in the various genres. 3 hours.

205. Major Writers Before 1700. Selected works of ancient classical writers, Chaucer, Shakespeare, and Milton. 3 hours.

206. Modern Masters of Literature. Selected major writers from 1700 to the present. 3 hours.

250. Journalism Activities—Newspaper.


252. Journalism Activities—Yearbook. Supervised work on and contributions to the publications. No prerequisites. 1 hour. The student may enroll for only one activities course (1 hour) per quarter. Six hours in one area or a combination of six hours from the three areas (250, 251, 252) may be counted toward graduation. Graded “S” or “U.”

290. Special Topics in English. 1-3 hours.

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

306. Continental Rationalism and Romanticism. European literary masterpieces from the Renaissance to the mid-nineteenth century. All works will be read in English translation. 3 hours.

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

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

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


322. Restoration and the Eighteenth Century. Major writers of the Neoclassical Period. 3 hours.

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

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

325. Modern Poetry. An intensive study of the poems of Yeats and Eliot with an introduction to the poetry of Hopkins, Frost, Stevens, and others. 3 hours.
333. Modern Drama. Studies in such fields of contemporary drama as realism, neoromanticism, impressionism, and expressionism. 3 hours.

337. American Literature: Beginnings. Chronological study of the development of American Idealism and Rationalism with emphasis on the organic continuity of Western thought in the major writers of the 17th and 18th centuries. 3 hours.

338. American Renaissance. Emerson, Thoreau, Hawthorne, Melville, Whitman, Dickinson, and their contemporaries. 3 hours.

339. American Realism and Naturalism (1865-1918). The decline of romanticism and the rise of realism and naturalism in American literature with emphasis on the works of such representative authors as Howells, Twain, James, Crane, and Dreiser. 3 hours.

341. Poetry Writing. The discipline and technique of writing poetry. 3 hours. May be repeated up to 6 hours. Graded “S” or “U.”

342. Fiction Writing. The discipline and technique of writing fiction. 3 hours. May be repeated up to 6 hours. Graded “S” or “U.”

343. Factual Writing. The discipline and technique of writing exposition and argument. 3 hours. May be repeated up to 6 hours. Graded “S” or “U”.

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

361. British Novel I. Development of the novel as a literary form from Defoe to George Eliot. 3 hours. Alternate years.

362. British Novel II. Development of the modern novel as a literary form from Hardy to the present. 3 hours. Alternate years.

363. Modern American Fiction. The development of the American novel after World War I with emphasis on the major novelists. 3 hours.

381. History of Literary Criticism. Movements and major writers of literary criticism. 3 hours. Alternate years.

382. Biography. Origins, development, and art of biography and allied forms, including autobiography, memoirs, diaries, and letters. Representative major classic, romantic, and critical lives of distinguished contributors to Western culture. 3 hours. Alternate years.

383. History of Ideas. A study of the continuity of ideas as they are found embodied in literature. 3 hours. Alternate years.

410. Chaucer. A chronological study of Chaucer's life in relation to his literary development; the chief literary forms of the Middle Ages with special reference to the Medieval Romance; skill in reading Middle English. 3 hours.

490. Special Topics in English. 1-3 hours.

494. Seminar in English Literature. 3 or 6 hours.

495. Seminar in American Literature. 3 or 6 hours.

497. Independent Study in English. 1-3 hours.
FOREIGN LANGUAGES

(DEPARTMENT 113)

PROFESSOR GATES (Chairman); ASSOCIATE PROFESSOR WETHERILL; ASSISTANT PROFESSORS ANIDO, MARTINEZ, PELLER, SAGONOWSKY; ASSISTANT INSTRUCTOR SCHMITZ.

The foreign language program is designed to train students to speak, read and write a foreign language, to insure a strong background in the literature and culture of the people whose language they are studying; to train teachers of foreign languages at the secondary level: to prepare students for graduate work in the languages.

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, 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 and Spanish 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.

Requirements for a major in a foreign language:

For a major in French, German or Spanish 45 hours, taken in logical sequence, are required above the 100 level course series. The sequences are as follows:

French 211-212-213; 311-312-313; 314-315-316; 411-412-413; 490.
German 221-222-223; 321-322-323; 324-325-326; 421-422-423; 491.
Spanish 241-242-243; 341-342-343; 344-345-346 (or: 347-348-349); 441-442-443; 492.
Other courses offered may be substituted according to the specific needs of the student. A comprehensive examination.

FRENCH

100. FRENCH. A rapid presentation of the structures and patterns of French, with emphasis upon unique characteristics. The course deals with grammatical, phonological and semantic problems in meaningful context. (Counts toward elementary sequence). One unit.

101. FRENCH. Outstanding contributions of French-speaking countries to the cultural heritage of the Western world in the visual arts, music, theater and literature. One unit.

112-113. ELEMENTARY FRENCH. To develop the ability to understand, speak, read, and write French; functional, rather than formal grammar, early and fluent speaking; elementary reading based on French life, customs and manners. Three class periods and two hours of scheduled laboratory practice per week. 8 hours.

211-212-213. INTERMEDIATE FRENCH. A review of fundamentals of grammar and pronunciation. Abundant conversational practice and composition based on short stories, plays and poetry. Occasional lectures on French life, history, architecture, art and civilization. Three class periods and two hours of scheduled laboratory practice per week. Prerequisite: 113, or two years of high school instruction in French. 12 hours.
311, 312, 313. French Conversation and Composition. To develop a useful command of the language; readings, slides, recordings, current periodicals and realia are used to stimulate conversation. A study of grammatical and phonetic problems aimed at perfecting clarity and accuracy of expression. Three class periods and two hours of scheduled laboratory practice per week. Prerequisite: 211-212-213. 12 hours.


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

318. The French Novel. An historical survey of the development of French prose fiction from the Middle Ages to the present. Special emphasis on the literary "isms" and outstanding writers in the XIX century: Stendahl, Balzac, Flaubert, Zola.


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


419. French Stylists. Review of essentials of French grammar geared to developing sense of historical grammar, morphology, and etymology. Vocabulary building also following these same points of reference. Problems involved in translation. 3 hours.

490. Special Topics in French. 1-3 hours.

494. Seminar in French. 1-3 hours.

497. Independent Study in French. 1-3 hours.
GERMAN

102. GERMAN. A rapid presentation of the structures and patterns of German, with emphasis upon unique characteristics. The course deals with grammatical, phonological and semantic problems in meaningful context. (Counts toward elementary sequence.) One unit.

103. GERMAN. Outstanding contributions of Germanic countries to the cultural heritage of the Western world in the visual arts, music, theater and literature. One unit.

122-123. ELEMENTARY GERMAN. To develop the ability to understand, speak, read, and write German; functional, rather than formal grammar; early and fluent speaking; elementary reading based on German life, customs, and manners. Three class periods and two hours of scheduled laboratory practice per week. 8 hours.

221-222-223. INTERMEDIATE GERMAN. Review of the fundamentals of grammar, pronunciation, vocabulary and idioms; conversational practice and composition; German life, history, civilization, art, music, illustrated with slides, film strips and motion pictures with German sound tracks. Three class periods and two hours of scheduled laboratory practice per week. Prerequisite: German 123 or two years of high school instruction in German. 12 hours.

321, 322, 323. GERMAN CONVERSATION AND COMPOSITION. To develop both a useful command of the German language and an appreciation of German civilization; recorded conversational dialogues on a variety of topics useful to the student or traveler in Germany, Austria, and Switzerland, films and slides, and current German periodicals are used. An advanced study of grammatical and phonetic problems aimed at perfecting clarity and accuracy of expression. Three class periods and two hours of scheduled laboratory practice per week. Prerequisite: German 221-223. 12 hours.

324, 325, 326. SURVEY OF GERMAN LITERATURE. Basic monuments of German literature from the earliest times to the present. Lectures, class discussions. Prerequisite: German 221-223; 321, 322, 323. 9 hours.

421, 422, 423. DEUTSCHE KULTURGESCHICHTE. The course, given in German, integrates the political, economic, social and cultural forces which have shaped Germany. Required of all German majors. Prerequisite: German 221-223; 321, 322, 323. 9 hours.

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

495. SEMINAR IN GERMAN. 1-3 hours.

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

SPANISH

104. SPANISH. A rapid presentation of the structures and patterns of Spanish, with emphasis upon unique characteristics. The course deals with grammatical, phonological and semantic problems in meaningful context. (Counts toward elementary sequence.) One unit.

105. SPANISH. Outstanding contributions of Spanish-speaking countries to the cultural heritage of the Western world in the visual arts, music, theatre and literature. One unit.
142-143. Elementary Spanish. To develop the ability to understand, speak, read and write Spanish; functional, rather than formal grammar; early and fluent speaking; elementary reading based on Spanish life, customs and manners, using materials dealing with Spain, Mexico and South America. Three class periods and two scheduled laboratory practices per week. 8 hours.

241-242-243. Intermediate Spanish. A review of grammar and pronunciation; conversational practice and composition; occasional lectures in Spanish on Spanish life, history, arts, crafts, and civilization, illustrated with film strips, slides, photographs, reproductions, and realia. Three class periods and two hours of scheduled laboratory practice per week. Prerequisite: Spanish 143, or two years of high school instruction in Spanish. 12 hours.

341, 342, 343. Spanish Conversation and Composition. To develop a useful command of the language; recorded dialogues on a variety of topics; color slides, film strips, current periodicals and realia; study of commercial Spanish and practice in correspondence useful to students in business or commerce. A study of grammatical and phonetic problems aimed at perfecting clarity and accuracy of expression. Three class periods and two hours of scheduled laboratory practice per week. Prerequisite: Spanish 241-242-243. 12 hours.

344, 345, 346. Survey of Spanish Literature. A study of the chief authors in the literature of Spain from the beginnings to the present, with special emphasis on the Golden Age. Prerequisite: Spanish 241-243; 341-343. 9 hours.


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

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


492. Special Topics in Spanish. 1-3 hours.

496. Seminar in Spanish. 1-3 hours.

499. Independent Study in Spanish. 1-3 hours.
Billiards instruction.

HEALTH AND PHYSICAL EDUCATION
(Department 143)

Professor English (Chairman); Associate Professors Michael, Roberson; Assistant Professors Johnson, Lauth, Ludwig, Middleton, J. Miller, Strayer; Instructors Palmisano, Wallace; Assistant Instructors Layne, Rose.

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

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

REQUIRED PHYSICAL EDUCATION SERVICE COURSES

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

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

001-002-003. Physical Education Men. Gymnasium and outdoor classes in season, natural gymnastics, informal play. 1 credit hour, per quarter.


143-070 to 143-081. Physical Education Women. 1 hour each.

070. Foundations of Movement
071. Dance and Free Exercise
072. Rhythms and Dance
073. Modern Dance and Golf
074. Tennis and Volleyball
075. Soccer and Volleyball
076. Softball and Trampoline
077. Basketball
078. Badminton and Trampoline
079. Gymnastics
080. Net Sports and Tennis

081. Archery & Recreational Games (Note: A student cannot take both 074 and 080 for credit.)

Intramural Sports. An intramural program offers activity for each university student. The following sports are offered for men: football, basketball, free throwing, baseball, speedball, handball, playground ball, volleyball, tennis, wrestling, boxing, track, touch football, golf, and horseshoes.

Women: softball, volleyball, basketball, free throws, timed basketball shooting, badminton, table tennis, tennis, archery and track and field.

Major in Health and Physical Education

A copy of the curriculum and the requirements for teacher certification may be obtained from the Chairman of the Department. In addition to the requirements listed in the curriculum, a physical education major is required to be affiliated in some manner with one of the major sports in the intercollegiate program. A Senior Comprehensive Examination is required of all majors.

The following courses indicated by asterisk are required professional courses:

*111. Current Personal Health Problems (formerly Hygiene 110). The identification and study of timely health issues from a personal viewpoint. 3 hours.
112. **First Aid and Safety Education.** Lectures, discussion and practice in the giving of first aid in emergencies. The American Red Cross First Aid Certificate may be obtained by students who pass an examination. 3 hours.

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

141-142-143. **Physical Education for Majors (Men).** Physical Education 141, 142, 143 are required of all students majoring or minoring in Physical Education. To assist the prospective physical educator in acquiring the fundamental skills and developing the methods of teaching in the following activities: 1 hour each.

141. **Speedball, Touch Football, Games of Low Organization**

142. **Tumbling, Wrestling**

143. **Trampoline, Tennis**

144, 145, 146. **Physical Education for Majors (Women). Team Sports.** Required of all women physical education majors. To assist the prospective physical educator in acquiring the fundamental skills and developing the methods of teaching in the following activities: 144-Field hockey and soccer; 145-Basketball and volleyball; 146-Track and field and softball. 1 hour each quarter.

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

148, 149. **Physical Education for Majors (Women). Individual Activities.** Required of all women physical education majors. To assist the prospective physical educator in acquiring the fundamental skills and developing the methods of teaching in the following activities. 148. Badminton & Trampoline; 149. Tennis. 1 hour each quarter.

201-202-203. **Physical Education for Majors (Men).** Physical Education 201, 202, 203 are required of all students majoring in Physical Education. To assist the prospective physical educator in acquiring the fundamental skills and developing the methods of teaching in the following activities: 1 hour each.

201. **Soccer, Flashball, Games of Low Organization**

202. **Parallel Bars, Badminton, Weight Lifting**

203. **Volleyball, Horizontal Bar**

204. **Physical Education for Majors (Co-Ed) Rythmic Activities.** Required of all physical education majors. To assist the prospective physical educator in acquiring the fundamental skills and developing the methods of teaching in Rythmic fundamentals and exercise to music. 1 hour.

205. **Physical Education for Majors (Women) Rythmic Activities.** Required of all women physical education majors. To assist the prospective physical educator in acquiring the fundamental skills and developing the methods of teaching Folk and Square Dance. 1 hour.
*206. Physical Education for Majors (Co-Ed) Rhythmic Activities. Required of all women physical education majors. To assist the prospective physical educator in acquiring the fundamental skills and developing the methods of teaching in Folk and Square Dance. 1 hour.

*207, 208, 209. Physical Education for Majors. (Women) Individual Activities. Required of all women physical education majors. To assist the prospective physical educator in acquiring the fundamental skills and developing the methods of teaching in the following activities; 207-Archery and tumbling; 208-Gymnastics, apparatus; 209-Recreational games and golf. 1 hour each quarter.

*222. School Health. Skills and knowledges for aiding teachers and others to observe and understand the school child in health and illness; the health program of the public schools and the relationship of the school to the students’ habits, attitudes, and knowledges conductive to good health. 3 hours.

*223. Kinesiology. The general body mechanics of the human organism; the activities of the physical education program in their relation to coordination and the proper body mechanics. Prerequisites: Physiology 231 and 232. 3 hours.

*233. Physical Education for the Elementary School. The aims, objectives, methods, and techniques of teaching physical education in the elementary school. The need for physical activity and practical application of theories are emphasized. 3 hours.

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

*301. Principles of Health and Physical Education. The aims, objectives, methods of teaching health and physical education in the public schools. Lectures, demonstrations, physical education, and health from the standpoint of general education. Prerequisite: 1 year Physical Education for Majors and Junior status. 3 hours.

*302. History and Principles of Health and Physical Education. A continuation of HPE 301. Includes a History of Health and Physical Education. Prerequisite: 1 year of Physical Education for Majors. Junior Status. 3 hours.

*303. Organization and Administration of Health and Physical Education. Discussion and consideration of the basic problems in the organization and administration of Health and Physical Education. Prerequisite: 1 year of Physical Education for Majors, Junior Status. 3 hours.

*304, 305. Practical Techniques of Teaching and Assisting in Health and Physical Education. Two hours required of all Physical Education Majors in their Junior year. 1 hour each.

**Men Physical Education Majors are required to complete 9 of the 12 hours.

***Women Physical Education majors are required to complete 4 of the 6 hours.

**320. The Theory of Coaching Wrestling (Men). Equipment, fundamentals of the art and skill of wrestling. Prerequisite for students seeking state certification in Physical Education, Junior status. 3 hours.
**321. THE THEORY OF FOOTBALL COACHING (MEN).** Equipment, fundamentals of the game, kicking, passing, handling the ball, tackling, blocking; individual position play; offensive and defensive formations; strategy and generalship. Prerequisite for students seeking state certification in Physical Education. Junior status. 3 hours.

**322. THE THEORY OF COACHING BASKETBALL (MEN).** The fundamentals, passing, shooting, dribbling, feinting, and pivoting, styles of offense and defense, equipment, conditioning, the handling of a team in games. Lectures, demonstrations and practice. Prerequisite for students seeking state certification in Physical Education. Junior status. 3 hours.

**323. THE THEORY OF COACHING BASEBALL AND TRACK (MEN).** Individual position and team play in men’s baseball. Methods and forms for all of the events in track and field. Lectures, reports, demonstration and practice. Prerequisites: for students seeking state certification in Physical Education. Junior status. 3 hours.

**324. THEORY OF COACHING FOR WOMEN.** To prepare students in physical education to coach athletics in secondary schools: technique, basic principles and fundamentals of volleyball and basketball. Lectures, reports, demonstrations, and practice. 2 hours.

**325. OFFICIATING FOR WOMEN.** To develop knowledge and techniques for officiating women’s volleyball and basketball games. Prerequisite: Physical Education. 2 hours.

**326. CO-CURRICULAR ACTIVITIES (WOMEN).** Theory and practice of the organization and administration of co-curricular activities commonly associated with the girls’ physical education program. 2 hours.

331-332-333. ADVANCED COACHING PRACTICE (MEN). To give men students who have had Physical Education 319-320-321-322 and 323 an opportunity to do actual coaching under supervision in all sports in season. Hours arranged. 6 hours maximum toward graduation. 1-3 hours per quarter.

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

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

342. BASKETBALL OFFICIATING. The study of basketball rules from the standpoint of player, coach and official. 3 hours.

343. ATHLETIC TRAINING AND CONDITIONING. To meet the need of the high school coach; training procedures and conditioning of athletic teams for all sports; treatment of athletic injuries. 3 hours.

*350. HEALTH METHODS AND EVALUATION. For the special teacher and supervisor of Health and Physical Education; teachers health; health problems arising in a school system; methods and materials for teaching health and evaluation. Prerequisite: 1 quarter of Health or HPE 111. 3 hours.

*402. ADAPTIVE AND CORRECTIVE PHYSICAL EDUCATION. For the teachers who are concerned with the education of the handicapped; to develop an understanding of the various handicapping conditions and to explore methods of adapting physical activities to meet the needs of the typical student in the physical education class. Prerequisite: 143; 223. 3 hours.
433. Driver Education. For those who plan to teach driving in the public schools; classes and driving demonstrations daily. 3 hours.

480. Student Teaching. See Education 470 and/or 480. 9, 12 or 15 hours.

490. Special Topics in Health and Physical Education. 1-3 hours.

494. Seminar in Health and Physical Education. 1-3 hours.

497. Independent Study in Health and Physical Education. 1-3 hours.

HISTORY AND POLITICAL SCIENCE
(Department 132)

Professors Darlington, Hilliard, Milnar; Associate Professors Davis (Chairman), Sobers; Assistant Professors Hammond, Ludanyi; Instructor Salomone; Lecturer C. Koehn.

The KERNAN ROBSON CHAIR OF GOVERNMENT, made possible by a trust established through the Will of Kernan Robson, deceased, has been inaugurated.

HISTORY

The history courses stress the evolution of human institutions with a view to developing an informed appreciation of past events as well as an understanding of our present civilization. Students majoring in history should take courses in both American and non-American History and electives in the allied social sciences: political science, sociology, geography and economics. In addition to the 45 hours required for the major in history, the student must complete History 100 and nine hours in political science (201-202-203). It should be noted that Human Geography 400 and Physical Geography 433 do not count as a part of the history major. For those majors who subsequently plan to attend graduate school, it is strongly recommended that a greater emphasis be placed on modern foreign languages, especially French and German. Except for Pol. Sci. 345, 347, and 384-385-386, political science courses are not applicable to the history major. A Senior Comprehensive Exam is not required.

HISTORY MAJOR REQUIREMENTS
(1) General: History 100, 45 additional hours in history ('C' grade or better), plus 9 credit hours of government (201-202-203).

(2) Specified Required Courses:

- History 100 (not applied to 45 hours).
- History 112 and 113.
- Government 201-202-203 (not applied to 45 hours).
- History 211-212-213.
- Historiography (367).
- History Seminar (494)—3 hours.
- History Electives: 24 hours.
100. **History.** Concepts and trends in world history. A conceptual and thematic approach to the meaning and content of history, emphasizing man's significant achievements. *One unit.* Required of history majors but not included in the 45 hours required for the official major.

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.** An introductory survey of European history: the medieval background, the Renaissance, the rise of industrialism, the World Wars and their aftermath. 3 hours.

211. **History of the United States to 1850.** 3 hours.

212. **History of the United States: 1850 to 1900.** 3 hours.

213. **History of the United States: 1900 to the Present Time.** The political, social and economic development of the United States from the colonial period to the present time. 3 hours. Open to freshmen.

303. **History of Ohio.** The political and cultural evolution of the state from prehistoric times to the present. 3 hours.

315, 316. **American Social and Intellectual History.** American intellectual life from the colonial period to the present in relation to the major political, economic, religious, literary, and philosophical ideas that have influenced the course of American national development. A two-quarter course. 6 hours. Alternate years, 1972-73.

321. **English History to 1603.** 3 hours.

322. **English History: 1603 to 1837.** 3 hours.

323. **English History: 1837 to the Present Time.** The English people in their political, social, and institutional development; the growth of the British Empire and the evolution of the British Commonwealth of Nations. 3 hours.
326. **Medieval Europe.** Europe from the decline of the Roman Empire to the beginning of the Renaissance. Special attention is given to those institutions most instrumental in shaping modern European development. 3 hours. Alternate years, 1972-73.

327. **The French Revolutionary Era.** The French Revolution and Napoleon, with the philosophical background and ideological development of the period, together with their effect on later history. 3 hours. Alternate years, 1971-72.

328. **Renaissance and Reformation.** The political evolution of the Italian communes; the cultural developments of the period; the Church and European society during the late Middle Ages and Luther and the expansion of Protestantism in Europe. 3 hours. Alternate years, 1971-72.

331-332-333. **U.S. Constitutional Development.** An historical and legal approach to the interpretation of the constitution. 9 hours.

341, 342. **American Foreign Relations.** The inception, development and present interpretation of the major foreign policies of the United States. 6 hours. Alternate years, 1971-72.

344. **History of the Modern Middle East.** The social, political and economic evolution of Turkey, Israel, and the Arab world from 1800 to the present. 3 hours. Alternate years, 1971-72.

351, 352. **Ancient History.** The development of civilization from prehistory to the fall of the Roman Empire. Emphasis is placed upon the early pre-Greek Oriental civilization and the cultural and political contributions of the period. 6 hours.

353, 354. **Latin American History.** The development of Latin America from the colonial period (353) to the modern era (354). Topics to be considered will include the conditions in Spain and Portugal leading to colonization; the growth of cultural and political institutions; the struggle for independence and the rise of the modern Latin American republics. 6 hours. Alternate years, 1972-73.

362. **Recent American History.** An intensive study of the major factors in United States history since 1928. 3 hours.

365. **Afro-American History.** The essential facts, trends and interpretations in the history of the black American from his African beginnings down to the present time. 3 hours. Alternate years, 1972-73.

367. **Historiography.** A research-oriented approach to the application of historical methodology and technique and an in-depth appraisal of major historians and the history they have written. 3 hours. Required of history majors.

368. **History of East Asia.** Japan, China and the Philippines from 1850 to the present with particular emphasis on political, social and cultural developments. 3 hours. Alternate years, 1972-73.

369. **History of Southeast Asia.** An historical survey of Burma, Thailand, Indochina, Indonesia and India from 1850 to the present. 3 hours. Alternate years, 1972-73.
374, 375, 376. Recent European History. Europe since 1878: imperialism; the alliance system; World War I; the Soviet Union and the fascist powers; relations with the Middle East and the Far East; World War II. 9 hours. Alternate years, 1972-73.

378. History of Modern France. The development of modern France from the beginning as a center of European movements and culture with emphasis upon the continuity of its history and its leading role in the development of institutions such as feudalism, the crusades, the philosophy and techniques of monarchy, and democracy. 3 hours. Alternate years, 1971-72.

381. The Westward Movement in the United States. Territorial expansion from colonial times to 1860; Indian relations; land policies; transportation and trade. 3 hours. Alternate years, 1971-72.

382. The Westward Movement in the United States. A continuation of 381; the advance of the frontier in the Trans-Mississippi West; the influence of the West on American ideals and institutions. 3 hours. Alternate years, 1971-72.

400. Human Geography. The interaction of man and his physical environment. 3 hours. Does not apply to history major requirements.

411, 412, 413. Russian History. Russia from Peter the Great to the present. 9 hours. Alternate years, 1972-73.

433. Physical Geography. A study and unification of the body of knowledge encompassing the earth sciences which give general insight into the nature of man's physical environment. 3 hours. Does not apply to history major requirements.

490. Special Topics in History. 1-3 hours.

494. Seminar in History. 1-3 hours.

497. Independent Study in History. 1-3 hours.

Political Science

The major in political science generally prepares for graduate study in government, for the study of law, for entrance into the public or foreign service, or for effective participation in politics as a citizen. Majors are advised to pursue courses in related social science disciplines such as economics, sociology and history. For those majors entering graduate school or the foreign service, extensive work in foreign languages, especially French and German, is strongly advised. Individuals interested in both political science and teacher certification should consult with the chairman of the Department for specific instructions. In addition to the 45 hours of political science required of the major, Political Science 105 and United States History 211-212-213 must be taken. Except for History 331-332-333 and 341-342, history courses are not applicable to the political science major. A Senior Comprehensive Exam is not required.
POLITICAL SCIENCE MAJOR REQUIREMENTS:

(1) General: Political Science 105, 45 additional hours in political science (‘C’ grade or better), plus 9 hours in history (211-212-213).

(2) Specific Required Courses:
- Political Science 105 (not applied to 45 hours).
- Political Science 201-202-203.
- History 211-212-213 (not applied to 45 hours).
- Political Science 210 (Methods).
- Political Science 384-385-386 (Theory).
- Political Science 495 (Seminar—3 hours).
- Political Science Electives: 21 hours.

105. Political Science. Fundamental concepts of governmental systems, including the basic sources of governmental policies and the process of implementation. One unit.


203. American State and Local Government. The origin, development, structure and functions of state and local government in the United States. 3 hours.

210. Basic Approaches and Methods in Political Science. Major concepts, issues, and methods in the study of politics. Emphasis is on current research to enable the student to select and design a research project. 3 hours. Required of political science majors.


334-335-336. Comparative Government. A structural-functional comparison of democratic political systems of the Western World, including the major democracies of Europe (334); Communist political systems, including those of the Soviet Union and Yugoslavia (335); and underdeveloped or “developing” political systems, including those of India and Mexico (336). 9 hours. Alternate years, 1972-73.

345. Conduct of American Foreign Relations. Major factors related to the formation of foreign policy; problems of constitutionalism and federalism; roles of the various departments of the executive branch of government, to Congress, and to the influence of pressure groups. 3 hours. Alternate years, 1971-72.

347. American Political Parties. The leadership, organization, activities, and role of the major political parties in the American political process. 3 hours. Alternate years, 1972-73.

363-364. Public Administration and Organization. The nature and function of public organizations; structure, management, and control. 6 hours. Alternate years, 1971-72.

371. International Relations. The forces which determine the policies of nation-states and their organizations in the international setting. 3 hours.
372. INTERNATIONAL ORGANIZATION. The objectives, structures, agencies, and procedures of international organization, with special emphasis on general-purpose institutions like the United Nations and regional-functional organizations like the European Common Market and the OAS. 3 hours.

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

384-385-386. WESTERN POLITICAL THOUGHT. Ancient, Medieval, Renaissance and Reformation (384); Modern, from the contract theorists to Marx and Nietzsche (385); American political thought from colonial times to the present (386). 9 hours. Required of political science majors.

391. PUBLIC OPINION AND INTEREST GROUPS. The formation, characteristics and role of public opinion in the American political process, particularly in relation to interest groups and their activities. 3 hours. Alternate years, 1972-73.

421. GOVERNMENT OF THE SOVIET UNION. Demographic, historical, and ideological basis of Soviet rule. The social, political and governmental structure, the Church, army, courts, and organs of police. 3 hours. Alternate years, 1972-73.

422. FOREIGN POLICY OF THE SOVIET UNION. Factors in Russian foreign policy; the early years, as affected by Marxian ideology, internal conditions and foreign interference; limited cooperation with Western Powers; Second World War and aftermath. 3 hours. Alternate years, 1972-73.

423. SOVIET SOCIAL AND ECONOMIC INSTITUTIONS. The Soviet economic structure; general principles of private law, including family law; industrial and trade relations; labor law; collective farms. 3 hours. Alternate years, 1971-72.

432. GOVERNMENT REGULATION OF BUSINESS. Development of governmental regulation of economic affairs in the United States, provisions of the U. S. Constitution, leading court opinions, and the regulatory laws of recent years. 3 hours. Alternate years, 1972-73.

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

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

498. INDEPENDENT STUDY IN POLITICAL SCIENCE. 1-3 hours.

INDUSTRIAL ARTS
(Department 142)

Professor Kain (Chairman); Assistant Professor Rex; Instructor Guilford.

The principal objective of the Department of Industrial Arts is to provide a basic education in applied arts and sciences through 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 in the public schools.

Courses are offered that are of value to both men and women students concentrating in other fields. The recommended courses are: 200 Arts and Crafts, 310 Handicrafts for Teachers, 311 Graphic Arts, 323 Lapidary and Jewelry, 330 Photography, 490 Special Topics in Industrial Arts.

Students concentrating in Industrial Arts complete courses in the areas of drawing, woodworking, metal-working, 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 57 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.

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

An orientation course (110, 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 should 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. A Senior Comprehensive Exam, including a major project exhibition, is required.

110. INDUSTRIAL ARTS ORIENTATION. An introduction to Industrial Arts; philosophical origins and contemporary practices. The fundamental procedures, operations, and special equipment for each of the several areas of Industrial Arts are briefly explored through laboratory activities and public school visitsations. 3 hours.

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

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

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

200. ARTS AND CRAFTS. Laboratory experiences in working with craft materials: copper, brass, aluminum, wood, plastics, leather, gemstones, textiles, ceramics and others. 3 hours.
213. **Wood Technology.** First in a series of three courses devoted to wood-working: the nature of wood, and its present day applications; forestry, lumbering, grading, preserving, and utilization of wood products and by-products; the identification of common commercial lumbers, strength analysis, control of shrinkage, methods of preservation and beautification; wood fabrication and joining techniques. 3 hours.

310. **Handcrafts for Teachers.** To introduce prospective elementary teachers to the basic hand tools and their proper manipulation in simple constructional activities. Practical unit development, subject integration. 3 hours.

311. **Graphic Arts.** The manipulation processes of duplicating written communications: process printing, mimeographing, spirit duplicating, photographs, diazo, block printing, etching, letterpress and offset printing. 3 hours.

313. **Metal Casting.** Foundry pattern design and construction; the study of molding materials and equipment; operations and procedures in the construction of sand molds; core construction; melting, pouring and casting of non-ferrous metals. Properties of metals and their alloys. 3 hours.

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

322. **Printing.** An historical study of printing with typical exercises in composition, typography, imposition, principles of display, platen press, cylinder press and offset press operations. Prerequisite: Graphic Arts 331. 3 hours.

323. **Lapidary and Jewelry.** The fundamentals of the art of lapidary; working with natural and synthetic stones including the sawing, shaping, polishing and mounting of jewelry stones. 3 hours.

330. **Photography.** Techniques of photographic composition, camera types and accessories, photographic optics, and laboratory methods and materials; dark room developing and printing of negatives. 3 hours.

331. **Furniture Design and Construction.** Advanced cabinetry procedures; and techniques in joinery and decorative treatments such as carving, turning, veneering, inlaying, fluting, and associated styling elements. One major project is required. Prerequisite: Industrial Arts 110, 112, 113. 3 hours.

332. **Metal Machining and Manufacturing.** Machine shop practice and metalwork technology; the engine lathe, shaper, milling machine, grinder, and power hack-saw; machining of bar stock and castings. Prerequisite: Metalwork Technology 321. 5 hours.

341. **Finishing Methods and Materials.** Finishing materials, their composition, qualities, and characteristics; protective agents and preservatives; mixing and matching colors; interior floor and wall treatments and finishes; the application of various finishes to wood and metal. 3 hours.
343. **Welding Theory and Practice.** Welding theory, and weld types; welding metallurgy; electrical resistance and arc welding, oxyacetylene welding, brazing, and burning; welded metal fabrications. 5 hours.

350. **Ceramics.** (See Department of Art, Ceramics 350.)

358. **Carpentry and Wood Structures.** The utilization of efficient construction practices in the building of modern wood structures; use of carpentry tools and power equipment. Prerequisite: Technical Drawing 111, Industrial Arts 110. 3 hours.

402. **Fundamentals of Electricity and Electronics.** The principles of electricity and their application to laboratory experiments and to the construction of a variety of electrical devices; introduction to electronics: vacuum tubes, rectifiers, power supplies, amplifiers, oscillators, transmitters, and receivers. 5 hours.

412. **Laboratory Planning and Equipment Selection.** The architectural features, selection, arrangement, and maintenance of equipment of the modern Industrial Arts laboratory. Prerequisite: Same as 423 Industrial Arts Organization and Methods. 3 hours.

423. **Industrial Arts Organization and Methods.** A professional course in the methods of teaching Industrial Arts: objectives, preparing lesson plans, organizing courses, laboratory procedures, instructional materials, and administrative practices. Visitations to representative high school laboratories. Open to students having 30 hours or more of Industrial Arts courses. 5 hours.

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


460. **Industrial Materials and Processes.** The manufacturing processes involved in industrial production; classroom discussions, technical motion pictures, and field trips to refineries, mines, quarries, mills, kilns, foundries, factories and other manufacturing firms. 5 hours.

480. **Student Teaching in Industrial Arts Education.** See Education 480. 15 hours.

490. **Special Topics in Industrial Arts.** 1-3 hours.

494. **Seminar in Industrial Arts.** 1-3 hours.

497. **Independent Study in Industrial Arts.** 1-3 hours.
MATHEMATICS

(DEPARTMENT 123)

PROFESSOR BERTON (Chairman); ASSOCIATE PROFESSORS K. KUHNS, LHAMON; ASSISTANT PROFESSORS DALY, EVANS, PILLAI, C. ROIDER, WONG; INSTRUCTORS CARPENTER, TAYIM.

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

In general, the sequence 100-172-173 is designed for prospective elementary school teachers; the sequences 100-142-143-147-148 and 100-147-148-142-143 are designed for prospective social and life scientists, and the "calculus" sequence 161-162-163-261-262-263-264 is designed for prospective engineers, mathematicians and physical scientists.

The beginning course of the "calculus" sequence for each individual freshman will be determined on the basis of the student's achievement in high school and on the basis of the college entrance examinations, especially the mathematics achievement examination. Advanced placement is encouraged.

Mathematics 100, as part of the general requirements, must be passed by all students. Students who take the "calculus" sequence should take Mathematics 100 concurrently with one of the courses of the "calculus" sequence, or should, after completing the "calculus" sequence and some study of the topics of Mathematics 100, pass the course by special examination for credit.

Students majoring in mathematics must complete 45 credit hours in mathematics. They must complete Mathematics 264 and then complete at least 25 credit hours in mathematics courses at the 300/400 level including 311, 321, 361, 421 and one of the following two-course sequences: 312-313, 422-423, 452-453. Physics 231-232-233 are also required as part of the mathematics major. All mathematics courses to be counted toward the major must have been completed with a grade of C or better. A Senior Comprehensive Exam is required.

All mathematics majors are encouraged to take Digital Computer 101 and 102 in the College of Engineering early in their program.

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

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

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

147-148. INTRODUCTORY CALCULUS. Limits, continuity, differentiation of algebraic functions, implicite differentiation and applications of differentiations; antiderivatives, the definite integral, the fundamental theorem of calculus, area between curves, exponential and logarithmic functions, techniques for integration, application of integration. Prerequisites: Mathematics 100 or 161 or its equivalent in high school work. 6 hours.
161. **Elementary Functions 1.** The real number system; inequalities; radicals; exponents; exponential and logarithmic functions; right triangle trigonometry; and theory of equations. 3 hours.

162. **Elementary Functions 2.** Trigonometric and inverse trigonometric functions; systems of equations; permutations and combinations; binomial theorem; mathematical induction; and sequences. Prerequisite: Mathematics 161 or its equivalent in high school work. 3 hours.

163. **Analytic Geometry.** Cartesian coordinates, distance, slope, loci problems, lines, circles, conic sections, transformations, curve sketching, parametric equations, polar coordinates and a brief introduction to differential and integral calculus. Prerequisite: Mathematics 162 or its equivalent in high school work. 5 hours.

172-173. **Fundamental Mathematics.** These courses provide topics in the theory of arithmetic and formal and informal geometry such as systems of numeration, relations, algorithms, whole numbers, integers, rational numbers, real numbers, points, lines and planes, patterns of proof, congruence and construction of Geometric figures. Prerequisite: Mathematics 100. 6 hours.

245. **History of Mathematics.** An introduction to the history and origin of mathematics, restricted principally to mathematics through elementary calculus. A chronological study of some mathematicians and their contributions to mathematical thought. Prerequisite: Mathematics 264. (To be offered on alternate years 1971-72). 3 hours.

261. **Calculus 1.** The Riemann integral, areas, volumes of revolution, the derivative, chain rule, rates of change, maxima and minima, the fundamental theorem of calculus, introduction to differential equations. Prerequisite: Mathematics 163. 4 hours.

262. **Calculus 2.** Differentiation and integration of trigonometric, logarithmic, and exponential functions, applications to differential equations, integration techniques, three dimensional space, vectors in n-space, Cramer's rule, and complex numbers. Prerequisite: Mathematics 261. 4 hours.

263. **Calculus 3.** Partial differentiation, functions of two variables, linear approximation, multiple integration, curves, infinite series. Prerequisite: Mathematics 262. 4 hours.

264. **Calculus 4.** Linear mappings, Jacobi's theorem, line integrals, surface integrals, arc length, surface areas, differential forms, vector notation, differential equations, integration factors, exact equations. Prerequisite: Mathematics 263. 4 hours.

311-312-313. **Abstract Algebra.** Rings, integral domains, fields, real and complex numbers, groups, polynomials, ideals, vector spaces, systems of linear equations, determinants, linear transformations and matrices. (To be offered on alternate years 1972-73). Prerequisite: Mathematics 264. 9 hours.

321. **Introduction to Topology and Analysis.** Set theory, composition, inverses, restriction and extension of functions, metric spaces, continuity; open and closed sets, limits, products, subspaces, and equivalence of metric spaces. Prerequisite: Mathematics 264. 3 hours.

322. **Point Set Topology.** Topological spaces, neighborhoods, closure, interior, continuity, homeomorphism, connectedness, homotopic paths, compactness, Bolzano-Weierstrass property. (To be offered on alternate years, 1972-73). Prerequisite: Mathematics 321. 3 hours.
323. **Combinatorial Topology.** Complexes, Betti groups, barycentric subdivisions, invariance of Betti groups, continuous mappings and fixed points. (To be offered on alternate years 1972-73). Prerequisite: Mathematics 322. 3 hours.

331. **Computer Concepts.** Definitions, flow and control of information, coding, machine arithmetic, number systems, machine languages, logical construction, memory devices control unit, input, output. (To be offered on alternate years, 1972-73). Prerequisite: Engineering 201-101 and Mathematics 264. 3 hours.

361. **Differential Equations 1.** Linear differential equations, non-homogeneous equations, variation of parameters, inverse differential operators, and the Laplace transform. Prerequisite: Mathematics 264. 4 hours.

362. **Differential Equations 2.** Fourier series, finite differences, Laplace transformations, partial differential equations, Bessel functions and Lagendre polynomials. Prerequisite: Mathematics 361. 5 hours.

363. **Vector and Complex Calculus.** Vector calculus, complex calculus, analytic functions, infinite series over the complex plane, theory of residues, conformal mapping. Prerequisite: Mathematics 361. 5 hours.

381-382. **Advanced Statistics 1 and 2.** Probability spaces, random variables and sampling multivariate distributions, law of large numbers, estimation of parameters, central limit theorem, confidence intervals, regression sampling and testing hypothesis. (To be offered on alternate years, 1971-72). Prerequisite: Mathematics 264. 6 hours.

421-422. **Foundations of Geometry 1 and 2.** Incidence, ordering, separation, and congruence, as they are involved in non-Euclidean, incidence, affine and Euclidean geometries. (To be offered on alternate years, 1971-72). Prerequisite: Mathematics 264. 6 hours.

423. **Projective Geometry.** Projectivities, perspectivities, perspective triangles, quadrangular sets, harmonic sets, duality, fundamental theorem and Pappus' Theorem, polarities, the conic, finite projective plane, parallelism, coordinates. (To be offered on alternate years, 1971-72). Prerequisite: Mathematics 264. 3 hours.

452-453. **Real Analysis 1 and 2.** Elements of point set theory, limits, sequences, continuity, partial differentiation, implicit functions, Riemann integrals including improper integrals, convergence and uniform convergence of infinite series. (To be offered on alternate years, 1971-72). Prerequisite: Mathematics 321. 6 hours.

461-462. **Numerical Analysis 1 and 2.** Review of Fortran, linear systems of equations, approximations, finite differences, differential equations, eigenvalue problems, numerical solutions of equations, linear programming. (To be offered on alternate years, 1972-73). Prerequisite: Mathematics 361. 3 hours.

490. **Special Topics in Mathematics. 1-3 hours.**

494. **Seminar in Mathematics. 1-3 hours.**

497. **Independent Study in Mathematics. 1-3 hours.**
MUSIC

(DEPARTMENT 152)

PROFESSORS DRAKE (Chairman), ROIDER; ASSISTANT PROFESSORS DOUDNA, FORSYTHE, MILLER, SONNTAG; INSTRUCTOR LAUTENBACH; LECTURERS BURKHARDT, DARST, FIRSZT, SOUDER.

The Department of Music serves a two-fold function. It serves the general university community and students through its general and in-depth course offerings, its performing groups which are open to all students, and through its many concerts, recitals, and other performances which enhance the cultural life and atmosphere of the university. In addition to this service function, the department offers a full course of music and music education studies for the aspiring music educator or professional performer.

The music major is given a variety of courses and experiences to help him gain the knowledge and proficiency in breadth and depth which will help him achieve future success in his chosen area of endeavor in the music field. Special topics and studies may be undertaken to enrich the basic course offerings, especially for the music major who is not taking teacher certification. Some of these special areas of concentration are applied performance, church music, music history and literature, theory and composition.

The basic courses required of all music majors are Music 100, 121, 122, 123, 131, 132, 133, 221, 222, 223, 321, 322, 323, 421, 422. Applied instruction and performing groups are taken in addition each quarter. Regular student recital performances and participation in performing group concerts provide continual growth in performance skills and musicianship. A Senior Comprehensive Exam is not required.

The music major electing to earn a teaching certificate is required to take the basic music education courses 334, 336, 338, 339, 361, 362, and 363 in addition to the professional education courses.

BACHELOR OF ARTS DEGREE

| Major performance area (individual instruction) | 24 hours |
| Theory of Music (Basic and Advanced Theory, Ear Training) | 21 hours |
| Music History and Literature | 9 hours |
| Conducting | 4 hours |
| *Major performing group (each quarter) | |
| **Piano proficiency | |
| ***Senior Recital | |

Total 58 hours

Note: Music 100 is also required, but is included in the general education units.

* All music majors must participate in a major performing group each quarter they are enrolled for 12 or more hours. They may be excused from this requirement only when an unavoidable conflict arises in their student teaching schedule. Vocal majors must participate in Chorus. Instrumental majors must participate in Band (or Orchestra if a string major who does not play a wind or percussion instrument). Keyboard majors must participate in Band or
Chorus. No credit for the major group participation may be used to satisfy credit hour requirements toward the degree. However, a minimum of six hours credit for various performing groups must appear on transcript for teacher certification.

** Piano proficiency is required. Two years of Class Piano should bring the student to the required level. Students may audit piano or take it for credit; however, three hours must be taken for credit to satisfy certification requirements.

*** A senior recital near the end of the applied major instruction will climax the effort in this area. The recital may be full length or may be in combination with other senior recitalists. The program will reflect the student's ability to perform music in a variety of period styles.

**ADDITIONAL COURSES FOR TEACHER CERTIFICATION IN MUSIC, VOCAL AND INSTRUMENTAL, GRADES 1-12**

Professional Education (as described in the Teacher Education part of the catalog) including Education 223, 224, 370, 380, and 15 hours of student teaching.

Music Education including elementary and secondary music methods (6 hours), instrumental methods (8 hours), class voice (3 hours), and class piano (3 hours).

Total additional for certification 47 hours

Note: Education 100 and Psychology 100 are also required, but are included in the general education units. A slightly reduced program for high school certification only can be arranged.

**APPLIED MUSIC**

Music majors must register for a minimum of two hours of individual instruction in their major applied area each quarter. Non-music majors and music majors studying minor applied areas usually register for one hour of class or individual instruction each quarter. Non-music majors are assessed an extra fee only for individual lessons, and the availability of these lessons is dependent upon the schedule and load of the instructor involved.

10. Voice
   —Class

15. Voice
   —Individual

20. Piano
   —Class

25. Piano
   —Individual

30. Organ
   —Class
35. Organ
   —Individual

40. Strings
   —Class

45. Strings
   —Individual

50. Woodwinds
   —Class

55. Woodwinds
   —Individual

60. Brasses
   —Class

65. Brasses
   —Individual

70. Percussion
   —Class

75. Percussion
   —Individual

Note: 1) All class instruction carries one hour credit per quarter. The amount of instruction depends upon the size of the class, but is no less than one-half nor more than two class hours per week.

2) Individual instruction is offered for varying hours of credit. The section number will determine the number of hours credit. Usually, two hours for majors and one hour for minors are taken.

MUSIC PERFORMING GROUPS

Membership in performing groups is open to all university students, and they are encouraged to participate. A maximum of six hours of credit is allowed non-music majors toward graduation, but students may enroll every year until graduation.

80. CHORUS. All qualified students are given the opportunity to sing in the University Chorus. Music of all types, accompanied and a cappella, is studied and performed throughout the year in concerts and performances on and off-campus. 1 hour per quarter.

83. UNIVERSITY SINGERS. A highly select group of men and women singers designed to perform a wide variety of choral literature with the highest musical standards. Performances include concerts and programs on and off-campus including combined tours with a select instrumental group. Membership by audition only. 1 hour per quarter.

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

86. VARSITY BAND. A band specially organized to provide music for athletic events and to perform at other functions. 1 hour per quarter.

88. JAZZ LAB BAND. A selected ensemble for the study and performance of modern characteristic literature for the medium. Performances on and off-campus are scheduled throughout the year. 1 hour per quarter.
90. **Men's Glee Club.** A vocal ensemble for men in the collegiate tradition. The Men's Glee Club appears regularly in concert and at other university and off-campus functions. *1 hour per quarter.*

91. **Women's Glee Club.** A vocal ensemble for women for the study and performance of characteristic literature. The Women's Glee Club performs at various concerts and functions on and off-campus. *1 hour per quarter.*

92. **Woodwind Ensemble.** Selected ensembles of woodwind instrumentalists for the study and performance of characteristic literature. *1 hour per quarter.*

94. **Brass Ensemble.** Selected ensembles of brass and percussion instrumentalists for the study and performance of characteristic literature. *1 hour per quarter.*

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

98. **String Ensemble.** Ensembles of string instrumentalists for the study and performance of characteristic literature. *1 hour per quarter.*

## Courses in Music

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

112. **Music for the Classroom Teacher.** Music activities, materials, and literature, unit planning, teaching methods and skills for the classroom teacher—grades K-6. Prerequisite: Music 100. *3 hours.*

121-122-123. **Theory of Music.** Basic music theory and harmony. Scales, intervals, chords, part-writing, functional music, creative projects in composition and arranging. Required of all freshmen music majors. Must be taken in sequence. Must be taken in conjunction with Ear Training 131, 132, 133. *3 hours per quarter.*

131-132-133. **Ear Training.** Sight singing, melodic and rhythmic dictation, keyboard harmony, functional music. Designed to supplement the first year of theory study. Required of all freshmen music majors. Must be taken in sequence. Must be taken in conjunction with Theory of Music 121-122-123. *1 hour per quarter.*

221-222-223. **Advanced Theory of Music.** Counterpoint, form and analysis, contemporary theory, harmonic dictation, orchestration, arranging, creative projects in composition. Must be taken in sequence. Prerequisite: Music 123. *3 hours per quarter.*

321-322-323. **Music History and Literature.** The historical development of music literature. Study of representative literature and composers; Ancient, Medieval, Renaissance; Baroque, Classical, Romantic, and Twentieth Century periods. Prerequisite: Music 100. *3 hours per quarter.*

334. **Woodwinds Methods.** Study, elementary performance skills, pedagogy, and material of the woodwind instruments. Designed for the future public school music teacher. *2 hours.*
336. **BRASS METHODS.** Study, elementary performance skills, pedagogy, and materials of the brass instruments. **2 hours.**

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

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

361. **ELEMENTARY MUSIC METHODS.** (Music Education Majors). Philosophy, techniques, materials, curriculum planning for the elementary music teacher and supervisor. **2 hours.**

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

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

371-372-373. **APPLIED FIELD LITERATURE.** Study of the professional and educational literature in a specific applied field. One or more areas offered each year. **1 hour per quarter.**

421-422. **CONDUCTING I, II.** General conducting techniques and principles of score study of choral, band, and orchestral literature. Rehearsal techniques and application of technique and score study to representative literature. Must be taken in sequence. Prerequisite: Music 223. **2 hours per quarter.**

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

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

463. **MARCHING BAND METHODS AND TECHNIQUES.** Methods, materials, and techniques in the development and direction of the marching band. Show planning, precision drill, rehearsal and techniques, selection and rehearsal of music. Laboratory experiences. **1 hour.**

490. **SPECIAL TOPICS IN MUSIC.** **1-3 hours.**

494. **SEMINAR IN MUSIC.** **1-3 hours.**

497. **INDEPENDENT STUDY IN MUSIC.** **1-3 hours.**

**PHILOSOPHY AND RELIGION**

(Department 115)

Professors Colloms (*Deceased*), Hinderliter, Tinsler (*Chairman*); Associate Professor Whipple; Assistant Professors Becker, Hodges; Instructor Simonsen.
RELIGION

The major in Religion requires a minimum of 45 quarter hours in the department beyond Religion 105, including Religion 254, 255, 256; 352, 353, 361; 454, 461, 463; and Independent Study 498. Seminars, electives in Religion, and up to three courses in Philosophy complete the requirement. A Senior Comprehensive Exam is not required.

PHILOSOPHY

The major in Philosophy requires a minimum of 45 quarter hours in the department beyond Philosophy 100, including three of the following courses: 234, 238, 241, 244, 245, 246. Also required are Philosophy 331, 332, 333 and Independent Study 497. Seminars, electives in Philosophy and up to three courses in Religion complete the requirement. A Senior Comprehensive Exam is not required.

INTERDISCIPLINARY MAJOR

The interdisciplinary major in philosophy and religion requires a minimum of 45 hours beyond 100 and 105 in the department, with the student completing the Sophomore and Junior requirements in both disciplines (see above) with independent study, and electives on the Senior level to complete the requirement.

For those planning to attend seminary or graduate school, two years of foreign language is strongly advised. A Senior Comprehensive Exam is not required.

PHILOSOPHY

In the Department of Philosophy a search is made for a comprehensive view of the universe and 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.

100. PHILOSOPHY. What philosophy is and what it attempts to do; the problem of knowledge, the nature of man and his environment, and the principles for establishing proper relationships between man and his economic, social, and political environments. **One unit.**

234. LOGIC. The principles and methods of reasoning; the relations of truth and validity, the uses of language, the sources of fallacies, and the structure of deductive arguments. **3 hours.** Offered 1972-73.

238. ETHICS. A critical study of the various moral theories developed in the Western world in the attempt to formulate a standard for moral behavior applicable to individuals and social groups. **3 hours.**

241. AESTHETICS. The theories relating to the creation, appreciation and critical evaluation of the various fine arts, and of the various theories of beauty and the related aesthetic experience. **3 hours.** Offered 1972-73.

244. PRAGMATISM AND AMERICAN CULTURE. The major theories of Pragmatism: selected writings of Pierce, James and Dewey; the influence of this school of philosophy on liberalism, democracy and freedom, jurisprudence, education, and religion. **3 hours.** Offered 1973-74.
245. **Existentialism.** The historical roots of existentialism in Kierkegaard and Nietzsche and the thought of Heidegger, Sartre, and other representative figures. 3 hours. Offered 1973-74.

246. **Philosophy of Religion.** The religious concepts of God, soul, freedom, prayer, destiny, evil, and immortality and the underlying metaphysical assumptions. 3 hours. Offered 1973-74.

331. **The Classical Greek and Roman Philosophers.** The Pre-Socratics, Plato, Aristotle, and Hellenistic philosophy through Neo-Platonism. 3 hours. Offered 1972-73.

332. **Medieval and Renaissance Philosophy.** The development of philosophy from St. Augustine to Francis Bacon. 3 hours. Offered 1972-73.

333. **Modern Philosophy.** The study of philosophy beginning with Descartes through the Nineteenth Century. 3 hours. Offered 1972-73.

492. **American Philosophy.** The main currents of philosophical thought in America from the Colonial Period to the present; Royce, Santayana, and Whitehead. 3 hours. Offered 1973-74.

433. **Philosophy of History.** Leading theories of history as reflected in the writings of philosophers from ancient times to the present; the nature of history and historical knowledge. 3 hours. Offered 1973-74.

441. **Philosophy of Science.** The concepts and assumptions of the scientific method, the relations of philosophy and science, the impact of modern scientific developments on metaphysical speculations. 3 hours. Offered 1973-74.

499. **Philosophical Analysis.** Recent and contemporary theories of epistemology that limit knowledge to statements of observable data and their interrelations, and the study of the meaning and function of language. 3 hours. Offered 1972-73.

490. **Special Topics in Philosophy.** 1-3 hours.

494. **Seminar in Philosophy.** 1-3 hours.

497. **Independent Study in Philosophy.** 1-3 hours.

**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 aim to give the student the factual background for his own interpretation of a vital faith.

105. **Religion.** A non-sectarian study of religion, and its nature and function in the modern Western world. Illustrations of basic concepts and principles of religion are taken mainly from Judaism and Christianity, the chief religions of our western culture. One unit.
254. The Beginnings of Israel. The development of the history and religious thought of the ancient Hebrews from Abraham through the fall of Jerusalem and the work of Jeremiah. 3 hours.

255. The Later Old Testament Community. Religious and historical developments beginning with Ezekiel through the Roman period, with special attention to the Qumran community and the Dead Sea Scrolls. 3 hours.

256. The Beginnings of Christianity. The events and interpretations surrounding the lives of Jesus, Paul, and the other Christian leaders of the first century. 3 hours.

261. Archaeology and the Bible. The methods and conclusions of archaeological studies in the Middle East as related to the Bible. 3 hours. Offered 1973-74.

262. Christianity and Culture. An examination of various interpretations of the relationship of Christianity to particular cultural phenomena, including literature, science, philosophy, psychology, and the economic and political orders. 3 hours. Offered 1973-74.

263. Christian Ethics. Theories of value in the field of conduct which have been recognized as "Christian ethics", relating to the individual, the family, society, economics, the state, international relations, war and the like. 3 hours. Offered 1973-74.

Philosophy of Religion. 3 hours. (See Philosophy 246.)

352. Church History to the Reformation. The Apostolic Age to the Council of Constance with emphasis on the theology of the Church Fathers, Augustine and Aquinas. 3 hours. Offered 1972-73.

353. Church History from the Reformation Through the Nineteenth Century. A history of the church and the theological developments of both Protestantism and Roman Catholicism. 3 hours. Offered 1972-73.


454. Asian Religions. The major living religions of the Orient. 3 hours. Offered 1972-73.

461. Studies in the Synoptic Gospels. The results of historical and literary criticism and their theological consequences. An attempt to answer the question, "What can we know of the historical Jesus?" 3 hours. Offered 1973-74.


491. Special Topics in Religion. 1-3 hours.

495. Seminar in Religion. 1-3 hours.

498. Independent Study in Religion. 1-3 hours.
PHYSICS
(Department 124)

Professor Abele (Chairman); Associate Professors Gangemi, Messick, Weimer; Assistant Professors Glenn, Roll.

The primary aim of the physics department is to offer courses that will stimulate scientific thought, train the student to reason from fundamental experimental fact, further the student’s desire to continue scientific investigation, and meet the needs of those students who are interested in physics for its cultural or its vocational value.

The department aims to give a training sufficiently broad to enable the student to appreciate the physics of scientific articles, to teach physics in the public schools, to apply physics in engineering, medicine and other sciences, and to pursue graduate work.

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

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

100. PHYSICS. Intended for Liberal Arts students. This course presents the basic laws and principles which govern the behavior of nature with special emphasis on Mechanics, and Atomic and Nuclear structure. The interaction of physics with other areas of culture will also be considered. One unit.

190. SEMINAR. Reading, discussion and reports on problems of historical and current interest in physics. 1 hour.

211. GENERAL PHYSICS: MECHANICS OF SOLIDS AND FLUIDS. 4 hours.

212. GENERAL PHYSICS: SOUND, HEAT AND LIGHT. 4 hours.

213. GENERAL PHYSICS: ELECTRICITY AND MAGNETISM. 4 hours.
For pre-medical, pre-dental, pre-pharmacy and secondary education students. (3 + 2). 211 should precede 212 and 213. Prerequisite: Mathematics 161.

231. PHYSICS: MECHANICS OF SOLIDS AND FLUIDS. 5 hours.

232. PHYSICS: SOUND, HEAT AND LIGHT. 5 hours.

233. PHYSICS: ELECTRICITY AND MAGNETISM. 5 hours.
For engineers and physical science majors. (4 + 2). 231 should precede 232 and 233. Prerequisite: Calculus 261, or taken concurrently.

250. ASTRONOMY I. The evolution of man’s understanding of the structure and extent of the solar system. A review of current knowledge of the solar system, and an introduction to stellar systems. 3 hours.

251. ASTRONOMY II. The structure and evolution of stars and stellar systems. Cosmology. Prerequisite: Astronomy 250. 3 hours.
303. Modern Physics. The concepts of relativity, quantum and wave mechanics, atomic structure and absorption and emission processes. Prerequisites: Calculus 264 and Physics 233. 3 hours.

310. Theory and Advanced Laboratory: Mechanics. 1-3 hours.

320. Theory and Advanced Laboratory: Light, Heat, Sound. 1-3 hours.

330. Theory and Advanced Laboratory: Electricity. 1-3 hours.

340. Theory and Advanced Laboratory: Nuclear Physics and Solid State. 1-3 hours. Credit is given in courses 310, 320, 330 and 340 according to the work done. Offered every quarter. Prerequisite: Physics one year.

351. Analytical Mechanics I. Vector analysis, kinematics, conservative forces, planetary motion, pendulum, free and forced oscillations, coupled systems and normal coordinates, angular momentum, rigid bodies. Prerequisites: Calculus and Physics 233. 3 hours.

352. Analytical Mechanics II. Lagrange equations, canonical formulation, principle of least action, normal coordinates, rigid bodies, special relativity, mathematical methods. Prerequisites: Mathematics 352 or 362 and Physics 351. 3 hours.

353. Nuclear Physics. Nuclear radiation detection instruments, nuclear constituents and structure, nuclear models, nuclear reactions, fundamentals of nuclear reactor theory and design, shielding and safety principles in nuclear physics. Prerequisite: Modern Physics 303. 3 hours.

361. Electronics. Electron ballistics, vacuum tubes, rectifiers, amplifiers, oscillators, modulators, electron tube instruments. Prerequisite: Physics 213 or 233. 3 hours.

363. Geometrical Optics. The laws of geometrical optics, image formation by mirrors and lenses, optical aberrations and optical instruments. Prerequisite: Physics 232. 2 hours.

411. Electricity and Magnetism I. Electrostatic field theory, capacitance, multipole expansion, dielectric properties of matter; magnetic field theory; electromagnetic induction; magnetic properties of matter; Maxwell's equations and electromagnetic waves. Prerequisites: Mathematics 264 and Physics 233. 3 hours.

412. Electricity and Magnetism II. Advanced electric and magnetic fields, electric and magnetic properties of solids, electromagnetic radiation. Prerequisites: Mathematics 352 or 362 and Physics 411. 3 hours.

413. Solid State. A lecture and problems course in the structure of solids and their phenomena. Quantum and statistical mechanics concepts are introduced to develop theories of internal stress and strain in crystals, conductivity of electricity in metals, semiconductors and superconductors, magnetism, the thermal properties of solids and imperfections in solids. Prerequisite: Physics 303. 3 hours.


433. Theoretical Physics. For students intending advanced work in physics, chemistry or mathematical physics. Selected topics in Classical Mechanics, Electromagnetic Theory, Quantum Theory, Relativity, Nuclear Theory, and Statistical Mechanics. 4 hours.
463. **PHYSICAL OPTICS.** The law of Physical Optics, interference, diffraction and polarization and instrumentation. Prerequisite: Physics 232. 3 hours.

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

494. **SEMINAR IN PHYSICS.** 1-3 hours.

497. **INDEPENDENT STUDY IN PHYSICS.** 1-3 hours.

**PSYCHOLOGY AND SOCIOLOGY**

(DePARTMENT 183)

ASSOCIATE PROFESSORS COHOE, HUNT (Chairman); ASSISTANT PROFESSORS GATES, N. HANSON, ZAUDEBER; INSTRUCTORS ADAMS, COMPTON; LECTURERS K. CRIDER, N. DAPORE.

The objectives of this department are to develop within each student an understanding of human relationships, institutions, and social processes; familiarize him with the nature and causes of social problems; acquaint him with the theories of behavior; enable him to think more critically and to integrate his insights for useful participation in community life; and prepare him for advanced study in his respective field.

A major in psychology includes the successful completion of forty-five hours in psychology. The following courses are required: Psychology 100, 110, 250, 311, 333, 420, 421, 431, 494; Biology 100, 112, 113. A Senior Comprehensive is required.

A major in sociology includes the successful completion of forty-six hours in sociology. The following courses are required: Sociology 105, 205, 206, 250, 305, 306, 319, 351, 417, 418; Anthropology 330. A Senior Comprehensive is required.

A major in social work includes the successful completion of fifty-three hours within the department. The following courses are required: Social Work 241, 342, 343, 441, 442, 443, 444; Psychology 100, 351; Sociology 105, 204, 205, 206, 305, 306, 321 or 403; Biology 100, 112, 113; Political Science 105. A Senior Comprehensive is required.

Secondary Certification programs are offered in social psychology, sociology, and comprehensive social studies.

**PSYCHOLOGY**

100. **PSYCHOLOGY.** General research and concepts in human behavior. Lectures, demonstrations, observations and experiments. One unit.

110. **ADVANCED GENERAL PSYCHOLOGY.** Scientific study of behavior with an in-depth emphasis on methodology and implications of contemporary theories. Formerly 210. Prerequisite: Psychology 100. 4 hours.

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

250. **SOCIAL STATISTICS.** The methods and uses of descriptive and inferential statistics in the Social Sciences; measures of central tendency, variability, and testing hypotheses. Formerly 350. Also listed as Sociology 250. 4 hours.

265. **PSYCHOLOGICAL ASSESSMENT.** The study of psychological measurement and evaluation in the areas of intelligence tests, tests of separate abilities, and personality inventories. Experience will be gained in test administration, scoring, and interpretation. Prerequisite: Psychology 100. 4 hours.
311. Psychology of Personality. The major theories of personality from Freud to contemporary theoretical approaches. Prerequisite: Psychology 100. 4 hours. (Offered 3 hours, 1971-72, Riverside campus.)

333. Psychology of Learning. The theoretical frames of reference and supporting research which underlie current conceptualizations of behavior modification in terms of the process of learning; conditioning and reinforcement theories. Prerequisite: Psychology 100. 3 hours.

351. Social Psychology. The effect of social and cultural forces upon the individual. The nature and development of attitudes, languages, cognitive processes. Individual and group projects illustrative of the methodology of Social Psychology. Also listed as Sociology 351. Prerequisite: Psychology 100 or Sociology 105. 4 hours.

353. Psychology of Business and Industry. Psychology as used in business, industry, and personnel work. Prerequisite: Psychology 100. 3 hours.

411. Counseling Psychology. The basic psychological principles involved in the counseling situation; techniques of interviewing. Prerequisite: Psychology 100. Open to juniors and seniors. 3 hours.

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

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

423. Psychology of the Exceptional Child. The classification of the non-typical child; the use of the school and other sources for meeting his needs. Prerequisite: Psychology 100 3 hours.

431. Introduction to Experimental Psychology. Methods of experimental psychology; report writing, terminology, and relevant background materials. Prerequisite: Psychology 100, 250. 4 hours.

434. Historical Study of Psychology. Lines of thought influencing the field of psychology; Greek and European antecedents of major issues up to the 20th century. Prerequisite: Psychology 100. 3 hours.

435. Systems of Psychology. Early systems of psychological thought and theoretical views of the 20th century. Prerequisite: Psychology 434. 3 hours.

436. Readings in Psychological Research. Current research and theory in psychological literature. Approval of instructor. 3 hours.

437. Practicum in Psychology. Work with patients in a clinical setting under supervision; practical experience in interviewing and administering routine psychological tests. May be repeated once. Approval of instructor. 3 hours.

490. Special Topics in Psychology. 1-3 hours.

494. Seminar in Psychology. 3 hours.

497. Independent Study in Psychology. Approval of chairman. 1-3 hours.
SOCIOLoGY

105. Sociology. Basic sociological concepts most needed for understanding and analyzing modern social structure and the process of social change. One unit.

204. Marriage and the Family. An institutional perspective on the family; patterns of courting, marital and parental behavior; trends in the contemporary American family as defined by current research. Prerequisite: Sociology 105 or Psychology 100. 3 hours.

205. Social Organization. Concepts of sociology and their uses; sources of continuity and change in human societies. Prerequisite: Sociology 105. 3 hours.

206. American Society (continuation of 205). Sociological analysis of contemporary American society; the structure of American social life, the major institutions of American society, and the sources of social change in American society. Prerequisite: Sociology 205. 3 hours.

250. Social Statistics. The methods and uses of descriptive and inferential statistics in the Social Sciences; measures of central tendency, variability, and testing hypotheses. Formerly 350. Also listed as Psychology 250. 4 hours.

305. Social Deviance. Sociological perspectives on the processes of individual and group deviance: a discussion of selected major problems of deviance in industrial societies, their social causes, consequences, and solutions. Prerequisite: Sociology 206. 3 hours.

306. Social Change. A structural analysis of the problems of complex societies; the systematic strains and inconsistencies which generate societal problems, such as poverty. Prerequisite: Sociology 205. 3 hours.

307. Population Analysis. Size, composition, distribution and growth of human populations; theories of population growth and migration; problems in social policy in overpopulation and economic development. Prerequisite: Sociology 206. 3 hours.

319. Methods in Social Research. Review of major methodological techniques in sociological research, illustrated by analysis of important research monographs and journal articles; development of individual student research projects using appropriate methods. Prerequisites: Sociology 206, 250. Formerly 419. 3 hours.

321. Criminology. The development of theories of criminal behavior; research contributions to the sociological understanding of crime and criminals; sociological approaches to law and to judicial and penal organizations. Prerequisite: Sociology 105 or Psychology 100. 3 hours.

351. Social Psychology. The effect of social and cultural forces upon the individual. The nature and development of attitudes, language, and cognitive processes. Individual and group projects illustrative of the methodology of Social Psychology. Also listed as Psychology 351. Prerequisite: Sociology 105 or Psychology 100. 4 hours.

403. Minority Groups. The phenomena which arise when groups of people who differ racially or culturally come into contact with one another. Prerequisite: Sociology 105. 3 hours.

404. Sociology of Knowledge. The social context of idea systems; the contribution of sociologists from Marx to the present; the derivations and functions of conservative and utopian idea systems; the relations between ideas and social change. Prerequisite: Sociology 105 or Psychology 100. 3 hours.
405. **Sociology of Religion.** The major contributions of social scientists to the study of religious institutions; the various forms and social functions of religion, the structure of religious behavior and organization; the relations between religion and other social institutions. Prerequisites: Sociology 105 or Psychology 100. Offered in 1972-1973. 3 hours.

414. **Urban Sociology.** A comparative study of the organization, social processes, problems, and interrelationships of rural and urban communities. Prerequisite: Sociology 105. 3 hours.

415. **Mass Communications.** The social structure of mass communications and its audiences; the social consequences of the media employed; content analysis; the effect of mass communications on its audience. Prerequisite: Sociology 105 or Psychology 100. Offered in 1972-1973. 3 hours.

416. **Collective Behavior.** Theory and research in the sociological study of crowds, publics, social movements and revolutions; the study of the origins, development and structure of noninstitutionalized social behavior and of social attempts to accomplish social change. Prerequisite: Sociology 105 or Psychology 100. 3 hours.

417. **Theory Construction.** The nature and functions of theory in sciences; the major types of social theories; the relationships between theories and facts; the construction and uses of theories in social science; the social effects of social theories. Open to seniors. Prerequisite: Sociology 206. 3 hours.

418. **History of Social Theory.** The development of sociological theory from Comte to the present, with emphasis upon 20th century American theory representing changing research interests and goals. Open to seniors. Prerequisites: Sociology 250, 417. 3 hours.

491. **Special Topics in Sociology.** 1-3 hours.

495. **Seminar in Sociology.** 3 hours.

498. **Independent Study in Sociology.** Approval of chairman. 1-3 hours.

**SOCIAL WORK**

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

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

343. **Social Work Methods.** Basic processes used in social work practices; social case work, social group work, and intergroup or community work. Prerequisite: Social Work 342. 3 hours.

441-442. **Social Welfare Investigation.** Social welfare investigation and methods of research and their application to the analysis of social phenomena. Prerequisite: Social Work 343. 6 hours.

443. **Social Field Work Observation and Orientation.** Observation and participation in social work programs under the supervision of professional social workers. Prerequisite: Social Work 442. 5 hours.

444. **Domestic Law.** Legal topics relating to social welfare including laws of marriage, divorce and alimony, and laws pertaining to infant and child rights. Prerequisite: Social Work 442. 3 hours.
ANTHROPOLGY

315. PHYSICAL ANTHROPOLOGY (Introductory). Basic concepts of physical anthropology; brief review of development of physical anthropology, relation to other branches of anthropology and other sciences; origins of life; taxonomy; primate evolution. Should be followed by 316. Offered in 1972-1973. 4 hours.


317. ARCHAEOLOGY. The nature and functions of archaeological science; archaeological history, research techniques, and interpretation; summary of world archaeology, with emphasis on North and Central America; brief introduction to Ohio archaeology. Offered in 1972-1973. 3 hours.

330. CULTURAL ANTHROPOLOGY (Introductory). An introduction to basic concepts; brief review of history of anthropology and its changing influence; future application of anthropological knowledge. 3 hours.

331. CULTURAL ANTHROPOLOGY (Analysis of Culture). Kinship and political structures, economics, language and linguistics, education and technology, religion and ritual, the arts, etc. Prerequisite: Anthropology 330. Students taking Anthropology 331 are urged to follow with 332. 3 hours.

332. CULTURAL ANTHROPOLOGY (Cultural Change). Processes of acculturation, diffusion, invention, etc.; relationships of elements of social structure to rates and types of changes, resistance to change, etc. Prerequisite: Anthropology 330. 3 hours.

SPEECH AND THEATRE

(Department 153)

ASSISTANT PROFESSOR LADWIG (Chairman); INSTRUCTORS BAKKERUD (part-time), LEE, RIGGLE, SCHUESSLER, WILD; LECTURER J. FIELD.

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

The programs in Forensics and Production are open to all students who have completed the basic requirement of Speech 100 and/or Theatre 105; such activities involve local, State, and National tournaments, and participation in theatrical events through University Theatre or the Children’s Theatre Tour. In addition to the cultural and service functions of the Department, a full course of Speech and Theatre education studies leading to Teacher Certification is provided, and a major may concentrate, beyond his basic Departmental requirements, on taking courses which will give him advanced studies in directing, acting, or technical theatre.

The major in Speech-Theatre requires a minimum of 45 hours beyond Speech 100 and Theatre 105, and must include the following from both areas:
SPEECH:  100  Speech  
         110  Argumentation  
         254  Voice and Diction I  
         262  Oral Interpretation  
         272  Adv. Public Speaking  
         370  Speech Methods  
         360  Parliamentary Procedure  

THEATRE:  105  Theatre  
         231 or 232 or 233 Stagecraft  
         241 or 242 or 243 Theatre Hist.  
         282 & 283 Acting Tech. II & III  
         331  Makeup  
         386  Directing I  

Therefore: Speech = 16 hours + 1 unit  
           Theatre = 16 hours + 1 unit

32 hours + 2 units  
+ 1-3 hours in either Speech 497 or Theatre 498  
          (Independent Study)  

33-35 hours total required + 2 units

The additional hours shall be elected from within the Department to complete the minimum major requirement of 45 hours. Area of concentration may be obtained by electing either advanced Speech or Theatre courses.  
Speech 100 and/or Theatre 105 are prerequisites for all advanced courses in the areas and do not count toward the major.

100. SPEECH. Basic principles of oral communication with attention to individual needs.  
One unit.

110. ARGUMENTATION. Argumentative speaking and debate; proposition analysis; use of evidence, elementary logic, and case construction. 3 hours.

254-255. VOICE AND DICTION I AND II. Voice and speech production; intensive drill, on a phonetic basis, in articulating the sounds which make up the English language, with attention to the production of good vocal quality and expression. Prerequisites: Speech 100. 6 hours.

260. SPEECH CORRECTION IN THE SCHOOLS. The recognition of speech disorders; speech and listening activities for the normal school child. 3 hours.

262. ORAL INTERPRETATION. The analysis and interpretation of the logic and emotional meaning in poetry, prose, and drama. Theories and practice in the art of oral interpretation. Prerequisites: Speech 254-255. 3 hours.

265. DIRECTING FORENSICS. Exploration, evaluation, and participation in methods and applications of directing debate and forensics programs; student participation in local, State, and National tournaments. 3 hours.
270. **Speech Activities.** Extra-curricular debate and/or individual speech activities. May be repeated for graduation credit up to a maximum of six hours. 1 hour.

272. **Public Speaking.** More extensive application of basic principles of oral communication in the composition and delivery of original speeches. Prerequisite: Speech 100. 3 hours.

273. **Seminar in the History of Public Address I.** Studies in the development of rhetorical theory and oratory from the Greeks to the Renaissance. Prerequisite: Speech 272. 3 hours.

274. **Seminar in the History of Public Address II.** Studies in the development of rhetorical theory and oratory from the Renaissance to the present. Prerequisite: Speech 273. 3 hours.

360. **Parliamentary Procedure.** A method of conducting formal meetings by parliamentary rules. 1 hour.

363. **Advanced Oral Interpretation.** Analysis and communication of significant forms of literature. Experimentation with various methods of oral interpretation, such as choral speaking, TV and radio scripts. Emphasis on advanced, individual work. Prerequisite: Speech 262. 3 hours.


370. **Speech Methods.** Investigation, survey, readings, methods, and application of teaching techniques in speech, theatre, and audiology and pathology. Prerequisite: acceptance in Teacher Education program. 3 hours.

371. **Group Communication.** The process of group discussion and problem-solving techniques. An opportunity to participate in and lead discussion. 3 hours.

373. **Persuasive Speaking.** A description and evaluation of modern persuasive theory and techniques. Preparation and delivery of original speeches based on current problems of interest and importance. Prerequisite: Speech 110. 3 hours.

490. **Special Topics in Speech.** 1-3 hours.

494. **Seminar in Speech.** 1-3 hours.

497. **Independent Study in Speech.** 1-3 hours.

**Theatre**

105. **Theatre.** General survey of theatrical and presentational art forms from primitive man through the present; emphasis on art, music, drama, literature, television, radio, motion pictures, costuming, acting, design, criticism, directing, etc. Unit.

231. **Stagecraft I.** 3 hours.

232. **Stagecraft II.** 3 hours.

233. **Stagecraft III.** 3 hours.

Theoretical and practical work in the fundamentals of theatre production. A minimum of 30 hours production work per quarter are required outside of lectures via labs.

241. **Theatre History I.** History of the Theatre from the beginning to 1500. 3 hours.
242. **Theatre History II.** History of the Theatre from 1500 to 1850. 3 hours.

243. **Theatre History III.** History of the Theatre from 1850 to the present. 3 hours.

250. **Production.** Open only to those students who have auditioned for and have been awarded roles in major University productions; 1-3 hours of S/U credit, depending on role. Prerequisite: permission of director.

280. **Theatre Activities.** Required participation in technical/productional aspects of University productions. A maximum of six hours may be taken for graduation credit. 1 hour.

281. **Acting Technique I.** 3 hours.

282. **Acting Technique II.** 3 hours. Prerequisite: Theatre 281 or Speech 262.

283. **Acting Technique III: Lab Theatre.** 3 hours. Prerequisite: Theatre 282. Exercises, improvisational work, and scenes designed to develop basic acting skills. Students are expected to audition for and/or participate in University productions.

331. **Make-up.** Methodology and practice in the creation and application of stage make-up. Lab sections plus lecture-demonstrations. Students compose make-up crews for University productions. Offered each quarter. 1 hour.

351. **Children's Theatre I.** Methods of acting, producing, and directing plays for young audiences with an understanding of the role of children's theatre in modern society; readings in children's dramatic literature. Prerequisite: Theatre 105 or Speech 100. 3 hours.

352. **Children's Theatre II.** Experience in selection and rehearsal/preparation for Children's Theatre Tour. Prerequisite: Theatre 351. 3 hours.

353. **Children's Theatre III.** Actual performances and Children's Theatre Tour. Prerequisite: Theatre 352 and permission of Director. 3 hours.

386. **Directing I.** Methods and theories of directing. Prerequisites: 3 hours of Stagecraft plus 6 hours of Acting Technique. 3 hours.

387. **Directing II.** Exercises and practices in directorial concepts; production of scenes and one-acts in Lab Theatre. Prerequisite: Theatre 386. 3 hours.

388. **Directing III: Lab Theatre.** Rehearsal and preparation for student directed plays and performances for University audiences. Prerequisite: Theatre 387. 3 hours.

441. **Technical Theatre: Scene Design.** Methodology and practice in the arts of scene design; application through University productions. (Alternate years: offered 1972-1973). Prerequisite: 6 hours of Stagecraft. 3 hours.

442. **Technical Theatre: Lighting Design.** Methodology and practice in the arts of lighting design; application through University productions. Prerequisite: Theatre 441. (Alternate years: offered 1972-1973). 3 hours.

443. **Technical Theatre: Costume Design.** Methodology and practice in costume design and construction; application through University productions. Prerequisite: Theatre 441 or 442. (Alternate years: offered 1972-1973). 3 hours.

495. **Seminar in Theatre.** 1-3 hours.

498. **Independent Study in Theatre.** 1-3 hours.
Student demonstrates mechanical engineering equipment.

The Order of the Ring is a tradition on campus. This is a replica on display in the Engineering Building.
College of Engineering

Lawrence H. Archer, Dean.

Academic Recognition

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

Purpose

Basically, the engineering student learns how to think in a logical sequence, subject to the facts involved. In keeping with the objectives of Ohio Northern University, it is the aim of the College of Engineering to develop the whole individual. We propose to have each student attain the highest undergraduate proficiency in subject matter basic to all engineering, in the essentials of his chosen branch of the profession, and in the areas of living, to enable him to become successful and creative in his profession and effective as a citizen.

History

During the ninety years of its existence the College of Engineering has had more than twenty-nine hundred graduates. The Civil Engineering Department had its first class in 1882; Electrical Engineering, in 1898; and Mechanical Engineering, in 1904. These departments continue to function with the highest standards today.

The student has always been treated as an individual. Class size has been kept at a minimum. Close faculty-student relationship is still maintained.
ADMISSION

Early application is advisable. As early as the junior year of high school the student interested in engineering is encouraged to obtain the advice of the Dean of the College of Engineering and to request appropriate information and application materials from the Office of Admissions, Ohio Northern University. Each applicant for admission should read carefully the section of this catalog entitled ADMISSION TO THE UNIVERSITY (see Index). Candidates of good moral character may apply for admission upon one of the following plans:

A. High School or Academy Graduates, or the equivalent. For the regular program each applicant must have course credits as follows: English, 4 years; mathematics, 4 years; science, 2 years. It is recommended, though not required, that applicants have two years of foreign language. The normal college preparatory program includes the necessary courses.

In mathematics, two years should be in algebra, one in geometry, and at least one-half in trigonometry or the equivalent thereof. The sciences must include physics, and should include chemistry.

Students who meet the general university admission standard, but are found to be deficient in mathematics or physics, will be required to make up the deficiency. It is best to do this before the regular school year starts. If you have this problem, contact the College of Engineering early. Otherwise, it will take at least one summer session in addition to the regular four-year program or may require a fifth year.

B. Transfer Students. Students from other accredited colleges and universities entitled to honorable dismissal and eligible to return to the home institution may be admitted with advanced standing. Concealment of previous college attendance is cause for revocation of admission. Advance credit from other institutions of higher learning will not be given for more than 150 quarter hours or their equivalent. The work must be "C" level or better.

C. Special Student. Mature persons not candidates for a degree may be admitted as special students if, on consultation, the Dean is satisfied that they have sufficient preparation to pursue the work successfully. Upon satisfactory completion of their work a certificate is awarded indicating the course of study pursued and the amount of work covered.

ACADEMIC LOAD

The standard load in the College of Engineering is listed under each department term by term. Extra hours based upon scholarship attainments, at
least a "B" average, may be permitted by the Dean upon recommendation of the student’s adviser. Engineering students are responsible to fulfill the requirements of the current year's catalog as they apply to that year of his course.

STUDENT'S ACADEMIC STATUS

Good Standing is the status when no academic conditions exist, i.e., the accumulative average is at least 2.0.

Probation is noted the first time a student’s accumulative average falls below 2.0 (“C” average). Normally, a student is given a full academic year to prove himself academically. Students may be carried on probation a second quarter if conditions and evidence indicate a possibility of improvement in academic attainment.

Consistent low academic attainment (below “C”) subjects the student to SUSPENSION. Suspension implies the possibility of readmission at a later date, generally three quarters having elapsed.

Students in academic difficulty are required to meet with their adviser more frequently than those who progress satisfactorily. Students on probation are not eligible to participate in extra-curricular activities. Some exceptions are made based upon the recommendation of the adviser and Dean of Men to the Dean of Engineering.

CLASSIFICATION

The traditional terms of freshman, sophomore, junior, and senior are used. Engineering education is vertical in nature insofar as most courses are sequential. The level at which the student is studying is far more consequential than the hours accumulated or the years spent in school.

Courses, or equivalent thereto, which must be completed before advancing to the next rank classification are shown in the programs for each of the departments in the pages that follow.

GRADUATION AND DEGREES

In addition to meeting specific course requirements, a minimum of 200 academic hours or the equivalent (unit courses equated at three hours each) is required for graduation. The student 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 per-
mitted to be a candidate for more than one degree at any one time, the Arts-Engineering program excepted.

All degree candidates must spend their last year in residence, taking at least forty-five quarter hours of upper level engineering courses for final credit toward graduation.

At graduation engineering students receive the appropriate degree, Bachelor of Science in Civil Engineering, Bachelor of Science in Electrical Engineering, or Bachelor of Science in Mechanical Engineering.

REGISTRATION AS A PROFESSIONAL ENGINEER

Registration by the state as a Professional Engineer, important for professional practice, requires four years of experience after graduation as an engineer. Full information is given in the first and last years while in school and is available from the Dean of the College of Engineering or from the Secretary of the Board of Registration for Professional Engineers, 21 West Broad Street, Columbus, Ohio 43215.

ENGINEERING BUILDING

The College of Engineering occupied its new facility in the summer of 1971. It is a completely new 1.8 million dollar modern, up-dated building. Included in this ninety-one room engineering building are classrooms, laboratories, and faculty offices. The addition of the new engineering building to the campus completes the Science Complex.

COMPUTER CENTER

Today, with the rapid advancement of science and technology, more and more use is being made of computers by scientists and engineers. Since nearly all firms that employ engineers have access to a computer, the engineer needs an educational background in their use. The establishment of the Computer Center started the current engineering trend to make equipment available to the undergraduate student.

Two courses, which use the Computer Center as a laboratory, are required of first year engineering students. Each 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 the engineer's education, and is 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, a 1443 Printer, and needed support equipment, all located within the engineering building.

**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**

Superior students may qualify to pursue the Arts-Engineering program. The student is admitted to both the College of Liberal Arts and the College of Engineering at the start of the planned program. In five academic years two degrees, Bachelor of Arts in the College of Liberal Arts and Bachelor of Science in the appropriate branch of engineering in the College of Engineering can be earned. An advantage of the program is the fact that a student can major in any subject matter area in liberal arts as well as any branch in engineering.

The superior student will be challenged to understand more fully, humanity and civilization in a scientific and engineering world. Completing this program will increase the service that he will perform for mankind and will help to create a much broader image of the engineer in this age.

*Modern Engineering Building nears completion. It opened in the fall of 1971.*
## Arts-Engineering Program

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**Totals**

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### Fourth Year

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Plus Junior Courses from Appropriate Engineering Department

**Notes:** U denotes unit course
FIFTH YEAR

Liberal Arts Major
Plus Senior Courses from
Appropriate Engineering Department

BASIC ENGINEERING

No sharp line of distinction can be drawn in the fundamental education of civil, electrical, or mechanical engineers for the reason that the sciences basic to engineering—mathematics, physics, chemistry, and the engineering sciences—are essential in all branches of engineering.

Since certain courses in engineering are considered to be fundamental and deal with the basics of the several fields, they are used by all three departments in, at least, the first two years of the curriculum.

The basic courses are taught by the engineering faculty and are required of all engineering students except as may be noted.

BASIC ENGINEERING: DESCRIPTIONS
(Department 201)

100. Pre-Engineering Mathematics Refresher. 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 college mathematics is offered previous to the opening of the fall quarter. All first year students find the systematic review of value. Topics included are algebra, geometry, trigonometry, and analytical geometry. Students who do not place sufficiently high in mathematics placement tests during summer orientation are required to take this course to prepare to start the calculus. No credit.


111. Introduction to Design (1 + 3)*. An introduction to design with particular emphasis on visualization and synthesis leading to engineering design and motivation of creativity, including orthographic, axonometric, and third angle projection, as well as elementary work projects. 2 hours.

112. Graphical Analysis (1 + 3). An introduction to graphical methods of problem solving encompassing discussions of: vector diagrams in two and three dimensional spaces, graphical presentation of data, graphical arithmetic and calculus, development of empirical functions for experimental data, and development of functional scales and nomographs for solution of engineering oriented problems. Prerequisite: 111. 2 hours.

* (2 + 1) indicates the student contact hours per week. The first number gives the lecture hours while the second, shows the laboratory hours.
ALL ENGINEERING — CLASS OF 1974
FRESHMAN

1970-71

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ALL ENGINEERING — CLASS OF 1973
SOPHOMORE

1971-72

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U—Denotes Unit Course.

120. **Orientation for Engineering Students** (1 + 0). Schedules, irregularities in schedules, graduation requirements, class preparations, problem solutions, taking of tests, slide rule, background of various branches of engineering, technical and professional organizations, and professionalism are covered. Designed to help the student to make the transition to college, as well as, properly orient the student in the profession. 1 hour.

Prerequisite: Math 153, Physics 231. 3 hours.

312. **Engineering Mechanics 2** (3 + 0). Fundamental principles of mechanics with vector methods as applied to dynamics. Includes absolute and relative motion; force, mass and acceleration; work and energy; and impulse and momentum.
Prerequisite: 311. 3 hours.

313. **Engineering Mechanics 3** (3 + 0). Elastic analysis through concepts of stress and strain in tension, torsion, compression, and flexure. Development and application of Mohr's
circle construction; analytical methods of determining shear stresses in beams subjected to torsional and flexural loadings, evaluation of shear flow, and shear and moment diagrams. Prerequisite: 312. 3 hours.

321. Passive and Active Circuits 1 (3 + 0). Introductory concepts in circuit analysis. Solution of resistive circuits using Ohm's and Kirchoff's Laws, mesh and nodal analysis, and network theorems. Prerequisite: Physics 233, 153. 3 hours.

322. Passive and Active Circuits 2 (3 + 0). Analysis of circuits in the sinusoidal steady-state. Phasor solution, effective values of current and voltage, instantaneous and average power, series and parallel resonance. Prerequisite: 321. 3 hours.

323. Passive and Active Circuits 3 (3 + 0). Magnetically coupled circuits, introduction to network topology, polyphase circuits and Fourier analysis. Prerequisite: 322. 3 hours.

332-333. Circuits Laboratory 1 and 2 (0 + 3). A laboratory study of electric circuits. Prerequisite: 322 concurrently. 2 hours.

CIVIL ENGINEERING — CLASS OF 1973
JUNIOR
1971-72

Mechanics of Materials, Similitude, Geology (202401, 465, 453) 3 3 3
Computer Aided Design, Structural Systems Analysis 1,2 (202411-2-3) 4 4 4
Probability and Statistics 1, Fluid Mech., Hydraulics (123142, 202422-3) 3 3 3
Urban Planning, Transportation, Materials Science (202434-5, 456) 4 4 4
Mechanical Measurements*, Thermodynamics*, Environmental Science* (204434, . . ., 202437) 3 3 3
Totals 17 17 17

*These courses may be substituted for with the approval of the Civil Engineering Department Faculty. Courses which may be substituted include: Astronomy 121250; Biology 112100; Ecology 112423; Business Law 131322; General Chemistry 122113; Physical Chemistry 122341; Probability and Statistics 2 123143; Advanced Statistics 123381; Modern Physics 124303; Nuclear Physics 124353; Biochemistry 302341; Microbiology 306361; EE Math 1; EE Math 2; Thermo 2; Engineering Materials; or others with faculty approval. During the Junior and Senior year, the student has six courses like this. Two of these courses must be in a Humanities or Social Science area to achieve a required depth. These two courses to be chosen by the student and his advisor.
CIVIL ENGINEERING – CLASS OF 1972
SENIOR

1971-72

Environmental Engineering 1,2 (202514-6) .......... (F) 3 (W) 3
Reinforced Concrete 1,2, Structural Systems Design* (202521-2-3) .......... 4 3 3
Soils 1,2, Construction Systems* (202531-2-3) .......... 4 4 3
Structural Design 1,2 (202545-6) .......... 4 3
CE Senior Seminar*, Structural Systems Analysis 3* (202511-5) .......... 3 4
Surveying1 .......... 4
Philosophy, Religion (115100-5) .......... 4

Totals .......... 17 17 16

1The student is encouraged to discuss with his advisor the possibility of taking this course during an earlier year to help him prepare for more meaningful summer employment.

*These courses may have substitutes. Same note applies as that listed with Junior year.

CIVIL ENGINEERING DEPARTMENT

PROFESSORS KEYSER, MILKS (Chairman); ASSOCIATE PROFESSORS KOEHN, SHAH.

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, and as a consultant in engineering.

Department facilities include high grade instruments and appliances in well-equipped laboratories. Laboratory work is offered in testing materials, concrete, soils, geology, and fluid mechanics, as well as field work in surveying.

Engineering education instills within the student the ability to know how, to know why, and to do the best engineering job possible for his client for the least amount of money in keeping with the Code of Ethics of the Professional Engineer.
CIVIL ENGINEERING: DESCRIPTIONS

(DEPARTMENT 202)

Civil Engineering courses use laboratory facilities as needed. The number of recitations and laboratory hours per week is an approximate average over the quarter and will vary with immediate class content.

303. SURVEYING (2 + 6). Use of level and transit, differential and profile leveling, traversing, theory and practice with horizontal and vertical curves, fundamentals of aerial photography. Prerequisite: Departmental permission. 4 hours.

401. MECHANICS OF MATERIALS (3 + 0). Deflection, combined loadings, repeated loading, dynamic loading, connections, formulation of statically indeterminate problems. Prerequisite: 201313. 3 hours.

411. COMPUTER AIDED DESIGN 1 (3 + 3). Principles of numerical analysis used in solving structural problems, numerical methods, linear programming, optimization, finite element, finite difference, and applications. Prerequisite: Math 361. Concurrently 202401. 4 hours.

412. STRUCTURAL SYSTEMS ANALYSIS 1 (3 + 3). Fundamentals of statically determinate structures; deflections, displacements, use of models to illustrate structural behavior, principle of superposition and study of elastic curve. Prerequisite: 411. 4 hours.

413. STRUCTURAL SYSTEMS ANALYSIS 2 (3 + 3). Fundamentals of statically indeterminate structures; classical and approximate methods of solution. Prerequisite: 412. 4 hours.

422. FLUID MECHANICS (3 + 0). Engineering properties of fluids, fluid statics, fluid dynamics, fluid resistance, boundary layer theory, steady flow in closed circuits and the introduction of flow through porous media. Prerequisite: 201312. 3 hours.

423. HYDRAULICS (2 + 3). Hydraulic analysis of piping systems using the digital computer. Steady flow in open channels, non-uniform flow in open channels, elements of Hydrology, introduction to chemical quality control of surface and subsurface waters. Prerequisite: 422. 3 hours.

434. URBAN PLANNING (3 + 3). Principles of city and regional planning; land use, zoning, housing codes, subdivision regulations, metropolitan problems, and urban development. Prerequisite: Permission of instructor. 4 hours.

435. TRANSPORTATION (3 + 3). Principles of transportation systems; economics, finance, and planning; and design construction and maintenance. Prerequisite: 434. 4 hours.

453. GEOLOGY (3 + 3). Principles of physical geology. Physical and chemical properties of minerals and rocks, geologic processes, earth materials, processes of erosion and deposition, crustal deformations, ground water hydrology. Prerequisite: Chemistry 112. 4 hours.

456. MATERIALS SCIENCE (3 + 0). A study of the fundamental physical and chemical properties of engineering materials and how they relate to mechanical behavior. Prerequisite: Chemistry 112, 201313. 3 hours.
465. SIMILITUDE (2 + 3). Types of similitude, dimensional analysis, and theory of models. Prerequisite: 201313, concurrently 202422. 3 hours.

473. ENVIRONMENTAL SCIENCE (3 + 0). Microbiological and chemical aspects of water and waste treatment. Air pollution controls and standards. Prerequisite: Permission of instructor. 3 hours.

491-492-493. INDEPENDENT STUDY. The independent planning of an engineering design project by individual study of a topic of particular interest to the student. Prerequisite: Junior status and Departmental permission. 1-3 hours.

514. ENVIRONMENTAL ENGINEERING 1 (2 + 3). Development of sources of water supply; determination of quantity of storm water; design of water distribution systems, storm water sewers, and sanitary sewers; hydraulic design of water and sewage treatment plants. Prerequisite: Chemistry 112, 423. 3 hours.

516. ENVIRONMENTAL ENGINEERING 2 (3 + 0). Principles and methods of water purification, sewage treatment, and disposal; control tests and correlation of results with treatment plant operations; interpretation of reports; inspection of local plants. Prerequisite: 514. 3 hours.

521. REINFORCED CONCRETE 1 (3 + 3). Elastic design and ultimate strength of structural elements, beams in bending, bond, shear; diagonal tension in beams, axially loaded columns, and eccentrically loaded columns; and application of codes and specifications to design. Prerequisites: 413, 452. 4 hours.

522. REINFORCED CONCRETE 2 (2 + 3). Retaining walls, footings, slabs, and thin shell roofs. Fundamentals of prestressing. Prerequisite: 521. 3 hours.

523. STRUCTURAL SYSTEMS DESIGN (2 + 3). Design of structural systems emphasizing optimization, creativity, and decision making. Prerequisites: 522, 541. 3 hours.

531. SOILS 1 (3 + 3). An introduction to soils engineering, physical properties of soils as
affecting engineering design and construction, soil sampling, mechanics of soil masses, consolidation, settlement, and laboratory soil tests. Prerequisites: 423, 453. 4 hours.

532. Soils 2 (3 + 3). Analysis of stress conditions imposed on the supporting soils by foundations. Design of foundations, retaining structures and piles. Prerequisite: 531. 4 hours.

533. Construction Systems (2 + 3). Specifications, economical construction methods, estimating critical path, fundamentals of PERT, engineering economics as applied to various engineering projects. Prerequisite: Departmental permission. 3 hours.

545. Structural Design 1 (3 + 3). The design of beams, columns, built-up members, and connections as applied to structural steel. Use of influence lines and various other techniques for determining maximum loadings. Prerequisite: 413. 4 hours.

546. Structural Design 2 (2 + 3). Theory of plastic design, analysis of ultimate load, design of connections, determination of deflections using plastic design, and comparison to elastic design. Prerequisite: 545. 3 hours.

551. Civil Engineering Seminar (3 + 0). Topics not currently in curriculum. Oral and written presentation by students. Prerequisite: Departmental permission. 3 hours.

555. Structural Systems Analysis 3 (3 + 0). Study of selected topics in advanced structural mechanics. Prerequisite: 413. 3 hours.

591-592-593. Independent Study. The independent planning of an engineering design project or the individual study of a topic of particular interest to the student. Prerequisite: Departmental permission. 1-3 hours.

ELECTRICAL ENGINEERING DEPARTMENT

PROFESSORS KLINGENBERGER (Chairman), CARMEAN; ASSOCIATE PROFESSOR STAHL; ASSISTANT PROFESSORS JOHANSEN (On Leave), GUENTZLER.

Electrical engineering is basically the science and application of electricity and magnetism. It treats 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 coordinates theoretical background with scientific working knowledge. The student starts the electrical engineering sequence by studying basic circuit theory. In these and subsequent courses he will work in electronics, electromagnetic fields and waves, network analysis and synthesis, energy conversion, automatic control systems, and communication theory.

Classroom activities are supplemented by work in well equipped laboratories. Problem solving is emphasized and particular attention is placed upon the use of the analog and digital computers which are readily available in the Engineering building.

This curriculum is designed to provide an excellent background for students who intend to pursue specialized work in graduate school, or who may choose employment in any of the following fields: radio communication, television, wire communications, electronics, development of electrical equipment and controls for the aerospace sciences, construction and operation of generating stations and electric power systems, installation and operation of equipment in industrial plants, design of power apparatus, and manufacture and sale of electrical equipment.
ELECTRICAL ENGINEERING: DESCRIPTIONS

(Department 203)

404. Electric Machinery (3 + 3). A course for the non-electrical engineering student in the theory and application of electric machinery. Prerequisite: 201323-333. 4 hours.

414. Professional Method (3 + 0). This course is focused on the professional method of dealing with problems, the orderly mental processes the professional engineer uses in practice. Prerequisite: Math 361. 3 hours.

415-416. Fields and Waves 1 and 2 (3 + 0, 4 + 0). Electrical phenomena from the viewpoint of field theory. Vector analysis used throughout. Prerequisite: 203444. 7 hours. (Formerly 431-2).

424. Solid State Electronics (3 + 0). The basic physical principles of the internal operations of electronic devices are studied. Prerequisite: 201323. 3 hours. (Formerly 411).

425. Electronics 1 (4 + 0). Operating principles of electronic devices (diodes, BJTs, and FETs), models representing these devices, and their use in simple circuitry. Prerequisite: 424 or consent. 4 hours. (Formerly 412).

426. Electronics 2 (4 + 0). Large and small signal amplifiers, frequency response of amplifiers, and oscillators. Prerequisite: 425. 4 hours. (Formerly 415).

436. Energy Conversion 1 (3 + 0). The underlying principles of energy conversion. Prerequisite: 415. 3 hours. (Formerly 531).

444. Engineering Analysis 1 (4 + 0). Selected analytical methods with engineering applications. Emphasis is on methods using complex variables and vector calculus. Prerequisite: Math 361. 4 hours.

445. Transient Analysis (4 + 0). Application of Laplace Transform methods to transient phenomena in linear electrical and mechanical systems. Prerequisite: 201323, 444. 4 hours. (Formerly 442).

446. Engineering Analysis 2 (3 + 0). Selected analytical methods with engineering applications. A continuation of 444 including topics pertinent to statistical and probabilistic methods. Prerequisite: 444. 3 hours.

451. Electrical Engineering Laboratory 1 (0 + 3). Instrumentation and measurement circuits and techniques. Prerequisite: 201323. 1 hour.

452-453. Electrical Engineering Laboratory 2 and 3 (0 + 3). Study of active devices and their associated circuits. Prerequisite: 425 concurrently. 2 hours.

464. Digital Computer Techniques (1 + 3). Instruction in the use and practicability of numerical methods in engineering problem solutions. Prerequisite: 201102. 2 hours.

466. Analog Computer Techniques (1 + 3). Instruction in the use and practicability of analog computer methods in engineering problem solutions. Prerequisite: 445. 2 hours.
### ELECTRICAL ENGINEERING – CLASS OF 1973

#### JUNIOR

1971-72

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### ELECTRICAL ENGINEERING – CLASS OF 1972

#### SENIOR

1971-72

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514.** Traveling Waves** *(3 + 0)*. A study of the principles of energy transmission using transmission lines, wave guides, and antennas. Prerequisite: 416. *3 hours.*
515. **Circuit Synthesis** (3 + 0). Introduction to the principles of modern circuit synthesis. Prerequisite: 445. 3 hours. (Formerly 521).

516. **Nonlinear Analysis** (3 + 0). Analysis of physical systems containing non-linear elements. Analytical, graphical, and numerical methods are studied. Prerequisite: 544. 3 hours. (Formerly 522).

524. **Electronics 3** (3 + 0). Introduction to devices and circuits for the generation and processing of pulse, digital, and switching waveforms. Prerequisite: 426. 3 hours.

525. **Electronics 4** (2 + 3). Continuation of 524 with emphasis on logic and memory circuits. Prerequisite: 524. 3 hours.

526. **Electronics 5** (2 + 3). Electronic power conversion circuits and devices. Power control and regulator circuits. Prerequisite: 525. 3 hours.

534. **Energy Conversion 2** (3 + 0). Steady state and transient analysis of direct current and alternating current machinery. Prerequisite: 436. 3 hours.

535. **Energy Conversion 3** (3 + 0). A continuation of 532. The application of ferromagnetic materials to inductors, transformers, relays and related devices of interest. Reading in classic and current literature with design projects. Prerequisite: 534. 3 hours.

536. **Energy Conversion 4** (3 + 0). An introduction to power systems analysis with load flow, faults and stability topics. Prerequisite: 534. 3 hours.

544. **Control Systems 1** (3 + 0). An introduction to the basic theory of feedback control devices. Transfer function formulation, frequency response, root locus and stability are studied. Prerequisite: 445. 3 hours.

545. **Control Systems 2** (2 + 3). A continuation of 544. Additional root locus techniques and compensation are studied. Prerequisite: 544. 3 hours.

546. **Modern Control Theory** (3 + 0). An introduction to state-variable techniques. Formulation and solution of state equations. Lyapunov stability, observability and controllability. Prerequisite: 544. 3 hours.

554. **Electrical Engineering Laboratory 4** (0 + 3). Laboratory study of electronic wave shaping and switching circuits. Prerequisite: 524 concurrently. 1 hour.

555. **Electrical Engineering Laboratory 6** (0 + 3). Laboratory study of transmission line and microwave circuits. Prerequisite: 514. 1 hour.

556. **Electrical Engineering Laboratory 8** (0 + 3). Laboratory study of nonlinear systems utilizing real nonlinear devices plus analog and digital computer techniques. Prerequisite: 516 concurrently. 1 hour.

564. **Electrical Engineering Laboratory 5** (0 + 3). Laboratory study of feedback control systems. Prerequisite: 544 concurrently. 1 hour.

565. **Electrical Engineering Laboratory 7** (0 + 3). Study of the generalized machine and other DC, synchronous, and induction machines. Prerequisite: 534. 1 hour.

575. **Communication Theory 1** (3 + 0). An introduction to the principles of communication theory. Prerequisites: 426, 445. 3 hours.

576. **Communication Theory 2** (3 + 0). Continuation of 575 and current topics in com-
munication including negative impedance devices and applications. Prerequisite: 575. 3 hours.

590. PROJECTS. Independent planning and conduct of an engineering design or development project in electrical engineering. Prerequisite: Departmental permission. 1-3 hours.

591. INDEPENDENT STUDY. Individual study of a topic of particular interest to the student in electrical engineering. Prerequisite: Departmental permission. 1-3 hours.

592. CURRENT TOPICS. Group study of selected topics of current interest in electrical engineering. Prerequisite: Departmental permission. 1-3 hours.

593. SEMINAR. A series of discussions with practicing engineer pertaining to design problems under their direction in electrical engineering. Prerequisite: Departmental permission. 1-3 hours.

MECHANICAL ENGINEERING DEPARTMENT

PROFESSORS BURTON (Chairman), HORLDT; ASSOCIATE PROFESSOR SCROGGIN; ASSISTANT PROFESSORS FARRINGTON, LAVAN, WHISLER (On Leave).

Mechanical Engineering is that branch of the profession of engineering which is concerned with the conversion of energy from one form to another, the design of machines, and the control of various processes. Mechanical Engineers are involved in creative design, research, development, and management. They are being challenged today to solve many critical problems such as pollution and mass transit which face our society.

Every mechanical engineering student has the opportunity to use extensively the engineering analysis and design laboratories as well as the Computer Center. The laboratories are equipped to supplement all engineering courses. They also provide the opportunity for individual as well as group projects and limited undergraduate research.

MECHANICAL ENGINEERING — CLASS OF 1973

JUNIOR

1971-72

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*Students completing the five-year program should have completed these courses by the time they reach the Junior level.
MECHANICAL ENGINEERING – CLASS OF 1972
SENIOR
1971-72

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**Students completing the five-year program should have completed these electives by the time they reach the Senior level.

MECHANICAL ENGINEERING DESCRIPTIONS

(DEPARTMENT 204)

405. THEORY OF MACHINES 1 (3 + 3). Analysis and synthesis of mechanisms for motion, velocity and acceleration properties. Linkages, cams, gears and gear trains are treated. Laboratory assignments deal with analysis, synthesis and construction of working mechanism models. Prerequisite: 201312. 4 hours.

406. THEORY OF MACHINES 2 (3 + 0). Review of static-force analysis using means of vector notation. Dynamic planar and spatial force analysis, balancing of rotating masses, partial balance of reciprocating devices, cam dynamics and introduction to mechanical vibrations. Prerequisite: 405. 3 hours.


416. THERMODYNAMICS 2 (4 + 0). Relations among thermodynamic properties, mixtures, chemical reactions and equilibrium. Prerequisite: 415. 4 hours.
424. **Analytical Methods 1 (4 + 0).** A development of the analytical methods arising from the theory of mechanics and control systems including the development and solution of systems of equations; the use of the Laplace transformation; the development of the relations between the dynamical variables resulting in partial differential equations. Prerequisite: Math 361. 4 hours.

425. **Analytical Methods 2 (4 + 0).** A study of the use of: Vector Analysis in Mechanical Engineering problems, including gradient, divergence, and curl operations, Gauss' and Green's Theorems; complex variables and conformal transformations particularly applicable to air foil problems; the use of numerical techniques in the solution of engineering problems; an introduction to the theory of optimization in engineering problems. Prerequisite: 424. 4 hours.

426. **Fluid Mechanics 1 (3 + 0).** An introduction to the mechanics of fluids; the state of stress in a static fluid; similitude and dimensional analysis; the dynamics of inviscid ideal fluids, Euler's equation, Bernoulli's equation, momentum equation and turbomachinery; vorticity and concepts of aerodynamics; an introduction to potential flow. Prerequisite: 201312. 3 hours.

434. **Mechanical Measurements (2 + 3).** An introduction to the theory of engineering experimentation through study of basic detector-transducer systems, intermediate amplification devices, and terminating devices; concepts of data manipulation and analysis; error analysis. Prerequisite: Junior status. 3 hours.

435. **Engineering Analysis (3 + 0).** The professional method as it applies to the analysis of engineering problems. Emphasis is placed on learning to deal with new situations in terms of fundamental principles. Prerequisite: 424. 3 hours.

436. **Mechanical Engineering Laboratory 1 (0 + 6).** Emphasis on the development of analogical techniques including simulation of dynamical systems; an introduction to experimental methods in heat, mass, and momentum transfer situations. Prerequisite 434. 2 hours.

446. **Engineering Materials & Processes (4 + 0).** Introduction to structure and properties of metals and alloys. Characteristics of common engineering materials including iron, steel and their alloys. Metal working processes and their heat treatment as well as other contemporary metal processes. Engineering processes which cover the basic machining operations, their machines, tools, equipment and the control for automation and mass production. Prerequisite: Chem. 112. 4 hours.

514. **Mechanical Design 1 (3 + 3).** Sequence of design of machine elements: analytical study of conventional components and units, their sizing and shaping, then calculation as well as proportions and ratios. Preparation and execution of sketches and drawings according to professional standards. Prerequisite: 446. 4 hours.

515. **Mechanical Design 2 (3 + 3).** Execution of complete designs of machines or units applying previously studied components and mechanisms, in order to develop engineering judgment and professional proficiency from the original conception of an idea to the finished product. Prerequisite: 514. 4 hours.
516. VIBRATION ANALYSIS (3 + 0). Fundamentals of linear and non-linear vibration of single degree of freedom, multi-degree of freedom, and continuous systems. Prerequisite: 406. 3 hours.

524. CONTROL SYSTEMS (4 + 3). Modelling, analysis and design of linear feedback control systems. Laplace transforms, transfer functions, frequency response and root locus techniques. Laboratory work in analog simulation of dynamic systems and performance studies of real systems. Prerequisite: 204406. 5 hours.

525-526. MECHANICAL ENGINEERING LABORATORY 2 and 3 (0 + 6). Individual and group projects with particular emphasis on planning and report writing. Upon the recommendation of the Mechanical Engineering faculty a student may undertake a two quarter in depth, experimental study, with a specific faculty member as project advisor. Prerequisite: 436. 6 hours.

534. FLUID MECHANICS 2 (3 + 0). Principles of viscous fluid mechanics; the Hagen-Poiseville equation; Navier-Stokes equations; compressible fluid mechanics; one-dimensional isentropic flows; shock waves; interaction of real fluid effects; non-continuous effects. Prerequisite: 426. 3 hours.

535. HEAT TRANSFER (4 + 0). Conduction of heat in the steady and non-steady states; graphical and numerical methods of solution; conduction in two and three dimensions; radiation heat transfer; free and forced convection heat transfer; heat transfer with change in phase. Prerequisite: 534. 4 hours.

536. THERMAL SYSTEMS DESIGN (3 + 3). Heat power systems design utilizing the concepts of heat transfer, fluid mechanics and thermodynamics combined with engineering systems design; study of the optimization of thermal systems; emphasis on the use of computational facilities as system design tools. Prerequisite: 535. 4 hours.

544. ADVANCED MECHANICS OF MATERIALS (3 + 0). Introduction to theory of elasticity, thick wall cylinders, beam-columns, beams on elastic foundation, inelastic action, and other selected topics. Prerequisite: 202401. 3 hours.

545. ADVANCED CONTROL SYSTEMS (3 + 0). Time domain analysis and design of control systems using state variable formulation. Digital control techniques and selected non-linear system studies. Prerequisite: 524. 3 hours.

546. SYSTEMS DESIGN (1 + 6). Participation in group projects, which reflects utilization of many previous courses. Engineering judgment, creativity and inventiveness are encouraged. The design process is considered from inception of an idea to completion of design. Prerequisite: Senior status. 3 hours.

556. PRODUCTION ENGINEERING (3 + 0). An introduction to scientific organizing, standardizing, and operating principles in production engineering. Basic industrial management and principles of engineering administration. Capabilities of manufacturing processes, analysis of machining, and metal removing requirements—tools, dies, jigs and fixtures, and special machinery. Fundamentals of time and motion study, quantity and quality control, space, location and material flow for a manufacturing enterprise. Prerequisite: 515. 3 hours.

590. MECHANICAL ENGINEERING PROJECTS. Practical studies of investigations involving the application of original thought, the determination of new information and/or new application of known information or equipment. Prerequisite: Senior status. 1-5 hours.
College of Pharmacy
1971-1972
Pharmacy Preparations Laboratory.
THE RUDOLPH H. RAABE

College of Pharmacy

LEROY D. BELTZ, Dean

The Raabe College of Pharmacy at Ohio Northern University endeavors today, as in the past, to meet the high standards of education demanded by the profession of pharmacy. Currently, the College of Pharmacy occupies a modern, one and one-half million dollar building, designed and equipped to provide the facilities required for contemporary pharmaceutical education. The course of instruction in pharmacy now is a five-year program leading to the Bachelor of Science in Pharmacy (B.S. Pharm.) degree.

Throughout its eighty-five year history, the Ohio Northern University College of Pharmacy has played an important role in pharmaceutical education. Over nineteen hundred pharmacists have been graduated by this institution. Its position in pharmaceutical education in Ohio is particularly significant. More than one-third of the registered pharmacists practicing in Ohio are graduates of the Ohio Northern University College of Pharmacy. Its graduates are particularly active and prominent in the local, state, and national pharmaceutical organizations.

The Raabe College of Pharmacy is an integral part of Ohio Northern University. It is recognized and approved by the Board of Pharmacy of the State of Ohio. It is a member of the American Association of Colleges of Pharmacy, and is accredited by the American Council on Pharmaceutical Education.

For the purposes of administration the pharmacy program is divided into two major divisions; the Lower Division, consisting of the first two years (P-1 and P-2), and the Upper Division, consisting of the last three years (P-3, P-4, and P-5).
AIMS AND OBJECTIVES

In addition to the general objectives set forth by the University, the College of Pharmacy includes the following among its aims and purposes:

Preparing students to meet satisfactorily the professional and cultural standards expected of pharmacists and to carry their share of the responsibility for improvement of the quality of the health, welfare and educational services to their respective communities.

Counseling students in the development of self-reliance, character and ethical concepts to the end that they will render safe and efficient pharmaceutical service to all who seek it.

Acquainting students 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. In this connection, student affiliation with chapters of the American and Ohio State Pharmaceutical Associations is strongly urged.

To accomplish these scholastic, professional, and social goals, faculty counselors are available to advise students concerning their plans of study and every encouragement is offered to maintain high standards of scholarship. Participation in a reasonable number of campus activities is encouraged in the belief that such activities, properly adjusted to the student's opportunity and ability to carry them, will broaden his outlook, enrich his college experience, and add much to his preparation for life.
ADMISSION TO THE COLLEGE OF PHARMACY

Persons seeking admission to the College of Pharmacy must provide the necessary information and meet the general requirements for admission to the University, as listed in that section of this catalog. Students who qualify under those standards are reviewed for final approval for admission by the Admissions Committee of the College of Pharmacy.

Students are permitted to enter the pharmacy program either as high school graduates or as transfer students from other recognized colleges.

High School Graduates. It is recommended that high school graduates entering the pharmacy curriculum should have completed the college preparatory course, including four years of English, three years of mathematics (algebra I and II and plane geometry), and three years of science (preferably general science, biology, and chemistry or physics). Priority will be granted to students with additional credits. Students found to be deficient in these areas may be required to pursue remedial work prior to being scheduled in the regular course of study.

Transfer Students. A student desiring to transfer from another accredited college or university must present a transcript of his record at that institution and a copy of their current catalog. Approval for admission and advanced placement will be determined by the Admissions Committee of the College of Pharmacy upon review of student's previous record. Full credit will be given for all work satisfactorily completed in other recognized institutions of higher learning, provided such work is parallel to the requirements for graduation in this institution. Credit will not be allowed for a course in which the lowest passing grade was received (i.e.—grades below C).

Persons who meet the requirements for admission as indicated in the preceding paragraphs are issued a Permit to Enter the College of Pharmacy. To enter any of the regular courses of study, the candidate, after being granted a Permit to Enter, must prepare a schedule of studies with the aid of an advisor and approval of the Dean, and pay tuition and fees as stated elsewhere in this catalog.

Students entitled to advanced standing may enter at the time approved by the Dean. All required courses in the Lower Division must be completed before the student is permitted to enter the second year of the Upper Division.

CLASSIFICATION OF STUDENTS

Students enrolled in the College of Pharmacy are classified as P-1 students until they have earned a minimum of thirty-eight quarter hours credit, at which point they are advanced to P-2 standing. In order to gain admission to the Upper Division and P-3 status, a student must have completed a mini-
mum of 84 quarter hours of academic work and all of the Lower Division courses that are prerequisite to the regular third year schedule. P-4 or P-5 standing is gained when a majority of the required course work in the previous year has been completed and a minimum of 130 and 175 quarter hours of academic credit respectively, has been earned. Additionally, students, whose accumulative average in their professional courses is below a 1.80, are not eligible for advancement to the P-4 class. In the same manner students, whose professional accumulative average is below a 2.00, are not eligible for P-5 standing.

STANDARDS OF SCHOLARSHIP

A student who fails to maintain the prescribed standards of scholarship will be subject to one of the following actions; namely: (1) being placed on probation, (2) being suspended from the College of Pharmacy, or (3) being dismissed from the College of Pharmacy.

If a student's accumulative quality point average falls below 2.0, the student will be placed on probation. If a student on probation does not restore his quality point average during the following or any subsequent quarter, he will be continued on probation and his participation in extracurricular activities shall be reviewed by his adviser, the Dean of Students and the Dean of the College.

Any student with an unusually low quality point average for any quarter may be placed on probation.

Actions to suspend or dismiss a student from the College of Pharmacy shall be initiated by the Dean of the College of Pharmacy when just cause for such action is evident. Actions to suspend or dismiss a student must be approved by a majority of the faculty of the College of Pharmacy.

If action is taken to suspend a student the suspension will be for a definite period of time after which the student will be eligible to resume his studies. When readmission is granted, the faculty may establish certain conditions of academic performance in order for the student to remain enrolled in the College of Pharmacy.

If action is taken to dismiss a student, it is to be regarded as a terminal action; therefore, the student is not eligible for readmission to the College of Pharmacy at any time thereafter.

REQUIREMENTS FOR GRADUATION

Each candidate for a degree:
1. Must be of good moral character.
2. Must have completed the required curriculum as determined by the
faculty of the College of Pharmacy and sufficient elective courses to total 234 quarter hours of credit. Every graduate must select 12 hours of electives from the Division of Social Sciences and 12 hours from the Divisions of Fine Arts and Humanities.

3. Must have maintained an overall grade point average of 2.0 and have an accumulative grade point average of 2.0 in all professional courses as defined by the American Council on Pharmaceutical Education.

4. Must meet such other qualifications as the faculty may determine.

LIBRARY

The facilities of the main library of the University are at the disposal of the pharmacy students. Many of the current books and classics contributing to an appreciation of the liberal arts and sciences are to be found there along with books, periodicals, and journals pertaining to pharmacy, medicine, and related professions. Current issues of pharmaceutical and related professional journals are available in the reading rooms of the College of Pharmacy.

SPECIAL NOTICE

The pharmacy curriculum, because of rapid developments in the medical and allied professions, is constantly being reviewed by the faculty. The College of Pharmacy reserves the right, without advance notice, to change the content, duration and sequence of any course included in the curriculum leading to the degree. A separate catalog or bulletin covering course content and other pertinent matters is issued periodically. Please address requests for copies to the Dean of Pharmacy, Ohio Northern University, Ada, Ohio 45810.

Pharmacology Laboratory.
PROGRAM OF STUDY LEADING TO THE DEGREE OF
BACHELOR OF SCIENCE IN PHARMACY

CURRICULUM

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U—Denotes unit course

*—Graded Satisfactory or Unsatisfactory (No credit toward honor point average.)

COURSE DESCRIPTIONS

For descriptions of the Lower Division courses turn to the listing of the courses offered in the College of Liberal Arts.

First number in parentheses is lecture hours per week, second is laboratory hours per week.

Courses listed with an asterisk are elective.
DEPARTMENT OF PHARMACY

(Department 301)

PROFESSORS BELTZ, LEE; ASSOCIATE PROFESSORS FITZGERALD, THEODORE (Chairman), VOTTERO; LECTURER SHERRIN; CLINICAL ASSOCIATES RUSH, SHOEMAKER.

101, 102, and 103. PHARMACY ORIENTATION (1 + 0). The profession of Pharmacy; its educational requirements, its correspondence to related health professions, its service to public health. 1 hour each.

211. INTRODUCTION TO PHARMACY (3 + 3). The chemical and physical theories which are considered basic to the science of pharmacy. The laboratory work will be, in so far as possible, related to the theoretical considerations. 4 hours.

311. PHARMACEUTICAL PREPARATIONS (3 + 3). Official solutions, suspensions, and other liquid dosage forms; the chemistry and/or the physics involved in making these products, and the correct procedures to be used in manufacturing, packaging, and labeling. Prerequisite: Pharmacy 211. 4 hours.

312. PHARMACEUTICAL PREPARATIONS (3 + 3). A continuation of Pharmacy 311; the study of solid and semi-solid dosage forms, such as ointments, pastes, tablets, capsules and related products. Prerequisite: Pharmacy 311. 4 hours.

333. PHYSICAL PHARMACY (3 + 3). The properties and technology of pharmaceutical systems and the fundamentals underlying the formulation, compounding, and stabilization of medicinal products are stressed. The laboratory enables the students to correlate the principles and equations with experimental observations. Prerequisite: Pharmacy 312 or consent of instructor. 4 hours.

421. INTRODUCTION TO INSTITUTIONAL PHARMACY (2 + 0). Professional services, concepts, standards of practice and roles of the pharmacist in contemporary hospitals and related institutions. Prerequisite: Consent of instructor. 2 hours.

431. HISTORY OF PHARMACY (3 + 0). The educational, organizational and professional growth and development of pharmacy in Western Europe and North America. 3 hours.

441. INTRODUCTION TO RADIOACTIVE PHARMACEUTICALS (2 + 2). A survey course in the types of radiation, methods of detection and measurement and the application of radioisotopes to modern health care. Emphasis in the laboratory will be on the safe storage, handling and control of radioactive material. Prerequisite: Consent of instructor. Offered Fall Quarter. 3 hours.

501, 502, 503. PRESCRIPTION PRACTICE (3 + 4). The procedures involved in filling a prescription; includes extemporaneous techniques with emphasis in areas of major importance; ophthalmic, otic and nasal solutions, dermatological preparations and special solutions. Family health records are maintained throughout the course with a view toward predicting possible drug interactions. The most commonly utilized prescription and non-prescription medications are discussed as therapeutic classes and as individual formulations. The laboratory is divided so that there is a two hour compounding session weekly and a two hour discussion session weekly. Prerequisite: Pharmacy 333, Chemical Pharmacology 413. 12 hours.
510. *Pharmacy Cosmetics (2 + 3). Formulation, preparation, and packaging of well known classes of cosmetics. Library assignments and reports are required. Prerequisite: Consent of instructor. 3 hours.

511. *Veterinary Pharmacy (2 + 0). The various pathological conditions peculiar to animals, and the pharmaceuticals used in the treatment thereof. 2 hours.

530. *Manufacturing Pharmacy (1 + 6). The formulation and fabrication by mechanized methods of a variety of pharmaceutical dosage forms. Prerequisite: Consent of instructor. Offered Fall and Winter Quarters. 3 hours.

540. Pharmacy Seminar (3 + 0). Related areas of Pharmacy are discussed by visiting lecturers. Ethics, Third Party Payments, Surgical Appliances, Prescription Accessories, The Use of Diagnostic Reagents, The Importance of Pharmaceutical Organizations have been discussed. 3 hours.

550. *Pharmacy Problems (0 + 3, 0 + 6, or 0 + 9). Principles of pharmacy research; the literature pertinent to a specific problem, designing and conducting experiments to solve the problem, analyzing the resultant data, and preparing a written report of the work. This course is offered in the fall, winter, and spring quarters. Prerequisites: Pharmacy 333 and consent of instructor. 1-3 hours.

570. *Advanced Institutional Pharmacy (2 + 0). A study of the organization and management of contemporary hospitals and the interrelationship of the pharmacy department to the hospital structure. Prerequisites: Pharmacy 421 and consent of instructor. Offered Spring Quarter. 2 hours.

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

(DEPARTMENT 302)

Professors Smith (Chairman), Stuart; Associate Professor Stewart

341. Biochemistry (3+0). The chemistry of carbohydrates, fats, proteins, nucleic acids and enzymes and the metabolism of carbohydrates. Prerequisite: Chemistry 233. 3 hours.

342. Biochemistry (3+0). A continuation of Pharmaceutical Chemistry 341. Metabolism of fats, proteins and nucleic acids, the chemistry of blood, respiration, diuresis and diuretics, vitamins and hormones. Prerequisite: Pharmaceutical Chemistry 341. 3 hours.

352. *Pharmaceutical Analysis (2+6). Gravimetric and volumetric analysis of chemicals, pharmaceuticals and crude drugs. Laboratory exercises emphasize analytical procedures, chemical control methods and some qualitative tests. Prerequisites: Chemistry 251 and 231. 4 hours.

353. *Introductory Instrumental Analysis (3+3). Instruments used in qualitative, quantitative and control analysis. Prerequisite: Pharmaceutical Chemistry 352. 4 hours.

550. *Chemistry Problems (0+3, 0+6, or 0+9). Principles of Pharmaceutical Chemistry research; literature pertinent to a specific problem, designing and conducting experiments to solve the problem, analyzing the resultant data, and preparing a written report of the work. Offered in the fall, winter, and spring quarters. Prerequisite: Departmental approval. 1-3 hours.
DEPARTMENT OF PHARMACOLOGY
(Department 303)

ASSOCIATE PROFESSORS EDLIN (Chairman), STEWART; ASSISTANT PROFESSOR BHATTACHARYA; LECTURER SHERRIN

133. PHARMACOLOGY (3 + 0). An introductory course, designed for students of nursing, on the principles of pharmacology, pharmacodynamics, and pharmacotherapeutics. Spring quarter. Prerequisite: Biology 232. 3 hours.

411. CHEMICAL PHARMACOLOGY (3 + 3). Principles involving the chemistry and pharmacology of medicinal agents of natural and synthetic origin including pharmacodynamics, pharmacotherapeutics, toxicology and structure-activity relationships. Prerequisites: Physiology 333 and Pharmaceutical Chemistry 342. 4 hours.

412. CHEMICAL PHARMACOLOGY (3 + 3). A continuation of Chemical Pharmacology 411. Prerequisites: Chemical Pharmacology 411. 4 hours.

413. CHEMICAL PHARMACOLOGY (3 + 3). A continuation of Chemical Pharmacology 412. Prerequisite: Chemical Pharmacology 411. 4 hours.

453. INTRODUCTION TO DISEASE (3 + 0). An introductory study of the underlying principles concerning the etiology of disease; through an understanding of the disturbances; and the ways in which they express themselves as symptoms and signs. Prerequisite: Concurrent enrollment in Chemical Pharmacology 413 or permission of the instructor. 3 hours.

511. CHEMICAL PHARMACOLOGY (3 + 0). A continuation of Chemical Pharmacology 413. Prerequisite: Chemical Pharmacology 413. 3 hours.

512. CHEMICAL PHARMACOLOGY (3 + 0). A continuation of Chemical Pharmacology 511. Prerequisite: Chemical Pharmacology 413. 3 hours.

513. CHEMICAL PHARMACOLOGY (3 + 0). A continuation of Chemical Pharmacology 512. Prerequisite: Chemical Pharmacology 413. 3 hours.

550.* PHARMACOLOGICAL PROBLEMS (0 + 3, 0 + 6, or 0 + 9). Research to acquaint the student with literature searching, experimental design, experimental methods and techniques, data analysis, and scientific reporting in pharmacology. Fall, winter, and spring quarters. Prerequisites: Pharmacology 413 and departmental approval. 1-3 hours.

DEPARTMENT OF PHARMACOGNOSY AND NATURAL PRODUCTS
(Department 304)

ASSOCIATE PROFESSOR AWAD (Chairman)

321. GENERAL PHARMACOGNOSY (3 + 3). An orientation in the field of Pharmacognosy: covering history, modern trends, nomenclature, classification, identification, and evaluation of certain drugs of biological origin. It deals with background information on drugs of carbohydrate, protein, lipid, ethereal, and resinous nature necessary for a more adequate understanding of subjects taught in the course sequence on pharmaceutical preparations. Prerequisite: Organic Chemistry 233 and Biology 113. 4 hours.
331.* MARINE PHARMACOGNOSY (3 + 0). An introduction to the study of natural products obtained from marine plants and animals. The course covers a survey of the taxonomy of biomedically interesting marine organisms as well as the chemical nature and biological activities of their major constituents. Prerequisite: Biology 223 and departmental approval. To be offered in the fall, 3 hours.

432. BIOMEDICINALS FROM NATURAL SOURCES (3 + 3). A study of the biological aspects of natural products used as important pharmaceuticals. Emphasis is placed on alkaloids, glycosides and certain other biomedicinals, their fundamental properties and methods of isolation. Prerequisites: Biochemistry 342 and Pharmacognosy 321. 4 hours.

433. ANTIBIOTICS AND BIOLOGICALS (3 + 0). A team-taught integrated course which deals with the concept of antibiosis, theory and principle of immunology as well as the production, chemistry, biosynthesis and pharmacology of the major antibiotic agents of therapeutic and pharmaceutical use. Emphasis is placed on biologicals currently recommended by the Public Health Service Advisory on Immunization Practice in the United States. Prerequisite: Microbiology 362. 3 hours.

441.* MEDICINAL PLANT PROPAGATION AND CULTIVATION (1 + 3). Propagation, cultivation, collection, preservation, screening, planning and development of a medicinal garden. Field trips. Prerequisite: Departmental approval. To be offered in the Spring. 3 hours.

541.* THE ORGANIC CONSTITUENTS OF MEDICINAL HIGHER PLANTS (3 + 0). Chemistry and interrelationships of constituents obtained from pharmacognostical plants; outline of the methods of isolation, purification, identification and structure determination. Prerequisite: Departmental approval. To be offered in winter of odd years. 3 hours.

542.* BIOGENESIS OF NATURAL PRODUCTS (3 + 0). An outline with discussion and study of research involving biosynthesis of compounds of pharmaceutical interest. Prerequisite: Departmental approval. To be offered in winter of even years. 3 hours.

550.* PHARMACOGNOSY PROBLEMS (0 + 3, 0 + 6, 0 + 9). Principles of pharmacognosy research, literature pertinent to a specific problem, designing and conducting experiments to solve problems, analyzing the resultant data, and preparing a written report of the work. Offered in the fall, winter, and spring quarters. Prerequisite: Departmental approval. 1-3 hours.

DEPARTMENT OF PHARMACEUTICAL ADMINISTRATION

(DEPARTMENT 305)

ASSISTANT PROFESSOR PREVITE (Chairman).

550.* PHARMACEUTICAL ADMINISTRATION PROBLEMS (0 + 3, 0 + 6, or 0 + 9). Research problems in pharmaceutical administration. Laboratory work employing some of the modern techniques available in pharmaceutical administration, including the application of basic principles to graduate study and research in pharmaceutical administration. Prerequisite: Departmental approval. 1-3 hours.
551. **Pharmaceutical Law** (4 + 0). A study of professional ethics and the philosophy, requirements, administration, and enforcement of local, state, and federal laws related to the practice of the profession of pharmacy. 4 hours.

552.* **Pharmaceutical Marketing** (3 + 0). Facts, considerations, and principles which underlie the flow of drug products, and the availability or use of pharmaceutical and other professional services from production to consumption. Principal economic, legislative, and social forces affecting the health-care industry are discussed, and resulting policies and procedures are appraised. Prerequisite: Pharmaceutical Administration 551. 3 hours.

553.* **Pharmaceutical Management** (4 + 0). Organization policies, planning, and controlling the relation of pharmaceutical services, professional practice, and pharmacy operation to general business activity, patients, the human service professions, and the public health. Prerequisite: Pharmaceutical Administration 551. 4 hours.

**DEPARTMENT OF MICROBIOLOGY**

(DePARTMENT 306)

**Professor Mallin (Chairman)**

361. **Microbiology I** (3 + 3). Fundamentals of general microbiology and a general survey of techniques and principles pertaining to bacteria, yeasts, molds, viruses and rickettsia. Emphasis is placed on the cell and its metabolites including the production of antibiotics, and other biological products. Prerequisite: one year of general biology, or botany-zoology. 4 hours.

362. **Microbiology II** (2 + 0). A continuation of Microbiology I with emphasis being placed on medical aspects including a detailed consideration of the host-pathogen relationship. Bacterial pathogens are considered from the standpoint of diagnosis, disease, and treatment. Prerequisite: Microbiology 361. 2 hours.

461.* **Parasitology** (2 + 0). The principle protozoan, arthropodal, and helminthic infestations of man and domestic animals. Prerequisite: Consent of instructor. 2 hours.

462.* **Virology** (2 + 0). Viral and rickettsial infections menacing to the health of man and animals, diagnosis and control procedures (immunization), relations of viruses to concepts of biochemistry and genetics. Prerequisite: Consent of instructor. 2 hours.

464.* **Clinical Pathology and Hematology** (1 + 3). Routine diagnostic tests performed in hospital laboratories. Selected tests involving blood chemistry, serology, and urinalysis will be performed. Prerequisite: Consent of instructor. 2 hours.

502. **Principles and Practices of Public Health** (3 + 0). Individual and community aspects of public hygiene; epidemiology and prophylaxis and violence; the major types of illness (nutritional, metabolic, mental, infections, environmental, occupational). Prerequisite: Microbiology 362. 3 hours.

550.* **Microbiology Problems** (0 + 3, 0 + 6, or 0 + 9). Documentation, manipulative, and intellectual skills of investigation in the biologic science areas of interest in pharmacy. Prerequisite: Consent of the instructor. 1-3 hours.
Law Dean meets with editor of intramural law review.

Proposed building for College of Law.
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 and the Association of American 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 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 catalog should be directed to the Dean of the College of Law.
University Administration

THE CABINET

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President of the University

I. LEONARD STRIGHT, A.B., A.M., Ph.D.
Academic Vice President

LOUIS S. GIBB, B.S., M.A.
Vice President for Development and Public Relations

GEORGE E. HASSELL, B.A., M.B.A.
Vice President for Financial Affairs

A. CHESTER BURNS, B.S., M.E., M.A.
Dean of Students

THOMAS G. HOFFMAN, A.B., S.T.B., S.T.M., Ph.D.
Campus Minister

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Dean, College of Liberal Arts

Dean, College of Engineering

LEROY D. BELTZ, B.Sc. in Pharm., Ph.D.
Dean, College of Pharmacy

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Assistant Dean, College of Pharmacy

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Dean, College of Law

DANIEL S. GUY, A.B., J.D., LL.M.
Assistant Dean, College of Law
Administration

MRS. OSCAR R. (FLORINE B.) JACOBS, Ph.C.
Dean of Women

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Head Librarian

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Assistant Director of Admissions

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Admissions Counselor

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Development Associate and Director of Annual Funds

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Assistant Dean of Men

FRANK KORN, B.A., M.D.
Director of Student Health Services

DONALD L. MARSHALL
Manager of Purchasing

JAMES L. MOORE, A.B., M.A.
Registrar

ALETA A. NITSCHKE, B.A.
Program Director of McIntosh Center

NORMAN K. QUICK, B.A.
Development Associate and Director of Deferred Gifts

WILLIAM L. ROBINSON, B.S.Ed., M.A.
Director of Admissions

GEORGE T. SCHEID, JR.
Superintendent of Buildings and Grounds
GEORGE W. SCHERTZER, A.A.
   Director of Alumni Relations

MRS. MATTHIAS (VICTORIA) SCHMITZ
   Associate Director of Schoonover Laboratory

JOHN D. SEITZ
   Superintendent of Construction

MONTY SIEKERMAN, A.B.
   Director of Public Information

JIMMIE O. STAHL, B.S.Ed., M.Ed.
   Director of McIntosh Center

FRED STOOP, B.A.
   Development Associate and Director of Corporation and
   Foundation Funds

GARY L. UTZ, B.A.
   Admissions Counselor

BUFORD E. WEST, B.S.
   Assistant Registrar

EMERITI

CLAUDE WESTCOAT PETTIT, A.B. (Ohio State), LL.B. (Western Reserve), LL.M. (George Washington), LL.D. (Ohio Northern), 1925-55
   Dean Emeritus, College of Law

   President Emeritus of the University

   Dean Emeritus, College of Pharmacy

GEORGE BRABSON, B.A. (Tennessee), LL.B. (Yale), M.A. (George Washington), 1962-68
   Professor Emeritus, Law

JAMES ANDREW WOOFTER, A.B. (Salem), A.M. (Virginia), Ed.D. (Cincinnati), 1947-68
   Registrar Emeritus

DAVID H. MARBLE, A.B. (Ohio Wesleyan), B.D., A.M., Ph.D. (Yale), 1949-69
   Professor Emeritus, Sociology

   Academic Vice President Emeritus
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President of the University

Bishop of the Ohio West Area
The United Methodist Church
395 East Broad Street
Columbus, Ohio

Sumpter M. Riley, Jr., A.B., B.D., S.T.M., D.D.
Lima District Superintendent of The United Methodist Church
Masonic Temple Bldg.
Lima, Ohio

MEMBERS OF THE BOARD

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Frank W. Wiley, LL.B., Judge, Common Pleas Court, Toledo, Ohio

William Messmer, A.B., B.D., D.D., Administrative Assistant to the Bishop, The Ohio West Area, The United Methodist Church, 395 East Broad Street, Columbus, Ohio

Term expires 1972

Floyd Powell, A.B., B.D., D.D., Pastor, First United Methodist Church, Reynoldsburg, Ohio

John Wesley Seay, B.S., S.T.B., D.D., Westwood United Methodist Church, Cincinnati, Ohio

Clifford L. Carter, A.B., M.A., State Farm Insurance Companies, 1440 Granville Road, Newark, Ohio
Term expires 1973

Paul J. Acker, A.B., B.D., D.D., St. Paul's United Methodist Church, Defiance, Ohio

Morgan Williams, J.D., Attorney, 4360 Airendel Court, Columbus, Ohio

Gordon E. Hughes, B.A., Director of Personnel, Armco Steel Corp., Middletown, Ohio

Term expires 1974

Don Montgomery, A.B., LL.B., President and General Manager, The Celina Insurance Group, Celina, Ohio

Paul M. Vandegrift, A.B., B.D., M.A., D.D., Pastor, Monroe Street United Methodist Church, Toledo, Ohio

F. Michael Herrel, B.S., General Manager, Diamond Milk Products, 2511 Bryden Road, Columbus, Ohio

Term expires 1975

Charles B. Hedrick, A.B., M.B.A., Manager, Employee Relations, Procter and Gamble Company, Cincinnati, Ohio

N. C. McPherson, B.Ph., B.D., Ph.D., D.D., Grace United Methodist Church, Dayton, Ohio

Cleo R. Ludwig, President, Ludwig & Kibbey Enterprises, Inc., Marion, Ohio

Elected by the Northeast Ohio Conference

Term expires 1971

C. Raymond Couts, A.B., LL.B., LL.M., Counsel and Assistant Secretary, B. F. Goodrich Company, 500 South Main Street, Akron, Ohio

Term expires 1972

Mrs. G. Robert Klein, B.A., 23699 Shaker Boulevard, Cleveland, Ohio

Term expires 1973

Charles B. Miller, A.B., Automatic Sprinkler Corp., Youngstown, Ohio

Term expires 1974

Theodore C. Mayer, A.B., B.D., D.D., Superintendent, Akron District of The United Methodist Church, 251 East Mill Street, Akron, Ohio

Term expires 1975

J. Maurice Struchen, B.B.A., M.B.A., President, Society National Bank, Cleveland, Ohio, 2175 Valley View Road, Rocky River, Ohio
Elected by the Alumni

Term expires 1971

Earl F. Boyle, B.S.C.E., D.Eng., Ada, Ohio

John Canterbury, A.B., M.S., Material Procurement and Distribution Manager, Ford Motor Company, Dearborn, Michigan

Term expires 1972

Robert W. Biggs, B.S.C.E., D.Eng., Chairman of the Board, The Brush Beryllium Co., Cleveland, Ohio

Eugene P. Light, B.S.C.E., Vice President, Cunningham-Limp Company, Birmingham, Michigan

Term expires 1973

Mrs. Calvin G. Jackson, A.B., Kenton, Ohio

Joseph E. Marmon, B.S.Ph., D.Sc., V.Pres., Eli Lilly & Co., Indianapolis, Ind.

Term expires 1974

Erwin L. Clemens, J.D., member of Law Firm of Shaw, Clemens, Williams & Hines, 203 First Federal Savings Building, Defiance, Ohio

Laurence N. Woodworth, A.B., M.S., Ph.D., D.P.A., Chief of Staff, Joint Committee on Internal Revenue Taxation, Congress of the U.S., 1011 Longworth House Office Bldg., Washington, D.C.

Term expires 1975

Herbert W. Leicy, Ph.C., B.S. in Pharm., D.Sc., President, Leicy’s Inc., Steubenville, Ohio

Ronald W. Wander, B.S.C.E., Chairman of the Board, Wander, Incorporated, Worthington, Ohio

Elected at Large

Term expires 1971


Harold H. Eibling, B.S.Ed., M.A., Ph.D., D.Sc.Ed., Superintendent of the City Schools, 270 E. State St., Columbus, Ohio

Term expires 1972

John M. Tittle, B.S., Stein, Roe and Farnham, Chicago, Ill.

Weldon W. Case, President, Mid-Continent Telephone Corp., Hudson, Ohio
Term expires 1974
FRANCIS E. KEARNS, A.B., S.T.B., Ph.D., LL.D., L.H.D., P.D.D., Bishop of the Ohio East Area of the Methodist Church, 1226 Market Avenue North, Canton, Ohio
HAROLD J. MEREDITH, J.D., LL.D., Attorney, Savings Building, Lima, Ohio
Term expires 1975
WALTER ENGLISH, B.S., LL.D., The Walter English Co., Columbus, Ohio

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89 Greenacres Avenue
Scarsdale, New York
J. BOYD DAVIS, B.S., M.S., D.B.A.
56 West Kenworth
Columbus, Ohio
1093 Sunset Drive
Gallipolis, Ohio

Men's Glee Club performs.
THE FACULTY

Position and rank as of 1970-71 academic year.
The year refers to the time of initial service to the University.

Ernest Abele, M.Math.Sc. (University of Latvia), 1952, Chairman, Department of Physics, Professor of Physics

David S. Adams, B.A. (Piedmont), M.A. (Georgia), 1968, Instructor in Sociology

Gaston Anido-Meulener, B.A. (Santa Clara), LL.D., Ph.D. (Havana), 1967, Assistant Professor of Spanish

Lawrence H. Archer, B.S.C.E., B.S.Ed. (Ohio Northern), M.A. (Bowling Green), (Ohio State), P.E. (Ohio), 1945, Dean, College of Engineering, Professor of Civil Engineering

Albert T. Awad, B.S., M.S. (Cairo U.), Ph.D. (Ohio State), 1966, Associate Professor of Pharmacognosy, Chairman, Department of Pharmacognosy

Albert A. Bailis, A.B., LL.B. (Western Reserve), LL.M. (New York), 1957, Professor of Law

J. Wayne Baker, A.B. (Murray, Ky.), M.A.L.S. (Indiana), 1967, Head Librarian with rank of Associate Professor

Thomas W. Banks, B.A. (Memphis State), M.A., Ph.D. (Emory), 1966, Associate Professor of English (Leave of Absence)

Ronald J. Beck, A.B., M.A. (Univ. of Michigan), Ed.D. (Wayne State), 1969, Associate Professor of English

Caroline B. Becker, B.A. (Southwestern), B.D. (Garrett), M.A. (Northwestern), Ph.D. (Drew), 1967, Assistant Professor of Philosophy and Religion

George E. Belch, B.A. (Stephen F. Austin), M.A. (Texas), 1960, Assistant Professor of English

LeRoy D. Beltz, B.Sc.Pharm. (Nebraska), Ph.D. (Connecticut), 1966, Dean, College of Pharmacy, Professor of Pharmacy

Frances Harriet Bennett, B.S.Ed., A.M. (Ohio State), 1952, Associate Professor of English

John A. Berton, A.B., A.M., Ph.D. (Illinois), 1967, Chairman, Department of Mathematics, Professor of Mathematics

Donald J. Bittenger, B.S. (Miami, Ohio), M.S. (Cincinnati), Ph.D. (North Carolina), 1963, Chairman, Department of Chemistry, Professor of Chemistry, Head, Division of Natural Sciences and Mathematics.

Amar N. Bhattacharya, Sc.I. (Calcutta City College), B.V.Sc. (Bengal Vet. College, Calcutta, India), M.S., Ph.D. (Ohio State), 1970, Assistant Professor of Pharmacology

William Bissey, B.S. in Bus., M.B.A. (Indiana), 1968, Instructor in Business Administration

James A. Boersma, A.B. (Hope College), M.A., Ph.D. (Western Mich. U.), 1970, Assistant Professor of Chemistry

Robert Bowden, A.B. (Haverford), B.S. (Ohio Northern), A.M. (Michigan), 1952, Chairman, Department of Biology, Professor of Biology
Marilyn H. Brown, B.A., B.S., M.A. (Ohio State), 1970, Instructor in English, Riverside Methodist Hospital

A. Chester Burns, B.S.M.E. (Ohio Northern), M.A. (Ohio State), 1968, Dean of Students with rank of Associate Professor

Bruce E. Burton, B.S.M.E. (Ohio U.), M.A.E. (Chrysler Inst. of Engr.), M.S. (Ohio State), Ph.D. (Colorado), P.E. (Ohio), 1958, Chairman, Department of Mechanical Engineering, Professor of Mechanical Engineering

Charles L. Busch, B.S.E.E. (Ohio Northern), (Pittsburgh), E.I.T. (Ohio), 1963, Assistant Professor of Computer Science, Director of Computer Center

Daniel R. Butler, Jr., B.S. (Florida), Ph.D. (Ohio State), 1961, Associate Professor of Biology (Leave of Absence, Spring Quarter)

Silas Earl Carmean, Jr., B.S.E.E. (Ohio Northern), M.S., Ph.D. (Ohio State), P.E. (Ohio), 1960, Professor of Electrical Engineering

Richard G. Carpenter, B.A. (Hiram), M.S. (Ohio State), 1968, Instructor in Mathematics


Alfred E. Cohoe, B.A. (Albion), M.A. (Bowling Green), 1962, Associate Professor of Sociology and Psychology

Lester H. Colloms, A.B. (Emory and Henry), B.D. (Emory), Ph.D. (Duke), 1968, Professor of Philosophy*

Philip W. Compton, B.A. (Manchester), M.A. (Bowling Green), 1967, Instructor in Psychology

Charles F. Conklin, B.A. (Waynesburg), M.A., Ph.D. (Pittsburgh), 1966, Chairman, Department of Economics and Business Administration, Professor of Economics, Head, Division of Social Sciences

Oscar W. Cooley, A.B. (Middlebury), M.S. (Butler), 1956, Associate Professor of Economics

Jack E. Corle, B.S. (Miami), M.Ed., D.Ed. (Penn State), 1970, Director of Testing and Counseling with rank of Associate Professor

Harold Cotsamire, B.B.A. (Ohio State), 1957, Controller with rank of Assistant Professor

William Robert Crider, B.S. in Soc. Adm. (Ohio State), M.Ed., (Bowling Green), 1961, Associate Professor of Education


Earl S. Daniel, B.S. (Florence State), M.A. (Peabody), 1969, Director of Admissions with rank of Associate Professor

Oscar G. Darlington, A.B., A.M. (Penn State), Ph.D. (Pennsylvania), 1955, Professor of History

Robert Ralph Davis, Jr., B.A., M.A. (Kent State), Ph.D. (Michigan State), 1966, Chairman, Department of History and Political Science, Associate Professor of History

John E. Dawson, A.B., M.S., Ph.D. (Cincinnati), 1964, Associate Professor of Biology

James H. DeVore, B.F.A., M.F.A. (Ohio U.), 1967, Associate Professor of Art

*Deceased November 13, 1970
CLYDE H. DORNBUSCH, B.A. (DePauw), M.A., Ph.D. (Duke), 1962, Chairman, Department of English, Professor of English, Head, Division of Humanities

LON B. DOUBNA, B.A. (Wisconsin), M.Mus. (Indiana), 1965, Assistant Professor of Music

ALAN H. DRAKE, A.B. (Miami, Fla.), M.Mus.Ed., Ph.D. (Florida State), 1969, Chairman, Department of Music and Division of Fine Arts, Professor of Music

WILLIAM H. DUDROW, B.S., B.S.Ed. (Bowling Green), M.S. (Ohio State), 1969, Instructor in Biology

EUGENE K. EAKIN, A.B. (Findlay), S.T.B. (Western Theol. Sem.), M.Ed., Ph.D. (Pittsburgh), LL.D. (Findlay), 1958, Academic Vice President with rank of Professor*

ALBERT I. EDLIN, B.S. in Pharm. (Cincinnati), M.S. (Ohio State), Ph.D. (Pittsburgh), 1969, Chairman, Department of Pharmacology, Associate Professor of Pharmacology

MARIYLNE S. ELLERY, B.S.Ed. (Ohio Wesleyan), M.E. (Toledo), 1963, Associate Professor of Elementary Education

MARVIN ENGLISH, B.S. (Ohio Northern), A.M. (Columbia), 1949, Chairman, Department of Health and Physical Education, Professor of Physical Education

RONALD L. EVANS, B.S.Ed. (Ohio Northern), M.A. (Bowling Green), 1966, Assistant Professor of Mathematics

FRANKLIN D. FARRINGTON, B.S.M.E. (Ohio Northern), M.S. (Arizona), P.E. (Ohio), 1961, Assistant Professor of Mechanical Engineering (Leave of Absence)

THOMAS G. FIELD, JR., A.B., J.D. (West Virginia U.), LL.M. (New York U. School of Law), 1970, Assistant Professor of Law

BRYANT W. FITZGERALD, B.S.Pharm. (Columbia), M.S., Ph.D. (Connecticut), 1969, Associate Professor of Pharmacy

WILLIAM P. FLEMING, B.B.A., M.A. (Sam Houston State), 1966, Instructor in English

DONALD E. FORSYTHE, B.M., B.M.Ed. (Oberlin), M.Ed. (Kent State), 1970, Assistant Professor of Music

PAUL S. FU, LL.B. (Soochow), M.C.L. (Illinois), M.S.L.S. (Villanova), 1969, Head Librarian, College of Law, with rank of Assistant Professor

FRANCIS A. GANGEMI, B.S. (Notre Dame), M.S., Ph.D. (Catholic U.), 1967, Associate Professor of Physics

DAVIDA P. GATES, A.B. (Catawba), M.A. (North Carolina), M.A. (Colorado), 1966, Assistant Professor of Sociology

WARREN E. GATES, A.B., M.A. (Miami, Fla), Ph.D. (Colorado), 1966, Professor of French, Chairman, Department of Foreign Languages

LOUIS S. GIBB, B.S., M.A. (Nebraska), 1964, Vice President for Development and Public Relations, with the rank of Professor

JOANNA N. GIDWANI, B.A. (Oberlin), M.A. (Wellesley), Ph.D. (Ohio State), 1964, Assistant Professor of Biology, Riverside Methodist Hospital

*Retires August 31, 1971
JOHN E. GLENN, B.A. (Wooster), Ph.D. (Pittsburgh), 1970, Assistant Professor of Physics
WALTER E. GODWIN, B.S. (Arkansas Tech.), Ph.D. (Oklahoma State), 1968, Assistant Professor of Chemistry
ROGER H. GOLDBERG, A.B. (Cornell), M.A. (Indiana), 1969, Instructor in Business Administration
THOMAS L. GORDON, B.F.A., M.F.A. (Ohio U.), 1966, Chairman, Department of Art, Associate Professor of Art
RONALD E. GUENTZLER, B.S.E.E., M.S.E.E. (Case Inst.), 1967, Assistant Professor of Electrical Engineering
PAUL D. GUILFORD, B.A., M.E. (Bowling Green), 1968, Instructor in Industrial Arts
DANIEL S. GUY, A.B. (Ohio Wesleyan), J.D. (Ohio Northern), LL.M., S.J.D. (Michigan), 1959, Professor of Law, Assistant Dean, College of Law
HOWARD L. HAIGHT, B.S., M.S. (Nebraska), Ph.D. (Iowa), 1968, Associate Professor of Chemistry
RAYMOND L. HAMILTON, B.S. (Sacramento State), M.Acc. (Bowling Green), 1970, Instructor in Accounting
MARY KATHARINE HAMMOND, B.A. (Swarthmore), M.A. (Delaware), 1963, Assistant Professor of History and Political Science
EUGENE N. HANSON, A.B. (Luther), A.M., J.D. (Wisconsin), LL.M. (Michigan), 1947, Dean, College of Law, Professor of Law
KATIE LOU HANSON, A.B., A.M. (South Carolina), Ed.D. (Columbia), 1948, Professor of Education
GEORGE E. HASSELL, B.A. (Col. of the Ozarks), M.B.A. (Ohio State), 1966, Vice President for Financial Affairs with the rank of Associate Professor
A. LOUISE HASTINGS, A.B., M.A., Ph.D. (Indiana), 1957, Professor of English
BYRON L. HAWBECKER, B.A. (Manchester), M.S. (Arizona), Ph.D. (Kent State), 1963, Associate Professor of Chemistry
GEORGE A. HENLEIN, A.B. (St. Mary's Col., Minnesota), M.A. (DePaul U.), 1970, Director of Institutional Research with rank of Instructor
ROBERT H. HILLIARD, A.B., B.S.Ed., A.M., Ph.D. (Ohio State), 1946, Professor of History
HAROLD H. HINDERLITER, A.B. (Houghton), S.T.B. (Wesley Theological Sem.), Ph.D. (Vanderbilt), 1960, Professor of Philosophy and Religion
FLOYD W. HOCH, B.S.Ed. (Ohio Northern), M.A. (Bowling Green), 1961, Associate Professor of Biology
IVAN C. HodGES, A.B. (Taylor), S.T.B. (Boston), A.M. (Earlham), 1955, Assistant Professor of Philosophy and Religion
THOMAS G. HOFFMAN, A.B. (Elizabethtown), S.T.B., S.T.M., Ph.D. (Temple), 1969, Campus Minister with rank of Associate Professor
HENRY HORLDT, (Technical School, Karlsruhe, Germany), B.S.M.E. (Michigan Technological University), P.E. (Michigan), 1958, Professor of Mechanical Engineering
ADA L. HUNT, B.A. (Ohio Wesleyan), M.A. (Ohio State), 1964, Assistant Professor of English
NORMAN J. HUNT, B.S. (Connecticut), M.A., Ph.D., (Indiana State), 1970, Chairman, Department of Psychology and Sociology, Associate Professor of Psychology
Hazel C. Hurlbut, A.B. (Ohio Northern), M.N. (Western Reserve), M.A. (Ohio State), Director of Nursing Education, Riverside White Cross School of Nursing, Riverside Methodist Hospital, Columbus, Ohio
Florine B. Jacobs, Ph.C. (Ohio Northern), 1966, Dean of Women with rank of Assistant Professor
Bruce E. Johansen, B.E.S. (Cleveland State), M.S. (Pittsburgh), 1967, Assistant Professor of Electrical Engineering
Robert E. Johnson, B.S.Ed. (Wittenberg U.), M.Ed. (Pittsburgh), 1970, Assistant Professor of Health and Physical Education
Richard D. Kain, B.S. (Ohio Northern), M.A. (Ohio State), 1953, Chairman, Department of Industrial Arts, Professor of Industrial Arts
Terry D. Keiser, B.S.Ed. (Ohio Northern), M.A. (Bowling Green), 1967, Assistant Professor of Biology
Robert H. Keyser, B.S.C.E., M.S. (Michigan State College), Ph.D. (U. of Wisconsin), P.E. (Ohio), 1966, Professor of Civil Engineering
James L. Klingenberg, B.S.E.E. (Ohio Northern), M.S. (Ohio State), P.E. (Ohio), 1949, Chairman, Department of Electrical Engineering, Professor of Electrical Engineering
Enno Koenh, B.C.E. (City College, N.Y.), M.S. (Columbia), M.C.E. (New York U.), P.E. (New York), 1967, Associate Professor of Civil Engineering
Frank Korn, B.A. (Indiana U.), M.D. (Indiana U. Med. Center), 1970, Director of Student Health Services with rank of Associate Professor
Frederick I. Kuhns, B.A. (Ohio State), B.D. (Union), A.M. (Chicago), Ph.D. (Chicago), 1960, Librarian with rank of Professor
Kathryn Z. Kuhns, B.A. (State Teachers College, N.D.), M.Ed. (Montana), M.A. (Bowling Green), 1960, Associate Professor of Mathematics
Ronald V. Ladwig, B.A. (Denver), M.A. (San Fernando Valley State), 1969, Chairman, Department of Speech and Theatre, Assistant Professor of Theatre
Charles C. Laing, Ph.B., Ph.D. (Chicago), 1966, Associate Professor of Biology
Margaret E. Lautenbach, B.M. (Capital), M.A. (Ohio State), 1967, Instructor in Music
Gayle E. Lauth, B.S.Ed. (Ohio U.), M.S. (Indiana), 1967, Assistant Professor of Health and Physical Education
Charles K. Lavan, Jr., B.S.M.E., M.S.M.E. (Case Institute of Tech.), 1969, Instructor in Mechanical Engineering
Theodora A. Layne, B.A. (San Jose State), 1968, Assistant Instructor in Health and Physical Education, Riverside Methodist Hospital


Earl E. Lhamon, B.A., B.S.E.E. (Ohio Northern), M.A. (Bowling Green), 1959, Associate Professor of Mathematics

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